HARRISBURG SCHOOL DISTRICT
SEISMIC UPGRADE PROJECT
CONSTRUCTION MANAGER/GENERAL CONTRACT
REQUEST FOR PROPOSAL (RFP)
ADDENDUM 1

This addendum forms a part of the Request for Proposal and modifies the original Documents dated **September 16, 2024** as noted below. Acknowledge receipt of this addendum in the space provided on Attachment B – Certifications / Residency Form. Failure to do so may subject the Proposer to disqualification.

ADD ATTACHMENT G- HARRISBURG ELEMENTARY SCHOOL SEISMIC EVALUATION REPORT

Add Attachment G Harrisburg Elementary School Seismic Evaluation Report by ZCS dated December 2023 **in its entirety.**

PRE-PROPOSAL MEETING SIGN IN SHEET

Please review the attached sign in sheet; if corrections are required please send them to courtney.fastenau@hmkco.org

END OF ADDENDUM 1

ADDENDUM 1

ATTACHMENT G

HARRISBURG ELEMENTARY SCHOOL SEISMIC EVALUATION REPORT

See Harrisburg Elementary School Seismic Evaluation Report by ZCS dated December 2023 following this cover page.

Seismic Evaluation Report For:

HARRISBURG ELEMENTARY SCHOOL

642 Smith St, Harrisburg, OR 97446
Harrisburg School District

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

Prepared By:
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ZCS ENGINEERING ARCHITECTURE

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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	Original Classroom	Yes	1954	PC1, W2	Yes	No
B	Classroom Addition	No	1960			
C	Kindergarten	No	Est. 1990			
D	Classroom Addition	No	2019			

*** Entries required **ONLY** for building parts included in proposed seismic retrofit

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	$2,467,555		
Retrofit Square Feet	24,100		
Retrofit Cost per Square Foot	$102.39		

Is the campus within a tsunami, FEMA flood zone, landslide/slope instability, liquefaction potential or other high hazard area? **If so, provide documentation.**	Yes, per DOGAMI but ruled out per attached Geotech. report

Engineering Report Checklist		
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1.0 Project Introduction

Harrisburg School District is located in Harrisburg, Oregon in Linn County. The District operates 3 schools within the community including the property of interest, Harrisburg Elementary School. The District has retained ZCS Engineering and Architecture (ZCS) to perform a seismic evaluation of Harrisburg Elementary School 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	642 Smith St., Harrisburg OR
Evaluation Standard	ASCE 41-17 (Tier 1 Analysis)
Building's Risk Category	IV
Target Building Performance Level	Immediate Occupancy (BSE-1E) | Life Safety (BSE-2E)
Target Non-Structural Performance Level	Position Retention (BSE-1E) | Hazards Reduced (BSE-2E)
ASCE 41 Building Type	PC1, W2
FEMA P-154 Seismicity Region (Table 2-2)	High
ASCE 41-17 Level of Seismicity (Table 2-4)	High
Cost Estimate	$2,467,555
Cost/Square Foot	$102.39

2.0 Building Description

After reviewing the subject facilities and the available existing drawings we have determined the lateral system present is defined as PC1. Per ASCE 41-17 these structure types is defined as:

Precast or Tilt-Up Concrete Shear Walls (with Flexible Diaphragms) PC1 – These buildings have precast concrete perimeter wall panels and often, interior walls, that are typically cast on site and tilted into place. The panels are interconnected by weldments, cast-in- place concrete pilasters, or collector elements. Floor and roof framing consists of wood joists, glulam beams, steel beams, or open web joists. Framing is supported on interior steel or wood columns and perimeter concrete bearing walls. The floors and roof consist of wood sheathing or untopped metal deck. Seismic forces are resisted by the precast concrete perimeter wall panels. Wall panels are permitted to be solid or have large window and door openings that cause the panels to behave more as frames than as shear walls. In older construction, wood framing is attached to the walls with wood ledgers. The roof framing is permitted to have tension-capable connections between elements. The foundation system is permitted to consist of a variety of elements.

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.

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.

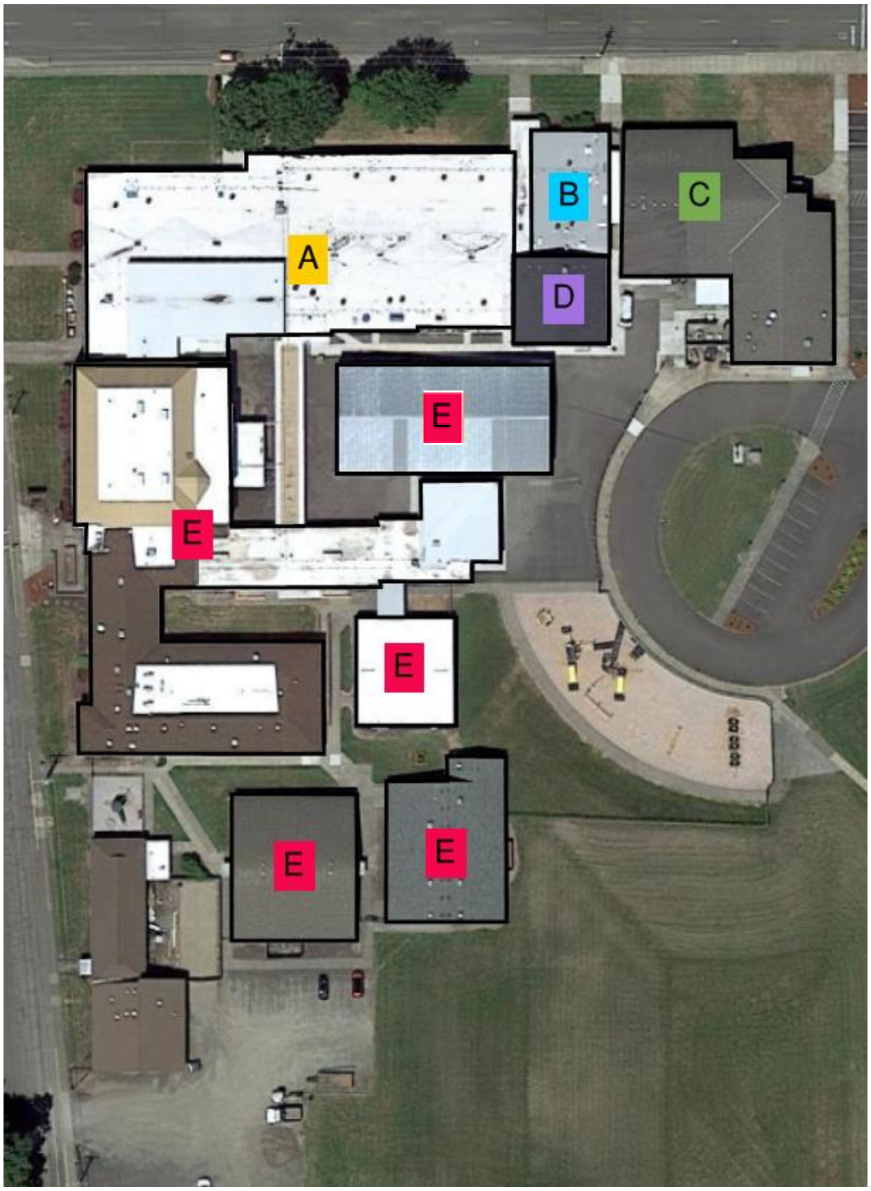

Figure 1- Harrisburg Elementary School Key Plan

BUILDING PARTS	
A	Construction Year: 1954 Building Name: Original Classroom ASCE 41-17 Building Type: PC1, W2 In Scope?: Yes
B	Construction Year: 1960 Building Name: Classroom Addition ASCE 41-17 Building Type: PC1 In Scope?: No
C	Construction Year: 1990 est. Building Name: Cafeteria ASCE 41-17 Building Type: RM1 In Scope?: No
D	Construction Year: 2019 Building Name: Classroom Addition ASCE 41-17 Building Type: RM1 In Scope? No
E	Construction Year: 1940 est. Building Name: Middle School ASCE 41-17 Building Type: In Scope? No

Building Part A Construction:

- ASCE 41-17 Building Type(s):
    - PC1, W2
- Roof Structure:
    - 1-inch diagonal decking supported by dimensional lumber roof joists over classrooms
    - 1-inch diagonal decking supported by dimensional lumber roof joists supported by glulam beams over multipurpose room (MPR)
- Walls:
    - 6-inch tilt-up reinforced concrete walls in N/S direction
    - Multipurpose room walls are dimensional wood-framed supported by lower precast walls. Hinge present
- Floor Structure and Foundation:
    - Concrete slab-on-grade with reinforced concrete footings.
- Notable Structural Features/Concerns:
    - Window walls along E/W walls
    - Unsupported hinge in perimeter walls of MPR

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 shelter.

In accordance with the table below, area A of this building is categorized as a risk category IV structure and was 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.

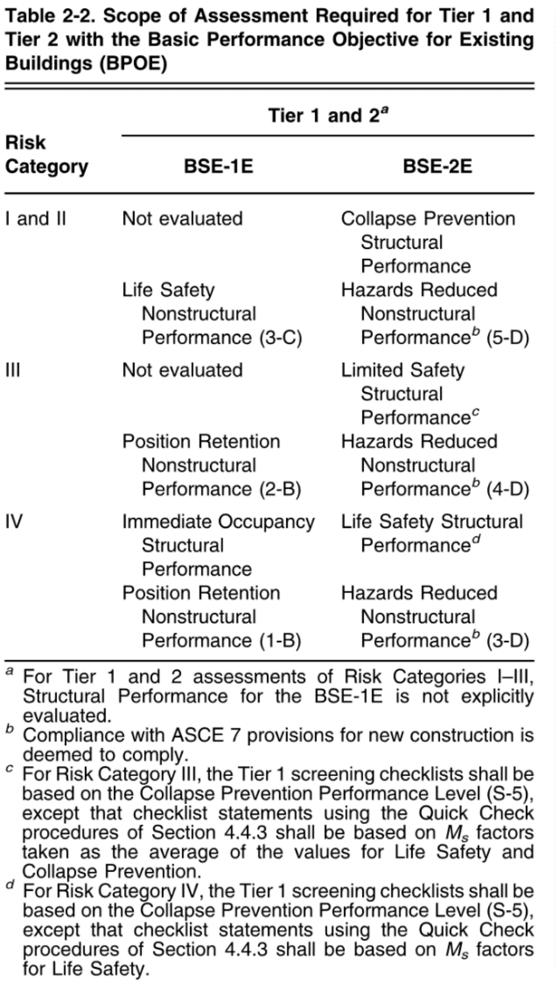

Table 2-2. Scope of Assessment Required for Tier 1 and Tier 2 with the Basic Performance Objective for Existing Buildings (BPOE)

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)	High
ASCE 41-17 Level of Seismicity (Table 2-4)	High
BSE-1E:	
S_{xs}	0.22
S_{x1}	0.146
Soil Condition Amplification Factors (F_V, F_A)	$F_v = 2.4$ | $F_a = 1.6$
BSE-2E:	
S_{xs}	0.727
S_{x1}	0.586
Soil Condition Amplification Factors (f_V, f_A)	$F_v = 2.02$ | $F_a = 1.378$

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 along with a geotechnical report. 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 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 Harrisburg Middle School Seismic Retrofit. Per the geotechnical report, attached in Appendix D, liquefaction is likely a Low risk for the site. Considering this information, it is our opinion that mitigation is not required to address the risk and is not included in the retrofit scheme.

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. Strong-back support b. Install in-plane shear attachments c. Install drags at E/W diaphragm chords	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 joint to separate buildings outside of scope. Provide all new gravity framing and lateral resisting elements as necessary a. Provide double wall to create a separate gravity load bearing system and additional vertical seismic load resisting element b. Provide new ledgers that can accommodate the required differential out-of-plane movement while transferring gravity and in-plane lateral forces as needed	S2
	PC1: IO CHECKLIST		
REDUNDANCY	The number of lines of shear walls in each principal direction is less than 2.	Provide additional vertical lateral resisting elements. Install new CMU walls along exterior wall line	S3

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.	S4
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 in-plane hardware for transfer of seismic forces from diaphragm to shear walls.	S5
CROSS TIES FOR FLEXIBLE DIAPHRAGMS	There are not continuous cross ties between diaphragm chords.	Provide new continuous cross ties between diaphragm chords.	S6
PLAN IRREGULARITIES	There is not tensile capacity to develop the strength of the diaphragm at reentrant corners or other locations of plan irregularities.	Provide new drag elements.	S7
DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS	Not all diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 30 ft or aspect ratios less than or equal to 3-to-1.	Install new blocked plywood diaphragm.	S8
	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 shear walls to ensure adequate shear capacity.	S9
DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS	Not all diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 30 ft and have aspect ratios less than or equal to 3-to-1.	Install new blocked plywood diaphragm.	S10
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.	S11

	NONSTRUCTURAL CHECKLIST		
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.	N1
LENS COVERS	Lens covers on light fixtures are not attached with safety devices.	Install safety devices for light fixture lens covers.	N2
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 to the structure.	N3
SUSPENDED CONTENTS	Items suspended without lateral bracing are not free to swing from or move with the structure from which they are suspended without damaging themselves or adjoining components.	Remove suspended items or ensure that items are free to swing from structure without damaging themselves or adjoining components.	N4
FALL-PRONE EQUIPMENT	Equipment weighing more than 20 lb whose center of mass is more than 4 ft above the adjacent floor level, and which is not in-line equipment, is not braced.	Brace and anchor equipment weighing more than 20 lb, whose center of mass is more than 4 ft above the adjacent floor level.	N5
TALL NARROW EQUIPMENT	Equipment more than 6ft high with a height-to-depth or height-to-width ratio greater than 3-to-1 is not anchored to the floor slab or adjacent structural walls.	Anchor equipment more than 6ft high with a height-to-depth or height-to-width ratio greater than 3-to-1 to the floor slab or adjacent structural walls.	N6
SUSPENDED EQUIPMENT	Equipment suspended without lateral bracing is not free to swing from or move with the structure from which it is suspended without damaging itself or adjoining components.	Remove suspended equipment or ensure that equipment is free to swing from structure without damaging itself or adjoining components.	N7
FLEXIBLE COUPLINGS	Fluid and gas piping does not have flexible couplings.	Install flexible couplings for fluid and gas piping.	N8
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.	N9

In addition to the structural and nonstructural deficiencies noted above, the gravity load resisting system was reviewed to identify obvious insufficient gravity components. Insufficient gravity elements can cause failure during seismic events. These gravity deficiencies are based on visual observations of the existing structural elements. No formal structural analysis was performed during this evaluation of the gravity resisting element.

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

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.

DIRECT COST	
Construction	$1,831,300
Engineering	$286,400
Construction Management	$60,500
Relocation	$26,300
Construction Contingency	$263,055
TOTALS AND SUMMARY	
Total Cost Estimate	**$2,467,555**
Match Funds	**$0**
Total Amount Requested from SRGP	**$2,467,555**
Total Area	**24,100**
Cost/Square Foot	**$102.39**

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: North Elevation

Figure 2: North Elevation

Figure 3: East Elevation

Figure 4: South Elevation

Figure 5: South Elevation

Figure 6: West Elevation

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	-Hinge at MPR load bearing walls, see section 2 on sheet S1.2 -Exterior walls in E/W direction lack chord elements
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	The clear distance between the building and areas A & B is not adequate
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	

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

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	DOGAMI states High, Geotech report states none/low.
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	

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

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	

Project Name Harrisburg SD TAP
Project Number P-2763-22

17.14IO Structural Checklist for Building Types PC1: Precast or Tilt-Up Concrete Shear Walls with Flexible Diaphragms and PC1a: Precast or Tilt-Up Concrete Shear Walls with Stiff Diaphragms

Table 17-29. Immediate Occupancy Structural Checklist for Building Types PC1 and PC1a

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	Shear walls in the East to West direction is less than two.
C ☒	NC ☐	N/A ☐	U ☐	WALL SHEAR STRESS CHECK: The shear stress in the precast panels, 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.3.2.3.1	
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.3.2.3.2	
Diaphragms (Stiff or Flexible)							
C ☐	NC ☐	N/A ☒	U ☐	TOPPING SLAB: Precast concrete diaphragm elements are interconnected by a continuous reinforced concrete topping slab with a minimum thickness of 2 in. (51 mm).	5.6.4	A.4.5.1	
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	-Walls not properly attached to diaphragms including interior bearing walls
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.	5.7.1.4	A.5.1.2	

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

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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	Inadequate diaphragm anchorage to transfer shear.
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, and the dowels are able to develop the least of the shear strength of the walls, frames, or slabs.	5.7.2	A.5.2.3	
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.		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 ☐	DEFLECTION COMPATIBILITY FOR RIGID DIAPHRAGMS: Secondary components have the shear capacity to develop the flexural strength of the components.	5.5.2.5.2	A.3.1.6.2	
C ☒ NC ☐ N/A ☐ U ☐	WALL OPENINGS: The total width of openings along any perimeter wall line constitutes less than 50% of the length of any perimeter wall when the wall piers have aspect ratios of less than 2-to-1.	5.5.3.3.1	A.3.2.3.3	
C ☒ NC ☐ N/A ☐ U ☐	PANEL-TO-PANEL CONNECTIONS: Adjacent wall panels are interconnected to transfer overturning forces between panels by methods other than welded steel inserts.	5.5.3.3.3	A.3.2.3.4	

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

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.3.2.3.5	
Diaphragms							
C ☐	**NC** ☒	**N/A** ☐	**U** ☐	CROSS TIES FOR FLEXIBLE DIAPHRAGMS: There are continuous cross ties between diaphragm chords.	5.6.1.2	A.4.1.2	Continuous cross ties do not exist.
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	No tensile capacity at re-entrant corners.
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	
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	
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	More than 30 foot span without blocking
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** ☐	MINIMUM NUMBER OF WALL ANCHORS PER PANEL: There are at least two anchors from each precast wall panel into the diaphragm elements.	5.7.1.4	A.5.1.3	
C ☒	**NC** ☐	**N/A** ☐	**U** ☐	PRECAST WALL PANELS: Precast wall panels are connected to the foundation, and the connections are able to develop the strength of the walls.	5.7.3.4	A.5.3.6	

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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	
C ☒	**NC** ☐	**N/A** ☐	**U** ☐	GIRDERS: Girders supported by walls or pilasters have at least two ties securing the anchor bolts unless provided with independent stiff wall anchors with strength to resist the connection force calculated in the Quick Check procedure of Section 4.4.3.7.	5.7.4.2	A.5.4.2	

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

Project Name ____________
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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	Shear stress exceeds the allowable at upper MPR walls
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	

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

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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	Shear wall aspect ratio will not require holdowns
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	

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 ☐	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	
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	
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	
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	Diagonally sheathed diaphragm spans greater than the allowable amount.
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	Sill bolts are spaced greater than 4 ft.

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

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Project Name Harrisburg SD TAP
Project Number P-2763-22

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	
Hazardous Materials							
C ☐	NC ☐	N/A ☒	U ☐	**HR—LMH; LS—LMH; PR—LMH**. HAZARDOUS MATERIAL EQUIPMENT: Equipment mounted on vibration isolators and containing hazardous material is equipped with restraints or snubbers.	13.7.1	A.7.12.2	
C ☐	NC ☐	N/A ☒	U ☐	**HR—LMH; LS—LMH; PR—LMH**. HAZARDOUS MATERIAL STORAGE: Breakable containers that hold hazardous material, including gas cylinders, are restrained by latched doors, shelf lips, wires, or other methods.	13.8.3	A.7.15.1	
C ☐	NC ☐	N/A ☒	U ☐	**HR—MH; LS—MH; PR—MH**. HAZARDOUS MATERIAL DISTRIBUTION: Piping or ductwork conveying hazardous materials is braced or otherwise protected from damage that would allow hazardous material release.	13.7.3 13.7.5	A.7.13.4	
C ☐	NC ☐	N/A ☒	U ☐	**HR—MH; LS—MH; PR—MH**. SHUTOFF VALVES: Piping containing hazardous material, including natural gas, has shutoff valves or other devices to limit spills or leaks.	13.7.3 13.7.5	A.7.13.3	
C ☐	NC ☒	N/A ☐	U ☐	**HR—LMH; LS—LMH; PR—LMH**. FLEXIBLE COUPLINGS: Hazardous material ductwork and piping, including natural gas piping, have flexible couplings.	13.7.3 13.7.5	A.7.15.4	Flexible couplings do not exist.

