Oregon Seismic Status Report - 2016

Oregon law requires school districts and education service districts to provide DOGAMI with notice of construction projects that may affect a school's seismic risk.
This report was generated by DOGAMI from submitted data.

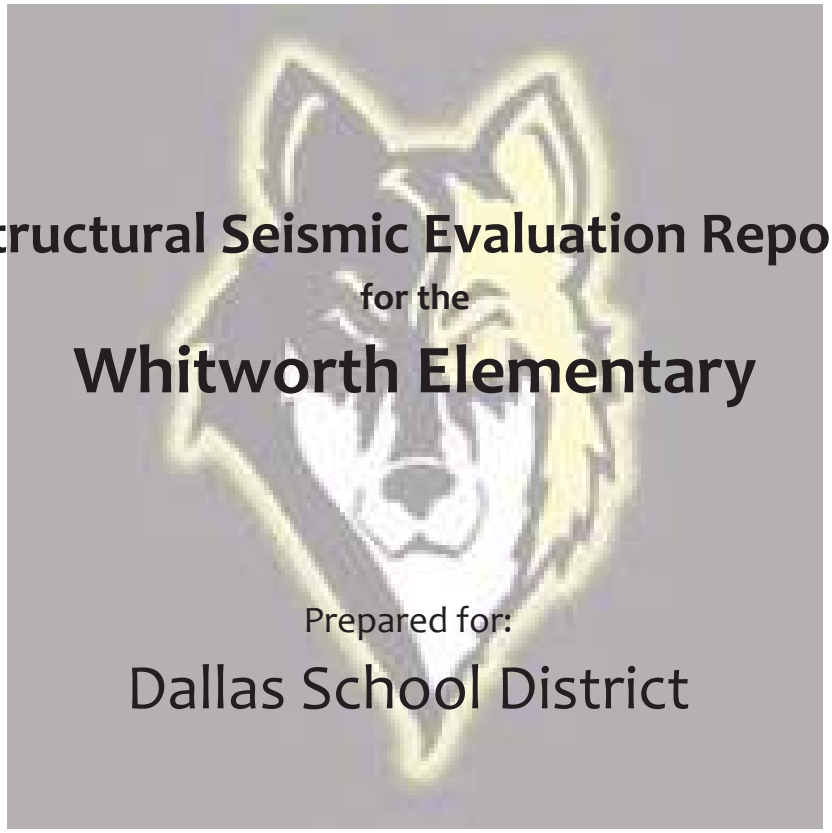
School District/ESD:	**Dallas 2**
County:	POLK
Contact Name:	Kevin Montague
Contact Email:	kevin.montague@dsd2,irg
Structures Replaced?	No
Name and Address:	
Kind of Structure:	
Type of Replacement:	
Max Occupancy:	
Date Occupied:	
Structures Modified?	No
Name and Address:	
Kind of Structure:	
Type of Modification:	
Date Re-occupied:	
Optional:	
Engineering Report?	Yes *If yes, attachments are appended to this report.*
Cost of Rehab:	
Method of Funding:	
	Seismic Rehabilitation Grant funding the upgrades to Whitworth Elementary School with construction to start summer of 2017
Notes:	

Submission Date: 9/1/2016

Structural Seismic Evaluation Report

for the

Whitworth Elementary



Prepared for:

Dallas School District

December, 2015

Prepared by:

Russell C. Carter, PE, SE
Principal in Charge

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER
18653
OREGON
July 16, 1996
RUSSELL C. CARTER
EXPIRES: 12-31-15

ZCS ENGINEERING Inc.

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Table of Contents

1.0 Executive Summary

The Dallas School District is located in Dallas Oregon in Polk County. The District operates 6 Schools located within the community including the property of interest, Whitworth Elementary approximately 2 miles West of Dallas Oregon. District has retained ZCS Engineering, Inc. (ZCS) to perform a seismic evaluation of Whitworth Elementary 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 41-13".

Whitworth Elementary is located at 1151 SE Miller Ave. in Dallas Oregon (Figure 1 – Vicinity Map). Whitworth ES is a single story conventionally framed structure approaching 50,000 sf in floor area. Areas A and C as designated in the DOGAMI RVS Report are the target areas for this grant application and are some 40,100 sf in size. The gymnasium is not included in this application. Several additions have been made to this facility over the years. The this K-6 facility supports some 427 students during the regular school year and some 50 students during the summer program.

The evaluation of the facility indicates, rehabilitation of existing lateral system components are necessary to meet the requirements for Life Safety as outlined in ASCE 41-13. The following is a brief list of seismic deficiencies encountered:

- Full height glazing packages in the longitudinal walls are not an adequate lateral force resisting system. The glazing packages are brittle and are not properly attached to the structure to properly transfer in plane shear forces from the diaphragm to the foundation.
- Large windows in the longitudinal direction reduce the available shear wall lengths. The shear walls with the windows do not have adequate capacity for the prescribed seismic loadings.
- The Interior gypsum shear walls below the lower roofs structure do not have adequate capacity to resist the prescribed seismic forces generated in the roof diaphragms.
- The 2x T&G decking roof diaphragms do not meet the prescribed aspect ratio. The code limits the aspect ratios (length to depth) to minimize the shear demands and deflection.
- The framing configuration at the top of the walls and glazing package does not provide for a continuous diaphragm top chord. This lack of top chords inhibits the ability of the roof diaphragm to transfer seismic forces into shear walls.
- The roof sheathing in the lower roof structure is not properly attached to the underlying shear walls.
- The covered play structure are does not have a lateral force resisting system along the East wall line.

- The upper transom windows in the cafeteria inhibit the roof diaphragm from transferring load to the shear walls below.
- Cafeteria and play structure are taller than classroom. This creates a vertical irregularity. This vertical irregularity could result in pounding of the surrounding classrooms into the cafeteria and play structure. The pounding effects increase the buckling loads on the walls.

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

To help the District understand the magnitude of the rehabilitation effort and secure funding sources for the seismic system rehabilitation of the building, a preliminary construction cost estimate was developed. With the assistance of a local construction company representative a total construction cost of $1,492,800 including all soft costs associated with architecture/engineering, permitting, and District Project Management was developed. Refer to section 5.0 of the report body.

In addition to the construction cost estimation efforts we performed a “Benefit Cost Analysis” using the tool provided by the State of Oregon Infrastructure Finance Authority. The building has a benefit cost score of 3.357. Refer to Appendix D for BCA worksheets.

It is our final recommendation that given the BCA score and the general condition of the seismic resisting systems, this building is an excellent candidate to be rehabilitated to meet the currently prescribed seismic demands for Life Safety per ASCE 41-13. Once rehabilitated, this building will meet the needs of the District and community for future generations.

2.0 Project Introduction

Dallas School District is centrally located in *Dallas,* Oregon in *Polk* County. *Whitworth* is located at 1151 SE Miller Ave.in *Dallas* Oregon (Figure 1 – Vicinity Map).

The *District has* retained ZCS Engineering, Inc. (ZCS) to perform a seismic evaluation of Whitworth Elementary. The purpose of the evaluation is to provide the District with an objective, comprehensive analysis of the condition of the existing seismic force resisting systems of the facility when compared to a building constructed using modern building codes. In addition to evaluating the building's seismic performance, schematic seismic retrofit plans have been developed. The rehabilitation plans have been developed using our extensive knowledge of seismic rehabilitation and are intended to meet the objectives and the level of performance of *Life Safety* based on the ASCE 41-13 requirements. Based on the seismic evaluation and schematic rehabilitation design drawings, a preliminary construction cost estimate was developed. Based on the preliminary construction cost estimate, a benefit cost analysis was prepared to help the *District* determine whether or not the rehabilitation efforts outlined in this report are financially responsible.

This work was conducted at the request of Kevin Montague under an engineering services contract between the District and ZCS.

2.1 Scope of Work

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

Seismic Evaluation & Preliminary Rehabilitation Services:

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

Preliminary Construction Cost Consulting Services:

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

3.0 Structural Evaluation

3.1 Introduction

ZCS was tasked with evaluating the lateral force resisting systems of the facility. The structures reviewed in our analysis include the entire existing school house with the exception of the gymnasium.

The facility is a single story timber framed building with varying roof levels throughout creating vertical load path irregularities. The lateral force resisting system currently relies on diaphragms consisting of roof decking and exterior/interior walls that transfer lateral forces from the diaphragms to the slab on grade foundation.

3.2 Structural Evaluation

The following outlines the evaluation of the existing structural components of the building. The evaluation includes site observations of the existing structural elements and follows the guidelines outlined in the American Society of Civil Engineer's "Seismic Evaluation of Existing Buildings – ASCE 41-13". This manual is the required evaluation tool per the Seismic Rehabilitation Grant Program through Business Oregon Infrastructure Finance Authority. Per ASCE 41-13 a Tier 1 evaluation has been performed. The purpose of a Tier 1 evaluation is to provide "Quick Checks" to properly evaluate a building and determine deficiencies related to the lateral resisting elements.

It is the intent of the District, as part of this study, to determine the structural deficiencies of the building as compared to current prescribed loading and detailing requirements for lateral (wind/seismic) loading to a performance level of "Life Safety" per ASCE 41-13. The level of performance is defined per ASCE 41-13 as:

"Structural performance level, life safety, means post-earthquake damage state in which significant damage to the structure has occurred but some margin against either partial or total structural collapse remains. Some structural elements and components are severely damaged but this has not resulted in large falling debris hazards, either inside or outside the building. Injuries may occur during the earthquake; however, the overall risk of life-threatening injury as a result of structural damage is expected to be low. It should be possible to repair the structure; however, for economic reasons this may not be practical. Although the damaged structure is not an imminent collapse risk, it would be prudent to implement structural repairs or install temporary bracing prior to reoccupancy."

