SCAN

MADDEN&BAUGHMAN
ENGINEERING, INC

July 2, 2013

Ms. Kim Greer
Harmony Montessori
PO Box 16695
Portland, Oregon 97292

RE: Harmony Montessori School Renovation
Portland, Oregon

Attached please find structural calculations for the seismic strengthening of the 2 story wood framed building located at 10541 SE Cherry Blossom Drive in Portland, Oregon, including new framing for a stair well. The seismic strengthening and new stair well are designed to meet the requirements of the 2010 Oregon Structural Specialty Code.

If you have any questions please call me.

Sincerely,

Jerome A Madden III

Jerome Madden, P.E., S.E., Principal
Madden & Baughman Engineering, Inc.

REGISTERED PROFESSIONAL ENGINEER
1938GPE
OREGON
July 22, 1997
JEROME A. MADDEN
Exp 12.31.14

13.1815.CO

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ENGINEERING, INC.
Portland, OR
tel 503.236.7611
www.maddenbaughman.com

Project	HARMONY MONTESSORI	By	JM
Location	SE CHERRY BLOSSOM	Date	6/29/13
Client	HARMONY	Revised	
	PORTLAND, OR	Date	

Sheet No 11

Job No.

(E) 1970's ERA WOOD FRAMED BUILDING. OR 1980's

2 STORIES/, REINF. CONC. STEM WALL. PARTIAL BASEMENT. (E) CONDITIONS NOTED WERE FIELD VERIFIED.

1.) STRENGTHEN TO OSSC.

a) CONFIRMED T-111 SIDING

b.) CONFIRED ½" CDX ROOF SHEATHING

2.) ENALUATE (E) WALLS FOR 2010 OSSC SEISMIC & WIND, REINF SHEAR WALL ANCHORAGE TO (E) WALL, ADD HOLDOWNS.

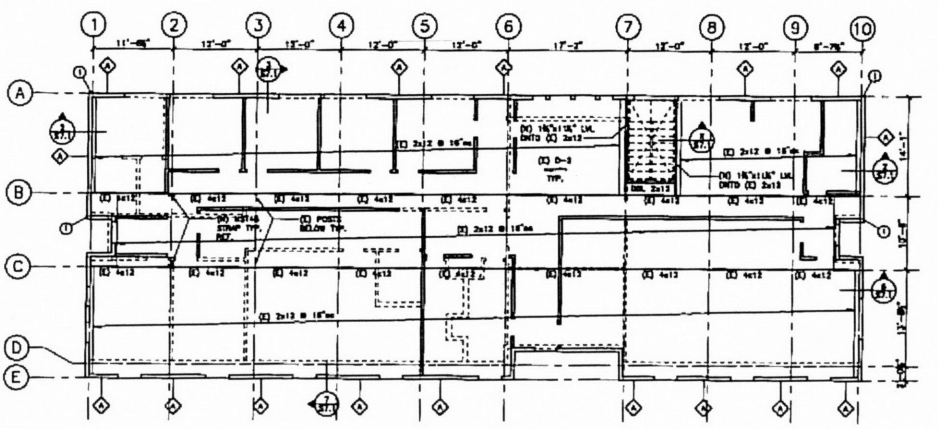
3.) PROVIDE CONTINUOUS CROSS TIES BOTH DIRECTIONS @ GRID LINES.

(E) LL = 50 psf. OK.