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

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

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

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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	Lens covers are not attached with safety devices.
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	

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

Project Name Harrisburg SD TAP
Project Number P-2763-22

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	
☐	☐	☒	☐	**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	
☐	☐	☒	☐	**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	
☐	☐	☒	☐	**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	
☐	☐	☒	☐	**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							
☐	☐	☒	☐	**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	
☐	☒	☐	☐	**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 at exits are not braced.
☐	☐	☒	☐	**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	
☐	☐	☒	☐	**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	

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

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

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	Suspended contents are not braced.
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	Fall prone contents are not braced.
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	Tall narrow contents are not braced.
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	Suspended equipment needs to be braced.
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	

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.** 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	Flexible couplings do not exist.
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	Piping is not braced.
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	
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

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

HARRISBURG ELEMENTARY SCHOOL SEISMIC RETROFIT

PRELIMINARY DESIGN

HARRISBURG ELEMENTARY SCHOOL
642 SMITH ST,
HARRISBURG, OR 97446

ZCS
ENGINEERING
ARCHITECTURE
524 Main Street, Suite 2, Oregon City, Oregon 97045 | 503-659-2205

Harrisburg Elementary School
642 Smith St,
Harrisburg, OR 97446

HARRISBURG ELEMENTARY SCHOOL SEISMIC RETROFIT

REPAIR KEYNOTES

STRUCTURAL REPAIRS:

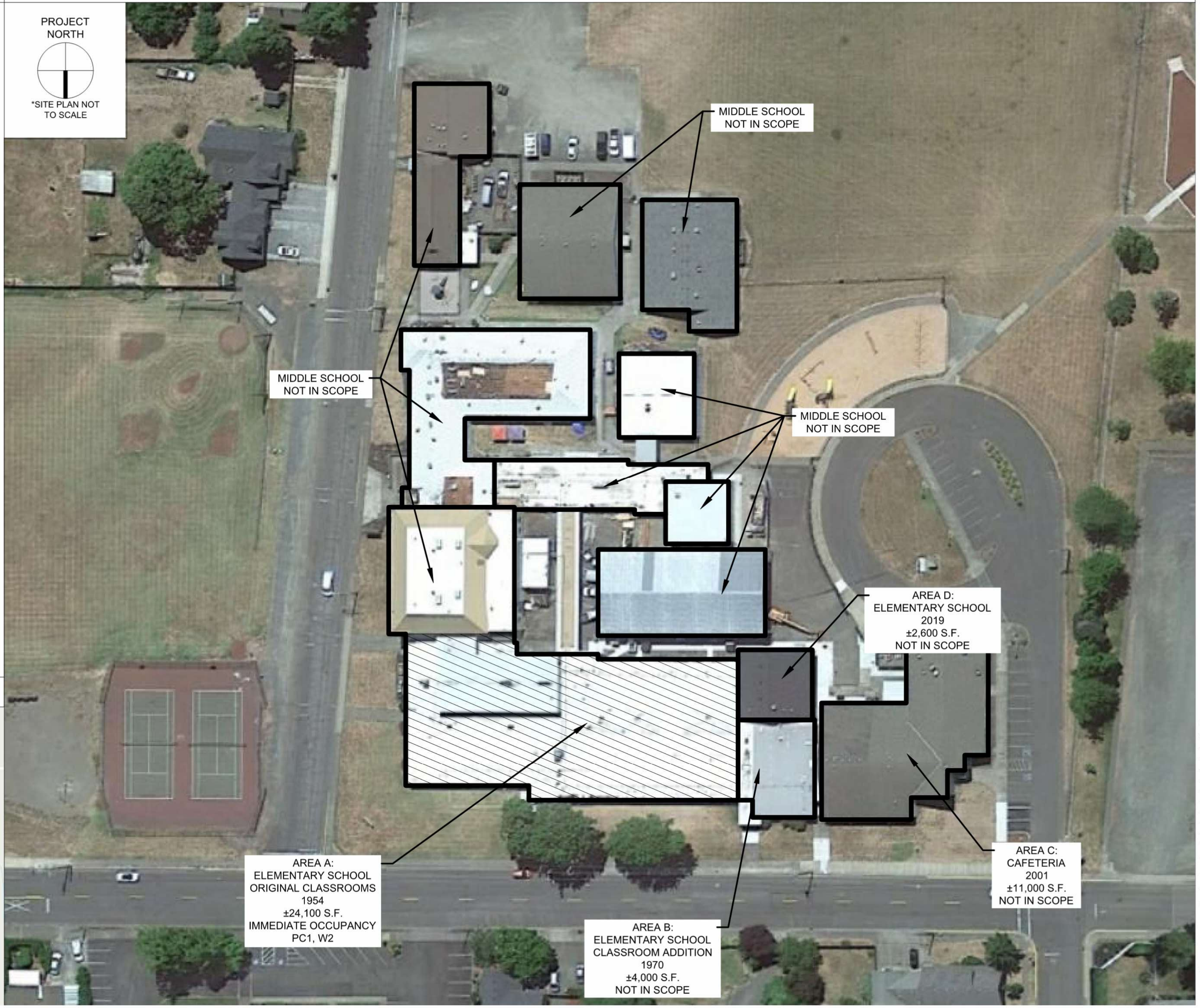
S1. PROVIDE A COMPLETE, WELL-DEFINED LOAD PATH BY INSTALLING NEW ELEMENTS AND CONNECTIONS AS NEEDED TO TRANSFER INERTIAL FORCES FROM ALL ELEMENTS OF THE BUILDING TO THE FOUNDATION.
  A. STEEL STRONG-BACK COLUMNS
  B. INSTALL IN-PLANE SHEAR ATTACHMENTS
  C. INSTALL DRAGS AT E/W DIAPHRAGM CHORDS
S2. PROVIDE SEISMIC JOINT TO SEPARATE BUILDINGS OUTSIDE OF SCOPE. PROVIDE ALL NEW GRAVITY FRAMING AND LATERAL RESISTING ELEMENTS AS NECESSARY.
  A. PROVIDE DOUBLE WALL TO CREATE A SEPARATE GRAVITY LOAD BEARING SYSTEM AND ADDITIONAL VERTICAL SEISMIC LOAD RESISTING ELEMENT.
  B. PROVIDE NEW LEDGERS THAT CAN ACCOMMODATE THE REQUIRED DIFFERENTIAL OUT-OF-PLANE MOVEMENT WHILE TRANSFERRING GRAVITY AND IN-PLANE LATERAL FORCES AS NEEDED.
S3. PROVIDE ADDITIONAL VERTICAL LATERAL RESISTING ELEMENTS.
  - NEW CMU SHEAR WALLS ALONG EXTERIOR WALL LINE.
S4. S5. INSTALL NEW OUT-OF-PLANE ANCHORAGE.
S5. INSTALL NEW IN-PLANE HARDWARE FOR TRANSFER OF SEISMIC FORCES FROM DIAPHRAGM TO SHEAR WALLS.
S6. PROVIDE NEW CONTINUOUS CROSS TIES BETWEEN DIAPHRAGM CHORDS.
S7. PROVIDE NEW DRAG ELEMENTS.
S8. INSTALL NEW BLOCKED PLYWOOD DIAPHRAGM.
S9. INSTALL NEW PLYWOOD SHEAR WALLS TO ENSURE ADEQUATE SHEAR WALL CAPACITY.
S10. INSTALL NEW BLOCKED PLYWOOD DIAPHRAGM.
S11. PROVIDE NEW ANCHOR BOLTS FROM WOOD SILLS TO THE FOUNDATION.

NON-STRUCTURAL REPAIRS:

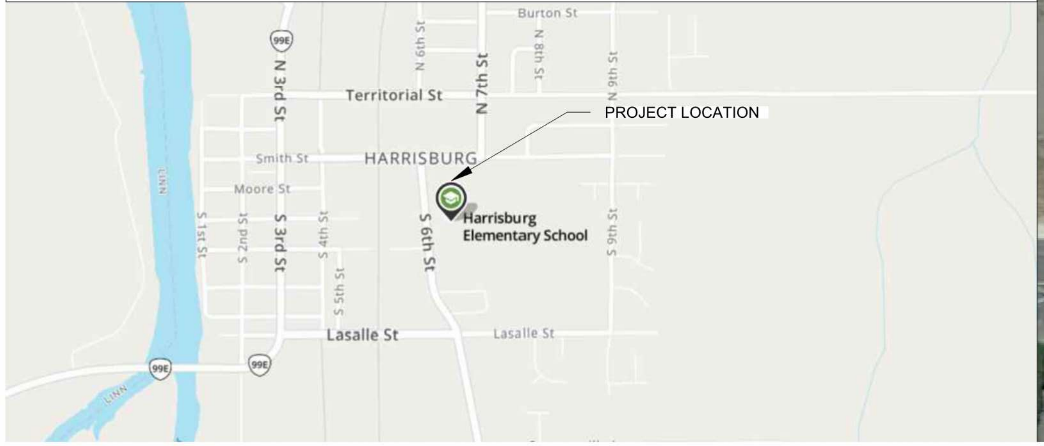
N1. INSTALL FLEXIBLE COUPLINGS FOR DUCTWORK AND PIPING CONTAINING HAZARDOUS MATERIAL, INCLUDING NATURAL GAS PIPING.
N2. INSTALL SAFETY DEVICES FOR LIGHT FIXTURE LENS COVERS.
N3. SEISMICALLY ANCHOR EXISTING CANOPIES TO THE STRUCTURE.
N4. REMOVE SUSPENDED ITEMS OR ENSURE THAT ITEMS ARE FREE TO SWING FROM STRUCTURE WITHOUT DAMAGING THEMSELVES OR ADJOINING COMPONENTS.
N5. BRACE AND ANCHOR EQUIPMENT WEIGHING MORE THAN 20 LB, WHOSE CENTER OF MASS IS MORE THAN 4 FT ABOVE THE ADJACENT FLOOR LEVEL.
N6. ANCHOR EQUIPMENT MORE THAN 6 FT HIGH WITH A HEIGHT-TO-DEPTH RATIO GREATER THAN 3-TO-1 TO THE FLOOR SLAB OR ADJACENT WALL STRUCTURE.
N7. REMOVE SUSPENDED EQUIPMENT OR ENSURE EQUIPMENT IS FREE TO SWING FROM STRUCTURE WITHOUT DAMAGING ITSELF OR ADJOINING COMPONENTS.
N8. INSTALL FLEXIBLE COUPLINGS FOR FLUID AND GAS PIPING.
N9. ANCHOR AND BRACE FLUID AND GAS PIPING TO THE STRUCTURE.

SHEET INDEX

BUILDING KEY PLAN



VICINITY MAP



ONE INCH EQUALS FULL SCALE

-PRELIMINARY-
NOT FOR CONSTRUCTION
EXPIRES: 06-30-22

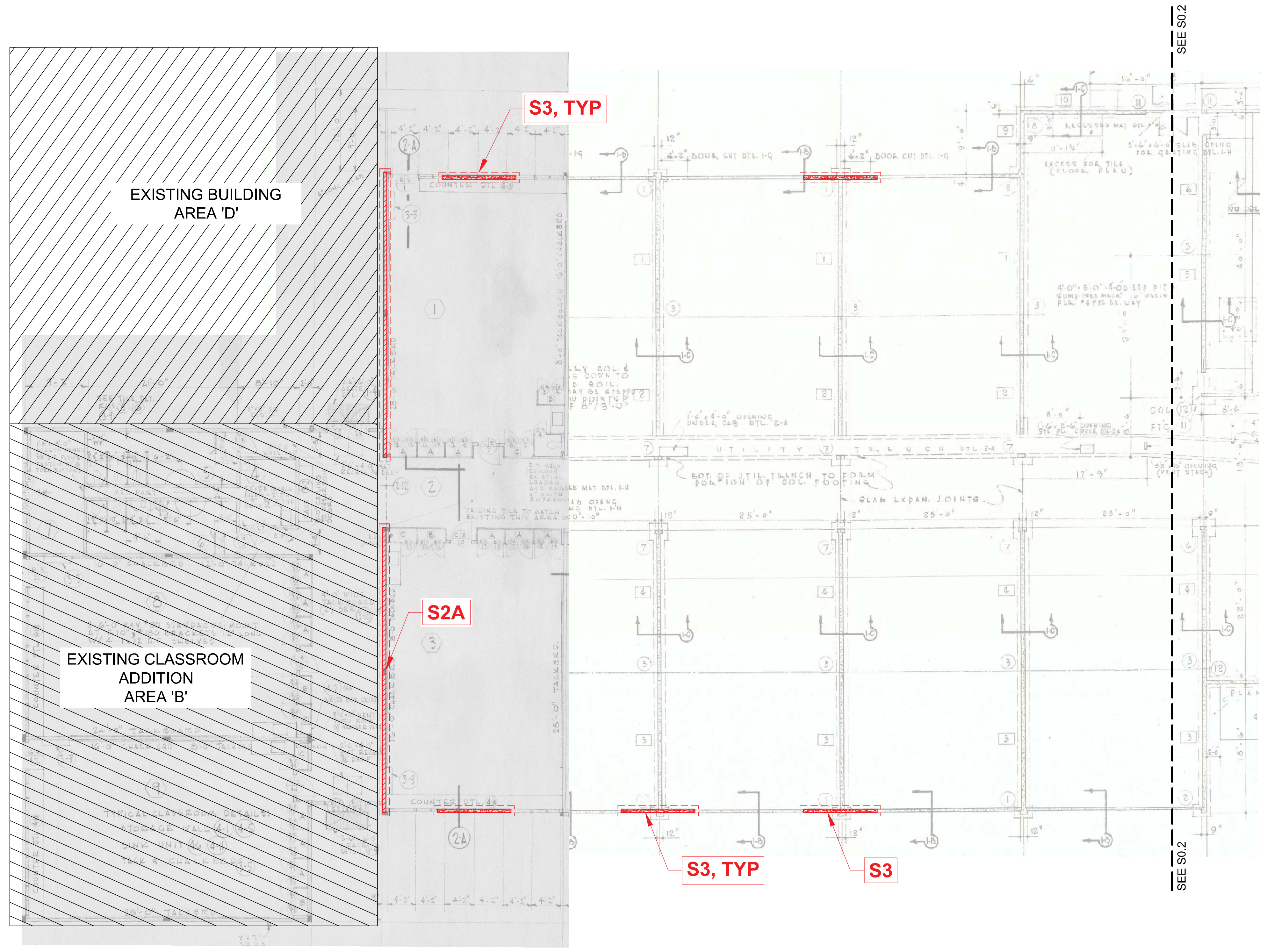
△ REVISION ID:	DATE:

PROJECT NO:	P-2764-22
DRAWN:	LRS
CHECKED:	MRS
DATE:	DEC. 2023

COVER SHEET

G0.0

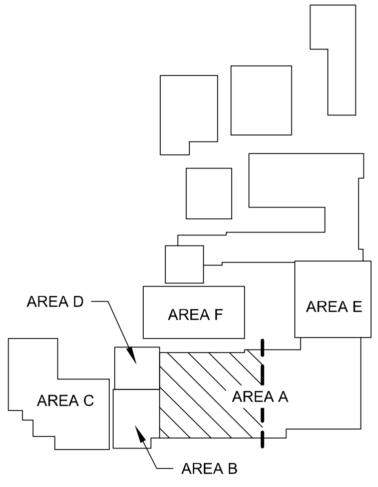
PRELIMINARY DESIGN



AREA A FOUNDATION PLAN

1 / S0.1

1/16"=1'-0"



CAMPUS KEY

0 / S0.1

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Harrisburg, OR 97446

HARRISBURG ELEMENTARY SCHOOL SEISMIC RETROFIT

PRELIMINARY-NOT FOR CONSTRUCTION

EXPIRES: 06-30-22

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PROJECT NO: P-2764-22
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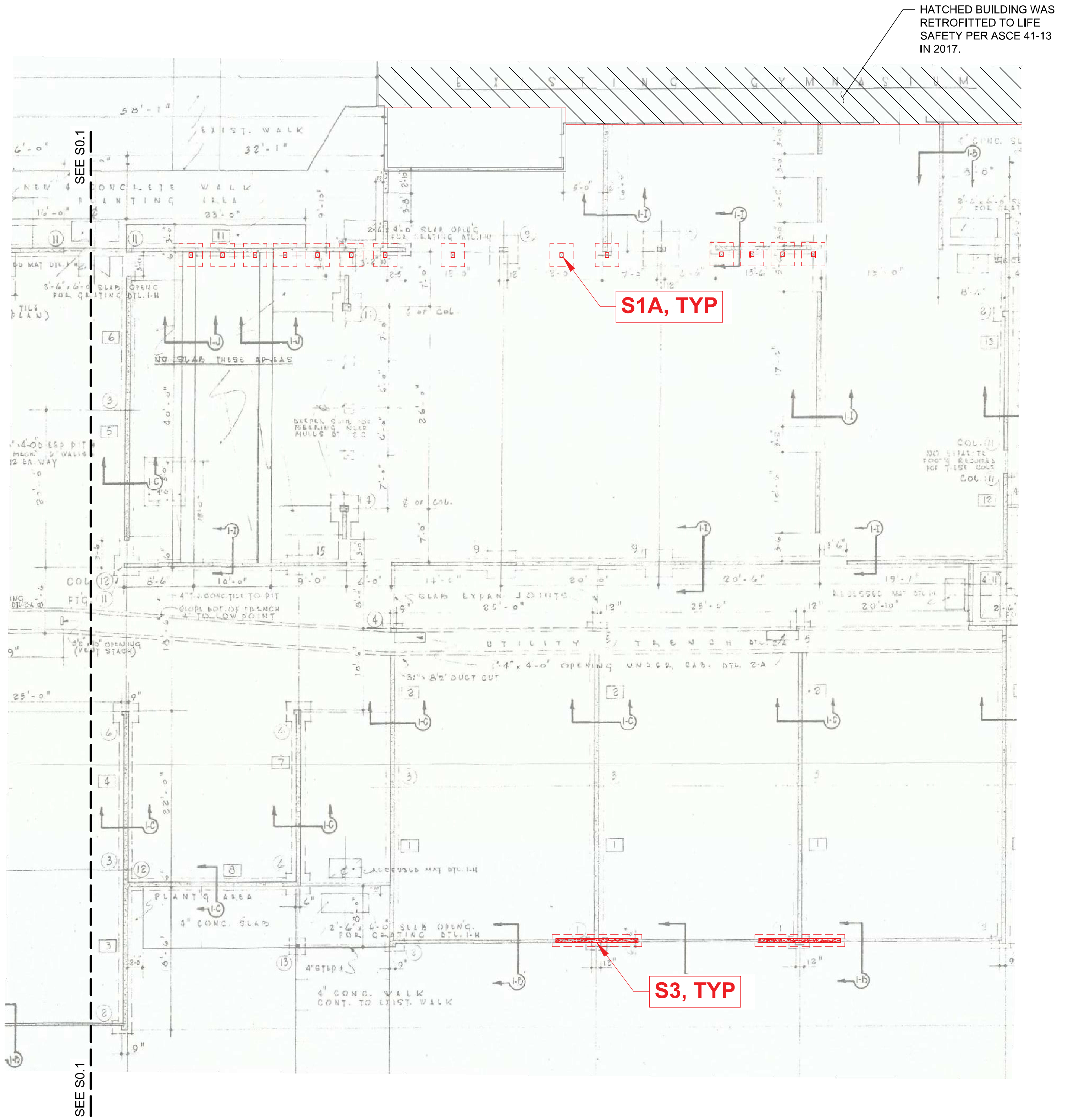
DATE: DEC. 2023