Per ASCE 41-13 a seismic hazard level is required. In order to obtain a performance level of " Life Safety" the seismic hazard shall be BSE-1N as defined in section 2.4.1.2 and C2.4.1.2. The BSE-1N hazard level earthquake has a probability of occurring once in every 475

years, or 10% chance in 50 years. This design level earthquake has a similar rate of occurrence and magnitude as the current state adopted building codes. A 25% reduction in force is recommended by the grant committee. This follows the recommendation of the City of Portland City Code for the evaluation and rehabilitation of existing buildings per chapter 24.85. We feel this provides an appropriate level of performance for this facility.

Lateral resisting systems work in conjunction with gravity framing systems. As such, the existing gravity framing system was also reviewed for structural deficiencies during our site observations. Section 3.3.3 outlines the existing gravity system and its structural deficiencies found during the evaluation.

3.3.1 Lateral Resisting Systems

After reviewing the facility and the existing drawings we have determined the lateral system is defined as a wood frames, commercial and industrial (W2). Per ASCE 41 a W2 lateral system is defined as:

Wood Frames, Commercial and Industrial W2 – These buildings are commercial or industrial buildings with a floor area of 5,000 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 aby pot-and-beam framing.

3.3.2 Lateral Resisting Element Deficiencies

The following lateral resisting element deficiencies are based on visual observations of the existing structural elements and the structural analysis performed during the Tier 1 “Quick Checks” of the ASCE 41-13. The Tier 1 checklists are attached in Appendix B. The following outlines the deficiencies for each portion of the facility.

- Full height glazing packages in the longitudinal walls are not an adequate lateral force resisting system. The glazing packages are brittle and are not properly attached to the structure to properly transfer in plane shear forces from the diaphragm to the foundation.
- Large windows in the longitudinal direction reduce the available shear wall lengths. The shear walls with the windows do not have adequate capacity for the prescribed seismic loadings.

- The Interior gypsum shear walls below the lower roofs structure do not have adequate capacity to resist the prescribed seismic forces generated in the roof diaphragms.
- The 2x T&G decking roof diaphragms do not meet the prescribed aspect ratio. The code limits the aspect ratios (length to depth) to minimize the shear demands and deflection.
- The framing configuration at the top of the walls and glazing package does not provide for a continuous diaphragm top chord. This lack of top chords inhibits the ability of the roof diaphragm to transfer seismic forces into shear walls.
- The roof sheathing in the lower roof structure is not properly attached to the underlying shear walls.
- The covered play structure are does not have a lateral force resisting system along the East wall line.
- The upper transom windows in the cafeteria inhibit the roof diaphragm from transferring load to the shear walls below.
- Cafeteria and play structure are taller than classroom. This creates a vertical irregularity. This vertical irregularity could result in pounding of the surrounding classrooms into the cafeteria and play structure. The pounding effects increase the buckling loads on the walls.

3.3.3 Gravity Resisting Systems and General Observations

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

- The gravity resisting system was found to be in good general condition based on the visual observations performed

3.3.4 Evaluation of Incidental Items

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

- Proper attachment and bracing of storage racks/cabinets/books shelves over 4' tall or 3:1 (height:width) ratio
- Attachment of equipment over 20 lbs. and above 4', and all equipment over 100 lbs.
- Attachment of all emergency lighting, power equipment and associated wiring
- Bracing of overhead fluid piping and any gas piping
- Verification/installation of emergency shutoff valves for gas utilities
- Hazardous material mitigation (floor tiles, roofing, ceiling tiles, etc.)

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

4.0 Seismic Rehabilitation Recommendations

The following structural improvements are required to resolve the deficiencies noted in section 3.9. These improvements are detailed below and in the attached schematic seismic rehabilitation drawings found in Appendix E. These drawings were prepared to assist in defining the rehabilitation scope of work.

- Selective windows in each classroom will be in-filled and new 2x walls with plywood sheathing will be installed to provide adequate shear capacity for in-pane loading. Interior and exterior finishes will be replaced to match existing.
- Where new shear walls are to be located, provide additional anchors to transfer lateral loads from the wall base plates to the concrete stem walls.
- To limit the aspect ratio of the roof diaphragm to code prescribed limits the existing interior cross walls will be sheathed with plywood on the existing wall framing. The existing gypsum interior finish will be removed and replaced over the plywood sheathing. The walls will be adequately attached to the existing slab on grade utilizing post installed anchors and attached to the existing slab on grade utilizing post installed anchors and attached to the roof framing using structural screws.
- Remove the roofing material and provide new roof sheathing to a reliable roof diaphragm.
- Provide blocking, clipping and nailing connections along top of walls to establish adequate connection between top of wall and diaphragm
- Provide new drag tie beams between the beam lines in the transverse direction over the corridor to complete cross ties
- New shear panels will in-fill the transom windows in the cafeteria to properly transfer the in-plane seismic force into the shear walls.
- All piping and HVAC equipment found throughout the building shall be properly braced and attached to the structure to limit the potential damage.
- All piping found within the building that is greater than 12" from structure shall be properly attached and braced.
- New full height shear walls and foundation element will be installed along the East wall of the covered play structure to provide a lateral force resisting system along this wall line.

5.0 Preliminary Construction Cost Estimate

The attached engineer's opinion of probable cost has been developed by ZCS for Whitworth Elementary. 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.

Following the generation of the preliminary construction cost estimate, it was reviewed with a local construction company representative who has participated in similar construction projects. This representative is a highly qualified commercial contractor that has worked on multiple educational facilities and performed seismic retrofits to existing structures. They reviewed the values presented in the construction cost estimate, and provided insight into current construction costs from a contractor's perspective. They also reviewed the schematic seismic retrofit plans attached in Appendix E and provided insight and constructability review. The comments and insight provided have been included in the proposed construction cost estimate and schematic seismic retrofit plans.

After final review the preliminary opinion of probable cost is $1,492,900.

6.0 Benefit Cost Analysis

The provided benefit-cost analysis (BCA) included in Appendix D, has been prepared by ZCS using the BCA tool as provided by the State of Oregon Infrastructure Finance Authority. The costs associated with the building replacement value, contents replacement value, and occupancy values have been developed by *District* staff using recent data.
The BCA for this project is 3.357. Given the BCA score of 3.357 is greater than 1.0. This project is a good candidate for the grant program.

7.0 Conclusion and Recommendations

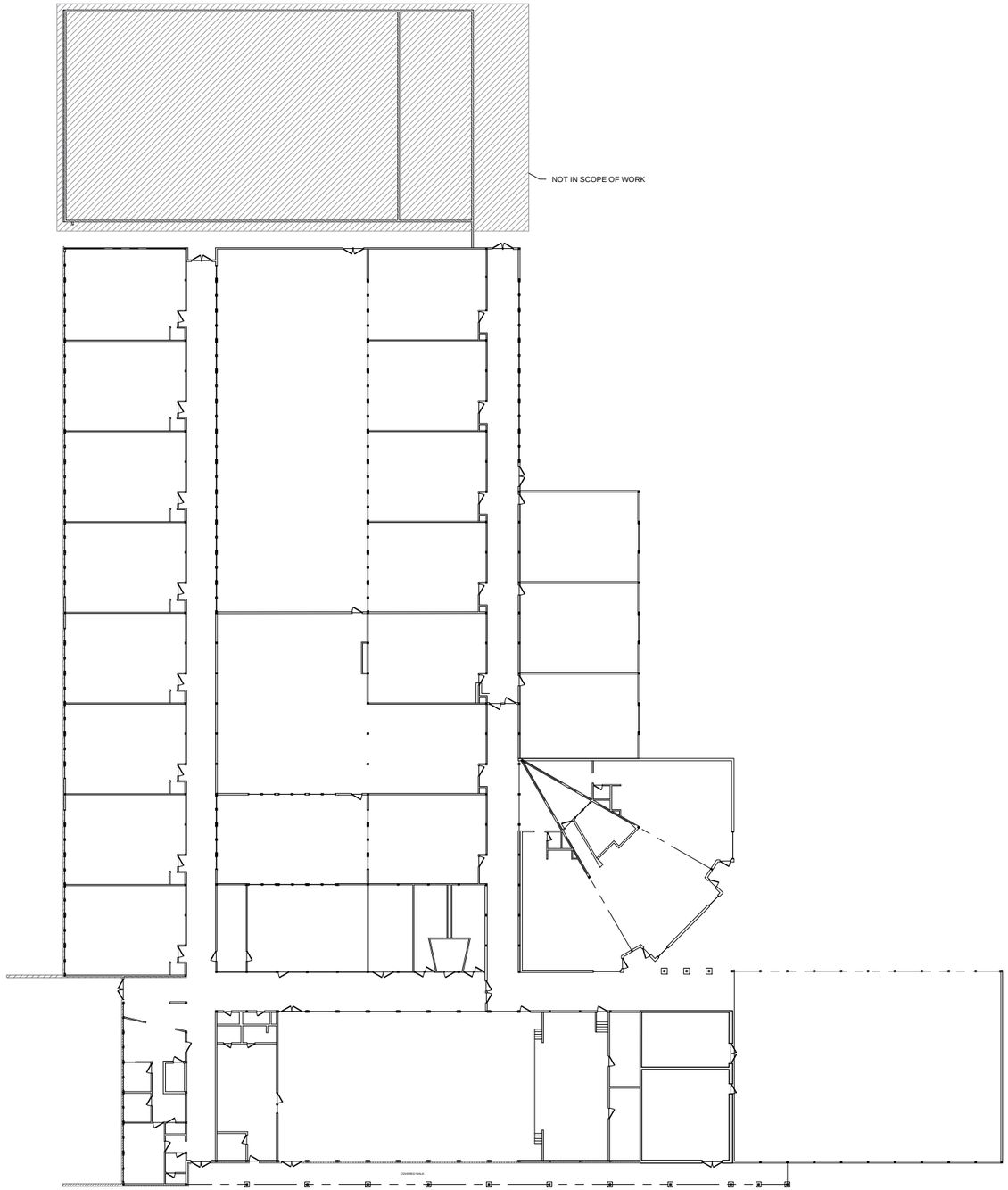
The findings described in this report have been limited to the lateral force-resisting structural system and general assessment of the gravity force-resisting elements. Based on our visual observations, we find the structure to be in good condition and generally safe for occupancy. No significant damage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