S_{DS} = .75

R = 6.5

I = 1.0



1 SECOND FLOOR FRAMING PLAN
1/8" = 1'-0"

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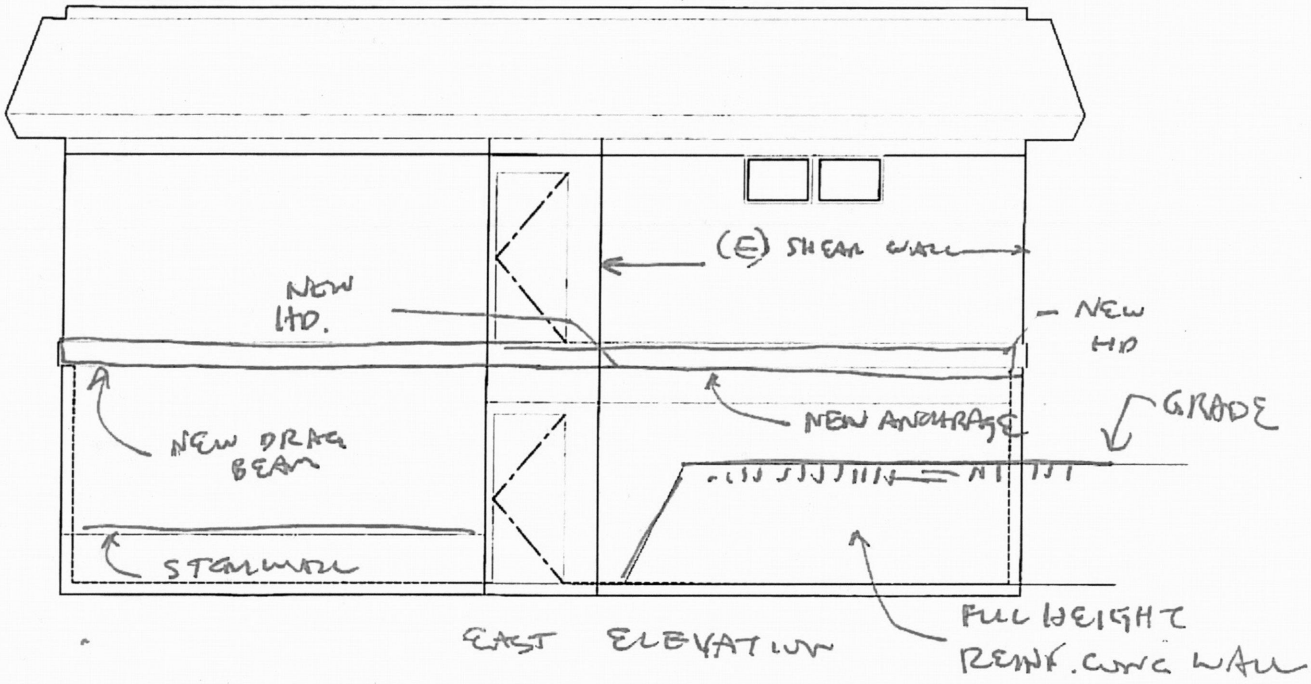
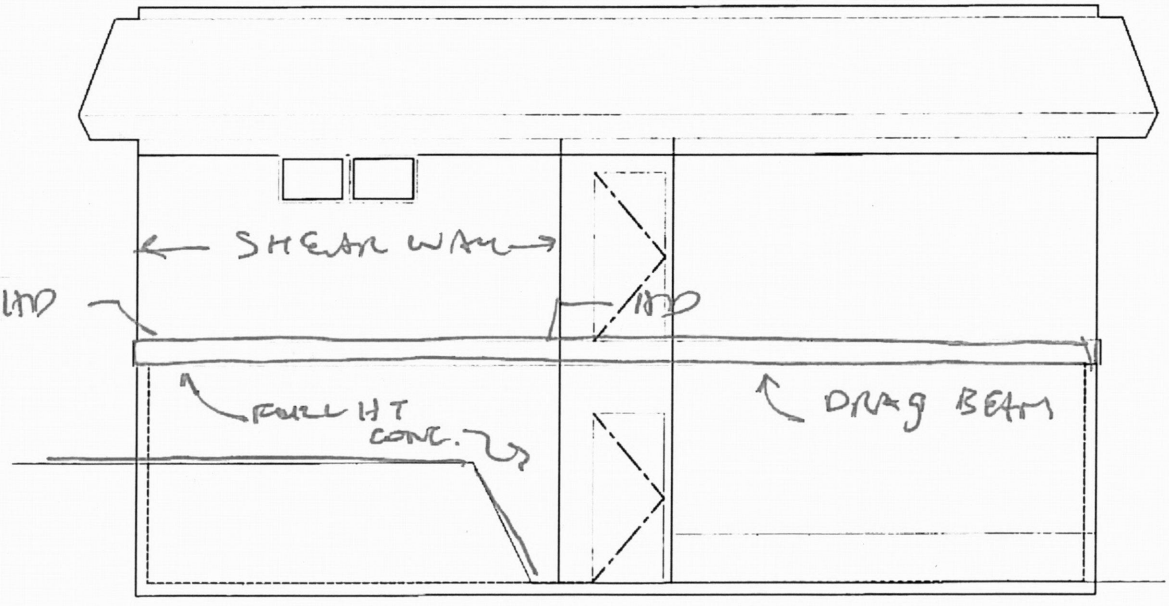
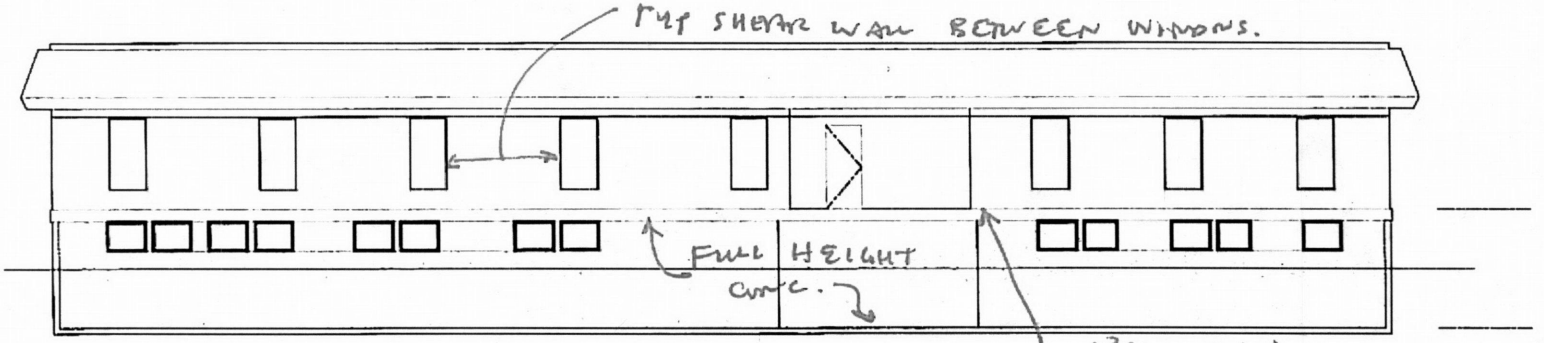
Project	HARMONY MONTESSORI	By JM	Sheet No. 2
Location	SE CHERRY BLOSSOM	Date 6/30/13	
Client	H. M. S.	Revised	Job No.
	PORTLAND OR	Date	