AREA A FOUNDATION PLAN

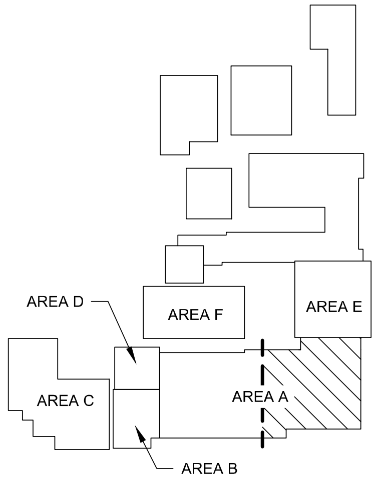
S0.1

PRELIMINARY DESIGN



1 S0.2 AREA A FOUNDATION PLAN

1/16"=1'-0"



0 S0.2 CAMPUS KEY

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Harrisburg Elementary School
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Harrisburg, OR 97446

HARRISBURG ELEMENTARY SCHOOL SEISMIC RETROFIT

MATTHEW R. SMITH
70808
JULY 08, 2014
EXPIRES: 06-30-22

-PRELIMINARY-
NOT FOR CONSTRUCTION

△ REVISION ID:	DATE:

PROJECT NO:	P-2764-22
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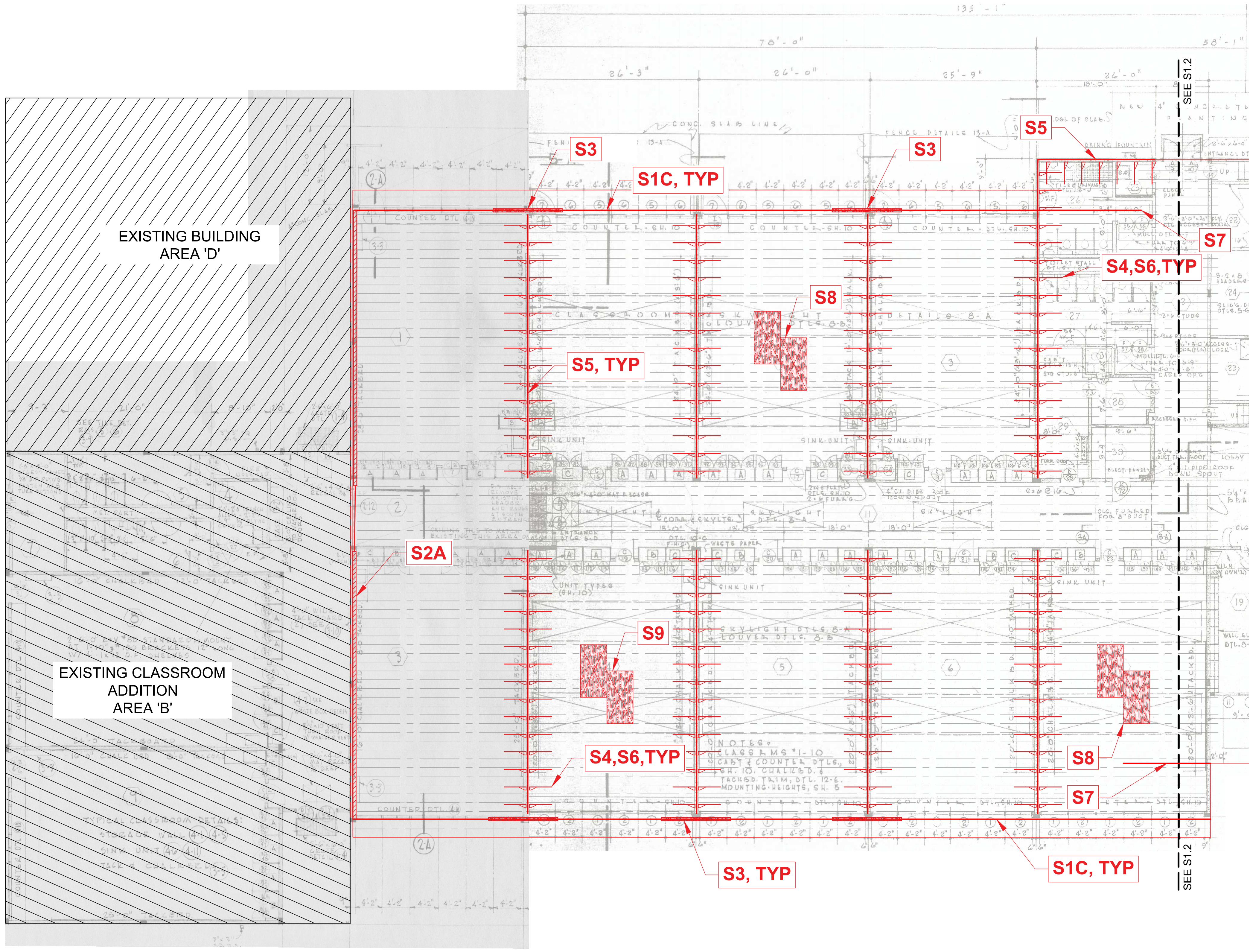
CHECKED:	MRS
DATE:	DEC. 2023

AREA A FOUNDATION PLAN

S0.2

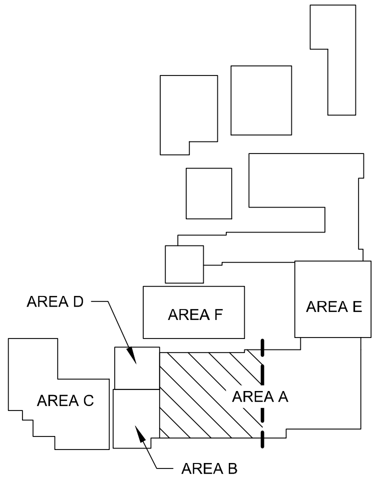
PRELIMINARY DESIGN

ONE INCH EQUALS FULL SCALE



1 S1.1 AREA A ROOF FRAMING PLAN

1/16"=1'-0"



0 S1.1 CAMPUS KEY

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HARRISBURG ELEMENTARY SCHOOL SEISMIC RETROFIT

MATTHEW R. SMITH
EXPIRES: 06-30-22

-PRELIMINARY-
NOT FOR CONSTRUCTION

△ REVISION ID:	DATE:

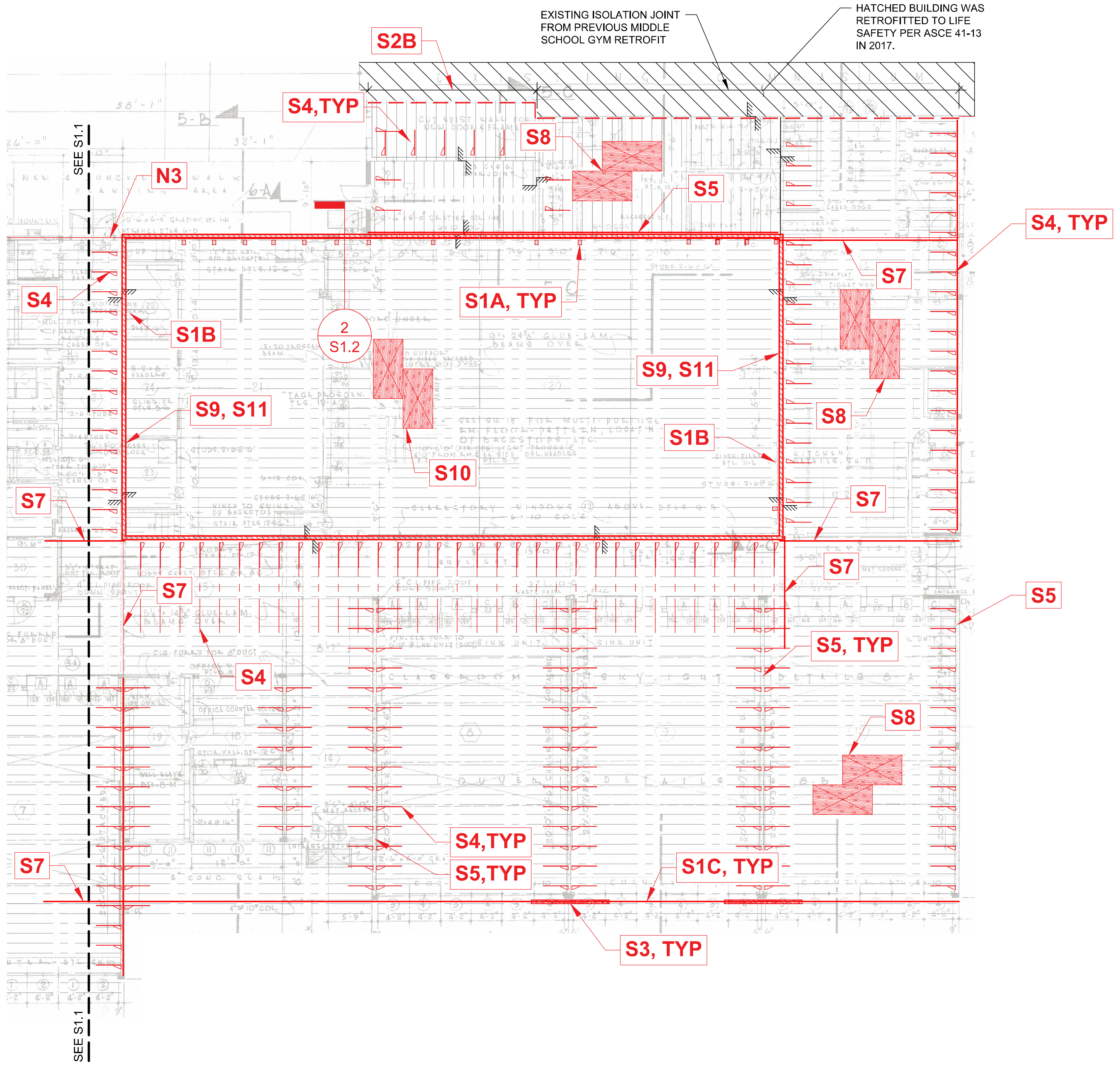
PROJECT NO:	P-2764-22
DRAWN:	LRS
CHECKED:	MRS
DATE:	DEC. 2023

AREA A ROOF
FRAMING PLAN

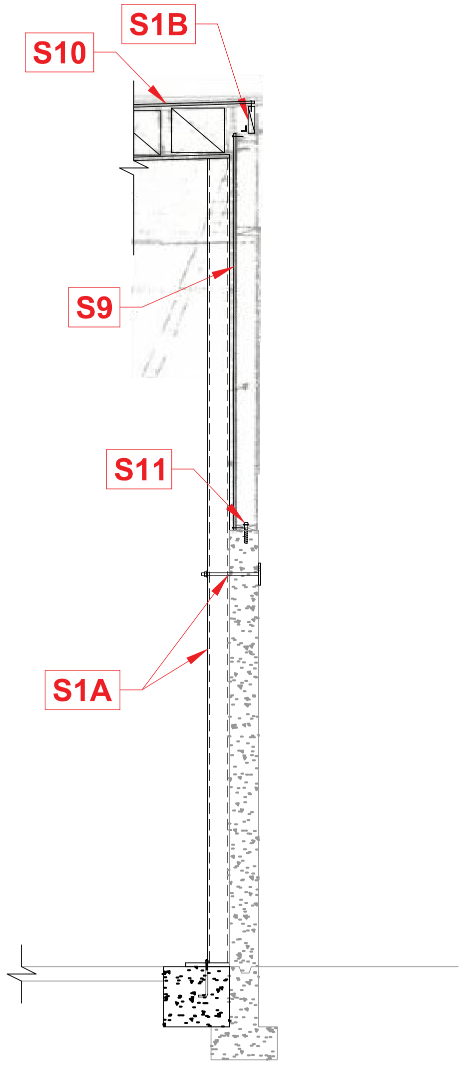
S1.1

PRELIMINARY DESIGN

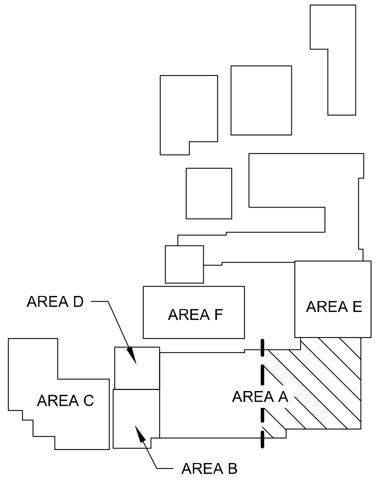
ONE INCH EQUALS FULL SCALE



1 S1.2 **AREA A ROOF FRAMING PLAN** 1/16"=1'-0"



2 S1.2 **AREA A SECTION** 1/2"=1'-0"



0 S1.2 **CAMPUS KEY** NTS

ZCS
ENGINEERING
ARCHITECTURE

524 Main Street, Suite 2, Oregon City,
Oregon 97045 | 503-659-2205

Harrisburg Elementary School
642 Smith St,
Harrisburg, OR 97446

HARRISBURG ELEMENTARY SCHOOL SEISMIC RETROFIT

STRUCTURAL
REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 08, 2014
MATTHEW R. SMITH
EXPIRES: 06-30-22
-PRELIMINARY-
NOT FOR CONSTRUCTION

△ REVISION ID:	DATE:

PROJECT NO:	P-2764-22
DRAWN:	LRS
CHECKED:	MRS
DATE:	DEC. 2023

AREA A ROOF
FRAMING PLAN

S1.2

PRELIMINARY DESIGN

Appendix D:
Geotechnical Information

Harrisburg Elementary School SRG

Latitude, Longitude: 44.27205916, -123.16522902

Date	11/17/2022, 11:27:57 AM
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)	0.77
S_1	spectral response (1.0 s)	0.426
S_{XS}	site-modified spectral response (0.2 s)	0.925
S_{X1}	site-modified spectral response (1.0 s)	0.799
F_a	site amplification factor (0.2 s)	1.2
F_v	site amplification factor (1.0 s)	1.874
ssuh	max direction uniform hazard (0.2 s)	0.882
crs	coefficient of risk (0.2 s)	0.873
ssrt	risk-targeted hazard (0.2 s)	0.77
ssd	deterministic hazard (0.2 s)	1.5
s1uh	max direction uniform hazard (1.0 s)	0.495
cr1	coefficient of risk (1.0 s)	0.861
s1rt	risk-targeted hazard (1.0 s)	0.426
s1d	deterministic hazard (1.0 s)	0.703

Type	Description	Value
Hazard Level		BSE-1N
S_{XS}	site-modified spectral response (0.2 s)	0.616
S_{X1}	site-modified spectral response (1.0 s)	0.533

Type	Description	Value
Hazard Level		BSE-2E
S_S	spectral response (0.2 s)	0.527
S_1	spectral response (1.0 s)	0.29
S_{XS}	site-modified spectral response (0.2 s)	0.727
S_{X1}	site-modified spectral response (1.0 s)	0.586
f_a	site amplification factor (0.2 s)	1.378
f_v	site amplification factor (1.0 s)	2.02

Type	Description	Value
Hazard Level		BSE-1E
S_S	spectral response (0.2 s)	0.138
S_1	spectral response (1.0 s)	0.061
S_{XS}	site-modified spectral response (0.2 s)	0.22
S_{X1}	site-modified spectral response (1.0 s)	0.146
F_a	site amplification factor (0.2 s)	1.6
F_v	site amplification factor (1.0 s)	2.4

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

DISCLAIMER

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Fault Hazard

September 19, 2022

— — Active Faults

Maxar, Microsoft

Landslide Hazard

September 19, 2022

Landslide Hazard

⬜	Low - Landsliding Unlikely
🟨	Moderate - Landsliding Possible
🟧	High - Landsliding Likely
🟧	Very High - Existing Landslide

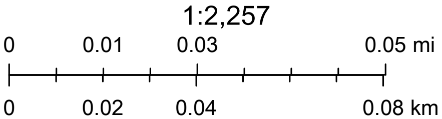
1:2,257

Maxar, Microsoft

Liquefaction Hazard

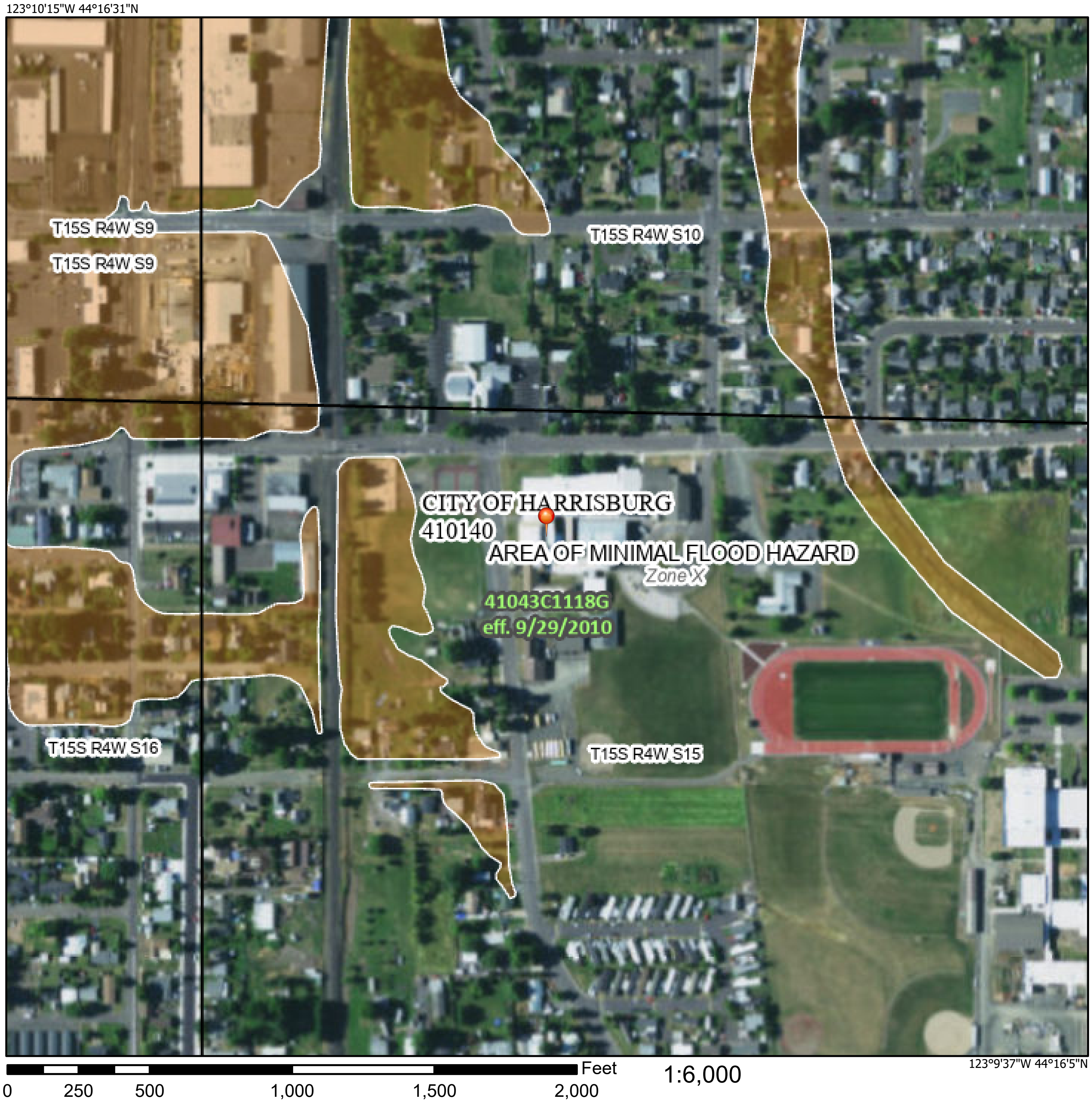
September 19, 2022

🟥 High 🟧 Moderate 🟩 Low



Maxar, Microsoft

National Flood Hazard Layer FIRMette



Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

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

SPECIAL FLOOD HAZARD AREAS	🟦	Without Base Flood Elevation (BFE) *Zone A, V, A99*
		With BFE or Depth *Zone AE, AO, AH, VE, AR*
	▨	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	🟧	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
	▨	Future Conditions 1% Annual Chance Flood Hazard *Zone X*
	▨	Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
	▨	Area with Flood Risk due to Levee *Zone D*
OTHER AREAS	NO SCREEN	Area of Minimal Flood Hazard *Zone X*
	▭	Effective LOMRs
	▭	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	— — —	Channel, Culvert, or Storm Sewer
	ııııııı	Levee, Dike, or Floodwall
OTHER FEATURES	B 20.2 17.5	Cross Sections with 1% Annual Chance Water Surface Elevation
	8 — — —	Coastal Transect
	〰 513 〰	Base Flood Elevation Line (BFE)
	—	Limit of Study
	—	Jurisdiction Boundary
	— · —	Coastal Transect Baseline
	—	Profile Baseline
	—	Hydrographic Feature
MAP PANELS	☐	Digital Data Available
	⬚	No Digital Data Available
	☒	Unmapped

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/15/2022 at 11:14 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

Supplemental Geotechnical Engineering Report

Harrisburg Middle School Seismic Retrofit

201 6th Street, Harrisburg, Oregon

Project: 19048

August 7, 2019

Prepared for:

Harrisburg School District
865 LaSalle Street
Harrisburg, OR 97446

Prepared by:

Michael Remboldt, P.E., G.E.
K & A Engineering, Inc.
Coburg, Oregon

K & A Engineering, Inc.
91051 S. Willamette Street
P. O. Box 8486, Coburg, OR 97408
(541) 684-9399 Voice
(541) 684-9358 FAX
kaengineers.com

k·a engineering

August 7, 2019 **Project: 19048**

Harrisburg School District
PO Box 208
865 LaSalle Street
Harrisburg, OR 97446

Subject: Supplemental Geotechnical Engineering Report
Harrisburg Middle School Seismic Retrofit
201 6th Street, Harrisburg, Oregon

K & A Engineering, Inc. is pleased to present our Geotechnical Engineering Report for the subject development.