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

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

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

Appendix A: Figures



1 S0.1 **OVERALL LAYOUT**
NTS

IF THIS BAR DOES NOT MEASURE 1-INCH IN LENGTH, THEN THE DRAWING IS NOT TO SCALE

NO.	BY	DATE

DALLAS SCHOOL DISTRICT

WHITWORTH ELEMENTARY SCHOOL
SRG APPLICATION

ZCS ENGINEERING
524 Main Street - Suite 02, Oregon City, OR 97045
(503) 657-0188 phone (503) 557-5211 fax

PROJECT NO:	P-2030-15
DRAWN:	CCK
CHECKED:	RCC
DATE:	12-18-15

REGISTERED PROFESSIONAL ENGINEER
OREGON
DECEMBER 16, 1986
RICHARD C. CARTER
EXPIRES: 12-31-15

PRELIMINARY - NOT FOR CONSTRUCTION

OVERALL LAYOUT

S0.1

1 S0.2 **PHOTO** NTS

2 S0.2 **PHOTO** NTS

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9 S0.2 **PHOTO** NTS

IF THIS BAR DOES NOT MEASURE 1-INCH IN LENGTH, THEN THE DRAWING IS NOT TO SCALE

NO.	REVISIONS	BY	DATE

DALLAS SCHOOL DISTRICT

WHITWORTH ELEMENTARY SCHOOL

SRG APPLICATION

ENGINEERING
524 Main Street - Suite 02, Oregon City, OR 97045
(503) 659-2400 fax (503) 659-2433
(503) 659-2205 phone

PROJECT NO:	P-2030-15
DRAWN:	CCK
CHECKED:	RCC
DATE:	12-18-15

REGISTERED PROFESSIONAL ENGINEER OREGON JULY 16, 1995 RUSSELL C. CARTER EXPIRES: 12-31-15

PRELIMINARY - NOT FOR CONSTRUCTION

INTERIOR PICTURES

S0.2

10 S0.3 **PHOTO** NTS

11 S0.3 **PHOTO** NTS

12 S0.3 **PHOTO** NTS

13 S0.3 **PHOTO** NTS

14 S0.3 **PHOTO** NTS

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18 S0.3 **PHOTO** NTS

IF THIS BAR DOES NOT MEASURE 1-INCH IN LENGTH, THEN THE DRAWING IS NOT TO SCALE

NO.	BY	DATE

REVISIONS

DALLAS SCHOOL DISTRICT

WHITWORTH ELEMENTARY SCHOOL

SRG APPLICATION

ZCS ENGINEERING
524 Main Street - Suite 02, Oregon City, OR 97045
(503) 659-2420 phone
(503) 659-2425 fax

PROJECT NO: P-2030-15
DRAWN: CCK
CHECKED: RCC
DATE: 12-18-15

REGISTERED PROFESSIONAL ENGINEER
OREGON
DEC. 16, 1986
ROBERT C. CARTER
EXPIRES: 12-31-15

PRELIMINARY - NOT FOR CONSTRUCTION

EXTERIOR PICTURES

S0.3

19 S0.4 **PHOTO** NTS

20 S0.4 **PHOTO** NTS

21 S0.4 **PHOTO** NTS

22 S0.4 **PHOTO** NTS

23 S0.4 **PHOTO** NTS

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26 S0.4 **PHOTO** NTS

27 S0.4 **PHOTO** NTS

IF THIS BAR DOES NOT MEASURE 1-INCH IN LENGTH, THEN THE DRAWING IS NOT TO SCALE

NO.	BY	DATE

REVISIONS

DALLAS SCHOOL DISTRICT

WHITWORTH ELEMENTARY SCHOOL

SRG APPLICATION

ZCS ENGINEERING, Inc.
524 Main Street - Suite 02, Oregon City, OR 97045
(503) 659-2406 phone (503) 659-2443 fax

PROJECT NO:	P-2030-15
DRAWN:	CCK
CHECKED:	RCC
DATE:	12-18-15

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 16, 1996
RUSSELL C. CARTER
EXPIRES: 12-31-15

PRELIMINARY - NOT FOR CONSTRUCTION

STRUCTURAL PICTURES

S0.4

Appendix B: Structural Tier 1 Check Sheets

Project: WHITWORTH ELEMENTARY Location: DALLAS, OREGON

Completed by: SMO Date: 12-21-15

TIER 1 CHECKLISTS

16.1 BASIC CHECKLIST

Very Low Seismicity

Structural Components

(C) NC N/A U LOAD PATH: The structure shall 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. (Commentary: Sec. A.2.1.1. Tier 2: Sec. 5.4.1.1)

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 shall have adequate strength to resist the connection force calculated in the Quick Check procedure of Section 4.5.3.7. (Commentary: Sec. A.5.1.1. Tier 2: Sec. 5.7.1.1)

Project: WHITWORTH ELEMENTARY Location: _____

Completed by: _____ Date: _____

16.1.2LS LIFE SAFETY BASIC CONFIGURATION CHECKLIST

Low Seismicity

Building System

General

(C) NC N/A U LOAD PATH: The structure shall 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. (Commentary: Sec. A.2.1.1. Tier 2: Sec. 5.4.1.1)

(C) NC N/A U ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building is greater than 4% of the height of the shorter building. This statement shall not apply for the following building types: W1, W1a, and W2. (Commentary: Sec. A.2.1.2. Tier 2: Sec. 5.4.1.2)

C NC (N/A) U MEZZANINES: Interior mezzanine levels are braced independently from the main structure or are anchored to the seismic-force-resisting elements of the main structure. (Commentary: Sec. A.2.1.3. Tier 2: Sec. 5.4.1.3)

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. (Commentary: Sec. A2.2.2. Tier 2: Sec. 5.4.2.1)

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. (Commentary: Sec. A.2.2.3. Tier 2: Sec. 5.4.2.2)

(C) NC N/A U VERTICAL IRREGULARITIES: All vertical elements in the seismic-force-resisting system are continuous to the foundation. (Commentary: Sec. A.2.2.4. Tier 2: Sec. 5.4.2.3)

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. (Commentary: Sec. A.2.2.5. Tier 2: Sec. 5.4.2.4)

C NC (N/A) U MASS: There is no change in effective mass more than 50% from one story to the next. Light roofs, penthouses, and mezzanines need not be considered. (Commentary: Sec. A.2.2.6. Tier 2: Sec. 5.4.2.5)

(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. (Commentary: Sec. A.2.2.7. Tier 2: Sec. 5.4.2.6)

Moderate Seismicity: Complete the Following Items in Addition to the Items for Low Seismicity.

Geologic Site Hazards

C NC N/A (U) LIQUEFACTION: Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance shall not exist in the foundation soils at depths within 50 ft under the building. (Commentary: Sec. A.6.1.1. Tier 2: 5.4.3.1)

(C) NC N/A U SLOPE FAILURE: The building site is sufficiently remote from potential earthquake-induced slope failures or rockfalls to be unaffected by such failures or is capable of accommodating any predicted movements without failure. (Commentary: Sec. A.6.1.2. Tier 2: 5.4.3.1)

C NC N/A (U) SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site are not anticipated. (Commentary: Sec. A.6.1.3. Tier 2: 5.4.3.1)

High Seismicity: Complete the Following Items in Addition to the Items for Low and Moderate Seismicity.

