ATKINSON ELEMENTARY SCHOOL
5800 SE DIVISION STREET

SEISMIC IMPROVEMENTS MADE TO FACILITY IN CONJUNCTION WITH THE 2009 REROOFING PROJECTS

LATERAL UPGRADE AND REROOFING SCOPE IN 2009

The 2009 Reroofing Project for Atkinson Elementary reroofed all portions of the facility. New supplemental plywood diaphragm strengthening was provided over the entire roof areas with the exception of the concrete roof zone over the Boiler/Electrical/Mechanical rooms at the north side of the north wing, and the two breezeway corridors roofs which connect the north and south wings.

The existing roof framing throughout the facility is 2 x 6 T & G decking which is exposed to view on the underside. The new ½" plywood diaphragms were nailed with short length nails so that they would not pass through the underside of the deck boards. Our drawings specified 0.131" diameter nails, but a request from the contractor to use 0.120" diameter nails was ultimately approved. Reduced nail spacing was used to compensate for the smaller nail diameter and the diaphragms ultimately constructed are capable of 455 pound per lineal foot shear as opposed to the 400 pound per foot capacity with original specified nailing.

A significant portion of the work ended up being the repair of dryrot which was ultimately discovered to exist for approximately 10 percent of the length of the building perimeter edge. Apparently there had been some form of problem with the roof perimeter detail for some time, and quite a bit of effort was expended in replacing decking boards and trying to match existing appearance. Generally only a small width of the building edge was affected. A couple of roof gluelam beams whose ends were exposed at building corners were also found to have a modest amount of rot and were repaired.

This building had received prior lateral upgrade work in 2000 by Froelich Engineers which completed needed lateral improvements below the roof surface. Our work in 2009 provided diaphragm strengthening and completed all roof to wall connections not previously addressed.

It is our opinion that the 2009 Reroofing Project combined with the 2000 Project completes all needed lateral upgrade for Atkinson Elementary and we believe the facility to be adequately upgraded in accord with the requirements of ASCE 41-06 Standards.

UPGRADE PHILOSOPHY

THIS IS A REROOFING PROJECT FOR PORTLAND PUBLIC SCHOOLS THAT ENCOMPASSES ALL OF THE ROOF AREAS OF THIS SCHOOL. IN 2000, THE SCHOOL UNDERWENT A SEISMIC UPGRADE OF IDENTIFIED DEFICIENCIES BELOW THE ROOF LEVEL (BY OTHERS). AT THIS TIME, THE ROOF MEMBRANES AND INSULATION ARE BEING REMOVED AND REPLACED. THE SEISMIC WORK ABOVE THE ROOF LEVEL (ADDING A PLYWOOD DIAPHRAGM AND IMPROVING CONNECTIONS TO MASONRY WALLS) IS BEING DONE.

PORTLAND PUBLIC SCHOOLS HAS INITIATED A VOLUNTARY SEISMIC HAZARD REDUCTION PROGRAM FOR EXISTING SCHOOL FACILITIES WITHIN THE DISTRICT. AS PART OF THAT OVERALL PROGRAM, JAMES G. PIERSON INC. HAS BEEN INSTRUCTED TO INCORPORATE SEISMIC STRENGTHENING INTO THE REROOFING WORK WHICH EXPOSES THE STRUCTURAL ROOF SHEATHING FOR IMPROVEMENT AS PART OF THE NATURAL PROGRESS OF THE REROOFING WORK. THE CURRENT PORTLAND PUBLIC SCHOOLS LATERAL UPGRADE GOAL IS COMPLIANCE WITH THE "BASIC SAFETY OBJECTIVE" OUTLINED IN ASCE-31 AND ASCE-41 STANDARDS, USING LIFE SAFETY LEVEL FOR THE BSE-1 EARTHQUAKE, AND COLLAPSE PREVENTION FOR BSE-2 EARTHQUAKE.

STRENGTHENING OF DIAPHRAGMS, CONNECTIONS TO WALLS, AND OTHER SIMILAR SEISMIC IMPROVEMENTS LOGICALLY UNDERTAKEN IN CONJUNCTION WITH THE REROOFING PROJECT ARE INCLUDED. THE DESIGN OF THESE ROOF LEVEL ELEMENTS IS IN ACCORDANCE WITH THE ASCE-31 AND 41 DOCUMENTS IN VIEW TO AN OVERALL BUILDING UPGRADE SCHEME. THE SEISMIC IMPROVEMENTS OF THIS CONTRACT MAY TERMINATE AT OR IMMEDIATELY BELOW ROOF SURFACE LEAVING FURTHER STRENGTHENING OF THE ENTIRE LOAD PATH UNTIL SUBSEQUENT SEISMIC UPGRADE PROJECTS.

