7. RECOMMENDATIONS

It is recommended that the following improvements are made to the new hold-down design and shear-wall configurations tested in this research paper:

(1) Bevel bottom sill plate to prevent crushing of sill plate end by the hold-down strap. It was obvious from the failure modes that if the bottom sill plate edge were beveled, the trap would not crush the corner of the sill plate (Figure 5.11). This would decrease the amount of uplift in the end-wall studs, improve the slope of the bilinear segments, and increase the calculated allowable design load.

(2) Use Douglas fir no. 2 or better studs and sill plates that would provide increased performance in the crushing resistance of the sill plate by the end-wall studs, tension in the end-wall studs at the hold-down, and the sheathing fastener's strength.

(3) Possible redundant end connections in shear walls should also be investigated. The first interior studs could be strapped beneath the sill plates to limit the separation from the sill plates. This would provide a redundant tension member at the end of the walls. Additionally the studs could be spaced at 12″ on center off the end walls with 24″ or 12″ spacing used for the interior studs that are not critical to the shear wall performance.

(4) Framing with 2″ x 6″ studs would provide a larger surface area for bearing on the sill plate and allow for an even wider hold-down strap to be used on the end-wall studs.

(5) Test nonuniform fastener spacing to determine if spacing can be increased in the areas of higher stress. The remaining fasteners in the center of the end-wall studs and the center of the top and sill plates could then be installed at lesser spacings. To further this spacing idea, design offices should be educated to understand which staple and nail spacing to maintain for the entire wall and which to tighten at the base of the wall. Design offices must also understand the effects on performance when eccentric hold-downs are used. It is imperative that the fasteners do not split the wood, which is the advantage of using staples. As noted in ATC R-1, the base connections are critical on narrow walls and should have special construction inspection to insure they are installed properly.

(6) Future testing should be performed on panels 8′ in length and various construction techniques tested on the center studs where the sheathing is lapped. Center studs could be 3″x studs or two 2″x studs face-nailed together.

(7) The 8′ long panels should also be tested with the sheathing installed with its long axis horizontal and blocked along its length. This may better simulate one 8′ x 8′ piece of sheathing.

(8) On future tests, it is recommended that a preliminary panel identical to the test specimens be tested with an assumed FME displacement point and

then verifying this assumed FME through the SEAOSC protocol. The assumed FME point for the remaining panels should be based on the results of the preliminary tests.