Foundation Configuration

C (NC) N/A U OVERTURNING: The ratio of the least horizontal dimension of the seismic-force-resisting system at the foundation level to the building height (base/height) is greater than $0.6S_a$. (Commentary: Sec. A.6.2.1. Tier 2: Sec. 5.4.3.3)

C NC (N/A) U TIES BETWEEN FOUNDATION ELEMENTS: The foundation has ties adequate to resist seismic forces where footings, piles, and piers are not restrained by beams, slabs, or soils classified as Site Class A, B, or C. (Commentary: Sec. A.6.2.2. Tier 2: Sec. 5.4.3.4)

Project: _____ Location: _____

Completed by: _____ Date: _____

16.3LS LIFE SAFETY STRUCTURAL CHECKLIST FOR BUILDING TYPE W2: WOOD FRAMES, COMMERCIAL AND INDUSTRIAL

Low and Moderate Seismicity

Lateral 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. (Commentary: Sec. A.3.2.1.1. Tier 2: Sec. 5.5.1.1)

C NC N/A U SHEAR STRESS CHECK: The shear stress in the shear walls, calculated using the Quick Check procedure of Section 4.5.3.3, is less than the following values (Commentary: Sec. A.3.2.7.1. Tier 2: Sec. 5.5.3.1.1):

Structural panel sheathing	1,000 lb/ft
Diagonal sheathing	700 lb/ft
Straight sheathing	100 lb/ft
All other conditions	100 lb/ft

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. (Commentary: Sec. A.3.2.7.2. Tier 2: Sec. 5.5.3.6.1)

C NC N/A U GYPSUM WALLBOARD OR PLASTER SHEAR WALLS: Interior plaster or gypsum wallboard is not used as shear walls on buildings more than one story high with the exception of the uppermost level of a multi-story building. (Commentary: Sec. A.3.2.7.3. Tier 2: Sec. 5.5.3.6.1)

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. (Commentary: Sec. A.3.2.7.4. Tier 2: Sec. 5.5.3.6.1)

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. (Commentary: Sec. A.3.2.7.5. Tier 2: Sec.5.5.3.6.2)

C NC N/A U HILLSIDE SITE: For structures that are taller on at least one side by more than one-half story because of a sloping site, all shear walls on the downhill slope have an aspect ratio less than 1-to-1. (Commentary: Sec. A.3.2.7.6. Tier 2: Sec. 5.5.3.6.3)

C NC N/A U CRIPPLE WALLS: Cripple walls below first-floor-level shear walls are braced to the foundation with wood structural panels. (Commentary: Sec. A.3.2.7.7. Tier 2: Sec. 5.5.3.6.4)

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. (Commentary: Sec. A.3.2.7.8. Tier 2: Sec. 5.5.3.6.5)

Connections

C NC N/A U WOOD POSTS: There is a positive connection of wood posts to the foundation. (Commentary: Sec. A.5.3.3. Tier 2: Sec. 5.7.3.3)

C NC N/A U WOOD SILLS: All wood sills are bolted to the foundation. (Commentary: Sec. A.5.3.4. Tier 2: Sec. 5.7.3.3)

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. (Commentary: Sec. A.5.4.1. Tier 2: Sec. 5.7.4.1)

High Seismicity: Complete the Following Items in Addition to the Items for Low and Moderate Seismicity.

Diaphragms

C NC N/A U DIAPHRAGM CONTINUITY: The diaphragms are not composed of split-level floors and do not have expansion joints. (Commentary: Sec. A.4.1.1. Tier 2: Sec. 5.6.1.1)

C NC N/A U ROOF CHORD CONTINUITY: All chord elements are continuous, regardless of changes in roof elevation. (Commentary: Sec. A.4.1.3. Tier 2: Sec. 5.6.1.1)

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. (Commentary: Sec. A.4.1.8. Tier 2: Sec. 5.6.1.5)

C NC N/A U STRAIGHT SHEATHING: All straight sheathed diaphragms have aspect ratios less than 2-to-1 in the direction being considered. (Commentary: Sec. A.4.2.1. Tier 2: Sec. 5.6.2)

C NC N/A U SPANS: All wood diaphragms with spans greater than 24 ft consist of wood structural panels or diagonal sheathing. Wood commercial and industrial buildings may have rod-braced systems. (Commentary: Sec. A.4.2.2. Tier 2: Sec. 5.6.2)

C NC N/A U DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 40 ft and aspect ratios less than or equal to 4-to-1. (Commentary: Sec. A.4.2.3. Tier 2: Sec. 5.6.2)

C NC N/A U OTHER DIAPHRAGMS: The diaphragm does not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Commentary: Sec. A.4.7.1. Tier 2: Sec. 5.6.5)

Connections

C NC N/A U WOOD SILL BOLTS: Sill bolts are spaced at 6 ft or less, with proper edge and end distance provided for wood and concrete. (Commentary: A.5.3.7. Tier 2: Sec. 5.7.3.3)

Appendix C: Construction Cost Estimate Worksheets

ENGINEER'S OPINION OF PROBABLE COST - WHITWORTH ELEMENTARY SCHOOL SEISMIC REHABILITATION

Description	Quantity	Units	Unit Price	Total Price for Construction Item
GENERAL CONDITIONS				
General Conditions	5%	%		$54,200.00
Preconstruction Services	1%	%		$11,400.00
Equipment Rental	3	Month	$ 5,000.00	$15,000.00
Toilet Rental	3	Month	$ 1,800.00	$5,400.00
Cleanup Continuous	3	Month	$ 4,000.00	$12,000.00
Clean Up Dumpsters	3	Month	$ 2,400.00	$7,200.00
Temporary Conditions	1	Lump Sum		$5,000.00
Final Clean UP	48800	Square Foot	$ 0.35	$17,100.00
Soft Demolition	48800	Square Foot	$ 2.00	$97,600.00
Asbestos Abatement	48800	Square Foot	$ 1.00	$48,800.00
Foundation Layout		Square Foot	$ 0.40	$0.00
Wall Framing Layout	15400	Square Foot	$ 0.25	$3,850.00
Roofing Framing Layout		Square Foot	$ 0.50	$0.00
Interior Finishes Layout	1540	Square Foot	$ 0.50	$770.00
Escalation	2%	%		$23,000.00
Bonding & Insurance	3%	%		$34,500.00
Contractor Profit & Overhead	5%	%		$60,300.00
			General Conditions Subtotal	$396,100.00
Foundation / Floor Strengthening Construction				
Shear Wall to Foundation Anchorage	1900	Lineral Foot	$ 35.00	$66,500.00
			Foundation Level Subtotal	$ 66,500.00
Wall Strengthening Construction				
New 2x Framed Shear Walls	2825	Square Foot	$ 15.00	$42,375.00
Sheathing of Existing Walls	12550	Square Foot	$ 4.00	$50,200.00
Exterior Finish Repair / Installation	2525	Square Foot	$ 28.00	$70,700.00
Interior Wall Finish Repair	15400	Square Foot	$ 2.00	$30,800.00
Painting of Wall	48800	Square Foot	$ 3.00	$146,400.00
			Wall Strengthening Subtotal	$ 340,475.00
Roof Strengthening Construction				
Diaphragm Attachments - In-Plane Shear	9500	Square Foot	$ 3.00	$28,500.00
New 60 mil TPO Roofing Membrane	48800	Square Foot	$ 5.50	$268,400.00
New Roof Sheathing	48800	Square Foot	$ 2.50	$122,000.00
			Roof Strengthening Subtotal	$ 418,900.00
Miscellaneous Elements				
Misc. Electrical / HVAC / Plumbing	1			$45,000.00
			Miscellaneous Subtotal	$ 45,000.00
			Total Construction Cost	**$1,267,000.00**
Associated Design / Soft Costs				
Architectural Consulting				$12,700.00
Structural / Rehabilitation Engineering				$107,700.00
Geotechnical Consulting				$7,900.00
Special Inspection Services for Construction				$6,300.00
Structural Observations during Construction				$6,300.00
Materials Testing for Design				$6,300.00
Construction Management / Owner Representation				$31,700.00
Permitting Fees				$38,000.00
Relocation of FF&E				$9,000.00
			Design / Soft Cost Subtotal	**$225,900.00**
			Total Project Funding Requirement	**$1,492,900.00**

Appendix E: Schematic Seismic Retrofit Drawings

WHITWORTH ELEMENTARY SCHOOL

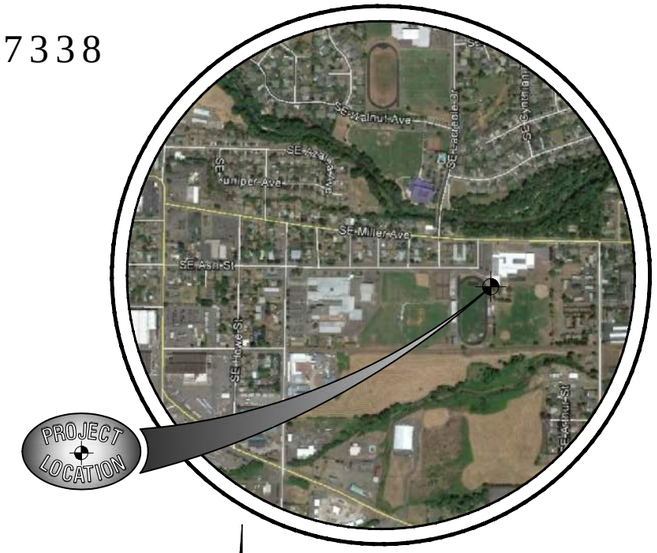
DALLAS SCHOOL DISTRICT

1151 SE MILLER AVENUE, DALLAS, OREGON 97338

3 S0.0 **SITE LAYOUT** NTS

2 S0.0 **ENTRANCE VIEW** NTS

3 S0.0 **STREET ENTRANCE VIEW** NTS



2 COVER **VICINITY MAP** NTS

PROJECT TEAM

OWNER

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STRUCTURAL ENGINEER

RUSSELL C. CARTER, PE SE
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SHEET INDEX

PROJECT NARRATIVE

INTENT OF THESE DRAWINGS IS TO ILLUSTRATE THE LEVEL OF UNDERSTANDING THE APPLICANT HAS WITH REGARDS TO THE EFFORT THAT WILL BE REQUIRED TO SEISMICALLY REHABILITATE THE BUILDING. THESE SCHEMATIC DRAWINGS HAVE BEEN PREPARED USING THE CURRENT OREGON STRUCTURAL SPECIALITY CODE (OSSC) AND THE ASCE 41 (SEISMIC REHABILITATION OF EXISTING BUILDINGS) AS THE REFERENCES FOR PRESCRIBED LOADING AND BUILDING PERFORMANCE LEVEL RATINGS.