Our Services were completed in accordance with our Contract for Engineering Services, dated June 10, 2019 and meet the requirements of 2014 Oregon Structural Specialty Code, Section 1803, Geotechnical Investigations.

Our report:

- Presents a summary of the existing subsurface conditions at the subject project site,
- Identifies and characterizes geologic hazards, and
- Presents recommendations for the design and construction for the proposed site developments.

Thank you for the opportunity to be involved with your project. Please call us if you have any questions.

Sincerely,

M Remboldt

Michael Remboldt, P.E., G.E.
K & A Engineering, Inc.

19,474
M Remboldt
SEPTEMBER 16, 1997
MICHAEL DENNIS REMBOLDT

EXPIRES: DECEMBER 31, 2020

Geotechnical Engineering Report

Harrisburg Middle School Seismic Retrofit

201 6th Street, Harrisburg, Oregon

August 7, 2019

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Generally, subsurface soils at the project site(s) include:

- Undocumented FILL (organic clays, mixed silts and gravels, pavements) up to 2.5-feet in depth below the ground surface; over
- Soft to stiff CLAY, over
- Dense to very dense sandy-GRAVELS.

Groundwater was relatively consistent across the project site(s) (with a few exceptions due to perching) at depths ranging from approximately 9 to 12-feet.

Geologic hazards at the project site include a moderate to high hazard of expansive soils.

We are recommending that foundation support for new or modified structural loads consist of either:

- Conventional shallow spread footings supported on Select Granular Fill that extends to a depth of approximately 5-feet or more below existing grade to stiff/dense clayey-GRAVEL or gravelly-CLAY, or
- Short drilled piers that find bearing in the dense sandy-GRAVELS.

1 INTRODUCTION

This report provides Geotechnical engineering design criteria and recommendations to support proposed improvements to the Harrisburg Middle School campus. This report is intended to supplement previous Geotechnical Engineering reports completed on or near the project site which include:

- December 2016 report[1] which addressed subsurface conditions and foundation support for seismic retrofit of the existing MS/ES. Fieldwork for this investigation included:
    - Three (3) dynamic probes, and
    - One (1) continuous boring sample,
- February 2019 report[2] which addressed various site improvements – including seismic, pavements, infiltration facilities, and more – for both the Middle School and High School campuses. Fieldwork completed for this investigation on the middle school included:
    - Two (2) dynamic probes.

Graphic summaries of probes and boring logs from these investigations have been attached in Appendix B at the end of this supplemental report.

As we understand it, seismic upgrades are proposed for building 3 on the Middle School campus, directly south of the gymnasium. Probes and borings completed around the gymnasium will serve to support recommendations in this supplemental report.

At your request, we have completed an additional investigation for the purposes of:

- Characterizing site surface and subsurface conditions,
- Delineating geologic hazards at the site,
- Providing preliminary design recommendations for:
    - Suitable foundation systems, and
    - Geologic hazard mitigation.

The scope of our services included:

- Fieldwork, including two (2) dynamic probes and one (1) continuous boring sample,
- Laboratory analysis of samples obtained from boring,
- Reduction of field data,
- Development of geotechnical design and construction criteria, and
- This written Supplemental Report.

Our services meet the requirements of the 2014 Oregon Structural Specialty Code, Section 1803 - Geotechnical Investigations.

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[1] K & A Engineering, Inc., "Geotechnical Engineering Report – Harrisburg Elementary School Gymnasium – Seismic Upgrades", Project No. 16045-01, dated December 18, 2016.

[2] K & A Engineering, Inc., "Geotechnical Engineering Report – Seismic Retrofit and Other Site Improvements – Harrisburg Middle School & High School Campuses", Project No. 19006, dated February 26, 2019.

2 PROJECT SITE DESCRIPTION

2.1 SITE LOCATION & SURFACE CONDITIONS

See previous Geotechnical Engineering reports for a description of the site location and surface conditions.

2.2 SUBSURFACE CONDITIONS

Subsurface conditions were characterized by making two (2) probes[3] and one (1) continuous sample borings[4] using our geotechnical drill. Subsurface conditions, summarized below, consider probes and borings made around the adjacent gymnasium (attached) for 2016 seismic retrofit project.

Subsurface conditions at the middle school, as observed in the probes and boring, generally consist of (approximately):

- **Undocumented FILL:**
    - 2-in of asphalt concrete pavement (FC-3), over
    - 0.5 to 3.0-feet of loose granular FILL (FC-3, FC-6 & FC-7), over
- **Organic CLAY:**
    - 2.5 to 5-ft of dark brown and gray, damp to moist, soft to moderately stiff, organic, high plasticity CLAY (CH near A-line), over
- **Cemented SILT, CLAY & GRAVEL:**
    - 4 to 6-ft of generally brown to tan, damp to wet, stiff to very stiff, lightly cemented, soils including silty-CLAY, silty-SAND, and gravelly-CLAY, over
- **Sandy-GRAVEL:**
    - Brown and gray, moderately dense to very dense, wet, subrounded and subangular, well-graded, sandy-GRAVEL.

The depth to moderately dense or dense, sandy-GRAVEL varied between 7.0 and 11.0-ft below the original ground surface.

Groundwater was observed directly in 2016 between 6.0 and 8.0-ft below the original ground surface. Water was measured at 4.9-ft (FC-7) for the current investigation, but this may have been drilling fluid introduced during probing which had not had time to dissipate.

The approximate locations of the probes and borings are shown on the attached drawing "Middle School Site Plan".

---

[3] A 3.55-in^2 cone is pushed into the soil using a 140-lb. hammer falling 30-in. The energy required to advance the cone is recorded in the field as the number of blows per 6-inches of penetration. Soil friction on the side of the cone is measured using a torque wrench. Calculated cone tip pressure is used to estimate soil engineering properties, and the ratio of side friction to tip pressure identifies soil behavior type.

[4] 1.5-in diameter x 4-foot continuous samples obtained using a G7 2-3/8" direct push dual tube system manufactured by AMS, Inc.

2.3 LOCAL GEOLOGY

See previous Geotechnical Engineering reports for a description of local geology.

3 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

3.1 GEOLOGIC HAZARDS

3.1.1 Design Earthquake

Based on the observed subsurface soil conditions and criteria in ASCE 7-10, the soil site class for both campuses are “D” for stiff soil and risk category “IV” for critical structures.

The design earthquake was determined using criteria including an event having a 10-percent chance, or higher, of occurring within a 50-year period, and soil site class D. *Based on analysis using current modeling of local sources of earthquake ground motion (crustal, deep, and subduction zone)*[5]*, the design earthquake is a Cascadia Megathrust event with a magnitude between 8.9 to 9.1 and peak ground acceleration of 0.19g.*

3.1.2 Faulting and Lateral Spreading

Due to the absence of active faults either through or in the near vicinity of the project site, there is not a significant hazard of ground rupture due to faulting.

Due to the large distance to any grade changes and the relatively level nature of the site, there is not a significant hazard of lateral spreading at the project site.

Faulting and related geologic hazard are evaluated and described in greater detail in previous Geotechnical engineering reports.

3.1.3 Expansive Soils

The high plasticity CLAY found near the ground surface present a moderate to high hazard of volume change due to seasonal changes in moisture content (i.e., they are moderately to highly “expansive”).

This hazard increases the risk of heaving and damage to slabs-on-grade and spread footings placed near the ground surface. Our recommendations in this report are made, in part, to mitigate this hazard.

3.1.4 Foundation Settlement

The surface layers loose or soft undocumented FILL, organic silt, and clays present a moderate to high hazard of total and differential settlement for conventional shallow spread footings due to long-term decomposition of organics, consolidation of soft clays.

Placing supporting foundation loads on conventional shallow spread footings supported directly by the surface layers of loose or soft undocumented FILL, organic silt, and clays may result in unacceptably high

---

[5] 2014 USGS dynamic conterminous PSHA, online at the USGS Earthquake Hazards Program: https://earthquake.usgs.gov/hazards/interactive/

differential settlement, thus limiting building serviceability and risking significant damage to finishes and moderate damage to structural connections.

The existing Middle School building (building 3) has already experienced moderate differential settlement, which is manifested through several large vertical cracks through the exterior stucco finish, observed near the southwest corner of the building. *A net increase in dead and live loads on the existing foundation system should be avoided, if possible, to minimize further excessive differential settlement.*

Our recommendations in “Foundations” are made to mitigate this hazard.

3.1.5 Liquefaction

No loose, saturated SAND layers were identified during our current investigation or in previous investigations at other locations across the Middle School campus. *The hazard of earthquake-induced liquefaction is low in the study area.*

3.1.6 Seismic Design Criteria

For designing lateral bracing systems and other structural elements for earthquake ground motion, we recommend that design criteria be selected based on a site class “D” stiff soils and risk category “IV” critical structures. The recommended design spectral response acceleration parameters[6] are shown on Table 1.

Table 1 – Recommended Seismic Design Parameters

Design Parameter	Design Value
S_{MS} (site class “D”)	0.985
S_{M1} (site class “D”)	0.679
S_{DS} (site class “D”)	0.657
S_{D1} (site class “D”)	0.452

For design of “non-structural” elements and anchorages for lateral earthquake loads, we recommend a design peak ground acceleration of 0.19g (10% chance of exceedance in 50-years).

3.2 FOUNDATION SUPPORT

3.2.1 General Discussion

New conventional spread footing systems, if supported on the undocumented FILL and/or soft, high-plasticity organic-laden CLAY are likely to experienced unacceptably high total and differential settlement over the typical 20-year analysis lifetime. We have estimated magnitudes of total settlement exceeding 1-inch, with differential settlement of 0.5-inches or more.

Additionally, the underlying CLAY soils are moderately to highly expansive. Our field and laboratory data suggest that mitigation of this hazard for spread footings would require excavation to an estimated

---

[6] http://earthquake.usgs.gov/designmaps/us/application.php?

minimum depth of approximately 5-ft below the original ground surface and replacement with select granular fill to footing grade.

Considering subsurface soil conditions at the project site, we are recommending two alternatives for foundation support for the project:

- **Conventional Spread Footing Systems**: Conventional spread footing systems are suitable to provide foundation support if foundation loads are placed either on:
  - Approved Subgrade consisting of native undisturbed non-organic stiff CLAY, or
  - Select Granular Fill that extends to native undisturbed non-organic stiff CLAY .
- **Deep foundation elements**: Cast-in-place concrete drilled piers, supporting isolated concrete pads for column loads or reinforced concrete grade beams for continuous line loads, finding end-bearing support in underlying native undisturbed, dense, sandy-GRAVEL.

3.2.2 Conventional Spread Footing Systems - New Construction

3.2.2.1 Design Criteria

For conventional spread footing systems supported as recommended in this report, we recommend a maximum allowable design bearing pressure of:

- 2.5-ksf for static load combinations, and
- 3.3-ksf for load combinations including transient wind and earthquake loads.

Total and differential settlement is expected to be less than 0.5 and 0.3-inches, respectfully, if design and constructed as recommended in this report.

To resist lateral loads, we recommend:

- Allowable design base sliding coefficient of 0.3
- Allowable passive earth pressure of 290-psf/ft (equivalent fluid pressure.)

3.2.2.2 Recommendations for Construction

For conventional, cast-in-place, concrete isolated and continuous "strip" footings, we recommend that the foundation pad(s) supporting foundations be constructed as follows:

- Excavate and remove of all undocumented FILL and soft CLAY, exposing Approved Subgrade consisting of native undisturbed stiff CLAY. Excavation should extend a minimum depth of 5-ft below the original ground surface, or to Approved Subgrade, whichever is greater.
- Grade the Approved Subgrade level and smooth. We recommend excavation using a smooth bucket to minimize disturbance to the subgrade.
- Remove loose soil debris and compact any disturbed areas of subgrade.
- Place Select Granular Fill on the approved foundation pad subgrade to the specified footing elevation(s) and compact.

The prepared foundation pad subgrade shall extend, laterally, from the outside edges of the perimeter footings a minimum horizontal distance equivalent to the vertical distance between footing grade and Approved Subgrade. See Figure 1.

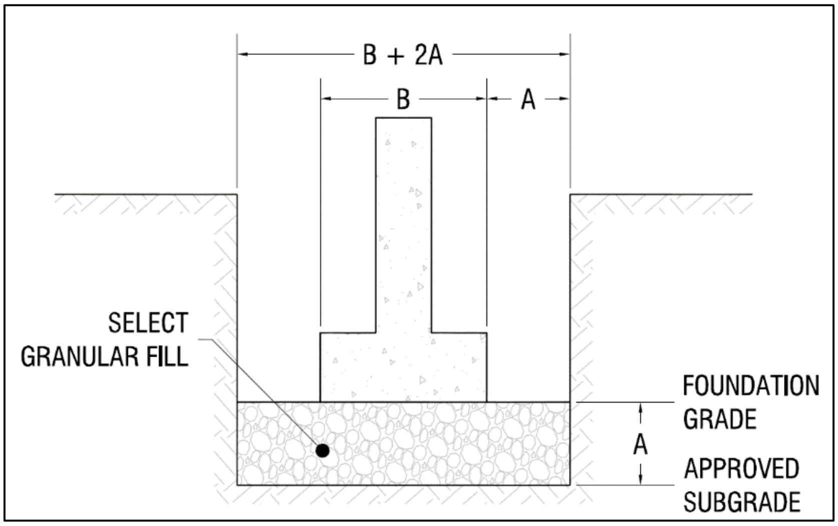

Figure 1- Lateral Excavation Requirement for New Footings.

K & A Engineering, Inc. should be on site to inspect foundation pad preparation and verify suitable subgrade prior to the placement Select Granular Fill or construction of foundations.

3.2.3 Drilled Piers – New Construction

3.2.3.1 Design Criteria

Vertical Load Capacity:

For isolated drilled piers finding end-bearing in dense, undisturbed, native undisturbed, stiff gravelly-CLAY, we recommend the following design criteria:

- **Static Load Combinations:** For load combinations **not** including transient wind and earthquake loads, we recommend a design maximum allowable bearing pressure of 8.5-kips per square foot.
- **Transient Load Combinations:** For load combinations including transient wind and earthquake loads, we recommend a design maximum allowable bearing pressure of 11.3-kips per square foot.

Total and differential settlement is expected to be less than 0.5 and 0.25-in, respectfully, if designed and constructed as recommended in this report.

Lateral Load Capacity:

We assumed a shear-only lateral load (no moment connection) on a 24-in diameter drilled pier extending a minimum of 8-feet in depth below existing ground elevation and extending 1-ft above the ground surface.

For these conditions, the maximum allowable shear, including all load combinations, is 35-kips to limit horizontal drift to 1-inch.

3.2.3.2 Recommendations for Construction

- **Depth:** All drilled piers shall extend a minimum depth of 8-ft below finish grade ***or*** extend a minimum of 1-ft into underlying native, stiff, gravelly-CLAY, whichever is greater.
- **Diameter:** We recommend a minimum diameter of 24-inches.
- **Subgrade:** Approved Subgrade for drilled piers shall consist of native, stiff gravelly-CLAY or dense, sandy-GRAVEL. K & A Engineering, Inc. should be on site to inspect foundation pad preparation and verify suitable subgrade prior to placing Select Granular Fill or construction of foundations.
- **Excavation:**
    - We recommend excavation using a truck-mounted boring machine.
    - All loose soils and other debris shall be removed from the bottom of the drilled hole prior to placement of steel reinforcement or concrete. (We have found that use of a truck-mounted vacuum system is efficient for debris removal).
- **Construction:** Concrete shall be tremmied or pumped into the hole, below the surface of any water, making sure that concrete is NOT dropped from the top of the hole. Any water in the pre-drilled hole shall be displaced as concrete is placed below the water surface.

3.3 SLABS-ON-GRADE

Due to the moderately expansive nature of the organic SILT and CLAY soil at the project site, slabs-on-grade may be affected by seasonal changes in water content. Even if our recommendations are implemented, some minor cracking is expected. Our recommendations below are to control cracking to the extent possible and limit heaving to serviceable ranges.

Slabs-on-grade shall be constructed on Select Granular Fill that extends to moderately stiff native CLAY *at a minimum of 18-inches below finished floor grade*.

The slab-on-grade area shall be prepared as follows:

- Excavate and remove undocumented FILL to expose moderately stiff CLAY. K & A Engineering, Inc. shall inspect and approve of the Subgrade for slabs-on-grade.
- Cover the CLAY Subgrade with Select Granular Fill immediately to avoid drying during hot, dry weather. If the CLAY Subgrade cannot be covered immediately with Select Granular Fill, the Subgrade shall be covered or periodically wetted to maintain soil moisture.

Additionally, we recommend that slabs-on-grade shall be designed and constructed to include:

- A minimum thickness of 4-inches,
- Reinforcement consisting of Grade 40 No. 4 deformed reinforcing bar spaced at 24-inches o.c. each way, in the middle of the slab. Bar chairs or blocks are required to ensure that the reinforcement is in the middle of the slab.
- Control joints spaced no further apart than 10-feet each way.