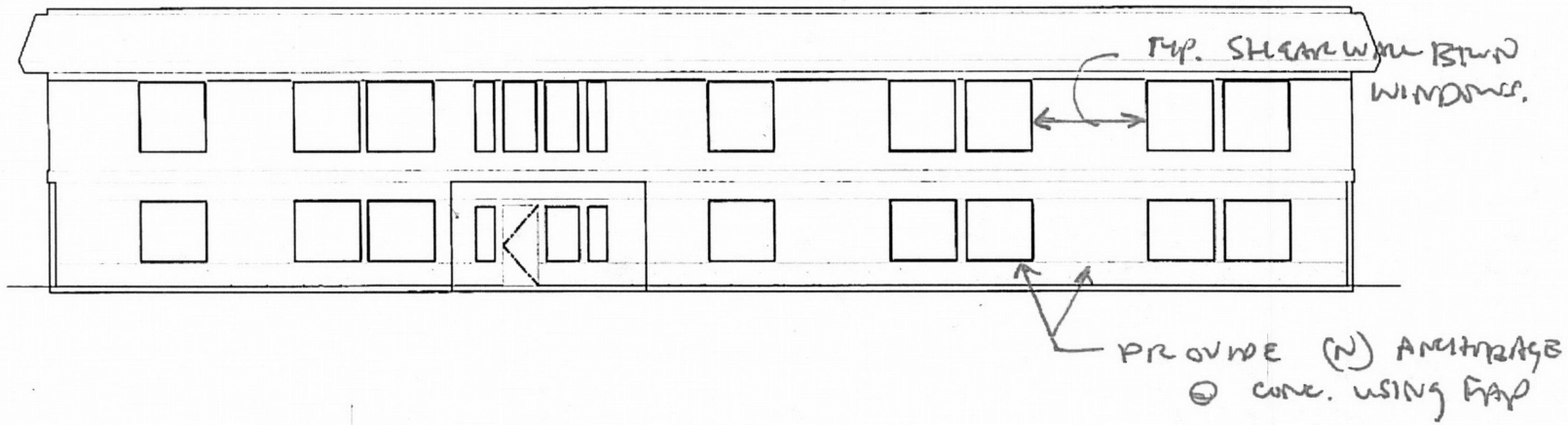
EAST ELEVATION



WEST ELEVATION



NORTH ELEV. - EXISTING T-11 SIDING



SOUTH ELEVATION.

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Project: Harmony Montessori
Location: SE Cleveland Blvd.
Client: H.M.S.
By: JM.
Date:
Revised:
Date:
Job No.
Sheet No: 31

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Project HARMONY MONTESSORI	By JM	Sheet No. 9/	
Location CHERRY BLOSSOM	Date 6/28/13		
Client HARMONY / STEM.	Revised	Job No.	
10541	Date		

SEISMIC STRENGTHENING & STAIR PROJECT

- EXISTING WOOD FRAMED BUILDING, CONC. FOUNDATION
- CHANGE OF USE
- 2010 OSSC SEISMIC UPGRADE
- LL = 50 psf W_{DL} = 15psf, S_{DS} = .75, R = 6.5

PLAN DIMENSION: WIND = 95 MPH I = 1.0.

- 111.25 x 40.33

- SEISMIC:

- ROOF trusses @ 24" o.c. : 1.5psf.
- PLYWOOD ROOF: 1.5psf
  GYP CEILING: 3.0psf
  INSULATION: 2.0psf
  ROOF: 20
  10psf. ← USE 12

FLOOR:

- 2x12 @ 16" = 3.0
- PLYWOOD: 2.0 psf
- INSULATION: 2.0psf
- MISC 1.0 psf
- CEILING 2.8psf
  10.8
  ↑ USE 12

ROOF:

111.25 x 40.33 (.012) = 54 kip.

FLOOR: 54 kip.

WALLS:

N/S: ROOF: $\frac{8.5}{2}(.01)(111)(2) = 9.4$

2ND: $\frac{18.5}{2}(.01)(111)(2) = 20.5$.

ROOF: 63.4 kip
2ND: 74.5 kip.

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Project	By	Sheet No. 5
Location	Date	
Client	Revised	Job No.
	Date	

EAST / WEST:

WALLS: $\frac{8.5}{2}(40.3)(2)(.01) = 3.4$

ROOF: 54 kip + 3.4 = 57.4 kip.

2ND: $54\text{ k} + \frac{18.5}{2}(.01)(40.33)(2) = 61.5$ kip

SEE SEISMIC WORKSHEET:

[$V_{N/S} = 6.7^{K}$ RF
4.2^{K} 2ND
10.9 kip.

$V_{E/W}$ RF = 6.0 kip
$V_{E/W_{2ND}} = 3.5$ kip
9.5 kip] ASD

WIND:

$V_{N/S}$ 90: 26.70 kip.

$V_{N/S}$ LW: 29.5 kip

$V_{AVE} = 28.1$ kip

$V_{E/W}$ 90 = 8.64 kip

$V_{E/W_{90}} = 10.71$ kip

$V_{AVE} = 9.68$ kip

WIND CONTROLS NORTH/S. DIRECTIONS:

$V_{RF} = .23\,V_{AVE} = 6.4$ kip

$V_{2ND} = 14.0$ kip

V_{RF} = 2.2 kip.