THE DRAWING ILLUSTRATES BOTH EXISTING CONDITIONS AND GENERAL REPAIRS THAT WOULD NEED TO BE ACCOMPLISHED TO REACH AN ACCEPTABLE LEVEL OF PERFORMANCE (LIFE SAFETY) ACCORDING TO CURRENT CODE.

"STRUCTURAL PERFORMANCE LEVEL, LIFE SAFETY, MEANS POST-EARTHQUAKE DAMAGE STATE IN WHICH SIGNIFICANT DAMAGE TO THE STRUCTURE HAS OCCURRED BUT SOME MARGIN AGAINST EITHER PARTIAL OR TOTAL STRUCTURAL COLLAPSE REMAINS. SOME STRUCTURAL ELEMENTS AND COMPONENTS ARE SEVERELY DAMAGED BUT THIS HAS NOT RESULTED IN LARGE FALLING DEBRIS HAZARDS, EITHER INSIDE OR OUTSIDE THE BUILDING. INJURIES MAY OCCUR DURING THE EARTHQUAKE; HOWEVER, THE OVERALL RISK OF LIFE-THREATENING INJURY AS A RESULT OF STRUCTURAL DAMAGE IS EXPECTED TO BE LOW. IT SHOULD BE POSSIBLE TO REPAIR THE STRUCTURE; HOWEVER, FOR ECONOMIC REASONS THIS MAY NOT BE PRACTICAL. ALTHOUGH THE DAMAGED STRUCTURE IS NOT AN IMMINENT COLLAPSE RISK, IT WOULD BE PRUDENT TO IMPLEMENT STRUCTURAL REPAIRS OR INSTALL TEMPORARY BRACING PRIOR TO REOCCUPANCY"

LIST OF DEFICIENCIES

- FULL HEIGHT GLAZING PACKAGES IN THE LONGITUDINAL WALLS ARE NOT AN ADEQUATE LATERAL FORCE RESISTING SYSTEM. THE GLAZING PACKAGES ARE BRITTLE AND ARE NOT PROPERLY ATTACHED TO THE STRUCTURE TO PROPERLY TRANSFER IN PLANE SHEAR FORCES FROM THE DIAPHRAGM TO THE FOUNDATION.
- LARGE WINDOWS IN THE LONGITUDINAL DIRECTION REDUCE THE AVAILABLE SHEAR WALL LENGTHS. THE SHEAR WALLS WITH THE WINDOWS DO NOT HAVE ADEQUATE CAPACITY FOR THE PRESCRIBED SEISMIC LOADINGS.
- THE INTERIOR GYPSUM SHEAR WALLS BELOW THE LOWER ROOFS STRUCTURE DO NOT HAVE ADEQUATE CAPACITY TO RESIST THE PRESCRIBED SEISMIC FORCES GENERATED IN THE ROOF DIAPHRAGMS.
- THE 2X T&G DECKING ROOF DIAPHRAGMS DO NOT MEET THE PRESCRIBED ASPECT RATIO. THE CODE LIMITS THE ASPECT RATIOS (LENGTH TO DEPTH) TO MINIMIZE THE SHEAR DEMANDS AND DEFLECTION.
- THE FRAMING CONFIGURATION AT THE TOP OF THE WALLS AND GLAZING PACKAGE DOES NOT PROVIDE FOR A CONTINUOUS DIAPHRAGM TOP CHORD. THIS LACK OF TOP CHORDS INHIBITS THE ABILITY OF THE ROOF DIAPHRAGM TO TRANSFER SEISMIC FORCES INTO SHEAR WALLS.
- THE ROOF SHEATHING IN THE LOWER ROOF STRUCTURE IS NOT PROPERLY ATTACHED TO THE UNDERLYING SHEAR WALLS.
- THE COVERED PLAY STRUCTURE ARE DOES NOT HAVE A LATERAL FORCE RESISTING SYSTEM ALONG THE EAST WALL LINE.
- THE UPPER TRANSOM WINDOWS IN THE CAFETERIA INHIBIT THE ROOF DIAPHRAGM FROM TRANSFERRING LOAD TO THE SHEAR WALLS BELOW.
- CAFETERIA AND PLAY STRUCTURE ARE TALLER THAN CLASSROOM. THIS CREATES A VERTICAL IRREGULARITY. THIS VERTICAL IRREGULARITY COULD RESULT IN POUNDING OF THE SURROUNDING CLASSROOMS INTO THE CAFETERIA AND PLAY STRUCTURE. THE POUNDING EFFECTS INCREASE THE BUCKLING LOADS ON THE WALLS.

SEISMIC REHABILITATION RECOMMENDATIONS

- SELECTIVE WINDOWS IN EACH CLASSROOM WILL BE IN-FILLED AND NEW 2X WALLS WITH PLYWOOD SHEATHING WILL BE INSTALLED TO PROVIDE ADEQUATE SHEAR CAPACITY FOR IN-PANEL LOADING. INTERIOR AND EXTERIOR FINISHES WILL BE REPLACED TO MATCH EXISTING.
- WHERE NEW SHEAR WALLS ARE TO BE LOCATED, PROVIDE ADDITIONAL ANCHORS TO TRANSFER LATERAL LOADS FROM THE WALL BASE PLATES TO THE CONCRETE STEM WALLS.
- TO LIMIT THE ASPECT RATIO OF THE ROOF DIAPHRAGM TO CODE PRESCRIBED LIMITS THE EXISTING INTERIOR CROSS WALLS WILL BE SHEATHED WITH PLYWOOD ON THE EXISTING WALL FRAMING. THE EXISTING GYPSUM INTERIOR FINISH WILL BE REMOVED AND REPLACED OVER THE PLYWOOD SHEATHING. THE WALLS WILL BE ADEQUATELY ATTACHED TO THE EXISTING SLAB ON GRADE UTILIZING POST INSTALLED ANCHORS AND ATTACHED TO THE EXISTING SLAB ON GRADE UTILIZING POST INSTALLED ANCHORS AND ATTACHED TO THE ROOF FRAMING USING STRUCTURAL SCREWS.
- REMOVE THE ROOFING MATERIAL AND PROVIDE NEW ROOF SHEATHING TO A RELIABLE ROOF DIAPHRAGM.
- PROVIDE BLOCKING, CLIPPING AND NAILING CONNECTIONS ALONG TOP OF WALLS TO ESTABLISH ADEQUATE CONNECTION BETWEEN TOP OF WALL AND DIAPHRAGM
- PROVIDE NEW DRAG TIE BEAMS BETWEEN THE BEAM LINES IN THE TRANSVERSE DIRECTION OVER THE CORRIDOR TO COMPLETE CROSS TIES
- NEW SHEAR PANELS WILL IN-FILL THE TRANSOM WINDOWS IN THE CAFETERIA TO PROPERLY TRANSFER THE IN-PLANE SEISMIC FORCE INTO THE SHEAR WALLS.
- ALL PIPING AND HVAC EQUIPMENT FOUND THROUGHOUT THE BUILDING SHALL BE PROPERLY BRACED AND ATTACHED TO THE STRUCTURE TO LIMIT THE POTENTIAL DAMAGE.
- ALL PIPING FOUND WITHIN THE BUILDING THAT IS GREATER THAN 12" FROM STRUCTURE SHALL BE PROPERLY ATTACHED AND BRACED.
- NEW FULL HEIGHT SHEAR WALLS AND FOUNDATION ELEMENT WILL BE INSTALLED ALONG THE EAST WALL OF THE COVERED PLAY STRUCTURE TO PROVIDE A LATERAL FORCE RESISTING SYSTEM ALONG THIS WALL LINE.

IF THIS BAR DOES NOT MEASURE 1-INCH IN LENGTH, THEN THE DRAWING IS NOT TO SCALE

NO.	BY	DATE
1		

REVISIONS

DALLAS SCHOOL DISTRICT
WHITWORTH ELEMENTARY SCHOOL
SRG APPLICATION

ZCS ENGINEERING
524 Main Street - Suite 02, Oregon City, OR 97045
(503) 657-0188 (503) 657-5779 www