4 SPECIFICATIONS

4.1 SUBGRADE

Approved Subgrade shall consist of:

for conventional shallow spread footing foundation elements shall consist of:

- **For Conventional Shallow Spread Footings:** Undisturbed, non-organic, stiff, native CLAY at an estimated minimum depth of 5-feet below the current ground surface.
- **For Drilled Piers:** Undisturbed native dense clayey-GRAVEL or stiff gravelly-CLAY and estimated minimum depth of 8-feet below the current ground surface.
- **For Slabs-on-Grade:** Undisturbed moderately stiff non-organic native CLAY a minimum of 18-inches below the finished floor grade.

4.2 SELECT GRANULAR FILL

4.2.1 General Requirements

Select granular fill may consist entirely of fine select granular fill or a minimum of 9-inches of coarse select granular fill covered with a minimum of 3-inches of fine select granular fill.

4.2.2 Coarse Select Granular Fill

Coarse select granular fill shall consist of clean, well-graded quarry stone having a maximum particle size of 5-inches. Quarry stone should be durable and have 100-percent fractured faces.

4.2.3 Fine Select Granular Fill

Fine select granular fill should consist of clean, durable, well-graded material with a maximum particle size of 3/4-inches and a maximum of 10-percent passing the no. 200 sieve. Select granular fill shall be placed in layers not to exceed 12-inches (loose) and mechanically compacted to a dry density exceeding 95-percent of maximum as determined by ASTM D698 (Std. Proctor).

4.3 WET WEATHER CONSTRUCTION

Care shall be taken to avoid disturbance of CLAY subgrade during wet weather. Approved Subgrade consisting of CLAY shall be protected from disturbance by vehicular or foot traffic by covering the Approved Subgrade immediately after grading with a minimum of 6-inches of Fine Select Granular Fill.

CLAY that is softened by traffic shall be removed and replaced with Select Granular Fill.

4.4 DRY WEATHER CONSTRUCTION

Care shall be taken to not allow Approved Subgrade consisting of CLAY to dry in hot, dry weather conditions. Approved Subgrade shall be covered immediately after grading with either Select Granular Fill (0.5-foot minimum thickness) or plastic sheeting. Watering the subgrade may be necessary to stabilize and maintain CLAY water content if long enough periods of hot, dry weather conditions persist to the extent that the Select Granular Fill begins to dry.

5 LIMITATION AND USE OF GEOTECHNICAL RECOMMENDATIONS

This report has been prepared for the exclusive use of the Harrisburg School District for the subject project.

This geotechnical investigation, analysis, and recommendations meet the standards of care of competent geotechnical engineers providing similar services at the time these services were provided.

We do not warrant or guarantee site surface subsurface conditions. Exploration test holes indicate soil conditions only at specific locations (i.e. the test hole locations) to the depths penetrated. They do not necessarily reflect soil/rock materials or groundwater conditions that exist between or beyond exploration locations or limits.

The scope of our services does not include construction safety precautions, techniques, sequences, or procedures, except as specifically recommended in this report. Our services should not be interpreted as an environmental assessment of site conditions.

Appendix A

Maps

- Vicinity Map
- Probe Location Plan

Supplemental Geotechnical Engineering Report
Harrisburg Middle School Seismic Retrofit
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Project: 19048
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Prepared for:

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865 LaSalle Street
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Prepared by:

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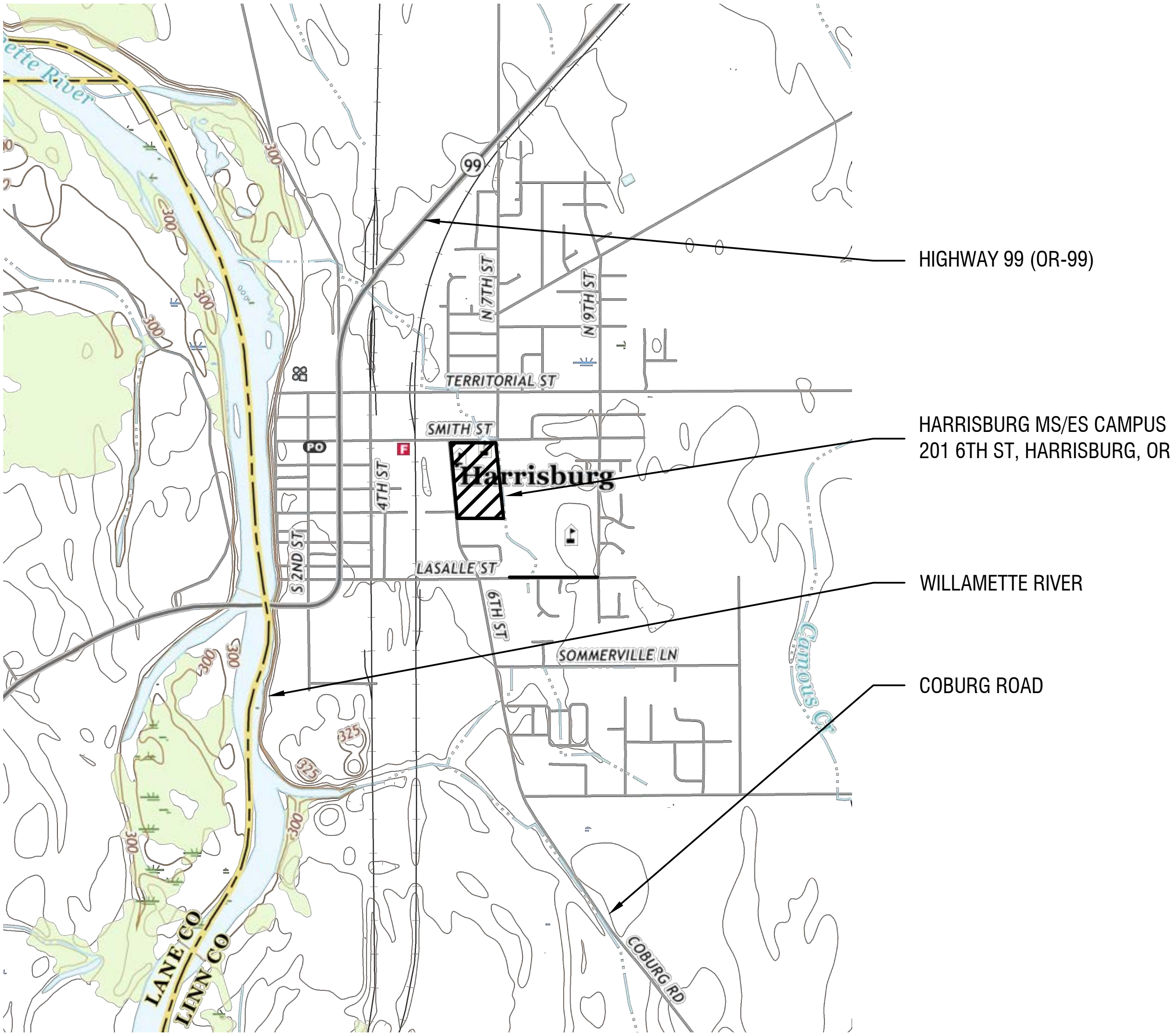
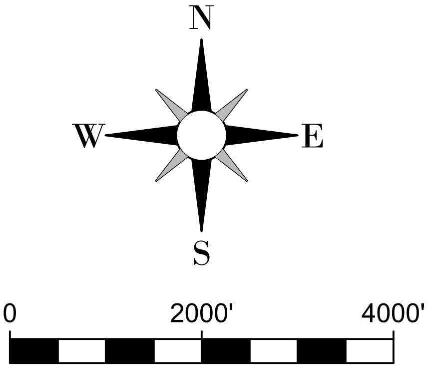
K & A Engineering, Inc.
Coburg, Oregon





Scale: 1" = 2000'

K & A Engineering,Inc

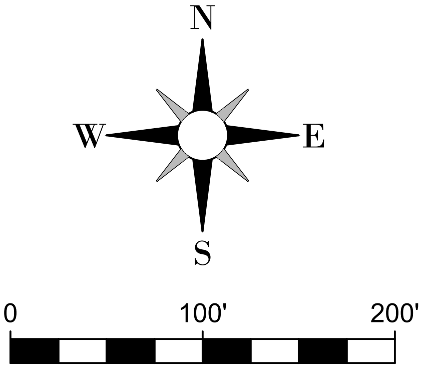
91051 S. Willamette St.
Coburg, OR 97408
541 684 9399 541 684 9358 fax

VICINITY MAP
Geotechnical Site Investigation
Harrisburg MS Geologic Hazard Investigation
201 6th Street, Harrisburg, Oregon

7/30/19 Project: 19048 Drawing 1 / 2

GEOTECHNICAL
REGISTERED PROFESSIONAL
ENGINEER
19,474
M Remboldt
OREGON
SEPTEMBER 16, 1997
MICHAEL DENNIS REMBOLDT

EXPIRES: DECEMBER 31, 2020



Scale: 1" = 100'

LEGEND

⊕ FC-7	JULY 2019 GEOTECH PROBE - (2) TOTAL
⊕ FC-2	FEBRUARY 2019 GEOTECH PROBE - (2) TOTAL
⊕ FC-4	DECEMBER 2016 GEOTECH PROBE - (3) TOTAL

K & A Engineering,Inc
91051 S. Willamette St.
Coburg, OR 97408
541 684 9399 541 684 9358 fax

MIDDLE SCHOOL SITE PLAN
Geotechnical Site Investigation
Harrisburg MS Geologic Hazard Investigation
201 6th Street, Harrisburg, Oregon

7/30/19 Project: 19048 Drawing 2 / 2

19,474
M Remboldt
SEPTEMBER 16, 1997
MICHAEL DENNIS REMBOLDT

EXPIRES: DECEMBER 31, 2020

Appendix B

Probes and Borings

- Probe & Boring Logs
- Atterberg Limit Results

Supplemental Geotechnical Engineering Report
Harrisburg Middle School Seismic Retrofit
201 6th Street, Harrisburg, Oregon
Project: 19048
August 5, 2019

Prepared for:

Harrisburg School District
865 LaSalle Street
Harrisburg, OR 97446

Prepared by:

Michael Remboldt, P.E., G.E.
K & A Engineering, Inc.
Coburg, Oregon

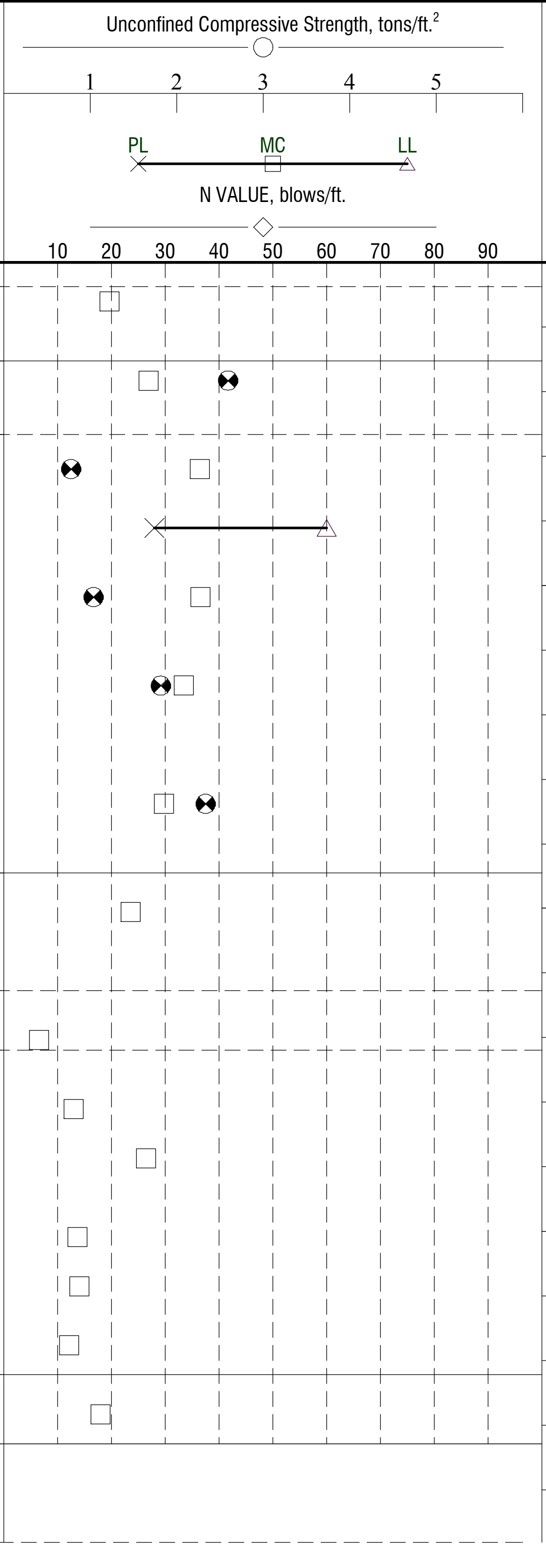
K & A Engineering, Inc.
PO Box 8486
Coburg, OR 97408
Telephone: 541-852-6939

Job No. 19048

CLIENT: Harrisburg School District
PROJECT: Geologic Hazard Investigation
SITE ADDRESS: 201 6th Street, Harrisburg, Oregon

BORING NUMBER **B-6** Sheet 1 of 1
SURFACE ELEVATION
NORTH
EAST

DEPTH, ft	SAMPLE NO.	SAMPLER TYPE	PERCENT RECOVERY	GRAPHIC LOG	DESCRIPTION OF MATERIALS (LABORATORY CLASSIFICATION)	UNIT DRY WT. LBS./FT.^{3}	DEPTH m.
					Dark brown, damp, bark and mulch.		
					Gray & brown, loose, sandy-GRAVEL and gravelly-SAND (undocumented granular FILL).		
					Dark gray, damp, very stiff (possibly compacted), high plasticity, CLAY with some sand or sandy-CLAY.		
	1		54		Dark gray, moist, moderately stiff grading to stiff, high plasticity, CLAY (CH). Possibly organic-laden. Atterberg limit testing from 2.5 to 3.0-ft indicates PL = 28 and LL = 60.		
2.5							
							1.0
5.0							
	2		59				
					Dark gray (variably colored gravels), damp, very stiff, sandy-CLAY and gravelly-CLAY.		2.0
7.5					Gray & brown (variable colored gravels), damp, moderately dense, well-graded, clayey-GRAVEL and sandy-GRAVEL. Lightly Cemented.		
					Gray & brown, wet, stiff, well-graded, clayey-GRAVEL and gravelly-CLAY. Lightly Cemented.		
10.0	3		105				3.0
					Gray & brown, well-graded, sandy-GRAVEL.		
					End of Boring @ 12 feet		
12.5							



● Calibrated Penetrometer Unconfined Compression

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED	CASING	CAVE-IN	WATER

BORING STARTED 8/1/19
BORING COMPLETED 8/1/19
DRILLER K & A
RIG AMS 9410-VTR
ENGINEER K & A
APPROVED

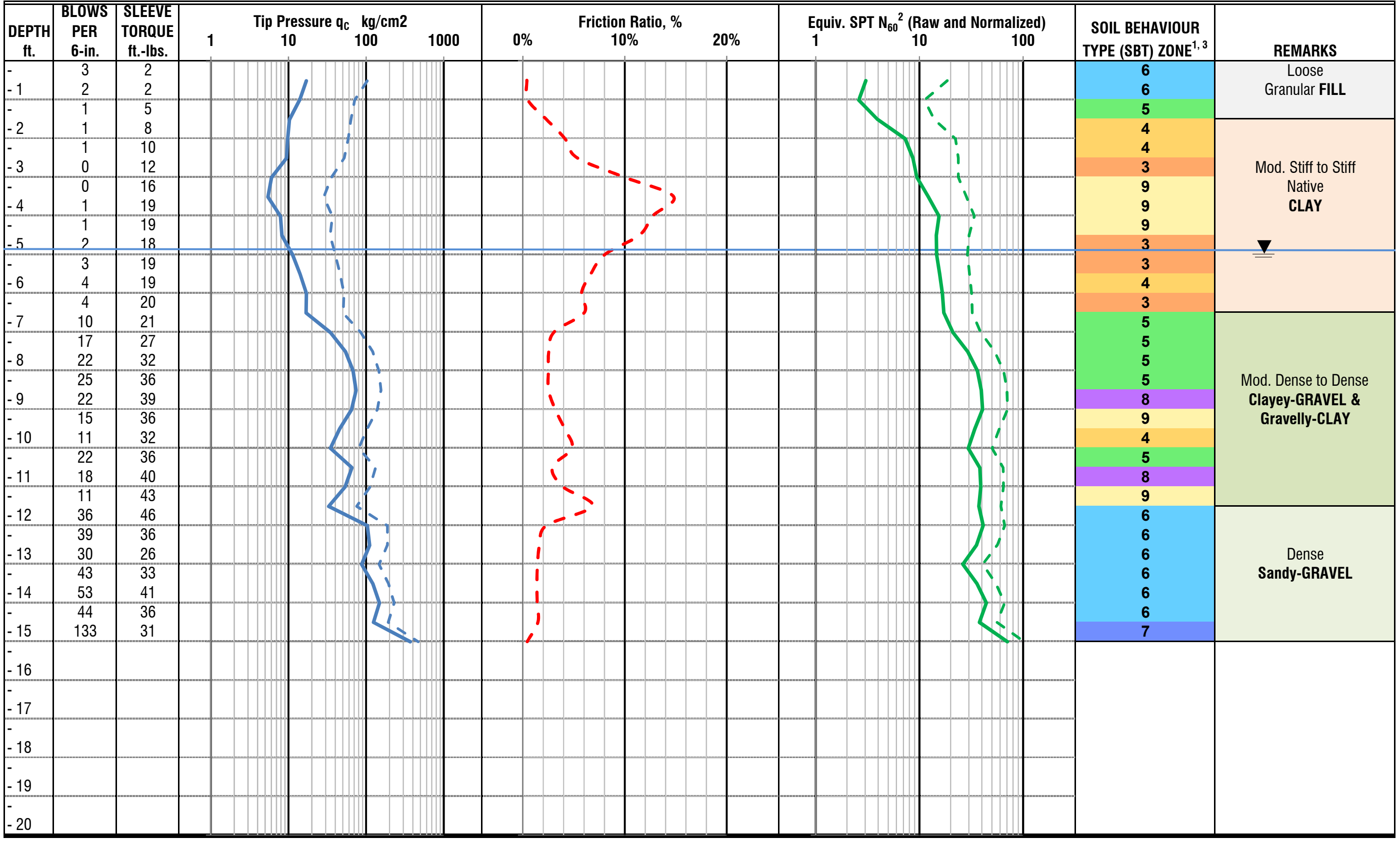
LOG A GNGN03 B-6 HARRISBURG LOG 08 01 19.GPJ LOG A GNGN03.GDT 8/7/19

DYNAMIC PROBE LOG
FC-6

K & A Engineering, Inc.
541-684-6966
kaengineers.com

HOLE #: FC-6
CREW: K & A Engineering, Inc.
PROJECT: Harrisburg MS Geologic Hazard Investigation
ADDRESS: 201 6th Street
LOCATION: Harrisburg, Oregon

PROJECT NUMBER: 19048
DATE STARTED: 07-29-2019
DATE COMPLETED: 07-29-2019
DEPTH COMPLETED (ft): 15.0
SURFACE ELEVATION: N/A
STATIC WATER DEPTH ON COMPLETION (ft): 4.9
FIRST ENCOUNTERED WATER DEPTH (ft): 4.9
HAMMER WEIGHT: 63.5 kg
CONE AREA: 22.9 sq. cm



DEPTH ft.	BLOWS PER 6-in.	SLEEVE TORQUE ft.-lbs.	SOIL BEHAVIOUR TYPE (SBT) ZONE[1, 3]	REMARKS
-	3	2	6	Loose Granular **FILL**
- 1	2	2	6	
-	1	5	5	
- 2	1	8	4	Mod. Stiff to Stiff Native **CLAY**
-	1	10	4	
- 3	0	12	3	
-	0	16	9	
- 4	1	19	9	
-	1	19	9	
- 5	2	18	3	
-	3	19	3	
- 6	4	19	4	
-	4	20	3	
- 7	10	21	5	Mod. Dense to Dense **Clayey-GRAVEL & Gravelly-CLAY**
-	17	27	5	
- 8	22	32	5	
-	25	36	5	
- 9	22	39	8	
-	15	36	9	
- 10	11	32	4	
-	22	36	5	
- 11	18	40	8	
-	11	43	9	
- 12	36	46	6	Dense **Sandy-GRAVEL**
-	39	36	6	
- 13	30	26	6	
-	43	33	6	
- 14	53	41	6	
-	44	36	6	
- 15	133	31	7	
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- 19				
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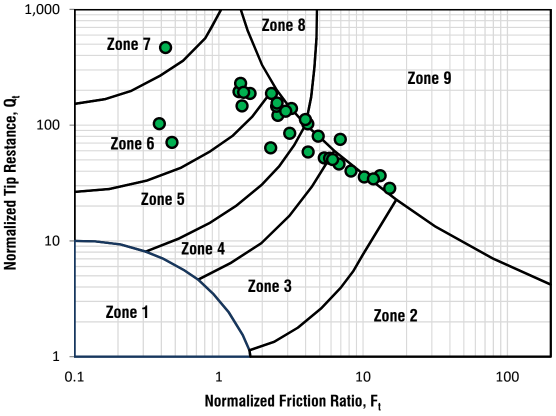
[1] P.K. Robertson, 2010. "Evaluation of flow liquefacton and liquefied strength using Cone Penetration Test." ASCE Journal of Geotechnical and Geoenvironmental Engineering, Vol 136, No. 6. and P.K. Robertson, 2000. "Soil classification using the cone penetration test," Canadian Geotechnical Journal, 27(1).

