Issue No. 1
Can the building be lowered by <u>8 Feet</u> to permit a view of the horizon at Oakland to the south.

Note: the view in question is diagonally across the site from the bedroom window at the rear corner of the Luk house.

General:

If the proposed Tong-Dean house had a conventional roof with an attic, there would be no question. The answer would be clearly NO. The fact that the design is contemporary architecture with a flat roof makes the question possible.

Luk has proposed a steeper driveway, thinner floors and roof, minimum roof slope, elimination of the parapet, and reduced ceiling heights to accomplish the 8-foot reduction. It should be noted that 8 feet is the <u>minimum</u> reduction required to expose the view. Anything less than that and the view of the horizon remains not visible. This corresponds to a top-of-parapet elevation of 820'-0". (The proposed design is 828'-0".)

The following is a technical analysis of the conditions at the site and of the building's construction to determine the maximum possible reduction that is possible.

Refer to the diagram, *Section Diagram Showing Required Heights*, for the complete analysis, with following specific comments:

A Because of the strong constraints of site geometry and site topography, there is only one way to get a car on to the site and turned to park under a rain-protected structure, with accessible entry to the house. That is accomplished with a sloping driveway within a fixed distance and turning area (for entry to and exit from the site) as shown in the original Plot Plan. The only question is the steepness of ramp.

Luk has proposed a design that has the bottom of the ramp at 791'-0". This is 2' lower than the original design of 793'-0'. I've consulted with my civil engineer and he advises that this code maximum, though steeper, is within acceptable design. <u>We therefore acknowledge the proposed lower elevation for this analysis</u> though we prefer the less steep option, especially when exiting the site.

The diagram therefore begins with the elevation of the bottom of the ramp at 791'-0".

B The parking area next to the lowest level, the Ground Floor, must drain away from the house with a 2% slope.

C The elevation of the ground floor, which must be accessible and therefore at the same elevation as the immediately adjacent grade, is 791'-6". (2% slope over 23'). We address the ceiling height when all the remaining issues have been addressed.

D (Refer to "Detail at D".) I consulted with my structural engineer concerning the use of 9½" truss joists. In general, the beams required are deeper than 9½". Use of the 9½" truss joists would mean the beams protrude below the ceiling. A solution that avoids this is the use of steel beams, a more expensive solution. However, aside from the added cost, it is technically feasible to obtain a thinner floor thickness using 9½" joists. <u>We therefore acknowledge the use of 9½" joists in the floor assemblies for this analysis</u>, though we prefer the less costly floor assemblies of the original design.

We note that the floor assemblies utilize radiant floor panels, "Warmboard", which requires the sheathing layer to be 1¼" to accommodate the plastic tubing. (This is a *Zero Net Energy* house, and this is a feature of such houses.) In addition, there must be a 2" insulation layer in order to insulate the warmboard from the unheated rooms below (and the ground where it occurs)

The total thickness of the floor assembly at the First Floor (D) is <u>14"</u>.

E (Refer to "Detail at E".) Again, this diagram accepts the use 9½" truss joists and steel beams for the floor assembly since it is technically possible (though more expensive). Warmboard Is required, though the insulation is not.

Therefore. the total thickness of the floor assembly at the Second Floor (E) is <u>12"</u>.

F Refer to the main diagram. Because the skylights and solar photovoltaic panels are at least 12" higher than the roof or several inches higher, and are placed on the roof in the general direction of the view in question, <u>the height of the parapet is technically irrelevant</u> with regard to blockage of the view in question. The skylights and support structure for the solar photovoltaic panels would still block the view. (Furthermore, good practice with regard to waterproofing, I believe as a practicing architect of 35 years, requires a minimum parapet height for flashing and counter-flashing.)

Therefore, <u>we do not acknowledge the reduction of parapet height</u> as having any effect on the ability to see the horizon.

(Refer to "Detail at F".) Because of the longer spans, the depth of the truss joists is 11½".

There is a built-up layer of roofing assembly (waterproofing and shaped Styrofoam) which provides the minimal drainage of ¼"-per-ft slope over the 30-foot width of the house. That is done so that rainwater is efficiently collected on one side of the house and piped to a cistern for storage in the utility room. (This is the rainwater gray water system used for landscape irrigation.) The thickness of this sloping assembly is 7½" at the upper end and 0 at the other. The parapet height will vary from a minimum of 8" to a maximum of 15½", though the top-of-parapet elevation remains constant. In any event, the top-of-parapet elevation is less than the height of the skylights or the height of the supporting structure for the solar photovoltaic panels.