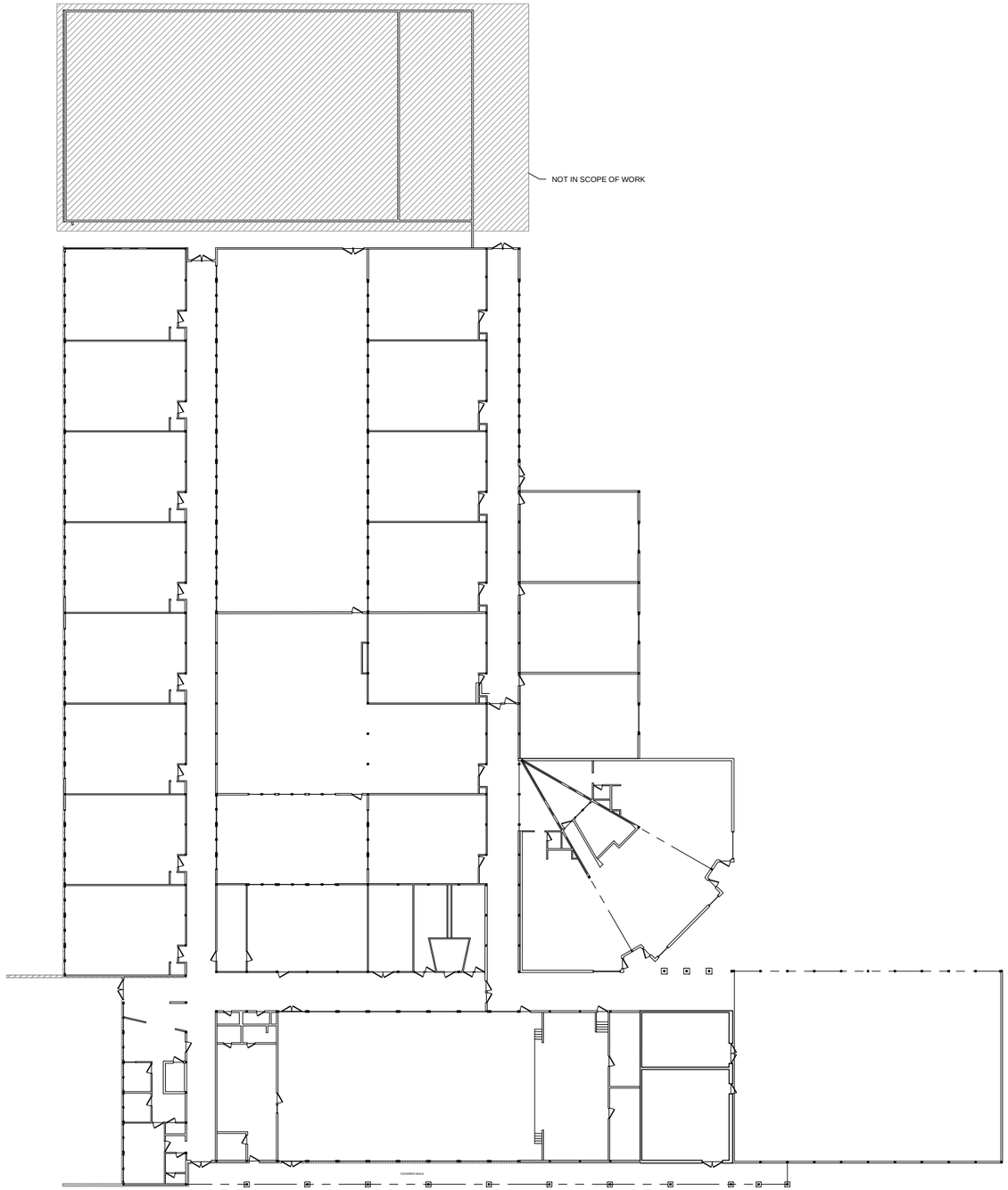
PROJECT NO:	P-2030-15
DRAWN:	CCK
CHECKED:	RCC
DATE:	12-18-15

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 16, 1996
RUSSELL C. CARTER
EXPIRES: 12-31-15

PRELIMINARY - NOT FOR CONSTRUCTION

COVER

S0.0



1 S0.1 **OVERALL LAYOUT**
NTS

IF THIS BAR DOES NOT MEASURE 1-INCH IN LENGTH, THEN THE DRAWING IS NOT TO SCALE

NO.	BY	DATE

DALLAS SCHOOL DISTRICT

WHITWORTH ELEMENTARY SCHOOL
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RICHARD C. CARTER
EXPIRES: 12-31-15

PRELIMINARY - NOT FOR CONSTRUCTION

OVERALL LAYOUT

S0.1

1 S0.2 **PHOTO** NTS

2 S0.2 **PHOTO** NTS

3 S0.2 **PHOTO** NTS

4 S0.2 **PHOTO** NTS

5 S0.2 **PHOTO** NTS

6 S0.2 **PHOTO** NTS

7 S0.2 **PHOTO** NTS

8 S0.2 **PHOTO** NTS

9 S0.2 **PHOTO** NTS

IF THIS BAR DOES NOT MEASURE 1-INCH IN LENGTH, THEN THE DRAWING IS NOT TO SCALE

NO.	REVISIONS	BY	DATE

DALLAS SCHOOL DISTRICT

WHITWORTH ELEMENTARY SCHOOL

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REGISTERED PROFESSIONAL ENGINEER OREGON JULY 16, 1995 RUSSELL C. CARTER EXPIRES: 12-31-15

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INTERIOR PICTURES

S0.2

10 S0.3 **PHOTO** NTS

11 S0.3 **PHOTO** NTS

12 S0.3 **PHOTO** NTS

13 S0.3 **PHOTO** NTS

14 S0.3 **PHOTO** NTS

15 S0.3 **PHOTO** NTS

16 S0.3 **PHOTO** NTS

17 S0.3 **PHOTO** NTS

18 S0.3 **PHOTO** NTS

IF THIS BAR DOES NOT MEASURE 1-INCH IN LENGTH, THEN THE DRAWING IS NOT TO SCALE

NO.	BY	DATE

REVISIONS

DALLAS SCHOOL DISTRICT

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ROBERT C. CARTER
EXPIRES: 12-31-15

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EXTERIOR PICTURES

S0.3

19 S0.4 **PHOTO** NTS

20 S0.4 **PHOTO** NTS

21 S0.4 **PHOTO** NTS

22 S0.4 **PHOTO** NTS

23 S0.4 **PHOTO** NTS

24 S0.4 **PHOTO** NTS

25 S0.4 **PHOTO** NTS

26 S0.4 **PHOTO** NTS

27 S0.4 **PHOTO** NTS

IF THIS BAR DOES NOT MEASURE 1-INCH IN LENGTH, THEN THE DRAWING IS NOT TO SCALE

NO.	DATE	BY	REVISIONS

DALLAS SCHOOL DISTRICT

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CHARLES C. CARTER
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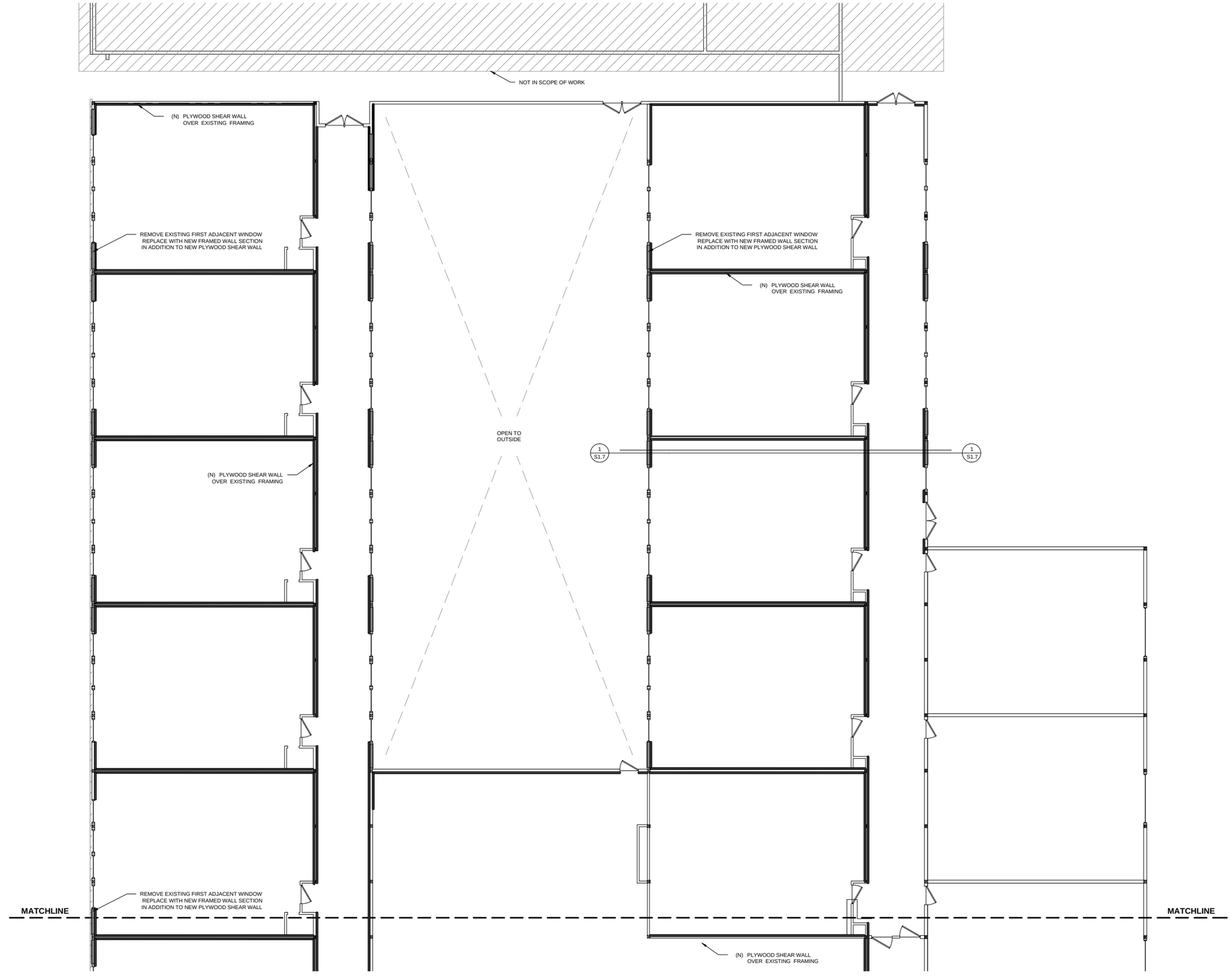
STRUCTURAL PICTURES