[2] John H. Schmertmann, "Statics of SPT", Journal of the Geotechnical Engineering Division, American Society of Civil Engineers. May 1979.

[3] P.K. Robertson, K.L. Cabal (Robertson), 2015. "Guide to Cone Penetration Testing for Geotechnical Engineering, 6th Edition" Gregg Drilling and Testing, Inc.

Note: Dashed lines show tip pressure and N normalized for overburden pressure

Zone	Soil Behaviour Type (SBT) Description
1	Sensitive, fine grained
2	Organic soils - clay
3	Clays - silty-clay to clay
4	Silt Mixtures - clayey-silt to silty-clay
5	Sand Mixtures - silty-sand to sandy-silt
6	Sands - clean sand to silty-sand
7	Gravelly sand to dense sand
8	Very stiff sand to clayey sand
9	Fine grained (weak rock, cemented, relic structure)



DYNAMIC PROBE LOG
FC-7

K & A Engineering, Inc.
541-684-6966
kaengineers.com

HOLE #: FC-7
CREW: K & A Engineering, Inc.
PROJECT: Harrisburg MS Geologic Hazard Investigation
ADDRESS: 201 6th Street
LOCATION: Harrisburg, Oregon

PROJECT NUMBER: 19048
DATE STARTED: 07-29-2019
DATE COMPLETED: 07-29-2019
DEPTH COMPLETED (ft): 9.0
SURFACE ELEVATION: N/A
STATIC WATER DEPTH ON COMPLETION (ft): 4.9
FIRST ENCOUNTERED WATER DEPTH (ft): 4.9
HAMMER WEIGHT: 63.5 kg
CONE AREA: 22.9 sq. cm

DEPTH ft.	BLOWS PER 6-in.	SLEEVE TORQUE ft.-lbs.	SOIL BEHAVIOUR TYPE (SBT) ZONE[1, 3]	REMARKS
-	4	2	6	Loose Granular **FILL**
- 1	8	2	6	
-	8	2	6	
- 2	9	2	6	
-	7	2	6	
- 3	7	2	6	
-	6	12	5	Stiff to Hard **CLAY**
- 4	6	22	9	
-	12	38	9	
- 5	15	55	9	
-	14	66	9	
- 6	9	76	9	
-	18	62	9	
- 7	23	48	8	
-	44	30	6	Dense **Sandy-GRAVEL**
- 8	78	13	7	
-	92	9	7	
- 9	108	6	7	
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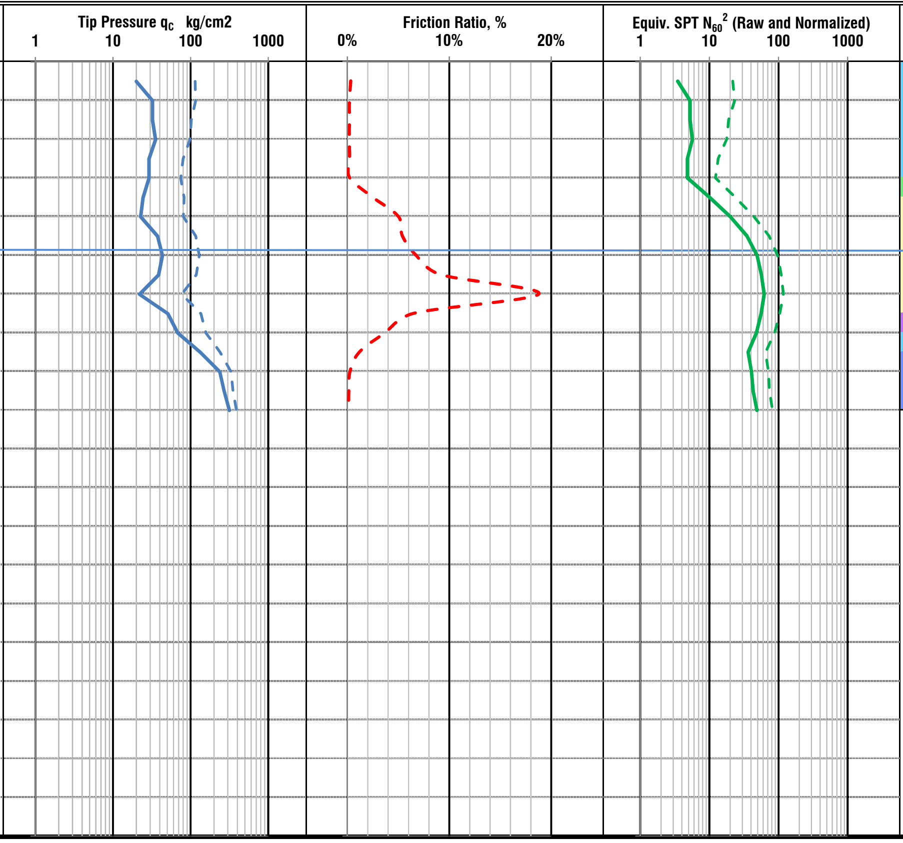


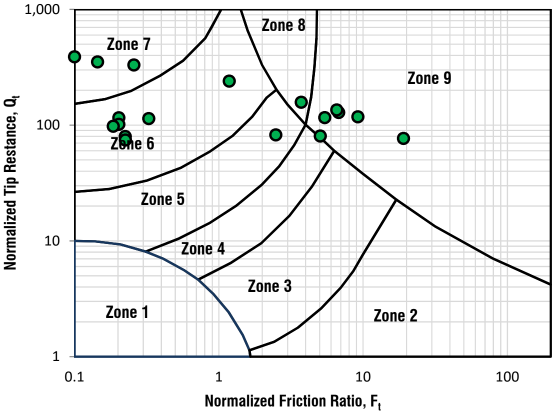
[1] P.K. Robertson, 2010. "Evaluation of flow liquefacton and liquefied strength using Cone Penetration Test." ASCE Journal of Geotechnical and Geoenvironmental Engineering, Vol 136, No. 6. and P.K. Robertson, 2000. "Soil classification using the cone penetration test," Canadian Geotechnical Journal, 27(1).

[2] John H. Schmertmann, "Statics of SPT", Journal of the Geotechnical Engineering Division, American Society of Civil Engineers. May 1979.

[3] P.K. Robertson, K.L. Cabal (Robertson), 2015. "Guide to Cone Penetration Testing for Geotechnical Engineering, 6th Edition" Gregg Drilling and Testing, Inc.

Note: Dashed lines show tip pressure and N normalized for overburden pressure

Zone	Soil Behaviour Type (SBT) Description
1	Sensitive, fine grained
2	Organic soils - clay
3	Clays - silty-clay to clay
4	Silt Mixtures - clayey-silt to silty-clay
5	Sand Mixtures - silty-sand to sandy-silt
6	Sands - clean sand to silty-sand
7	Gravelly sand to dense sand
8	Very stiff sand to clayey sand
9	Fine grained (weak rock, cemented, relic structure)



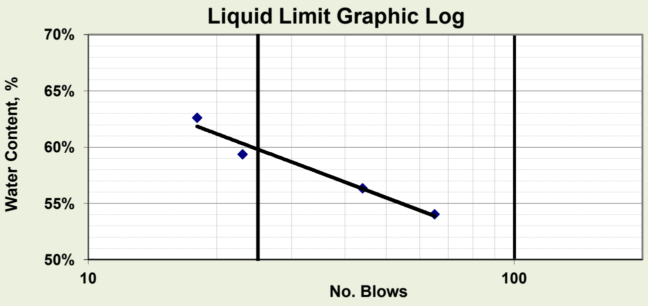
Atterberg Limits

Date: 3/7/2019
Sample No.: B-6 from 2.1' to 3.2'
Client: Harrisburg MS
Project: 19048

Liquid Limit

Test No	No Blows	Pan no.	Pan Weight, g	Pan+Wet Sample, g	Pan+Dry Sample, g	Water Content, %
1	65	27	12.5	50.7	37.3	54.0%
2	44	28	11.3	48.2	34.9	56.4%
3	23	29	11.8	51.8	36.9	59.4%
4	18	3	11.6	49.0	34.6	62.6%

Liquid Limit = **60%**



Plastic Limit

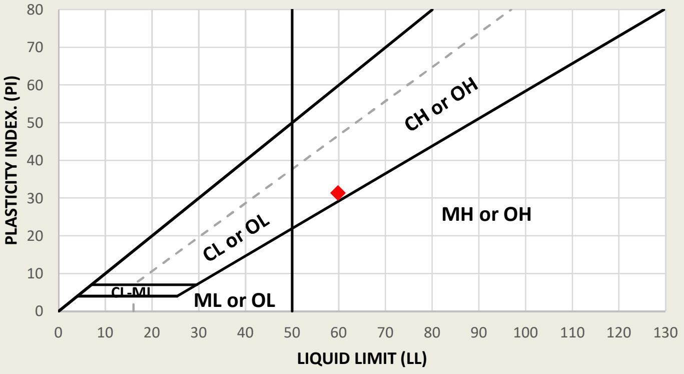
Test No	Pan No.	Pan Weight, g	Pan+Wet Sample, g	Pan+Dry Sample, g	Water Content, %
1	25	12.2	28.6	25.0	28.1%
2	26	12.1	28.2	24.6	28.8%
				Mean Plastic Limit =	28.5%

Natural Water Content

Depth	Pan No.	Pan Weight, g	Pan+Wet Sample, g	Pan+Dry Sample, g	Water Content, %
2.0	3	12.3	65.1	51	36.4%
3.3	4	11.7	67.4	52.5	36.5%
				Average =	36.5%

Summary

Mean Plastic Limit (PL) = 28%
Liquid Limit (LL)= 60%
Natural Water Content = 36%
Plasticity Index (PI)= 31%
Liquidity Index = 26%



K & A Engineering, Inc.
91051 S. Willamette St.; P. O. Box 8486
Coburg, OR 97408
Telephone: 541-684-9399
Fax:

Job No. 16045

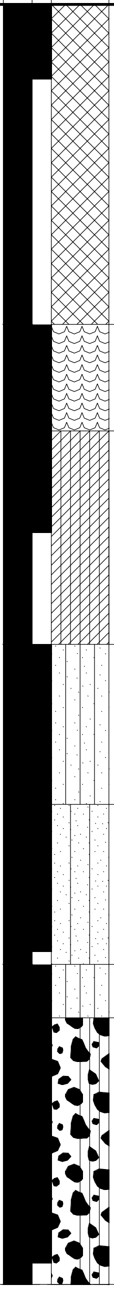
CLIENT:	Harrisburg Elementary School
PROJECT:	Gymnasium Seismic Retrofit
SITE ADDRESS:	642 Smith St, Harrisburg, Oregon

BORING NUMBER **B-1** Sheet 1 of 1

SURFACE ELEVATION

NORTH

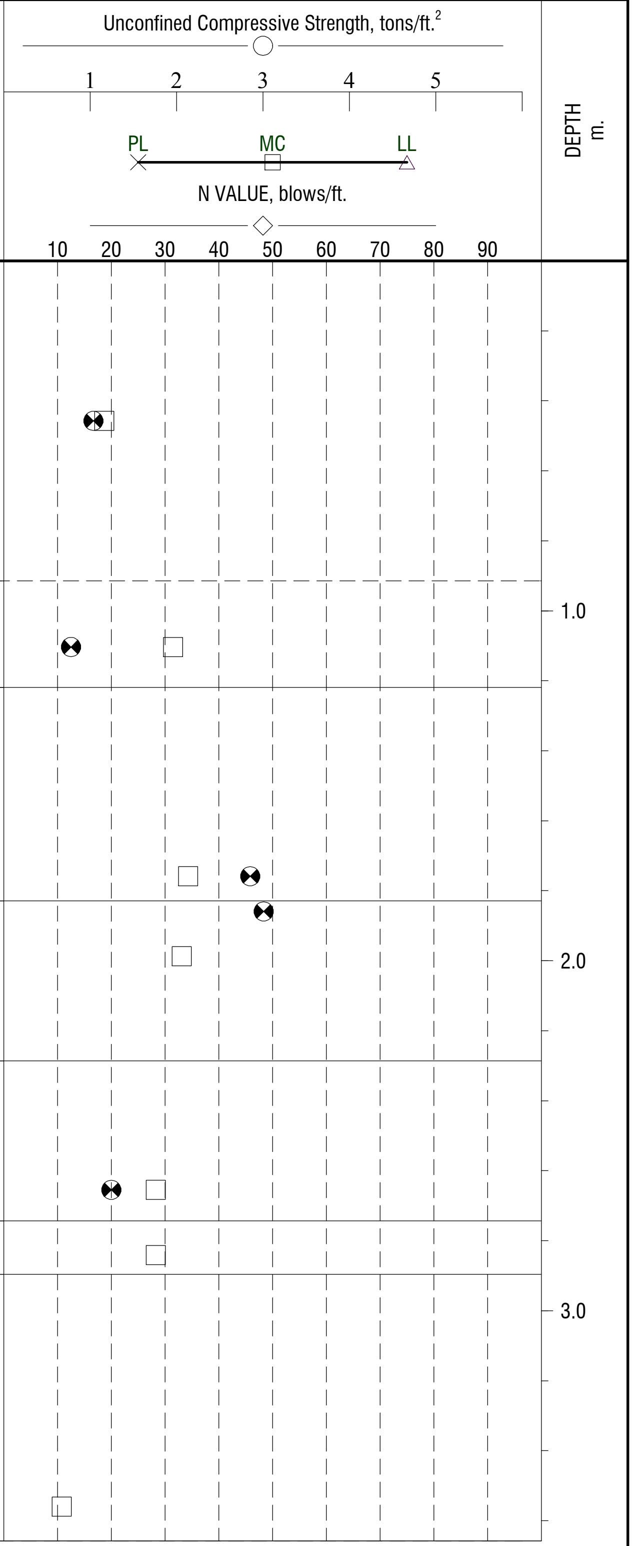
EAST



DEPTH, ft	SAMPLE NO.	DESCRIPTION OF MATERIALS (LABORATORY CLASSIFICATION)	UNIT DRY WT. LBS./FT.³
	1	Dark brown, damp,soft to mod. stifff, moderately plastic, organic silty-CLAY with 1/4-inch gravel and landscaping bark. Likely FILL. Thin roots through layer.	
3.0		Brown, moist, soft, high plasticity, organic silty-CLAY with trace amounts (<5%) of sand. Thin roots.	
4.0	2	Tan, damp or moist, moderately stiff to stiff, moderately plastic, silty-CLAY or clayey-SILT	
6.0		Brown, damp, very stiff, low plasticity sandy-SILT; increasing sand content with depth. Lightly cemented.	
	3	Dark brown, wet, very dense, non-plastic, silty-SAND. Lightly cemented.	
9.0		Gray/brown, saturated, dense to very dense, sandy-SILT.	
	4	Gray, dense to very dense, saturated, silty-sandy-GRAVEL	

DEPTH, ft: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, ACR ▽ (6.7), 7.0, 8.0, 9.0, 10.0, 11.0, 12.0

End of Boring @ 12 feet



⊗ Calibrated Penetrometer Unconfined Compression

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED	CASING	CAVE-IN	WATER
12/2/16	00:00	ACR			6.7

BORING STARTED	12/2/16
BORING COMPLETED	12/2/16
DRILLER	K & A
RIG	Dando
ENGINEER	K & A
APPROVED	

DYNAMIC PROBE LOG
FC-1

K & A Engineering, Inc.
541-684-6966
kaengineers.com

HOLE #: FC-1
CREW: K & A Engineering, Inc.
PROJECT: Harrisburg Elementary School Gym Retrofit
ADDRESS: 642 Smith Street
LOCATION: Harrisburg, Oregon

PROJECT NUMBER: 16045
DATE STARTED: 12-02-2016
DATE COMPLETED: 12-02-2016
DEPTH COMPLETED (ft): 15.0
SURFACE ELEVATION: N/A
STATIC WATER DEPTH ON COMPLETION (ft): 6.0
FIRST ENCOUNTERED WATER DEPTH (ft): 6.0
HAMMER WEIGHT: 63.5 kg
CONE AREA: 25.7 sq. cm

DEPTH ft.	BLOWS PER 6-in.	SLEEVE TORQUE ft.-lbs.	SOIL BEHAVIOUR TYPE (SBT) ZONE$^{1, 3}$	REMARKS
-	0	11	9	Soft to Mod. Stiff SILT or CLAY
- 1	2	15	9	
-	2	12	9	
- 2	2	10	5	
-	2	7	5	
- 3	0	8	4	
-	0	11	3	
- 4	0	13	3	
-	1	24	9	
- 5	6	35	9	Very Stiff or Hard SILT or CLAY
-	10	52	9	
- 6	11	69	9	
-	17	71	9	
- 7	18	72	9	
-	15	73	9	
- 8	10	74	9	
-	18	61	9	
- 9	37	49	5	Dense Silty-sandy-GRAVEL
-	72	55	6	
- 10	80	60	6	
-	92	57	6	
- 11	88	53	6	
-	83	50	6	
- 12	64	46	6	
-	61	41	6	
- 13	63	36	6	
-	75	39	6	
- 14	70	42	6	
-	85	41	6	
- 15	86	41	6	
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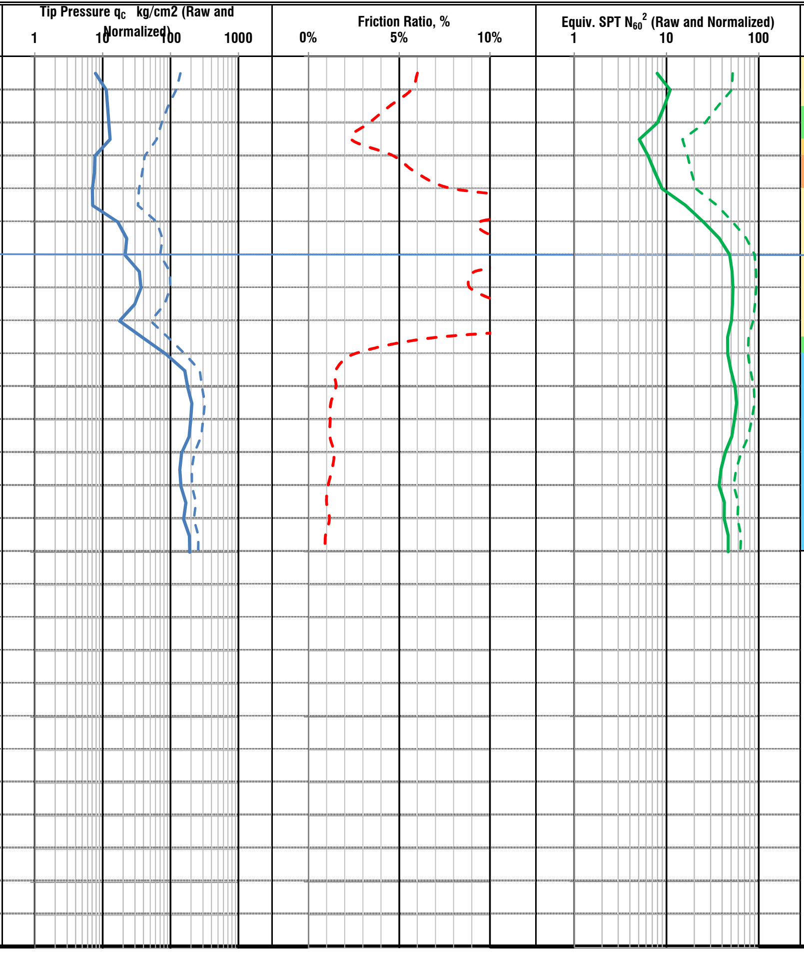

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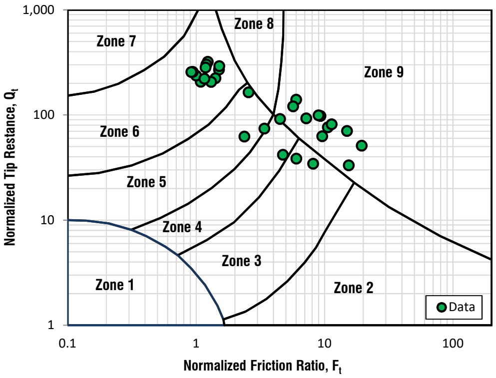
[1] P.K. Robertson, 2010. "Evaluation of flow liquefacton and liquefied strength using Cone Penetration Test." ASCE Journal of Geotechnical and Geoenvironmental Engineering, Vol 136, No. 6. and P.K. Robertson, 2000. "Soil classification using the cone penetration test," Canadian Geotechnical Journal, 27(1).