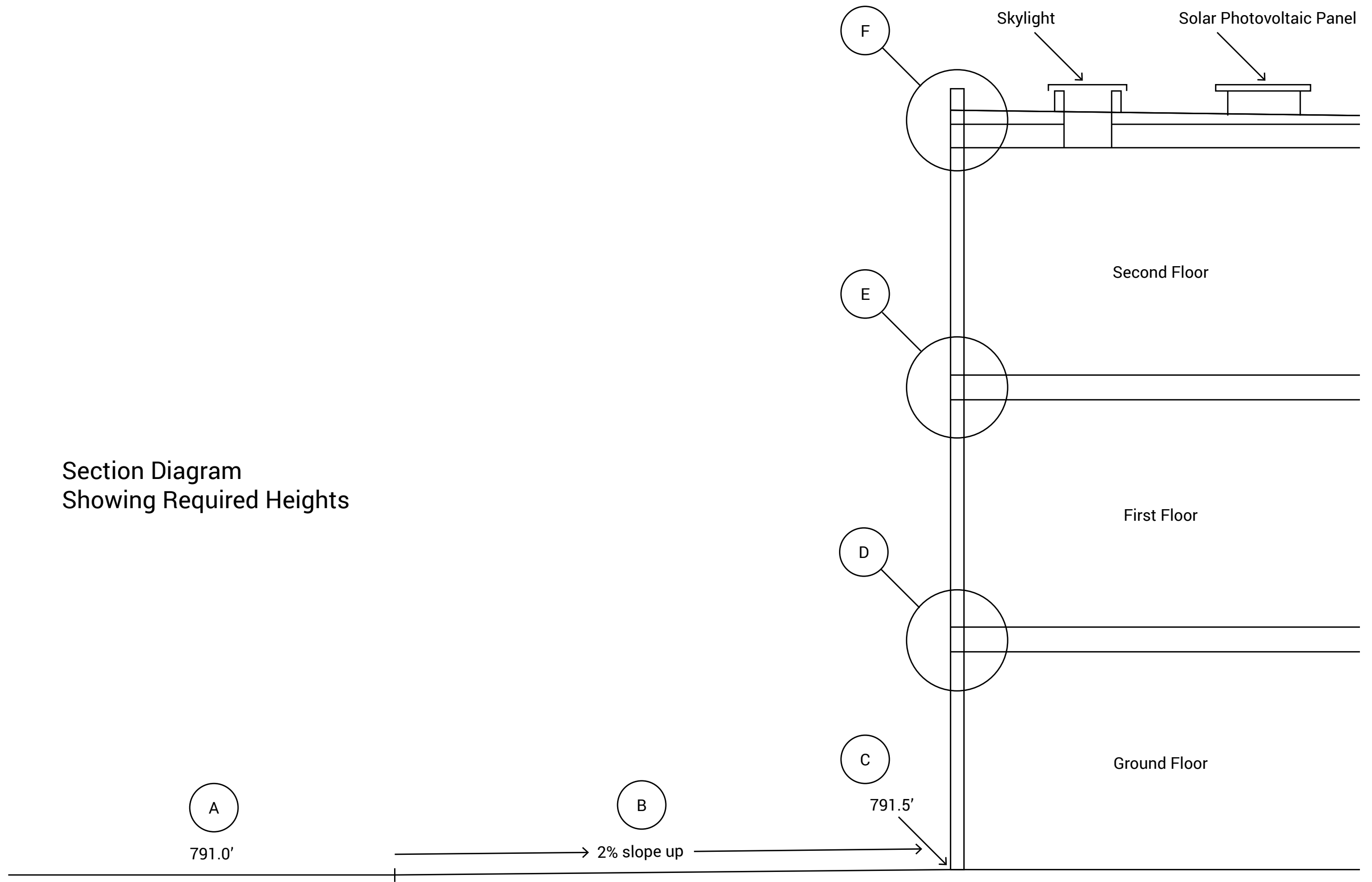Therefore, the total thickness of the overall