S0.4

FOR AGENCY REVIEW / NOT FOR CONSTRUCTION



1 S1.1 **SECTION A FLOOR PLAN**

1/8" = 1'-0"

IF THIS BAR DOES NOT MEASURE 1-INCH IN LENGTH, THEN THE DRAWING IS NOT TO SCALE

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RICHARD C. CARTER
EXPIRES: 12-31-15

PRELIMINARY - NOT FOR CONSTRUCTION

FLOOR PLAN

S1.1

MATCHLINE

REMOVE EXISTING FIRST ADJACENT WINDOW
REPLACE WITH NEW FRAMED WALL SECTION
IN ADDITION TO NEW PLYWOOD SHEAR WALL

(N) PLYWOOD SHEAR WALL
OVER EXISTING FRAMING

OPEN TO
OUTSIDE

2 S1.1

MATCHLINE

(N) PLYWOOD SHEAR WALL
OVER EXISTING FRAMING

REMOVE EXISTING FIRST ADJACENT WINDOW
REPLACE WITH NEW FRAMED WALL SECTION
IN ADDITION TO NEW PLYWOOD SHEAR WALL

REMOVE EXISTING HIGH ELEVATION WINDOWS
REPLACE ALL WITH NEW FRAMED WALL SECTIONS WITH
ADDITION OF NEW PLYWOOD SHEATHED SHEAR WALL

(N) PLYWOOD SHEAR WALL
OVER EXISTING FRAMING

REMOVE EXISTING HIGH ELEVATION WINDOWS
REPLACE ALL WITH NEW FRAMED WALL SECTIONS WITH
ADDITION OF NEW PLYWOOD SHEATHED SHEAR WALL

COVERED WALK

MATCHLINE

2 S1.1

1 S1.2 **SECTION B**
FLOOR PLAN
1/8" = 1'-0"

IF THIS BAR DOES NOT MEASURE
1-INCH IN LENGTH, THEN THE
DRAWING IS NOT TO SCALE

NO.	BY	DATE

REVISIONS

DALLAS SCHOOL DISTRICT

WHITWORTH ELEMENTARY
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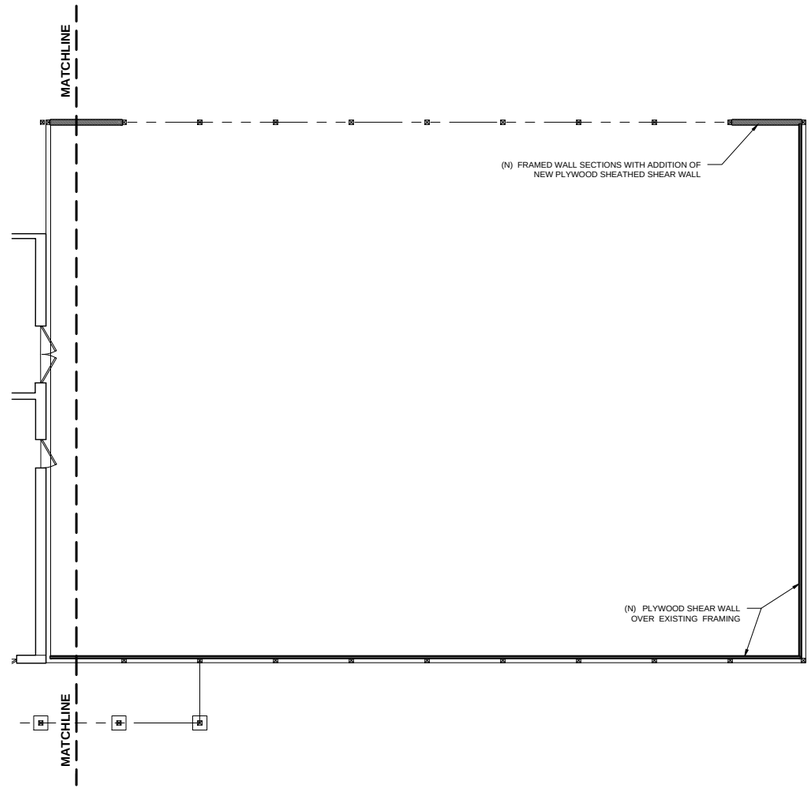
RUSSELL C. CARTER
EXPIRES: 12-31-15

PRELIMINARY - NOT FOR CONSTRUCTION

FLOOR PLAN

S1.2



1 / S1.3 **SECTION C FLOOR PLAN**

1/8" = 1'-0"

IF THIS BAR DOES NOT MEASURE 1-INCH IN LENGTH, THEN THE DRAWING IS NOT TO SCALE

NO.	REVISIONS	BY	DATE

DALLAS SCHOOL DISTRICT

WHITWORTH ELEMENTARY SCHOOL

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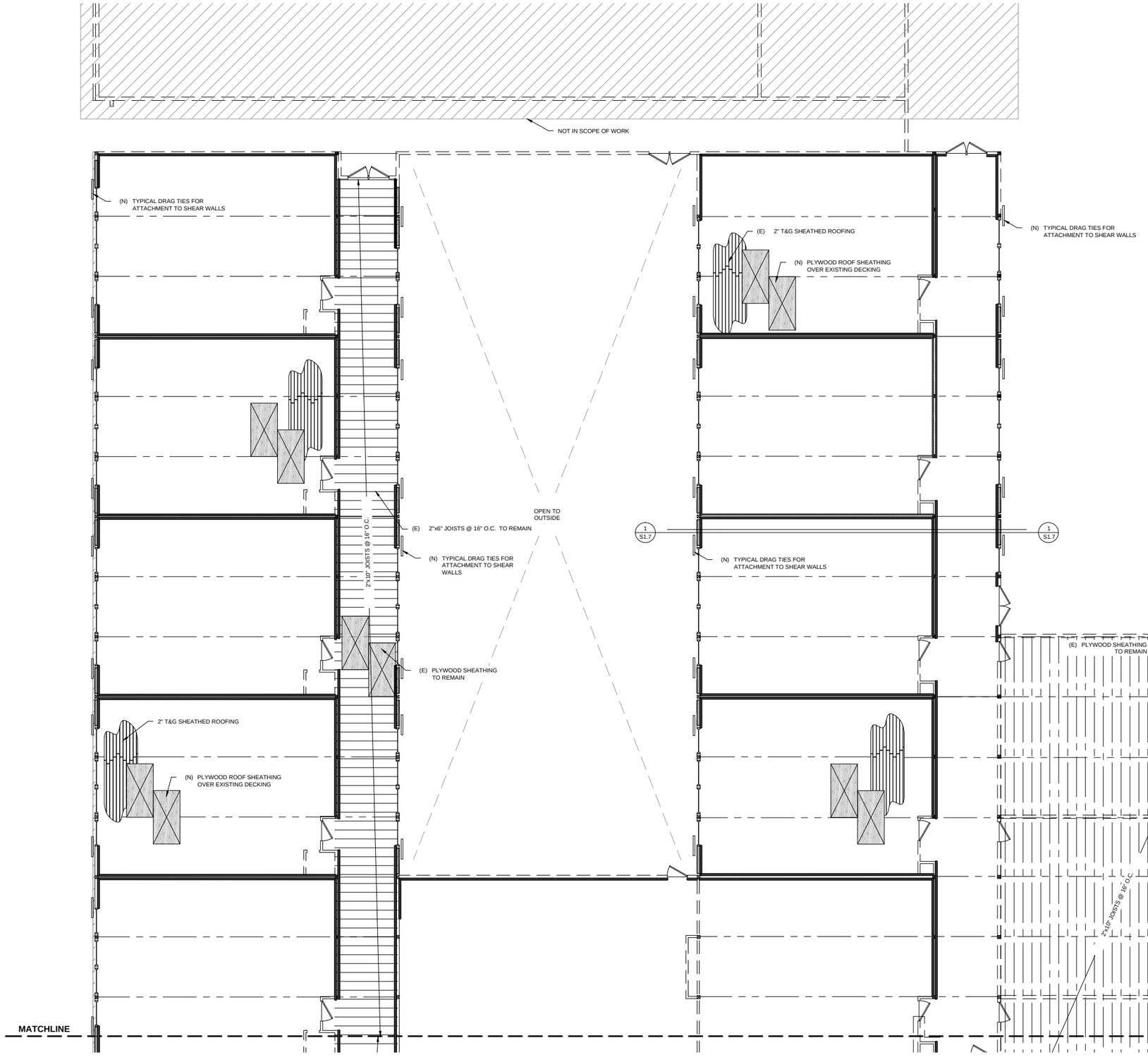
DEC. 16, 1996
R. C. CARTER
EXPIRES: 12-31-15

PRELIMINARY - NOT FOR CONSTRUCTION

FLOOR PLAN

S1.3



1 S1.4 **SECTION A ROOFING PLAN**
1/8" = 1'-0"

IF THIS BAR DOES NOT MEASURE 1-INCH IN LENGTH, THEN THE DRAWING IS NOT TO SCALE

NO.	REVISIONS	BY	DATE

DALLAS SCHOOL DISTRICT

WHITWORTH ELEMENTARY SCHOOL

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OREGON
JANUARY 16, 1996
RUSSELL C. CARTER
EXPIRES: 12-31-15

PRELIMINARY - NOT FOR CONSTRUCTION

ROOFING PLAN

S1.4

MATCHLINE

MATCHLINE

(E) 2"x6" JOISTS @ 16" O.C. TO REMAIN

(E) PLYWOOD SHEATHING TO REMAIN

2"x10" JOISTS @ 16" O.C.

