Oregon Schools Seismic Feedback Form

General information:

1. Date of submittal

September 21, 2012

2. County

Linn

3. School district or special education district

Greater Albany Public School District 8J

4. Name and title of person submitting report

Russell Allen
Director of Business and Operations

5. Year for reporting - Please submit separate forms for each year of reporting

2011/2012

Specific information:

6. Did the district replace any school structures with new buildings during the reporting year?

Yes ○

No ◉

a. If No please go to question #7

b. If Yes please fill out the following information FOR EACH STRUCTURE that was replaced

i. Name and address of the school where structure was replaced

ii. Exact structure or structures that were replaced (for example, gymnasium, main building, etc.)

iii. Type of replacement building (for example, tilt-up, masonry, wood frame, etc.)

iv. Maximum occupancy of new structure

v. Date the new structure became occupied

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7. Did the district modify an existing school building in a manner that may affect the seismic risk category of a school?

Yes (●)

No ( )

a. If No you are finished - Please go to the end of the form for submittal instructions

b. If Yes please fill out the following information FOR EACH STRUCTURE that was modified

i. Name and address of the school where structure was modified

Central Elementary School
336 9th Avenue SW
Albany, Oregon 97321

ii. Exact structure or structures that were modified (for example, gymnasium, main building, etc.)

Central Elementary School is a single structure with 3 floors, partial basement, main floor, and second floor. Work occurred on all levels of the building

iii. Type of modification to the building (for example, awnings anchored, structural reinforcement, etc.)

Structural reinforcement of masonry exterior walls, structural tie of floors and roof joist to exterior walls, construction of shear walls.

iv. Date the structure was re-occupied after modification

August 21, 2012

c. Optional - submit a copy of the seismic rehabilitation or structural engineering report

Please attach to email when you submit this form.

d. Optional - cost and method of seismic rehabilitation funding (grant through Seismic Rehabilitation Grant Program, local school bond, etc.)

Completely funded by Seismic Rehabilitation Grant

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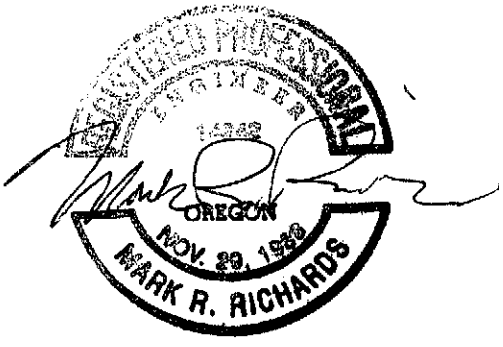
d. Optional – cost and method of seismic rehabilitation funding (grant through Seismic Rehabilitation Grant Program, local school bond, etc.)
Please submit your completed report to: **seismic.feedback@dogami.state.or.us** **Thank you for your cooperation.**

M. R. RICHARDS ENGINEERING INC
100 WEST 13th AVENUE, SUITE 210, EUGENE OR 97401
541-687-0129 FAX 541-687-0133
www.mrrichards.com

STRUCTURAL EVALUATION OF CENTRAL ELEMENTARY SCHOOL

Albany, Oregon



RENEW: 12-31-08

Prepared For

gLAs Architectural Group

December 26, 2007

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STRUCTURAL EVALUATION

Central Elementary School
Albany, Oregon

Summary

A seismic evaluation of Central Elementary School has been performed by M. R. Richards Engineering according to the screening and evaluation procedure of ASCE 31, Seismic Evaluation of Existing Buildings. Major structural deficiencies were found. Rehabilitation to provide a reliable lateral force resisting system is recommended.

Description

Central Elementary School was constructed in 1915. It is a three-story building totaling approximately 42,000 square feet with concrete ground floor walls, masonry exterior walls and wood framed interior walls for the upper levels. Interior finishes were replaced with more modern materials circa 1961, but no specifically structural changes appear to have been made since the original construction.

Scope of work

This evaluation is based on a site visit by Mark R. Richards, S.E. of M. R. Richards Engineering and review of drawings for architectural and mechanical upgrades that have been performed since Central Elementary School was constructed. Drawings for a seismic upgrade proposed in 2005 by KPFF Consulting Engineers were also reviewed as the only available structural drawings for this building.

Evaluation of the Central Elementary School was performed using ASCE standard ASCE 31-03 Seismic Evaluation of Existing Buildings with a selected performance level of "Life Safety". A Tier 1 screening evaluation was performed for all portions of the building. Tier 2 evaluations were performed for components identified as deficient in the Tier 1 evaluation. A Tier 3 evaluation using 75 percent of the design loads required for new buildings was performed to verify the structural adequacy of proposed improvements.