roof assembly is <u>28¼"</u>.
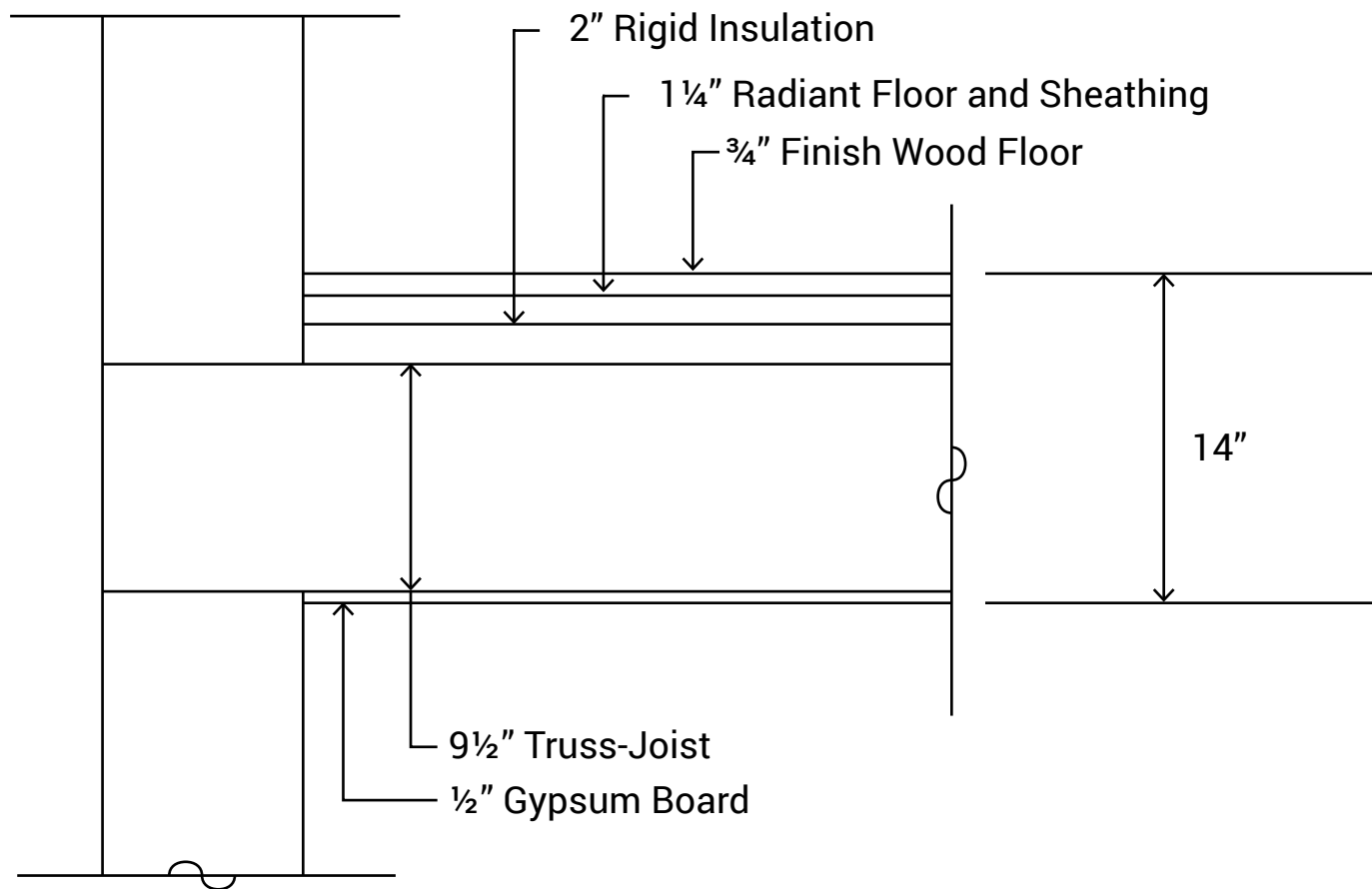
Conclusions