$V_{AVE} = 4.84$ kip.

$V_{RF\,WEST} = V_{RF\,EAST} = 3.2$ $\quad l = 17' - 9'' - 6 = 11.75'$

$v = 3.2/11.75 = .272$ klf. ← TYPE (A)

$T_{GROSS} = .188(8.5) = 1.6$ kip.

$P_{DL\,WALL} = 17(.01)(8.5) = 1.4$

$T_{NET} = 1.6 - .6(1.4) = .8^{k}$ ← FSA TO (E) STUD.

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Project	By	Sheet No
Location	Date	5
Client	Revised	Job No
	Date	

NORTH / SOUTH ... CONT.

$V_{2ND-1ST}$: $3.2^k + 7.0 = 10.2$ kip

RF - 2ND.
SHEAR WALL:

$1/2"$ T-111 ASSUME NET = $3/8"$.
FIELD VERIFIED NAILING @ 4" o.c. EDGE. $v_{allow} = 320$ plf. > 272 plf
O.K.

2ND - 1ST:

$\frac{7.0\ k}{40} = .175$ KLF

← (E) 3/4" PLYWOOD.
UNBLOCKED DIAPHRAGM
$v_{allow} = 285$ plf
10d @ 6" o.c. EDGE
OR
$v_{allow} = 215$ plf O.K.

$V_{DIRECT} = 17.2 (.175) = 3.01 + V_{above} = 3.2 = 6.2$ kip.

$V_{DRAG} = 4.0$ kip. MSTC40
$T_{allow} = 4.75$ kip.

SPLICE NEW 2x12
ONTO (E) RIM.

$\frac{4.0k}{17.0} = .23$ KLF ← (2) 1/4 SDS @ 16" o.c

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Project	By	Sheet No.
Location	Date	7
Client	Revised	Job No.
	Date	

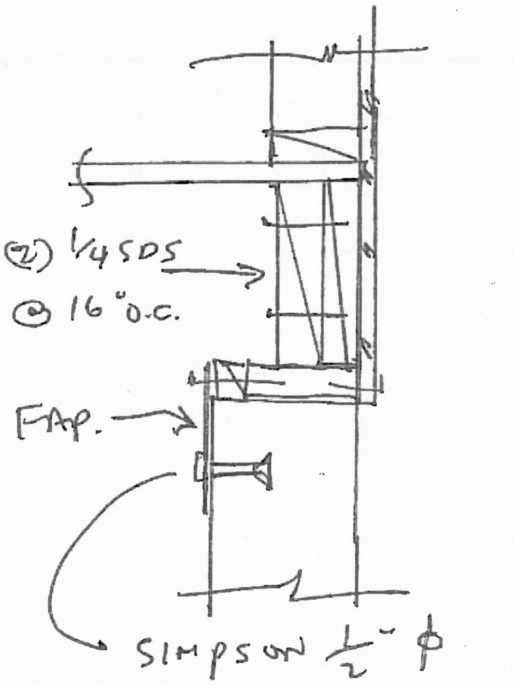
2ND – 1ST CONC. N/S

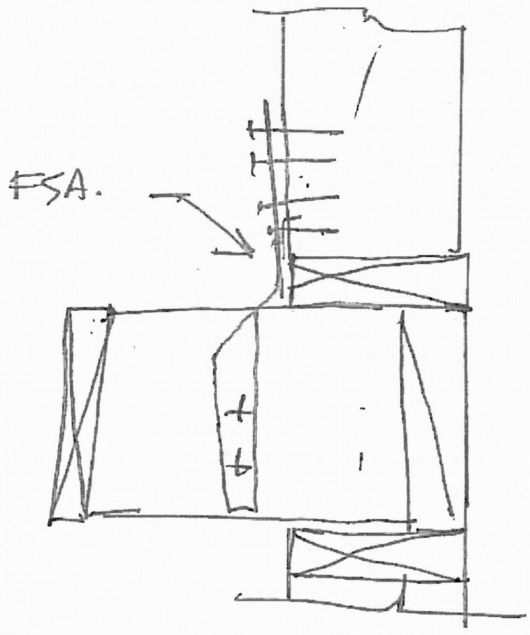
10.2 K ←

$\frac{10.2}{0.95} = 10.7$ OVER 17FT.

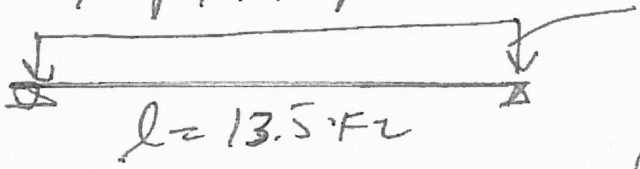
← FAP @ 16" O.C.

T = .8K ← TallN = 1.2 kip.





OPENING @ STAIR



3.5(.110) = .385 KLF

M = 8.77

$S_{xx} = 84$

$f_{bxx} = 1.25$ ksi OK.

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Project	By	Sheet No.
Location	Date	B1
Client	Revised	Job No.
	Date	

EAST / WEST LATERAL:

$V_{RF} = 2.2$ WIND $\quad V_{RF} = 6.0$ kip SEISMIC

$V_N = V_{SRF} = \frac{6.0}{2} = 3.0$ K.