[2] John H. Schmertmann, "Statics of SPT", Journal of the Geotechnical Engineering Division, American Society of Civil Engineers. May 1979.

[3] P.K. Robertson, K.L. Cabal (Robertson), 2015. "Guide to Cone Penetration Testing for Geotechnical Engineering, 6th Edition" Gregg Drilling and Testing, Inc.

Note: Dashed lines show tip pressure and N normalized for overburden pressure

Zone	Soil Behaviour Type (SBT) Description
1	Sensitive, fine grained
2	Organic soils - clay
3	Clays - silty-clay to clay
4	Silt Mixtures - clayey-silt to silty-clay
5	Sand Mixtures - silty-sand to sandy-silt
6	Sands - clean sand to silty-sand
7	Gravelly sand to dense sand
8	Very stiff sand to clayey sand
9	Fine grained (weak rock, cemented, relic structure)

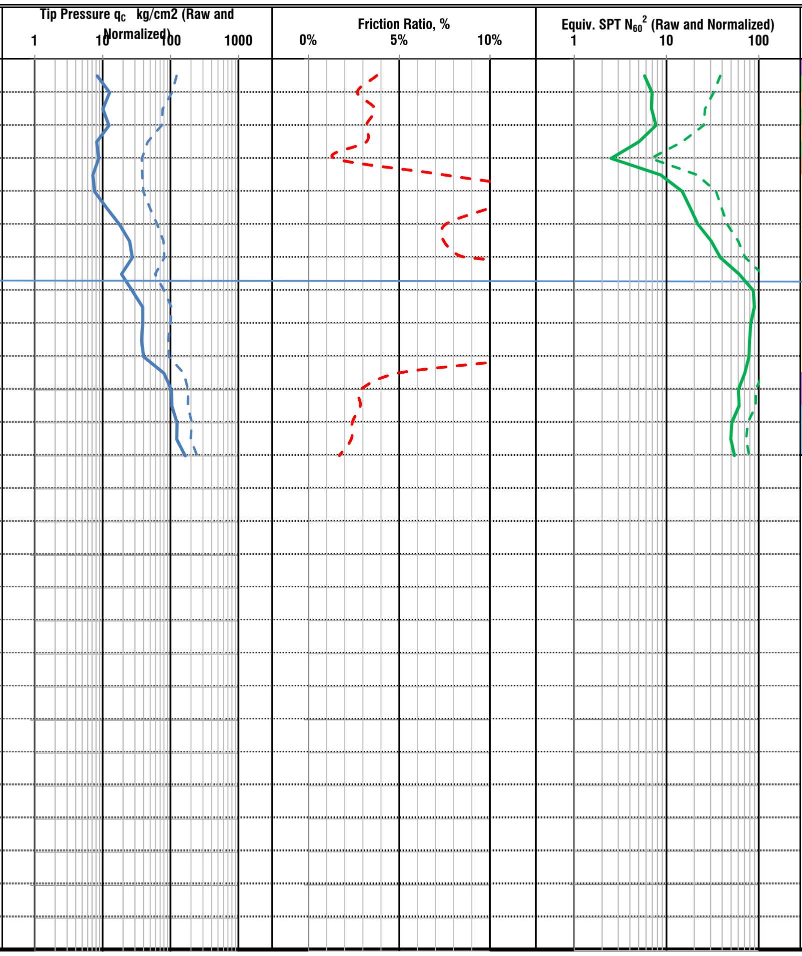


DYNAMIC PROBE LOG
FC-2

K & A Engineering, Inc.
541-684-6966
kaengineers.com

HOLE #: FC-2
CREW: K & A Engineering, Inc.
PROJECT: Harrisburg Elementary School Gym Retrofit
ADDRESS: 642 Smith Street
LOCATION: Harrisburg, Oregon

PROJECT NUMBER: 16045
DATE STARTED: 12-02-2016
DATE COMPLETED: 12-02-2016
DEPTH COMPLETED (ft): 12.0
SURFACE ELEVATION: N/A
STATIC WATER DEPTH ON COMPLETION (ft): 6.7
FIRST ENCOUNTERED WATER DEPTH (ft): 6.7
HAMMER WEIGHT: 63.5 kg
CONE AREA: 25.7 sq. cm



DEPTH ft.	BLOWS PER 6-in.	SLEEVE TORQUE ft.-lbs.	SOIL BEHAVIOUR TYPE (SBT) ZONE[1, 3]	REMARKS
-	0	8	8	Soft or Very Soft SILT or CLAY
- 1	2	8	5	
-	1	9	4	
- 2	2	9	5	
-	0	6	4	
- 3	0	3	5	
-	0	13	3	
- 4	1	22	9	Very Stiff or Hard SILT or CLAY
-	3	26	9	
- 5	6	30	9	
-	10	41	9	
- 6	12	52	9	
-	12	90	9	
- 7	19	128	9	▼
-	24	128	9	
- 8	23	116	9	
-	22	113	9	
- 9	23	110	9	
-	39	88	9	Very Dense or Dense Silty-sandy-GRAVEL
- 10	47	66	8	
-	48	67	8	
- 11	57	67	6	
-	56	65	6	
- 12	74	63	6	
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[1] P.K. Robertson, 2010. "Evaluation of flow liquefacton and liquefied strength using Cone Penetration Test." ASCE Journal of Geotechnical and Geoenvironmental Engineering, Vol 136, No. 6. and P.K. Robertson, 2000. "Soil classification using the cone penetration test," Canadian Geotechnical Journal, 27(1).

[2] John H. Schmertmann, "Statics of SPT", Journal of the Geotechnical Engineering Division, American Society of Civil Engineers. May 1979.

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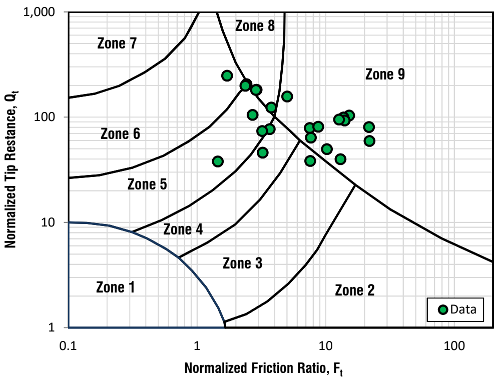
Note: Dashed lines show tip pressure and N normalized for overburden pressure

Zone	Soil Behaviour Type (SBT) Description
1	Sensitive, fine grained
2	Organic soils - clay
3	Clays - silty-clay to clay
4	Silt Mixtures - clayey-silt to silty-clay
5	Sand Mixtures - silty-sand to sandy-silt
6	Sands - clean sand to silty-sand
7	Gravelly sand to dense sand
8	Very stiff sand to clayey sand
9	Fine grained (weak rock, cemented, relic structure)

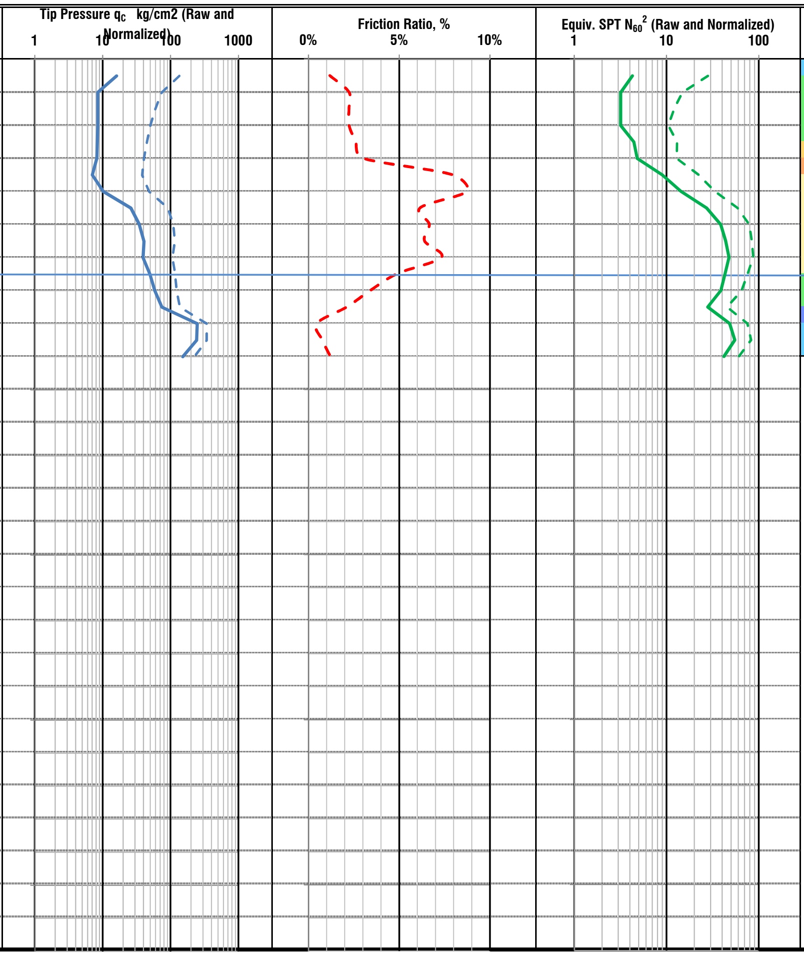


DYNAMIC PROBE LOG
FC-3

K & A Engineering, Inc.
541-684-6966
kaengineers.com

HOLE #: FC-3
CREW: K & A Engineering, Inc.
PROJECT: Harrisburg Elementary School Gym Retrofit
ADDRESS: 642 Smith Street
LOCATION: Harrisburg, Oregon

PROJECT NUMBER: 16045
DATE STARTED: 12-02-2016
DATE COMPLETED: 12-02-2016
DEPTH COMPLETED (ft): 9.0
SURFACE ELEVATION: N/A
STATIC WATER DEPTH ON COMPLETION (ft): None Observed
FIRST ENCOUNTERED WATER DEPTH (ft): None Observed
HAMMER WEIGHT: 63.5 kg
CONE AREA: 25.7 sq. cm



DEPTH ft.	BLOWS PER 6-in.	SLEEVE TORQUE ft.-lbs.	SOIL BEHAVIOUR TYPE (SBT) ZONE^{1,3}	REMARKS
-	3	5	6	2-in HMAC
- 1	0	5	5	Crushed Aggregate FILL
-	0	5	5	Soft Sandy-SILT CLAY
- 2	0	5	5	
-	0	5	5	
- 3	0	6	4	
-	0	13	3	
- 4	2	21	9	Very Stiff Lightly Cemented SILT & SAND
-	10	36	9	
- 5	15	51	9	
-	18	57	9	
- 6	18	63	9	
-	22	54	9	
- 7	25	45	5	▼
-	31	36	5	Dense Silty-sandy-GRAVEL
- 8	105	27	7	
-	104	41	6	
- 9	65	41	6	
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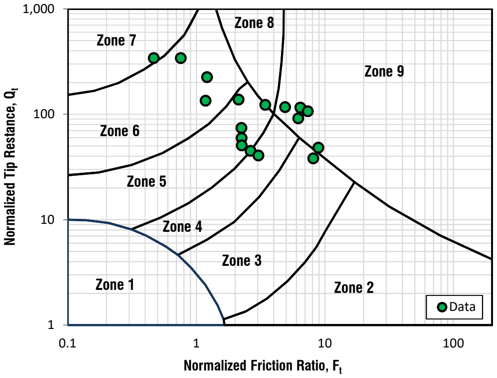
[1] P.K. Robertson, 2010. "Evaluation of flow liquefacton and liquefied strength using Cone Penetration Test." ASCE Journal of Geotechnical and Geoenvironmental Engineering, Vol 136, No. 6. and P.K. Robertson, 2000. "Soil classification using the cone penetration test," Canadian Geotechnical Journal, 27(1).

[2] John H. Schmertmann, "Statics of SPT", Journal of the Geotechnical Engineering Division, American Society of Civil Engineers. May 1979.

[3] P.K. Robertson, K.L. Cabal (Robertson), 2015. "Guide to Cone Penetration Testing for Geotechnical Engineering, 6th Edition" Gregg Drilling and Testing, Inc.

Note: Dashed lines show tip pressure and N normalized for overburden pressure

Zone	Soil Behaviour Type (SBT) Description
1	Sensitive, fine grained
2	Organic soils - clay
3	Clays - silty-clay to clay
4	Silt Mixtures - clayey-silt to silty-clay
5	Sand Mixtures - silty-sand to sandy-silt
6	Sands - clean sand to silty-sand
7	Gravelly sand to dense sand
8	Very stiff sand to clayey sand
9	Fine grained (weak rock, cemented, relic structure)

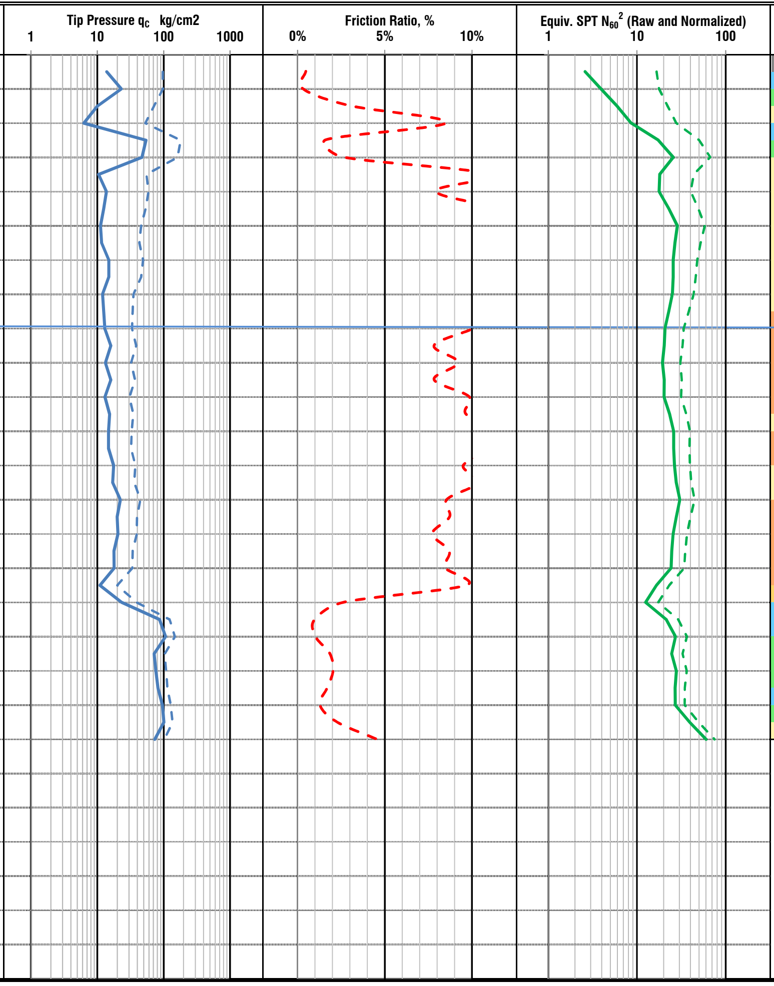


DYNAMIC PROBE LOG
FC-4

K & A Engineering, Inc.
541-684-6966
kaengineers.com

HOLE #: FC-4
CREW: K & A Engineering, Inc.
PROJECT: Harrisburg Middle School Seismic Retrofit Project
ADDRESS: 201 6th Street
LOCATION: Harrisburg, Oregon

PROJECT NUMBER: 19006
DATE STARTED: 02-07-2019
DATE COMPLETED: 02-07-2019
DEPTH COMPLETED (ft): 20.0
SURFACE ELEVATION: N/A
STATIC WATER DEPTH ON COMPLETION (ft): 8.0
FIRST ENCOUNTERED WATER DEPTH (ft): 8.0
HAMMER WEIGHT: 63.5 kg
CONE AREA: 22.9 sq. cm



DEPTH ft.	BLOWS PER 6-in.	SLEEVE TORQUE ft.-lbs.	SOIL BEHAVIOUR TYPE (SBT) ZONE[1, 3]	REMARKS
-	2	2	▨	3" HMAC
- 1	5	2	6	Loose to Mod. Dense **Undocumented FILL** Gravels, Silts, Sands
-	1	7	5	
- 2	0	11	9	
-	16	17	6	
- 3	14	23	5	
-	2	22	9	**Cemented** **SILT or sandy-SILT**
- 4	3	21	9	
-	3	28	9	
- 5	3	36	9	
-	3	34	9	
- 6	4	31	9	
-	4	31	9	
- 7	3	31	9	
-	3	28	9	
- 8	3	26	3	▼ Stiff to Very Stiff **SILT or CLAY**
-	4	25	3	
- 9	3	24	3	
-	4	25	3	
- 10	3	26	3	
-	4	29	3	
- 11	4	32	9	
-	4	32	3	
- 12	5	32	3	
-	5	35	9	
- 13	7	37	9	
-	6	34	3	
- 14	6	31	3	
-	5	31	3	
- 15	5	30	3	
-	2	22	3	
- 16	6	14	4	
-	30	19	6	Moderately Dense **Silt, Sand, and Gravel**
- 17	38	23	6	
-	25	27	5	
- 18	27	31	5	
-	29	28	5	
- 19	34	26	6	
-	37	45	5	
- 20	28	64	9	
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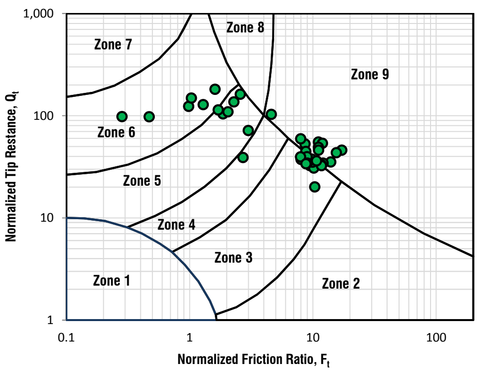
[3] P.K. Robertson, K.L. Cabal (Robertson), 2015. "Guide to Cone Penetration Testing for Geotechnical Engineering, 6th Edition" Gregg Drilling and Testing, Inc.