Adding the elevation of the Ground Floor to the thicknesses of First Floor, Second Floor and Roof assemblies, yields 796'- ¼". <u>As the architect for the Luks said, the minimum acceptable ceiling height in modern homes is 9'-0".</u> This includes the Ground Floor, since it will be an occupied floor, not a "basement room". However, even if we were to assign 8 ft to the ceiling of the Ground Floor, the total of the three ceiling heights would be 9 + 9 + 8 = 26'. Added to the 796'- ¼", the lowest elevation that is possible technically is 822'- ¼", still 2 feet short of the minimum required.

<u>The 8-foot reduction cannot be reasonably accomplished</u>, even if these minimum ceiling heights were acceptable. (Acceptable to us would be minimally 9.5', 9.5', 9.0', for a total of 28.0')
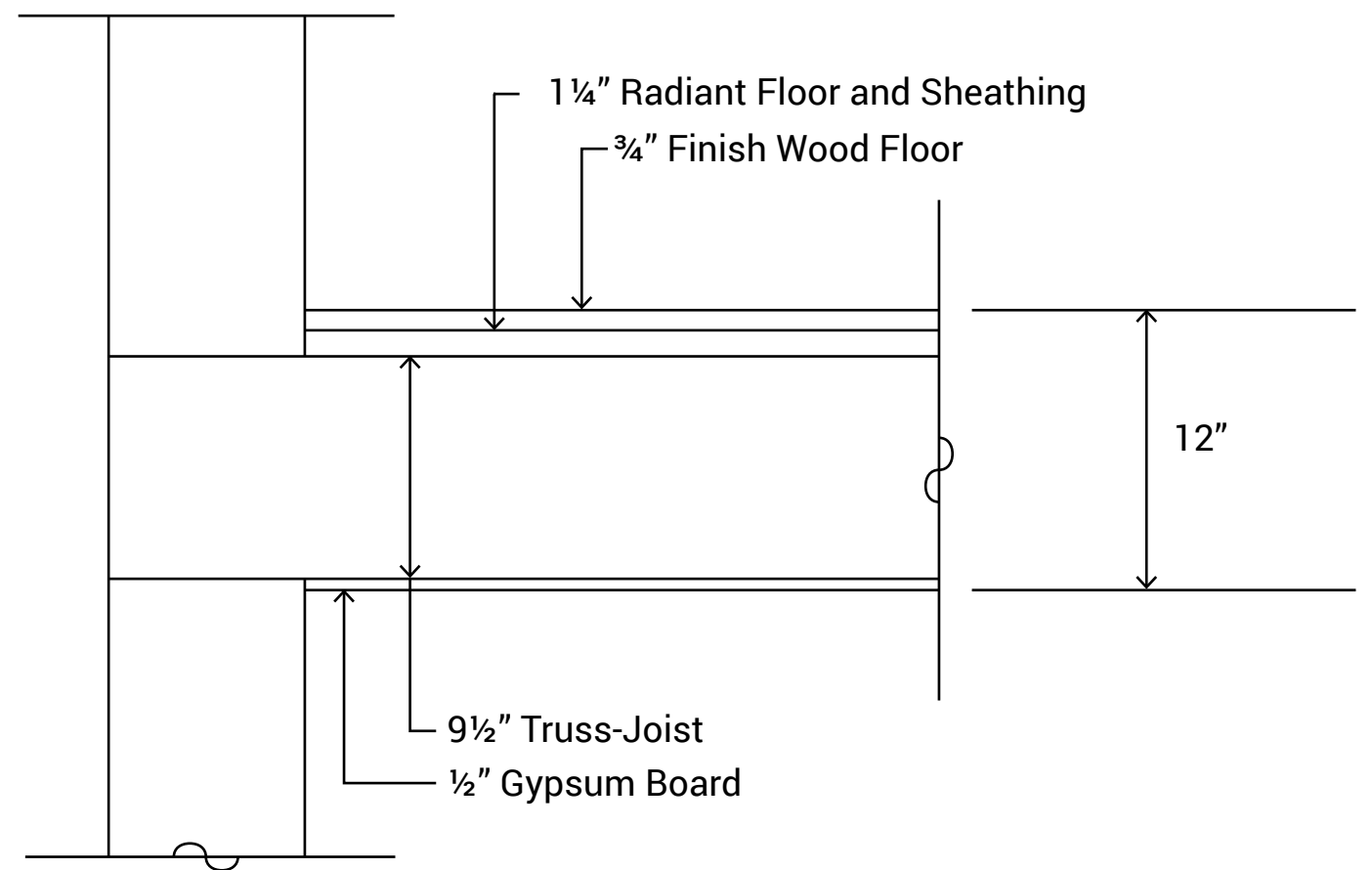