$l_{NORTH} = 47$ FT.

↳ (E) TILL 8d @ 9" O.C.

$v = 3.0/47 = .06$ KLF OK.

$l_{SOUTH} = 63.$ FT.

$v = 3.0/63 = .047$ KLF.

↳ (E) 8d @ 9" O.C.

OK

$V_{2NP-1ST\ S,ORN.} = 3.0 + \frac{3.5}{2} = 4.7.$ kip.

USE FAP @ 4'-0" O.C.

EA SIDE

$v = .950/4' = .238$ KLF.

SEISMIC FACTOR -

I =	1.0		
R =	6.5		
ρ =	1.0		
S_S =	1.100	$S_{DS} = 2/3\ S_s$ =	0.733
S_1 =	0.340	$S_{D1} = 2/3\ S_1$ =	0.227
hn =	18 ft		
Ct =	0.02		
x =	0.75	$T = Ct\ (hn)^x$ =	0.175
		$C_{SS} = S_{DS} / (R / I)$ =	0.113
		$C_{S1} = S_{D1} / T / (R / I)$ =	0.200
		Cs =	**0.113**

N/S			E/W		
Weight trib to roof =	63.4	kips	rf	57.4	kips
Weight trib to 2nd =	74.5		2nd	61.5	
	0.0			0.0	
	0.0			0.0	
Weight trib to Ground =	0.0	kips	Weight trib to Ground =	0.0	kips
W =	137.9	kips	W =	118.9	kips
V = CsW =	15.6	kips	$V_{NS} = CsW_{NS}$ =	13.4	kips

NORTH-SOUTH DIRECTION -

Level	w_x	h_x	$w_x h_x$	%	Q_E	Story Force, kips ULT $E = \rho Q_E$	Story Force, kips ASD 0.7E
R	63.4	18.5	1172.9	0.6	9.5	9.5	6.7
2	74.5	10.0	745.0	0.4	6.0	6.0	4.2
0	0	0.0	0.0	0.0	0.0	0.0	0.0
0	0	0.0	0.0	0.0	0.0	0.0	0.0
0	0	0.0	0.0	0.0	0.0	0.0	0.0
			1917.9	1.0			10.9

NORTH-SOUTH DIRECTION -

Level	w_x	h_x	$w_x h_x$	%	Q_E	Story Force, kips ULT $E = \rho Q_E$	Story Force, kips ASD 0.7E
R	57.4	18.5	1061.9	0.6	8.6	8.6	6.0
2	61.5	10.0	615.0	0.3	5.0	5.0	3.5
0	0	0.0	0.0	0.0	0.0	0.0	0.0
0	0	0.0	0.0	0.0	0.0	0.0	0.0
0	0	0.0	0.0	0.0	0.0	0.0	0.0
			1676.9	0.9			9.5

"ASCE705W.xls" Program
Version 1.0

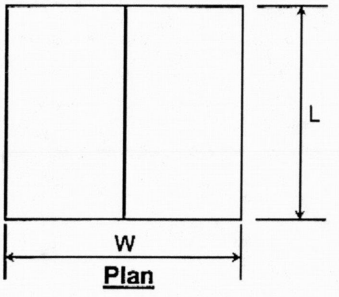
WIND LOADING ANALYSIS - MWFRS and Components/Cladding

Per ASCE 7-05 Code for Low-Rise, Enclosed Buildings with h <= 60' and Roof θ <= 45°
Using Method 1: Simplified Procedure (Section 6.4)

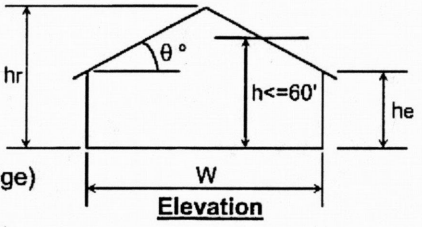
Job Name:	Harmony Montessori	Subject:			
Job Number:		Originator:		Checker:	

Input Data:

Wind Speed, V =	100	mph (Wind Map, Figure 6-1)
Bldg. Classification =	II	(Table 1-1 Occupancy Category)
Exposure Category =	B	(Sect. 6.5.6)
Ridge Height, hr =	24.00	ft. (hr >= he)
Eave Height, he =	18.50	ft. (he <= hr)
Building Width, W =	40.33	ft. (Normal to Building Ridge)
Building Length, L =	111.25	ft. (Parallel to Building Ridge)
Roof Type =	Gable	(Gable or Monoslope)
Topo. Factor, Kzt =	1.00	(Sect. 6.5.7 & Figure 6-4)
Wall C&C Name =	Wall	(Girt, Siding, Wall, or Fastener)
Wall C&C Eff. Area =	16.00	ft.^2 (for Component/Cladding)
Roof C&C Name =	Joist	(Purlin, Joist, Decking, or Fastener)
Roof C&C Eff. Area =	2.00	ft.^2 (for Component/Cladding)
Overhang Eff. Area =	0.00	ft.^2 (for Component/Cladding)



Plan



Elevation

Resulting Parameters and Net Design Pressures:

For Transverse Direction: (wind perpendicular to ridge)