Findings

Seismic design at the time that Central Elementary School was constructed would have been minimal, if considered at all. The upper floors were most likely constructed without steel reinforcement in the exterior masonry walls and with brittle finishes on the interior wood wall, so the structures ability to deform elastically is limited. Reinforcing amount and detailing for the ground floor concrete walls are not known.

Current building codes do not favor sharing of seismic loads between unreinforced masonry and wood framed shear walls. As such, a more favorable analysis is achieved by neglecting the strength of the masonry and designing the wood shear walls to carry seismic load for the entire building.

The existing wood shear walls, if new sheathing were applied, are adequate for the majority of potential seismic loads. Additions of new wood shear walls in selected locations at the perimeter of the building, as shown in the attached structural plans, would result in a complete structural system. Using this method of seismic rehabilitation, some cracking is expected to occur in the masonry exterior walls if a major earthquake were to occur, but the masonry would stay intact and continue to carry gravity loads.

Compared to the braced frame and concrete shear all system proposed by KPFF Consulting engineers, a system of wood shear walls is expected to result in a less costly seismic upgrade due to utilization of the existing wood walls. In addition, the uniform flexibility of a wood shear wall system is expected to have less potential for damage due to differential deflections between portions of the building than a mixed lateral system with varying stiffness.

Out of plane anchorage for masonry and concrete walls has historically been inadequate to resist seismic forces. Installation of anchors meeting current requirements for existing buildings is recommended.

The exterior gym walls, unlike the rest of Central Elementary School, are not supported at the second floor. Installation of a steel strongback system is recommended to prevent out-of-plane failure of these walls.

The type of wood sheathing used in the existing floor and roof diaphragms should be exposed so that the type of sheathing can be identified and re-evaluated based on knowledge of existing conditions.

Details of existing connections for much of Central Elementary School are not known. Prior to finalizing plans for any seismic rehabilitation project, connection details should be observed and assessed by an engineer for any deficiencies in need of correction.

The construction of existing unreinforced masonry walls does not include use of bond courses, which would tie the wythes of brick together. Without wall ties, bricks from the outer wythe could separate from the building during an earthquake, reducing the vertical load capacity of the walls and potentially injuring people exiting the building. At a minimum, helical wall ties should be installed over and around exit ways to protect occupants exiting the building during an earthquake. Installation of wall ties throughout the unreinforced masonry portions of the building would further enhance seismic safety.

Also of note is the fact that roof and second floor joists at the perimeter of the building are supported only by unreinforced masonry. In the event of a masonry failure due to seismic forces, these joists would lose vertical support. Wood bearing walls, similar to the recommended new shear walls, could be constructed as a secondary support system, but are not required.

It is understood that full seismic rehabilitation of Central Elementary School would require significant disruption to use of the building and may exceed available funds. If full seismic rehabilitation is not feasible, a partial seismic upgrade could be performed to improve the safety of the building relative to current conditions without fully meeting current code requirements. A partial seismic upgrade should, at a minimum, include masonry wall anchorage and safety glass in the vicinity of exitways. These corrective actions have the dual purpose of both protecting people outside the building from falling materials and reducing collapse potential by reducing the chance of failures in the building's gravity load carrying system.

Conclusion:

Central Elementary School, in its current state, does not have adequate seismic load resisting systems to prevent damage and/or collapse in the event of a strong earthquake. Satisfactory performance can be achieved with wood shear walls instead of the braced frames and concrete shear walls previously proposed by KPFF Consulting Engineers. Installation of anchors to securely connect masonry and concrete walls to the structural diaphragms and masonry ties to prevent the outer brick wythes from separating from the building are also required for minimum seismic safety. The existing diaphragms and connections should be evaluated after verification of existing conditions. A partial seismic upgrade consisting of wall anchorage is the minimum recommended corrective action.

Recommendations:

1. Conduct further engineering field investigation to determine the building's actual construction conditions. The information needed includes details of the masonry, roof, floor and concrete construction. Partial demolition may be necessary to obtain this information.