The view of the horizon to the south from the corner of the rear of the Luks' house cannot technically be maintained if a two-story house is built at 158 Lawson Road. Conversely, a two-story house cannot be built on 158 Lawson Road if it is required to maintain that view.
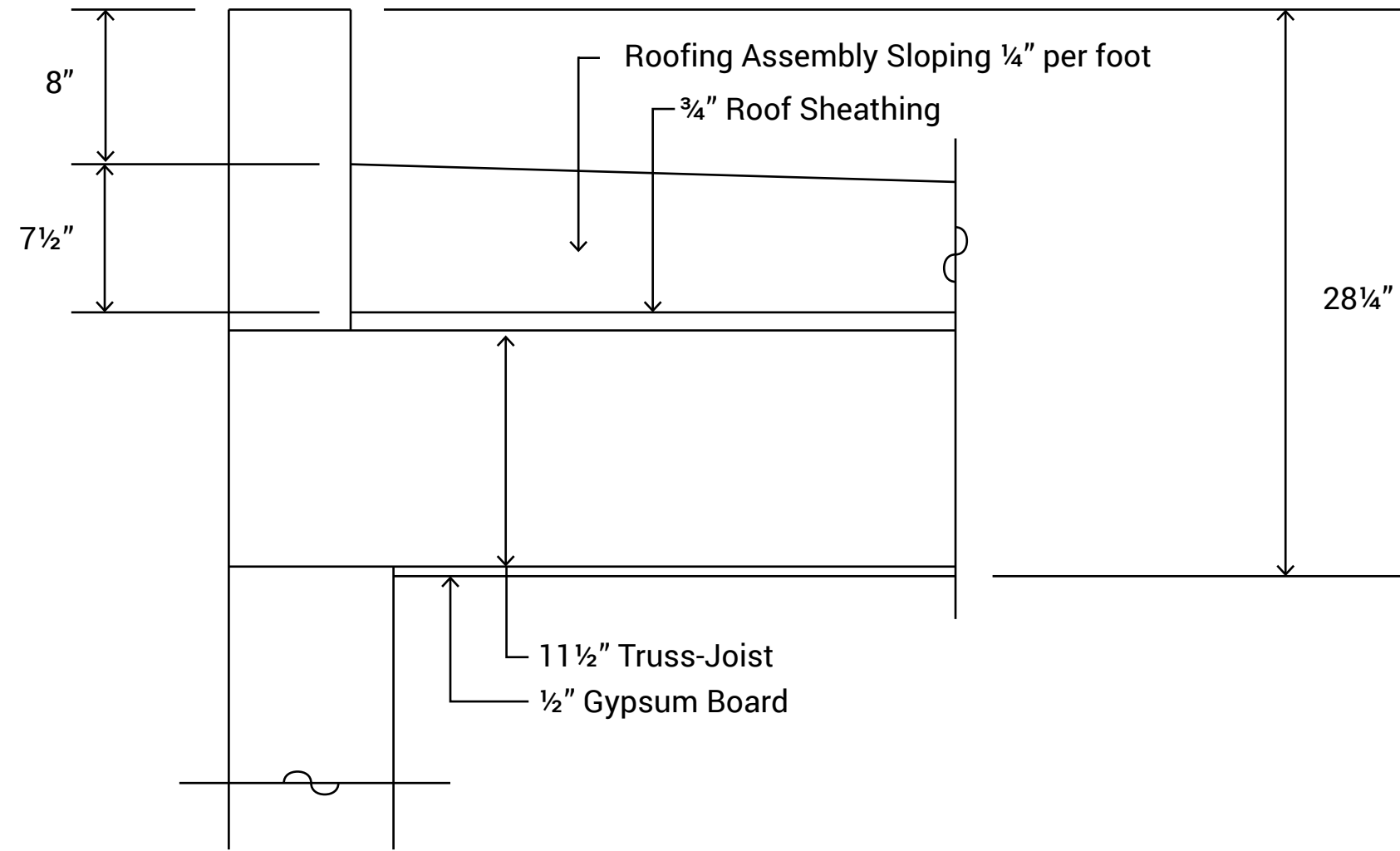
**Section Diagram
Showing Required Heights**

F

Skylight

Solar Photovoltaic Panel

Second Floor

E

First Floor

D

Ground Floor

C

791.5'

A

791.0'

B

2% slope up

2" Rigid Insulation

1¼" Radiant Floor and Sheathing

¾" Finish Wood Floor

14"

9½" Truss-Joist

½" Gypsum Board

Detail at D
1½" = 1'

1¼" Radiant Floor and Sheathing

¾" Finish Wood Floor

12"

9½" Truss-Joist

½" Gypsum Board

Detail at E
1½" = 1'

8"

7½"

28¼"

Roofing Assembly Sloping ¼" per foot

¾" Roof Sheathing

11½" Truss-Joist

½" Gypsum Board

Detail at F

1½" = 1'