Roof Angle, θ =	15.26	deg.
Mean Roof Ht., h =	21.25	ft. (h = he for θ < 10 deg.)
Adjustment Factor, λ =	1.000	(adjusts for height and exposure)
Importance Factor, I =	1.00	(Table 6-1)
Wall & Roof End Zone Width, a =	4.033	ft. (use: "2*a" for MWFRS, "a" for C&C)

Transverse MWFRS Net Pressures, ps (psf) — ps = λ*Kzt*I*ps30 (ps30 from Fig. 6-2)

Location	Direction	Zone	Load Case 1	Load Case 2
A = end zone of wall	Horizontal	A	20.01	—
B = end zone of roof	Horizontal	B	0.00	—
C = interior zone of wall	Horizontal	C	13.37	—
D = interior zone of roof	Horizontal	D	0.00	—
E = end zone of windward roof	Vertical	E	-19.10	—
F = end zone of leeward roof	Vertical	F	-12.45	—
G = interior zone of windward roof	Vertical	G	-13.30	—
H = interior zone of leeward roof	Vertical	H	-9.53	—

For Longitudinal Direction: (wind parallel to ridge)

Roof Angle, θ =	0.00	deg. (assumed)
Mean Roof Ht., h =	21.25	ft. (h = (hr+he)/2)
Adjustment Factor, λ =	1.000	(adjusts for height and exposure)

Longitudinal MWFRS Net Pressures, ps (psf) — ps = λ*Kzt*I*ps30 (ps30 from Fig. 6-2)

Location	Direction	Zone	Load Case 1	Load Case 2
A = end zone of wall	Horizontal	A	15.90	—
B = end zone of roof	Horizontal	B	0.00	—
C = interior zone of wall	Horizontal	C	10.50	—
D = interior zone of roof	Horizontal	D	0.00	—
E = end zone of windward roof	Vertical	E	-19.10	—
F = end zone of leeward roof	Vertical	F	-10.80	—
G = interior zone of windward roof	Vertical	G	-13.30	—
H = interior zone of leeward roof	Vertical	H	-8.40	—

Total Design MWFRS Horizontal Load (kips)					
Transverse			Longitudinal		
Load Case 1	Load Case 2	Min. Load	Load Case 1	Load Case 2	Min. Load
29.49	—	26.70	10.71	—	8.57

Formulas:

Ph(Trans) = ((Pc*(L-4*a)+Pa*4*a)*he+(Pd*(L-4*a)+Pb*4*a)*(hr-he))/1000

Ph(Trans)(min) = P(min)*L*hr/1000 , where: P(min) = 10.0 psf on projected area

Ph(Long) = (Pa*(he+4*a/W*(hr-he)+he)/2*4*a+Pc*(W*(hr+he)/2-(he+4*a/W*(hr-he)+he)/2*4*a))/1000

Ph(Long)(min) = P(min)*W*(hr+he)/2/1000 , where: P(min) = 10.0 psf on full area

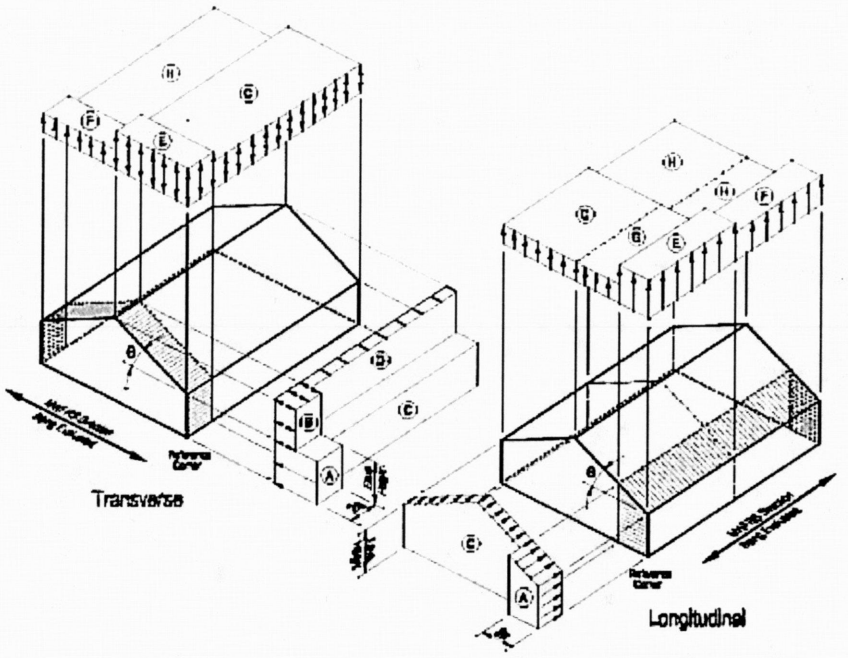
Components & Cladding Net Pressures, ps (psf)				
Item	Location	Zone	Pos. (+)	Neg. (-)
Wall	4 = interior zone of wall	4	17.52	-19.02
	5 = end zone of wall	5	17.52	-23.14
Roof Joist	1 = interior zone of roof	1	10.40	-16.50
	2 = end zone of roof	2	10.40	-28.70
	3 = corner zone of roof	3	10.40	-42.40
Roof Overhang	2 = end zone of o.h.	2	—	—
	3 = corner zone of o.h.	3	—	—

pnet = λ*Kzt*I*pnet30
(pnet30 from Fig. 6-3)