(N) TYPICAL DRAG TIES FOR ATTACHMENT TO SHEAR WALLS

OPEN TO OUTSIDE

(N) PLYWOOD ROOF SHEATHING OVER EXISTING DECKING

2"x6" JOISTS @ 16" O.C.

2"x10" JOISTS @ 16" O.C.

2"x10" JOISTS @ 16" O.C.

2"x6" JOISTS @ 16" O.C.

(E) PLYWOOD SHEATHING TO REMAIN

(E) 2" T&G SHEATHED ROOFING

(E) PLYWOOD SHEATHING TO REMAIN

MATCHLINE

(N) PLYWOOD ROOF SHEATHING OVER EXISTING DECKING

(N) PLYWOOD ROOF SHEATHING OVER EXISTING DECKING

(E) 2" T&G SHEATHED ROOFING

2" T&G SHEATHED ROOFING

COVERED WALK

ROOF OVER HANG LIMITS

MATCHLINE

2 S1.7

SECTION B
ROOFING PLAN

1 S1.5

1/8" = 1'-0"

IF THIS BAR DOES NOT MEASURE 1-INCH IN LENGTH, THEN THE DRAWING IS NOT TO SCALE

NO.	BY	DATE

REVISIONS

DALLAS SCHOOL DISTRICT

WHITWORTH ELEMENTARY SCHOOL

SRG APPLICATION

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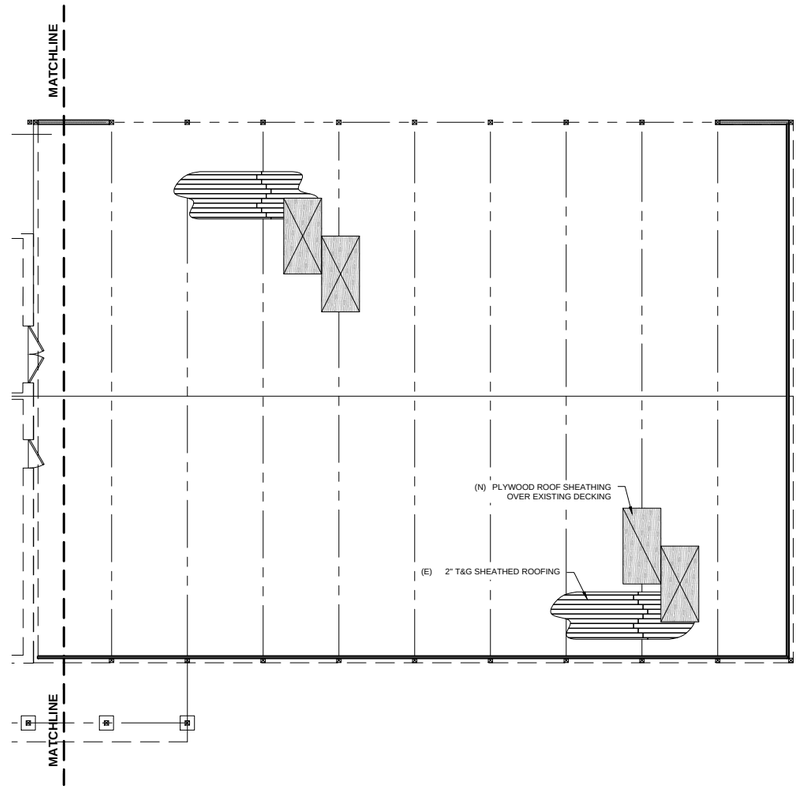
DATE:	12-18-15

REGISTERED PROFESSIONAL ENGINEER
OREGON JANUARY 16, 1996 RUSSELL C. CARTER
EXPIRES: 12-31-15

PRELIMINARY - NOT FOR CONSTRUCTION

ROOFING PLAN

S1.5



1 S1.6 **SECTION C ROOFING PLAN**

1/8" = 1'-0"

IF THIS BAR DOES NOT MEASURE 1-INCH IN LENGTH, THEN THE DRAWING IS NOT TO SCALE

NO.	BY	DATE

REVISIONS

DALLAS SCHOOL DISTRICT

WHITWORTH ELEMENTARY SCHOOL

SRG APPLICATION

ENGINEERING

524 Main Street - Suite 02, Oregon City, OR 97045

fax (503) 659-2413

(503) 659-2206 phone

PROJECT NO: P-2030-15

DRAWN: CCK

CHECKED: RCC

DATE: 12-18-15

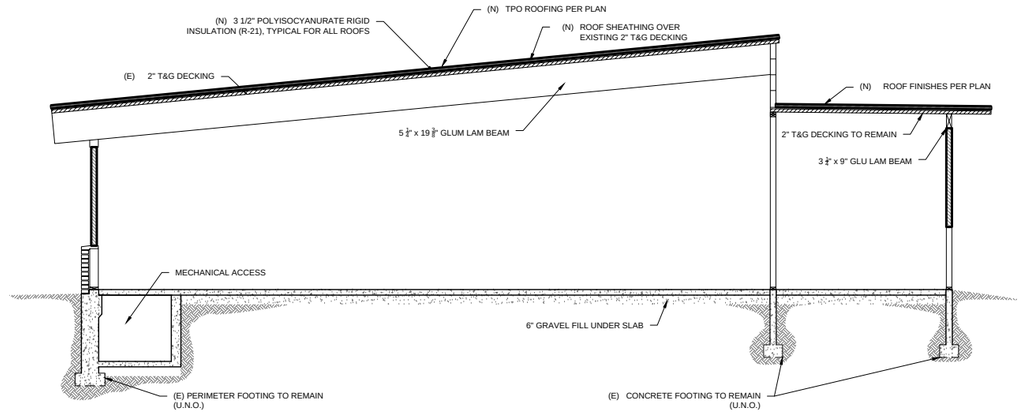
REGISTERED PROFESSIONAL ENGINEER OREGON JULY 16, 1996 RUSSELL C. CARTER

PRELIMINARY - NOT FOR CONSTRUCTION

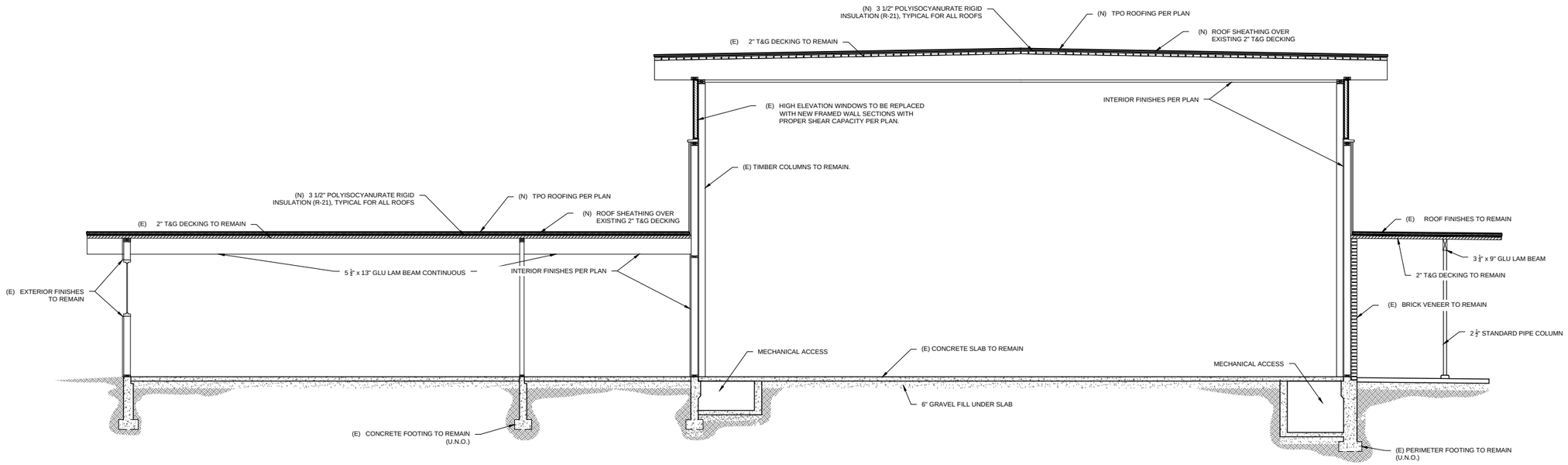
EXPIRES: 12-31-15

ROOFING PLAN

S1.6



1 S1.7 **TRANSVERSE SECTION**
1/4" = 1'-0"



2 S1.7 **TRANSVERSE SECTION**
1/4" = 1'-0"

IF THIS BAR DOES NOT MEASURE 1-INCH IN LENGTH, THEN THE DRAWING IS NOT TO SCALE

NO.	BY	DATE

REVISIONS

DALLAS SCHOOL DISTRICT
WHITWORTH ELEMENTARY SCHOOL
SRG APPLICATION

ENGINEERING
524 Main Street - Suite 02, Oregon City, OR 97045
(503) 657-0295 phone (503) 657-2483 fax

PROJECT NO:	P-2030-15
DRAWN:	CCK
CHECKED:	RCC
DATE:	12-18-15

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 16, 1996
RICHARD C. CARTER
EXPIRES: 12-31-15

PRELIMINARY - NOT FOR CONSTRUCTION

SECTIONS

S1.7