2. Further development of an engineered design of seismic upgrades to a point that a cost estimate can be performed.

3. Finalization and construction of the seismic upgrade design.

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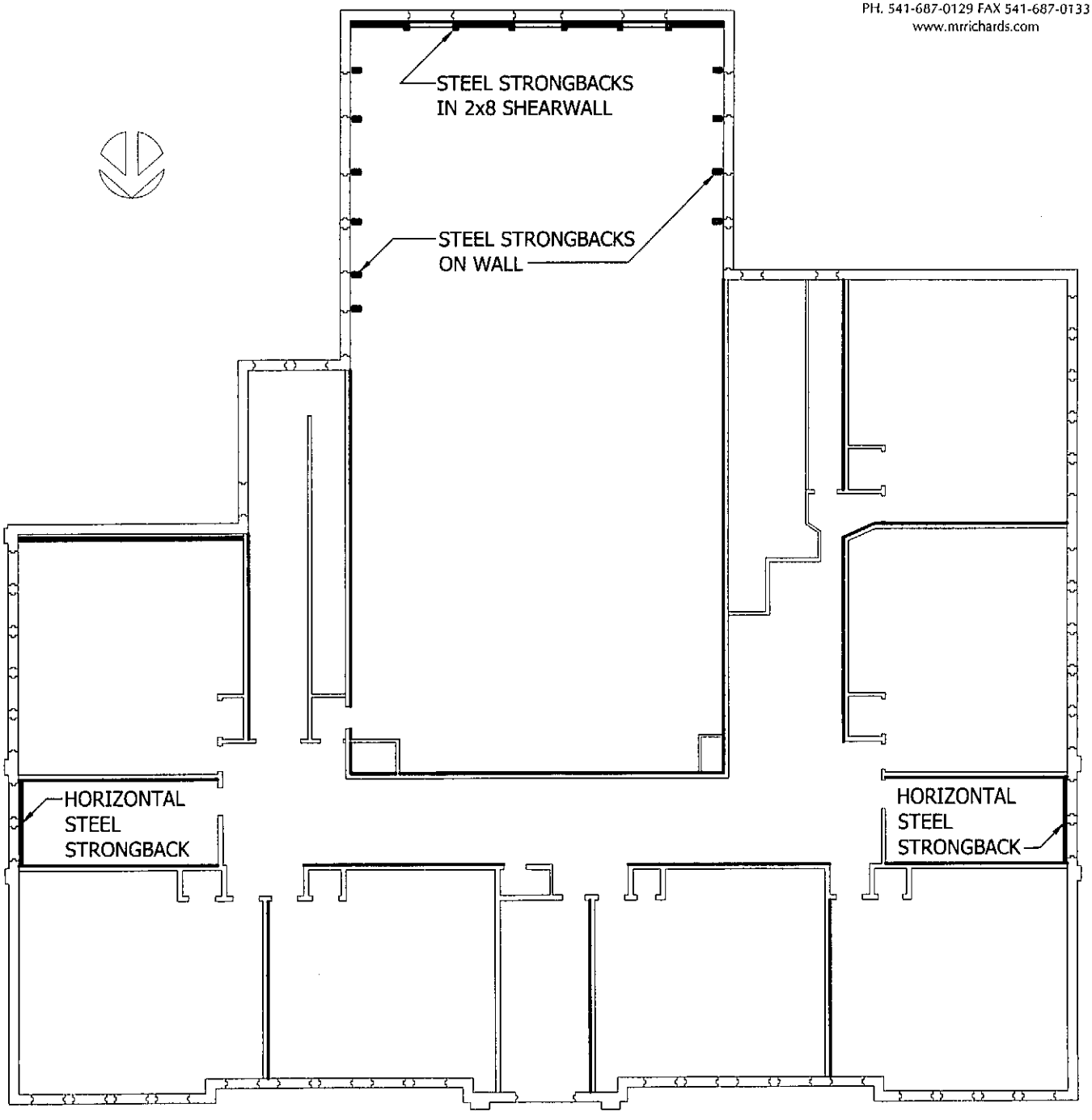

LEGEND:

STRUCTURAL SHEATHING APPLIED TO ONE SIDE OF EXISTING STUDWALL

NEW WOOD SHEARWALL

NOTE:

SHEARWALL AND DIAPHRAGM UPGRADES TO INCLUDE CONNECTING HARDWARE AND BLOCKING (ROOF INCLUDED)