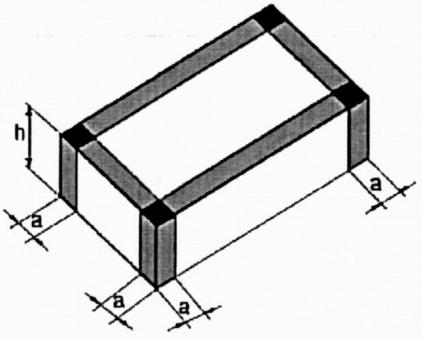
Notes:

1. For Method 1: Simplified Procedure of Section 6.4 to be used for an enclosed low-rise building to determine the design wind loads, all of the following eight conditions of 6.4.1.1 must be met:
   a. Building is a simple diaphragm building, in which wind loads are transmitted through floor and roof diaphragms to the vertical Main Wind-Force Resisting System (MWFRS).
   b. Building is a low-rise building where mean roof height, h <= 60 ft., and h <= min. of L or W.
   c. Building is enclosed and conforms to wind-borne debris provisions of Section 6.5.9.3.
   d. Building is a regular shaped building, having no unusual geometrical irregularity.
   e. Building is not classified as a flexible building so it is considered "rigid".
   f. Building is not subject to across-wind loading, vortex shedding, etc.
   g. Building has an approximately symmetrical cross section in each direction with either a flat roof, or gable roof with θ <= 45 degrees.
   h. Building is exempted from torsional load cases or torsional load cases do not control any of the MWFRSs of the building.
2. Wind pressures (p_{s30}) in Figure 6-2 and (p_{net30}) in Figure 6-3 were prepared based on following:
   a. Mean roof height, h = 30 ft. , Exposure category = B , Importance factor, I =1.0
   b. Velocity pressure exposure coefficient, Kz = 0.70
   c. Directionality factor, Kd = 0.85 , Topographic factor, Kzt = 1.0
   d. Internal pressure coefficients, GCpi = +0.18, -0.18 (enclosed building)
   e. MWFRS pressure coeff's. from Figure 6-10, and C&C pressure coeff's. from Figure 6-11.
   f. MWFRS design wind pressure, $P_s = \lambda*Kzt*I*p_{s30}$, in psf.
   g. Components & cladding design wind pressure, $P_{net} = \lambda*Kzt*I*p_{net30}$, in psf.
3. Design wind pressures are net pressures (sum of external and internal pressures).
4. Wall net pressure for MWFRS is total for both windward and leeward walls.
5. (+) and (-) signs signify wind pressures acting toward & away from respective surfaces.
6. If pressures for Zones "B" and "D" < 0, assume = 0.
7. For the design of the longitudinal MWFRS use roof angle, θ = 0 degrees.
8. Both load cases 1 and 2 are be checked for roof angle, 25 degrees < θ <= 45 degrees.
9. The total design MWFRS horizontal load is the total horizontal wind load on either the length (L) or the width (W) of the building respectively assuming one end zone of a width = 2*a.
10. Minimum wind load for MWFRS design shall be 10 psf applied to area on projected vertical plane. Minimum wind load for C&C shall be 10 psf acting in either direction normal to surface.
11. References:
    a. ASCE 7-05 Standard, "Minimum Design Loads for Buildings and Other Structures".
    b. "Guide to the Use of the Wind Load Provisions of ASCE 7-02" by: Kishor C. Mehta and James M. Delahay (2004).

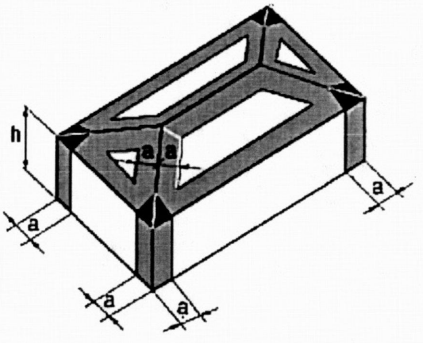
(continued)



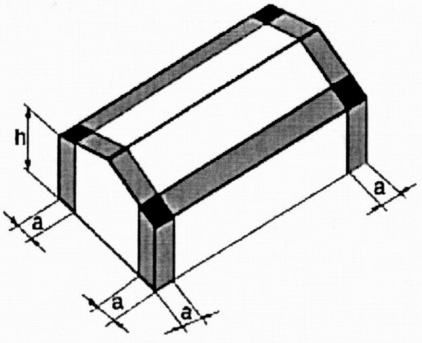
MWFRS - Wind Zones



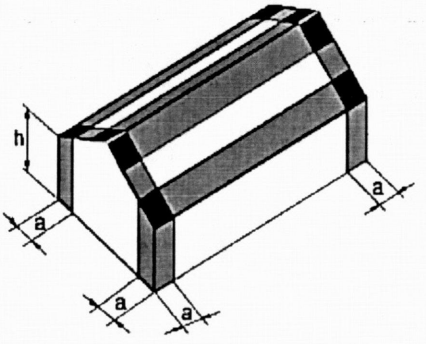
Flat Roof



Hip Roof (7°< θ ≤ 27°)



Gable Roof (θ ≤ 7°)



Gable Roof (7°< θ ≤ 45°)

Interior Zones
Roofs - Zone 1/Walls - Zone 4

End Zones
Roofs - Zone 2/Walls - Zone 5

Corner Zones
Roofs - Zone 3

Components and Cladding - Wind Zones

SCAN

MADDEN&BAUGHMAN
ENGINEERING, INC

August 23, 2013

Mr. Ben King
Stem Architecture
PO Box 2124
Portland, Oregon

Attached below is our response to the plan review structural checksheet from the City of Portland.