REVIEWERS ARE DIRECTED TO THE SUPPORTING STRUCTURAL CALCULATIONS FOR MORE DETAIL AS TO THE OVERALL BUILDING UPGRADE SCHEME PLANNED, AND THE ELEMENTS OF THE BUILDING WHICH PARTICIPATE IN THAT MECHANISM. ELEMENTS OF THAT SCHEME NOT STRENGTHENED AT THIS TIME (BUT IMPORTANT TO THE LATERAL RESISTANCE OF THE BUILDING) ARE IDENTIFIED SPECIFICALLY AND FULLY BY THAT PACKAGE FOR FUTURE ATTENTION, AND MAY NOT BE AS CLEARLY DEFINED IN THE SHORT SUMMARY SENTENCES WHICH FOLLOW BELOW.

FEMA 178 REPORTS FOR ALL PORTLAND PUBLIC SCHOOLS HAVE BEEN COMPLETED PREVIOUSLY IN 1997 THROUGH 1999. A FEMA REPORT BY OTHERS IS PROVIDED IN CONJUNCTION WITH THE STRUCTURAL SUBMITTAL FOR THIS BUILDING PERMIT.

<u>AREAS OF THE STRUCTURE RECEIVING SEISMIC UPGRADE AT THIS TIME</u>

1. STRENGTHEN (E) ROOF DIAPHRAGM BY ADDING PLYWOOD ON TOP OF (E) 2X STRAIGHT SAWN SHEATHING.
2. STRENGTHEN IN-PLANE SHEAR TRANSFER BETWEEN GYM ROOF DIAPHRAGM AND (E) MASONRY WALLS.

<u>AREAS OF THE BUILDING PREVIOUSLY UPGRADED UNDER PRIOR PERMITS</u>

1. NEW OR REHABILITATED SHEARWALLS AND CONNECTIONS TO THE 2X DECKING (SEE 2000 PROJECT DOCUMENTS BY AMAA AND FROELICH ENGINEERS)

<u>AREAS OF THE BUILDING IDENTIFIED FOR FUTURE UPGRADES</u>

1. NONE

SCHOOL NUMBER

BUILDING SUMMARY

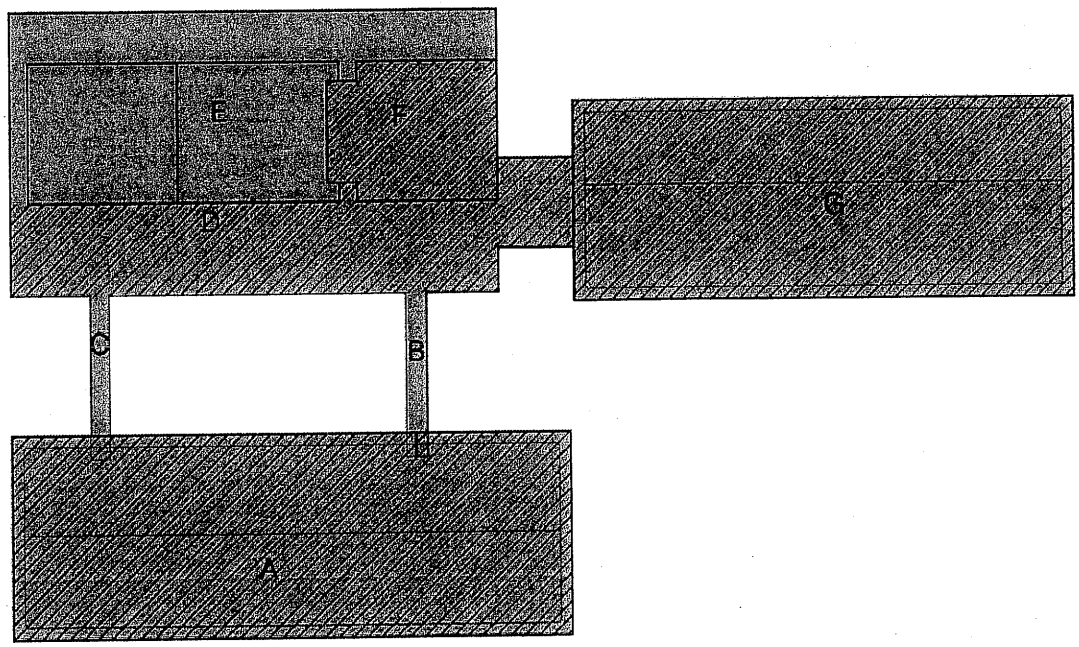
234

PROJECT GROUP

Replace - G

SCHOOL NAME

ATKINSON ELEMENTARY SCHOOL



ROOF PLAN - ATKINSON ELEMENTARY SCHOOL
SCALE: NO SCALE

N

Priority 1

Existing roof system has generally expired. Repair scopes should not be considered an option. ***Replace in 2009.***

Priority 2

Roof systems are approaching the end of their service life. Roof system replacement could be deferred. ***Repair in 2009.***

P.V. Option

As denoted with a hatch pattern, these areas could be considered for installation of a rooftop P.V. system.

Priority 3

Roof system replacement or major repair is not immediately required.

2009 COST SUMMARY – ATKINSON ELEMENTARY SCHOOL		
2009 Replacement	*Areas A, B, C,D, E, F, G*	***$1,069,100.00***
2009 Repair	*n/a*	***n/a***
Structural Scope	*Gym / Stage / Auditorium Sections*	***$55,000.00***
TOTAL		**$1,124,200.00**