PLAN: SECOND FLOOR SEISMIC UPGRADES

NO SCALE

CENTRAL ELEMENTARY SCHOOL
SEISMIC EVALUATION
ALBANY, OREGON
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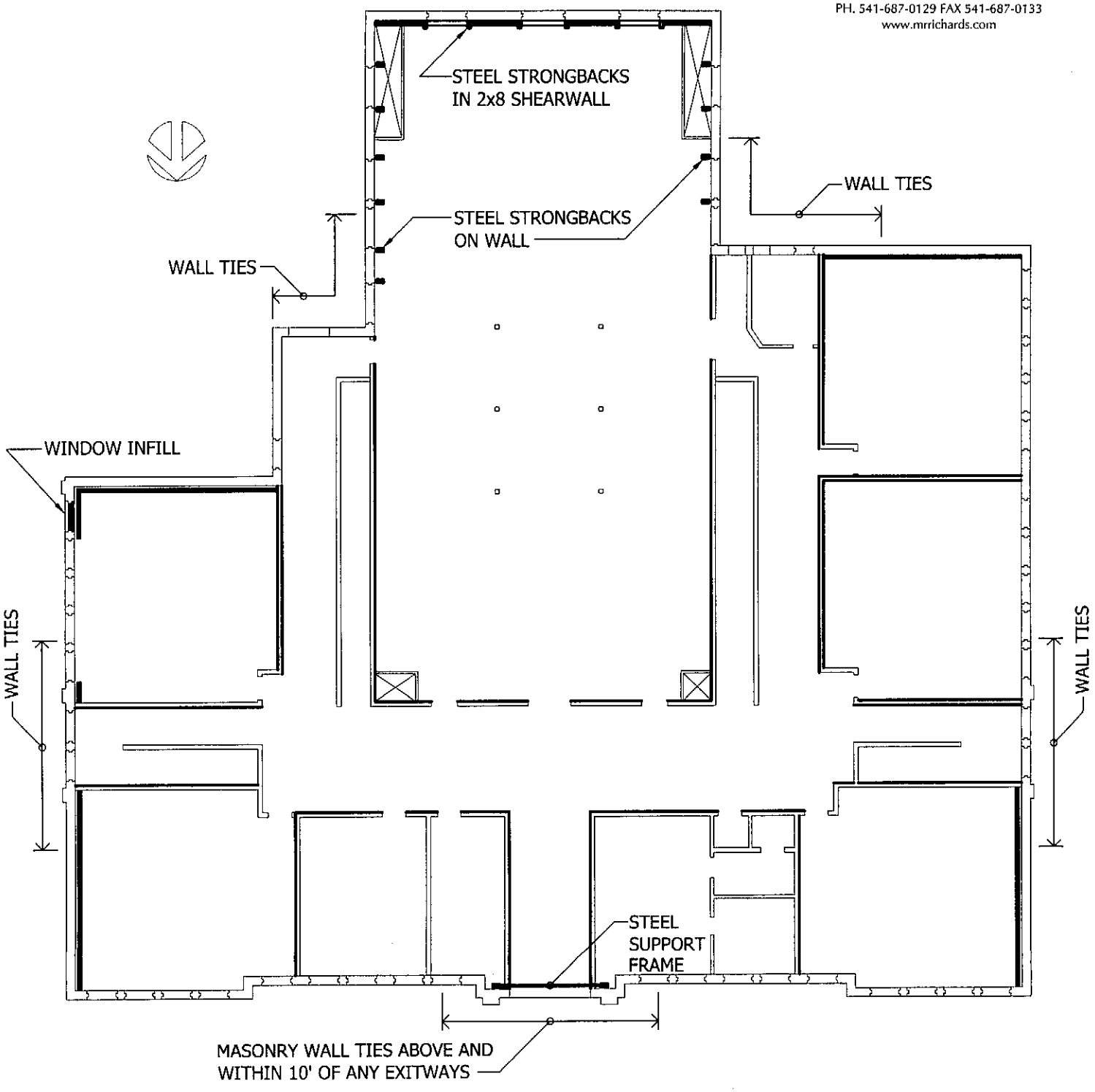

LEGEND:

- STRUCTURAL SHEATHING APPLIED TO ONE SIDE OF EXISTING STUDWALL
- STRUCTURAL SHEATHING APPLIED TO BOTH SIDES OF EXISTING STUDWALL
- NEW WOOD SHEARWALL

NOTE:
SHEARWALL AND DIAPHRAGM UPGRADES TO INCLUDE CONNECTING HARDWARE AND BLOCKING (ROOF INCLUDED)

PLAN: MAIN FLOOR SEISMIC UPGRADES
NO SCALE

CENTRAL ELEMENTARY SCHOOL
SEISMIC EVALUATION
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