Based on the plans and specifications submitted, the following items appear to be missing or not in conformance with the Oregon Structural Specialty Code and / or other city, state, or federal requirements.

Item #	Location on plans	Code Section	Clarification / Correction Required
1.		OSSC 110.3.9	Complete and return the attached Special Inspection form prior to issuance of the permit. The completed form can be fax returned to Special Inspections at 503-823 4172, to 2nd Floor Document Services, or by email to specialinspectionschecksheets@portlandoregon.gov. The list of special inspections on sheet S0.1 does not accurately reflect what is required on this project (pin piles?, masonry?). Please revise this list so that it is specific to this project. MBE Response: S0.1 revised and inspection form attached.
2.	S0.1		On sheet S0.1, include in the general notes a structural summary that summarizes the existing building and the goal of the seismic strengthening (i.e. current code), and what is causing the current code seismic upgrade. MBE Response: Sheet S0.1 revised. Building strengthened to OSSC because the occupancy category has changed from B to E.
3.	1/S2.1 (2nd floor plan)		Detail 6/S7.1 cut on grid 10 between grids C and D does not appear to apply at this location. Please review and revise the detail reference as appropriate. MBE Response: Plan changed to locate 6/S7.1 over beams.
4.	1/S2.1 (2nd floor plan)		The calculations (page 5) appear to indicate that new drag/collector work is intended for north-south loading at or near grids 1 and 10 at the 2nd floor. Please review and revise the drawings or clarify the intent as appropriate. MBE Response: As noted on 2/S7.1, additional 2x12 added to existing 2x12 rim joist because a splice is assumed in the existing rim joist. 2/S7.1 notes that existing and new 2x12 draw beam are to be nailed with (2) 16d@16" o.c. page 6.
5.	1/S2.1 (1st floor plan)		Please address the adequacy of the existing shear walls on grid A at the first floor. MBE Response: see attached addendum to calculation sheet page 8.
6.	2/S7.1		It appears that the holdown force needs to get transferred to the existing concrete wall on detail 2/S7.1 rather than just the floor framing. Please review/explain. MBE Response: FSA strap added from block to concrete, see 2/S7.1

Sincerely

Jerome A Madden III

Jerome Madden, P.E., S.E., Principal
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REGISTERED PROFESSIONAL ENGINEER
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Project	HARMONY MONTESSORI	By	JM	Sheet No.
Location		Date		5
Client		Revised	8/20/13	Job No.
		Date		

NORTH / SOUTH . . . CONT.

$V_{2ND-1ST}$: $3.2^k + 7.0 = 10.2$ kip

RF - 2ND.
SHEAR WALL:

1/2" T-111 ASSUME NET = 3/8".
FIELD VERIFIED NAILING @ 4" o.c. EDGE. $V_{allow} = 320$ plf. > 272 plf O.K.

2ND - 1ST:

$\frac{7.0\ k}{40} = .175$ KLF

(E) 3/4" PLYWOOD.
UNBLOCKED DIAPHRAGM
$V_{allow} = 285$ plf
10d @ 6" o.c. EDGE
OR
$V_{allow} = 215$ plf O.K.

$V_{DIRECT} = 17.2(.175) = 3.01 + V_{above} = 3.2 = 6.2$ kip.

$V_{DRAG} = 4.0$ kip.

MSTC40
$T_{allow} = 4.75$ kip.

1 SPLICE NEW 2x12 ONTO (E) RIM.

$\frac{4.0k}{17.0} = .23$ KLF ← (2) 1/4 SDS @ 16" o.c.

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Project HARMONY MONTESSORI	By JM.	Sheet No. B1
Location	Date	
Client	Revised 8/20/13 (1)	Job No.
	Date	

EAST / WEST LATERAL:

V_{RF} = 2.2 WIND V_{RF} = 6.0 kip SEISMIC

$V_N = V_{SRF} = \frac{6.0}{2} = 3.0$ k.

l_{NORTH} = 47 ft.

↳ (E) T111 8d @ 4" o.c.

$v = 3.0/47 = .06$ klf OK.

l_{SOUTH} = 63. ft.

$v = 3.0/63 = .047$ klf.

↳ (E) 8d @ 4" o.c.

OK

$V_{2ND-1ST} = 3.0 + \frac{3.5}{2} = 4.7$ kip.
S, OR N.

USE FAP @ 4'-0" o.c.
EA SIDE

$v = .950/4' = .238$ klf.

(1) PLAN REVIEW:

$v = \frac{4.7}{63 ft} = .0746$ klf ← (E) T111 8d @ 4" o.c.
1ST Vallow = 320 plf OK

$T_{GROSS} = .0746(7'-0") = .52$ kip. ← NO NET UPLIFT. WALL DL ALONE = 1.6 kip

NORTH & SOUTH ANCHORAGE:

FAP $V = 950\# / \frac{32}{12} = 356$ plf. OK. ← FAP @ 32" o.c. AT SHEAR WALLS