CLAIMS

What is claimed is:

1. A floor panel, comprising:

a first cement board layer;

a hydronic foam layer disposed below the first cement board layer;

hydronic piping disposed within the hydronic foam layer;

a second cement board layer disposed below the hydronic foam layer;

one or more joists each having a first horizontal flange coupled to a bottom surface of the second cement board layer;

a first sheet metal member disposed between the bottom surface of the second cement board layer and a top surface of the first horizontal flange of the one or more joists;

one or more gypsum board layers disposed below the one or more joists, wherein the one or more joists each have a second horizontal flange coupled to a top surface of the one or more gypsum board layers;

a second sheet metal member disposed between a bottom surface of the second horizontal flange of the one or more joists and a top surface of the one or more gypsum board layers; and

one or more layers of insulation disposed in a space defined by the second cement board layer, the one or more joists, and the one or more gypsum board layers.

2. The floor panel of claim 1, wherein the first cement board layer and the second cement board layer are attached to the first sheet metal member via one or more fasteners.

3. The floor panel of claim 1, wherein the one or more gypsum board layers comprises two fiberglass sheathed gypsum board layers.

4. A modular building system, comprising:

the floor panel of claim 1; and

a roof panel, comprising:

a roofing material layer;

a protection board layer disposed beneath the roofing material layer;

a rigid insulation layer disposed beneath the protection board layer;

a vapor retarder disposed beneath the rigid insulation layer;

a cement board layer of the roof panel;

one or more joists of the roof panel coupled to a bottom surface of the cement board layer of the roof panel;

a first sheet metal member of the roof panel disposed between the bottom surface of the cement board layer of the roof panel and the one or more joists of the roof panel;

one or more gypsum board layers of the roof panel disposed below the one or more joists of the roof panel, wherein the one or more joists of the roof panel are coupled to a top surface of the one or more gypsum board layers of the roof panel; and

one or more layers of insulation of the roof panel disposed in a space defined by the cement board layer of the roof panel, the one or more joists of the roof panel, and the one or more gypsum board layers of the roof panel.

5. The modular building system of claim 4, further comprising a second sheet metal member of the roof panel disposed between the one or more joists of the roof panel and the top surface of the one or more gypsum board layers of the roof panel.

6. The modular building system of claim 4, wherein the cement board layer of the roof panel is attached to the first sheet metal member of the roof panel via one or more fasteners.

7. The modular building system of claim 4, wherein the one or more gypsum board layers of the roof panel comprises two fiberglass sheathed gypsum board layers.

8. A modular building system, comprising:

the floor panel of claim 1; and

a demising wall, comprising:

an insulation section;

a first gypsum board layer installed on a first side of the insulation section;

a second gypsum board layer installed over on a second side of the insulation section, opposite the first side of the insulation section;

a first plurality of hat channels coupled to the first gypsum board layer;

a second plurality of hat channels coupled to the second gypsum board layer;

first finish panels coupled to the first plurality of hat channels via first trim pieces; and

second finish panels coupled to the second plurality of hat channels via second trim pieces.

9. The modular building system of claim 8, wherein the demising wall further comprises:

a first sheet metal member installed on an interior surface of the first gypsum board layer between the insulation section and the first gypsum board layer; and

a second sheet metal member disposed on an interior surface of the second gypsum board layer between the insulation section and the second gypsum board layer.

10. The modular building system of claim 8, wherein the first gypsum board layer includes fiberglass sheathed gypsum board, and wherein the second gypsum board layer includes fiberglass sheathed gypsum board.

11. A modular building system, comprising:

the floor panel of claim 1; and

a utility wall, comprising:

an insulation section;

an insulation board installed on a first side of the insulation section;

a first gypsum board layer installed over the insulation board on the first side of the insulation section;

a second gypsum board layer installed on a second side of the insulation section, opposite the first side of the insulation section;

a weather resistive barrier installed over the first gypsum board layer; and

a vapor retardant layer installed over the second gypsum board layer.

12. The modular building system of claim 11, wherein the utility wall further comprises:

one or more furring members coupled to an exterior of the utility wall over the weather resistive barrier; and

one or more external finish panels coupled to the one or more furring members.

13. The modular building system of claim 12, wherein the utility wall further comprises:

one or more hat channel members coupled to the second gypsum board layer;

one or more trim pieces corresponding to the one or more hat channel members; and

one or more interior finish panels coupled to the utility wall via the trim pieces.

14. The modular building system of claim 11, wherein the insulation section includes a plurality of insulation layers.

15. A modular building system, comprising:

the floor panel of claim 1; and

an end wall, comprising:

an insulation section;

a thermal insulation layer installed on a first side of the insulation section;

a first gypsum board layer installed on a side of the thermal insulation layer opposite the insulation section;

a weather resistant barrier installed on a side of the first gypsum board layer opposite the thermal insulation layer;

a second gypsum board layer installed on a second side of the thermal insulation layer opposite the first side of the thermal insulation layer; and

a vapor retardant layer installed on an interior surface of the second gypsum board layer between the second gypsum board layer and the insulation section.

16. The modular building system of claim 15, wherein the end wall further comprises:

a first sheet metal layer installed on an interior surface of the thermal insulation layer between the thermal insulation layer and the insulation section; and

a second sheet metal layer installed on an interior surface of the second gypsum board layer between the second gypsum board layer and the insulation section.

17. The modular building system of claim 16, wherein the end wall further comprises:

one or more hat channel members coupled to the second gypsum board layer;

one or more interior finish panels coupled to the hat channel members via corresponding trim pieces; and

insulation installed in a space defined by the second gypsum board layer, the one or more hat channel members, and the interior finish panels.

18. A modular building system, comprising:

the floor panel of claim 1; and

a corbel beam, comprising:

a hollow structural section beam; and

a wide flange beam disposed within the hollow structural section beam,

wherein the hollow structural section beam is filled with grout so as to surround the wide flange beam disposed within the hollow structural section beam.

19. The modular building system of claim 18, wherein the corbel beam further comprises a plate installed within the hollow structural section beam and adjacent a flange of the wide flange beam within the hollow structural section beam.

20. The floor panel of claim 1, further comprising fire tape installed adjacent to the second sheet metal member and spanning across a space between the floor panel and another wall panel.