Note: Dashed lines show tip pressure and N normalized for overburden pressure

Zone	Soil Behaviour Type (SBT) Description
1	Sensitive, fine grained
2	Organic soils - clay
3	Clays - silty-clay to clay
4	Silt Mixtures - clayey-silt to silty-clay
5	Sand Mixtures - silty-sand to sandy-silt
6	Sands - clean sand to silty-sand
7	Gravelly sand to dense sand
8	Very stiff sand to clayey sand
9	Fine grained (weak rock, cemented, relic structure)

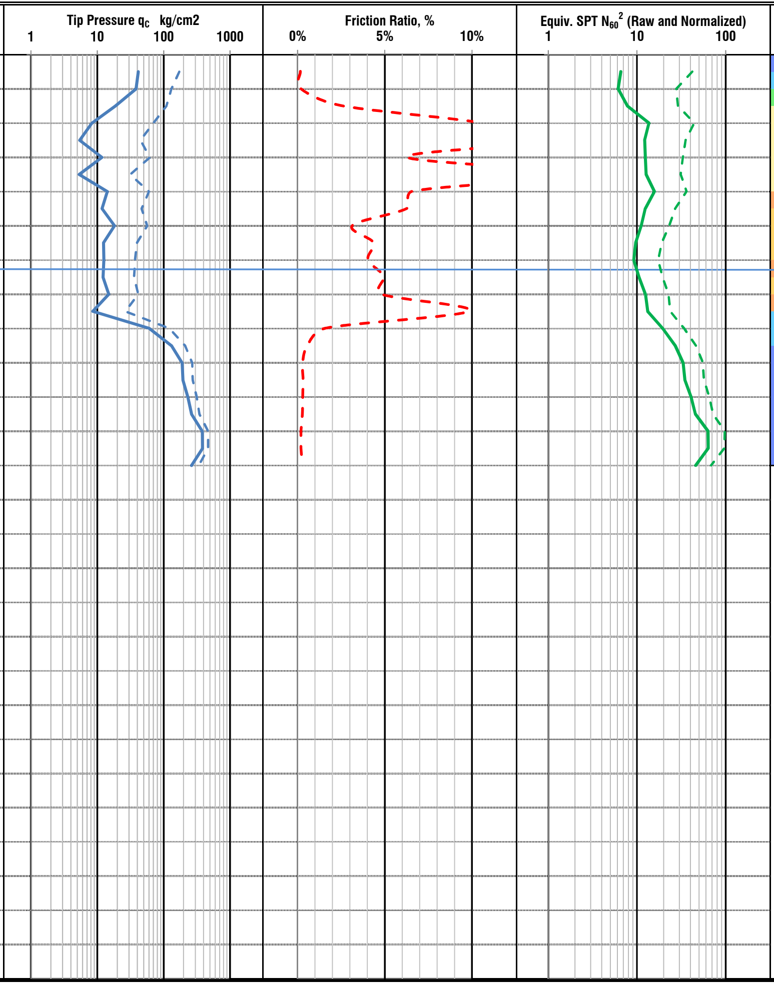


DYNAMIC PROBE LOG
FC-5

K & A Engineering, Inc.
541-684-6966
kaengineers.com

HOLE #: FC-5
CREW: K & A Engineering, Inc.
PROJECT: Harrisburg Middle School Seismic Retrofit Project
ADDRESS: 201 6th Street
LOCATION: Harrisburg, Oregon

PROJECT NUMBER: 19006
DATE STARTED: 02-07-2019
DATE COMPLETED: 02-07-2019
DEPTH COMPLETED (ft): 12.0
SURFACE ELEVATION: N/A
STATIC WATER DEPTH ON COMPLETION (ft): 6.2 (caved)
FIRST ENCOUNTERED WATER DEPTH (ft): 6.2 (caved)
HAMMER WEIGHT: 63.5 kg
CONE AREA: 22.9 sq. cm



DEPTH ft.	BLOWS PER 6-in.	SLEEVE TORQUE ft.-lbs.	SOIL BEHAVIOUR TYPE (SBT) ZONE[1, 3]	REMARKS
-	11	2	7	Loose **Crushed Aggregate FILL**
- 1	10	2	6	
-	4	10	5	
- 2	1	17	9	**Cemented SILT or CLAY**
-	0	16	9	
- 3	2	15	9	
-	0	16	9	
- 4	3	18	9	
-	2	15	3	Moderately Stiff **SILT or CLAY**
- 5	4	12	4	
-	2	12	4	
- 6	2	11	4	
-	2	13	3	▼
- 7	3	15	4	
-	1	17	3	
- 8	19	19	6	Dense to Very Dense **Silty-sandy-GRAVEL**
-	44	16	6	
- 9	64	12	7	
-	66	13	7	
- 10	79	15	7	
-	90	15	7	
- 11	132	16	7	
-	133	16	7	
- 12	90	16	7	
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Note: Dashed lines show tip pressure and N normalized for overburden pressure

Zone	Soil Behaviour Type (SBT) Description
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6	Sands - clean sand to silty-sand
7	Gravelly sand to dense sand
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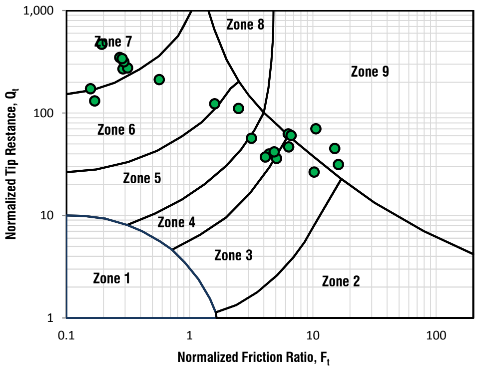
9	Fine grained (weak rock, cemented, relic structure)



Appendix E:
Construction Cost Estimate Worksheets

ENGINEER'S OPINION OF PROBABLE COST - HARRISBURG 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%	%		$ 136,160.00
Preconstruction Services		2%	%		$ 27,232.00
Escalation		7%	%		$ 106,749.44
Bonding & Insurance		3%	%		$ 45,749.76
Contractor Profit & Overhead		5%	%		$ 76,249.60
			General Conditions Subtotal		$ 392,140.80
Non-Structural Elements					
Misc MEP	N1, N2, N5, N6, N7, N8, N9	1	Lump Sum	$ 87,700.00	$ 87,700.00
Misc Non-Structural	N3, N4	1	Lump Sum	$ 35,200.00	$ 35,200.00
			Non-Structural Subtotal		$ 122,900.00
Construction Cost Per Building Part					
			Building Part 'Original Classroom-Area A' Subtotal		$ 1,238,700.00
			Sub-Total Construction Cost		**$ 1,753,700.00**
			Contingency	**15%**	**$ 263,055.00**
			Total Construction Cost		**$ 2,016,755.00**
Cost Estimate Summary					
Engineering					$ 286,400.00
Architectural Consulting				$ 30,300.00	
Structural / Rehabilitation Engineering				$ 221,800.00	
Geotechnical Consulting				$ 19,200.00	
Materials Testing for Design				$ 15,100.00	
Construction Management					$ 60,500.00
Construction					$ 1,831,300.00
Sub-Total Construction Cost				$ 1,753,700.00	
Special Inspection Services for Construction				$ 17,100.00	
Permitting Fees				$ 60,500.00	
Relocation of FF&E					$ 26,300.00
Contingency					$ 263,055.00
			Total Project Funding Requirement		**$ 2,467,555.00**

ENGINEER'S OPINION OF PROBABLE COST - HARRISBURG SEISMIC REHABILITATION

BUILDING PART - 'Original Classroom-Area A'

Description	Deficiencies (Ref. Seismic Evaluation Report Sec. 6.0)	Quantity	Units	Unit Price	Total Price for Construction Item
Demolition & Asbestos Abatement					
Built-Up Roof Demo	S8, S11	24100	Square Foot	$ 4.00	**$ 96,400.00**
Soft Demolition	S1-S7, S9, S11	6000	Square Foot	$ 2.00	**$ 12,000.00**
Hard Demolition	S1A, S2	2400	Square Foot	$ 20.00	**$ 48,000.00**
Abatement	S1-S7, S9, S11	2800	Square Foot	$ 5.00	**$ 14,000.00**
			Demolition & Asbestos Subtotal		**$ 170,400.00**
Foundation / Floor Strengthening Construction					
Shear Wall Footings - CMU / Concrete	S2, S3	150	Linear Foot	$ 300.00	**$ 45,000.00**
Spread Footings for Columns / Holdown	S1A	14	Each	$ 4,000.00	**$ 56,000.00**
Floor Finish Patch / Replacement	S1A, S2	600	Square Foot	$ 7.00	**$ 4,200.00**
Wood Flooring Re-Finish	S1A	1800	Square Foot	$ 5.00	**$ 9,000.00**
Flooring Protection	S1B	2800	Square Foot	$ 6.00	**$ 16,800.00**
Bolting of Extg Walls	S11	240	Linear Foot	$ 30.00	**$ 7,200.00**
			Foundation Level Subtotal		**$ 138,200.00**
Wall Strengthening Construction					
New CMU / Concrete Shear Walls	S3, S4	700	Square Foot	$ 30.00	**$ 21,000.00**
Light Steel Columns	S1A	14	EA	$ 1,600.00	**$ 22,400.00**
Sheathing of Existing Walls	S11	3900	Square Foot	$ 5.00	**$ 19,500.00**
Interior Wall Finish Repair	S11	3900	Square Foot	$ 2.00	**$ 7,800.00**
New 2x Framed Shear Walls	S11	800	Square Foot	$ 10.00	**$ 8,000.00**
Painting	S1-S10	24100	Square Foot	$ 3.00	**$ 72,300.00**
			Wall Strengthening Subtotal		**$ 151,000.00**
Roof Strengthening Construction					
New Roof Sheathing	S8	24100	Square Foot	$ 4.00	**$ 96,400.00**
Diaphragm Attachments - Out-of-Plane	S4	1100	Linear Foot	$ 50.00	**$ 55,000.00**
Diaphragm Attachments - In-Plane Shear	S5	1100	Linear Foot	$ 20.00	**$ 22,000.00**
Tapered insulation for drainage	S5	24100	Square Foot	$ 10.00	**$ 241,000.00**
New Single Ply Roof	S5	24100	Square Foot	$ 12.00	**$ 289,200.00**
New Drag Beam	S6, S7	7	EA	$ 2,500.00	**$ 17,500.00**
Seismic Isolation from Adjacent Building	S2	100	Linear Foot	$ 400.00	**$ 40,000.00**
Ceiling Repair	S4-S6	6000	Square Foot	$ 3.00	**$ 18,000.00**
			Roof Strengthening Subtotal		**$ 779,100.00**
			Building Part 'Original Classroom-Area A' - Total Construction Cost		**$ 1,238,700.00**

Appendix F:
Rapid Visual Screening

Rapid Visual Screening of Buildings for Potential Seismic Hazards

FEMA P-154 Data Collection Form

Level 1
HIGH Seismicity

Address: 642 Smith St.
Harrisburg, OR **Zip:** 97446
Other Identifiers: Original Classroom
Building Name: Elementary School
Use: School
Latitude: 44.271938 **Longitude:** 123.165233
S_S: 0.854 **S_1:** 0.435
Screener(s): SJL **Date/Time:** 9/19/2022

No. Stories: Above Grade: 1 Below Grade: 0 **Year Built:** 1954 ☐ EST
Total Floor Area (sq. ft.): 24,100 **Code Year:** 1997
Additions: ☐ None ☒ Yes, Year(s) Built: 1960

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.*

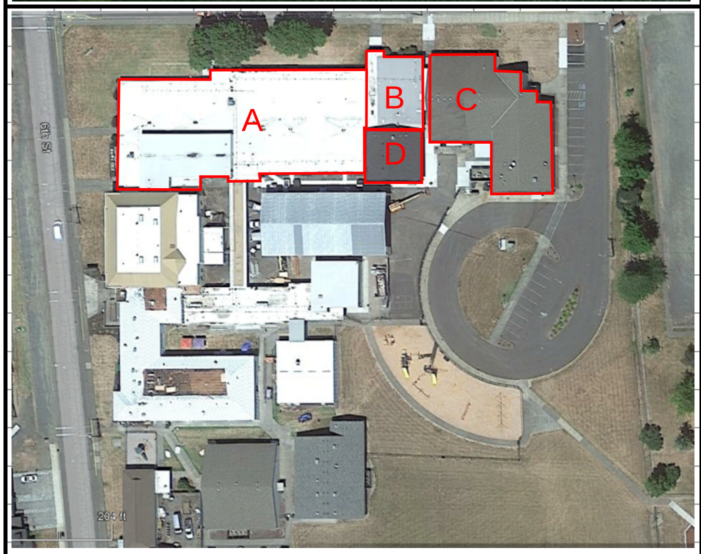
Geologic Hazards: Liquefaction: [✓ Yes]/No/DNK Landslide: Yes/[✓ No]/DNK Surf. Rupt.: Yes/[✓ No]/DNK

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:



SKETCH

☐ Additional sketches or comments on separate page

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

FEMA BUILDING TYPE	Do Not Know	W1	W1A	W2	S1 (MRF)	S2 (BR)	S3 (LM)	S4 (RC SW)	S5 (URM INF)	C1 (MRF)	C2 (SW)	C3 (URM INF)	PC1 (TU)	PC2	RM1 (FD)	RM2 (RD)	URM	MH
Basic Score		**3.6**	**3.2**	**2.9**	**2.1**	**2.0**	**2.6**	**2.0**	**1.7**	**1.5**	**2.0**	**1.2**	**[✓ 1.6]**	**1.4**	**1.7**	**1.7**	**1.0**	**1.5**
Severe Vertical Irregularity, V_{L1}		-1.2	-1.2	-1.2	-1.0	-1.0	-1.1	-1.0	-0.8	-0.9	-1.0	-0.7	[✓ -1.0]	-0.9	-0.9	-0.9	-0.7	NA
Moderate Vertical Irregularity, V_{L1}		-0.7	-0.7	-0.7	-0.6	-0.6	-0.7	-0.6	-0.5	-0.5	-0.6	-0.4	-0.6	-0.5	-0.5	-0.5	-0.4	NA
Plan Irregularity, P_{L1}		-1.1	-1.0	-1.0	-0.8	-0.7	-0.9	-0.7	-0.6	-0.6	-0.8	-0.5	-0.7	-0.6	-0.7	-0.7	-0.4	NA
Pre-Code		-1.1	-1.0	-0.9	-0.6	-0.6	-0.8	-0.6	-0.2	-0.4	-0.7	-0.1	[✓ -0.5]	-0.3	-0.5	-0.5	0.0	-0.1
Post-Benchmark		1.6	1.9	2.2	1.4	1.4	1.1	1.9	NA	1.9	2.1	NA	2.0	2.4	2.1	2.1	NA	1.2
Soil Type A or B		0.1	0.3	0.5	0.4	0.6	0.1	0.6	0.5	0.4	0.5	0.3	0.6	0.4	0.5	0.5	0.3	0.3
Soil Type E (1-3 stories)		0.2	0.2	0.1	-0.2	-0.4	0.2	-0.1	-0.4	0.0	0.0	-0.2	-0.3	-0.1	-0.1	-0.1	-0.2	-0.4
Soil Type E (> 3 stories)		-0.3	-0.6	-0.9	-0.6	-0.6	NA	-0.6	-0.4	-0.5	-0.7	-0.3	NA	-0.4	-0.5	-0.6	-0.2	NA
Minimum Score, S_{MIN}		*1.1*	*0.9*	*0.7*	*0.5*	*0.5*	*0.6*	*0.5*	*0.5*	*0.3*	*0.3*	*0.3*	*0.2*	*0.2*	*0.3*	*0.3*	*0.2*	*1.0*

FINAL LEVEL 1 SCORE, $S_{L1} \geq S_{MIN}$: 0.2 FEMA P-154 Collapse Potential High (>10%) From SL2 Score

EXTENT OF REVIEW

Exterior: ☐ Partial ☒ All Sides ☐ Aerial
Interior: ☐ None ☒ Visible ☒ Entered
Drawings Reviewed: ☒ Yes ☐ No
Soil Type Source: Assumed
Geologic Hazards Source: DOGAMI
Contact Person:

LEVEL 2 SCREENING PERFORMED?

☒ Yes, Final Level 2 Score, S_{L2} 0.2 ☐ 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	RC = Reinforced concrete	URM INF = Unreinforced masonry infill	MH = Manufactured Housing	FD = Flexible diaphragm
	BR = Braced frame	SW = Shear wall	TU = Tilt up	LM = Light metal	RD = Rigid diaphragm

HARRISBURG SCHOOL DISTRICT
CM/GM SEISMIC UPGRADE PROJECT
PRE-PROPOSAL CONFERENCE
SIGN IN
SEPTEMBER 24, 2O24

Company: CB Construction Contact: Jason Pennington
Address: 1202 Adams Ave, La Grande, OR 97805
Email: jasonp@cbconst.us
Phone: 541-663-4188 Cell: 541-910-1239

Company: Essex General Construction Contact: Billy Philips
Address: 4284 W 7th Ave, Eugene, OR 97402
Email: billy.phillips@essexgc.com
Phone: ________ Cell: 541-953-9633

Company: Gerding Builders Contact: Stacy Rodgers
Address: 200 SW Airport Ave, Corvallis, OR 97333
Email: stacyr@gerdingbuilders.com
Phone: 541-745-4011 Cell: 541-753-2012

Company: McKenzie Commercial Contact: Jennifer Thomas
Address: 3625 West 1st Ave, Eugene, OR 97402
Email: jthomas@mccmail.biz
Phone: 541-343-7143 Cell: 541-543-1756

Company: Vitus Construction Contact: Corey Vitus
Address: 612 2nd Ave, Gold Hill, OR 97525
Email: corey@vitusconstruction.com
Phone: 541-855-7177 Cell: 541-821-7403

Company: Triplett Wellman Contact: Nick Wellman
Address: 1717 Mt. Jefferson Ave., Woodburn, OR 97071
Email: nick@triplettwellman.com
Phone: 503-982-4182 Cell: 503-442-5355

The District will only accept Proposals from those firms who signed in at the Mandatory Pre-Proposal Conference. The District will not accept responses where an attendee subrogates their attendance to a firm not in attendance.

HARRISBURG SCHOOL DISTRICT
CM/GM SEISMIC UPGRADE PROJECT
PRE-PROPOSAL CONFERENCE
SIGN IN
SEPTEMBER 24, 2O24

Company: McKenzie Commercial Construction Contact: Toby DeMasters
Address: 3625 West 1st Ave, Eugene, OR 97402
Email: tdemasters@mccmail.biz
Phone: 541-343-7143 Cell: 541-729-2561

Company: ____ Contact: ____
Address: ____
Email: ____
Phone: ____ Cell: ____

Company: ____ Contact: ____
Address: ____
Email: ____
Phone: ____ Cell: ____

Company: ____ Contact: ____
Address: ____
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Company: ____ Contact: ____
Address: ____
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Phone: ____ Cell: ____

Company: ____ Contact: ____
Address: ____
Email: ____
Phone: ____ Cell: ____

The District will only accept Proposals from those firms who signed in at the Mandatory Pre-Proposal Conference. The District will not accept responses where an attendee subrogates their attendance to a firm not in attendance.