SkillsUSA
2010 Contest Projects

Architectural Drafting

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SkillsUSA

Architectural Drafting
June 24, 2010

You have just been contacted by a hopeful new client, Mr. Lyle Pig, who has asked you to produce a set of schematic drawings for his new custom home. Mr. Pig's vision is to construct his home using bales of straw, which is an unconventional construction type in his town of Dark Woods. Before he spends his hard-earned money to have you develop a full set of construction documents, Mr. Pig needs to take his schematic drawings to a meeting with the local Codes Department to see if they will consider issuing a building permit using this method of construction.

In his research, Mr. Pig has learned that straw bales were a fairly common building material in the United States between 1895 and 1940. Straw Bale construction is coming back in favor and he is very interested in this earth-friendly and energy efficient method of construction. Straw bale construction, when done properly, can be very fire-resistant, as well as very resistant to winds that could blow his house down. Straw bales also have excellent insulating properties.

There are two main construction methods using straw bales, non-load-bearing (also called post-and-beam) or load-bearing. Non-load-bearing construction uses a structural framework and uses the straw bales as in-fill. The load-bearing method uses the bearing capacity of the stacked bales to support roof loads. Mr. Pig would like to employ the non-load-bearing method so he can have the structural framework support a second story and because he has learned that this method is typically more easily accepted by local building code officials in other communities.

Mr. Pig intends to use 2-string straw bales which measure 18" wide by 16" high by 36" long. He has provided a preliminary floor plan for you to use. While the house will use the non-load bearing method of construction, for this set of plans, the Code Official, Mr. B. B. Wolf, is only interested in seeing what the "weird straw bale house" will look like. After Mr. Wolf has seen the plans and has approved the construction method, you will employ the help of a structural engineer who will show the load-bearing posts and beams on her drawings, therefore, you do not need to worry about showing the structural members in the wall at this time.

The home will have a 4" concrete slab on grade first floor and a framed second floor. Do not draft the second floor, only provide the drawings as listed below. The foundation will be 8" cast-in-place concrete with 8" x 24" concrete footings. The frost line for this project is 36". The exterior of the bales will be coated with a cement-mixture stucco. The interior of the bales will be plastered. As straw bales need to be able to breathe in order to allow any moisture to evaporate, no moisture barrier will be installed.

Please provide complete drawings as noted below, including dimensions and all appropriate annotations. Refer to the following information for specific requirements and materials required in addition to the information contained here.

When working on projects like this, you know you can procrastinate. You work best when you create interim deadlines for yourself. Knowing this, you have told yourself you will have your hand sketch completed by lunch time. As such, please turn in your hand sketch at noon, when we break for lunch.

The second deadline is at 4:00 p.m. All remaining drawings and associated information are due at this time.

Your task is to provide the following documents for Mr. Pig's use:

-Hand sketch of exterior wall section cut "M" where indicated on the floor plan sketch
-Dimensioned First Floor Plan created from Sketch A
-Openings Schedule(s)
-Three exterior elevations
-Interior elevation as indicated on the floor plan sketch and labeled "ELEV"

General Information - Computer Generated Items

-Use good CAD production techniques.
-You are allowed only one plotted sheet.
-Dimensioning, general text, and notes shall have a plotted height of 1/8".
-Other text (i.e. titles, room names) may be a height of your choice, but must be legible and appropriately sized using architectural conventions.
-Include a title and scale for each drawing on the sheet. Include a North arrow where appropriate.
-The size of your finished, plotted sheet will be 24" x 36". Construct a border of a plotted size of 34" x 22". Place a 1" x 1" square (plotted size) in the bottom, right-hand corner of your sheet. Place your contestant number in this square.
-The scale of all required drawings will vary. Utilize wise sheet layout.
-Provide full and complete drawings. Do not compromise quality and completeness on required drawings in order to provide drawings that are not required.
-Read all sheets to get all required information to produce all required drawings.

First Floor Plan – Computer-Generated Drawing

1. First Floor per attached Sketch A.
2. First floor plan is to be plotted at a scale of ¼" = 1'-0".
3. The north, west and east walls are framed with 2-string straw bales. Straw bales are not to be cut as much as possible in the exterior wall construction.
4. The south wall, where it is not framed with straw bales, will be 2 x 4 wood-stud framed, see attached Sketch A.
5. Exterior faces of all walls shall be cement-mixture stucco with wire lath with a finished thickness of ¾".
6. Interior faces of all exterior walls shall be plastered with a finished thickness of 1/2".
7. All interior walls are framed with 2 x 4's, sheathed with ½" gypsum board on each side.
8. The first bale will sit on continuous 2 x 4 plates located at the exterior and interior edges of the bale.
9. The dimension from the top of concrete first floor to the truss bearing is 8'-1-1/2".
10. The ceiling joist shall be 2 x 6. The subfloor for the second floor shall be ½" plywood.
11. The roof will be framed with a scissor truss made up of 2 x 6's installed at 24" on center. The roof pitch shall be 10:12.
12. The roof shall be standing seam metal panels installed over roofing paper on ½" plywood.
13. The overhangs shall be 16" deep.
14. Provide batt insulation at the roof trusses.

15. Show casework, appliances and plumbing fixtures. Do not show furniture.
16. Provide necessary interior and exterior dimensions for construction.
17. Dimension all exterior windows and doors to their centers.
    a. All first floor windows to be 36" wide with the exception of the three windows located on the south wall. Those windows shall be 24" wide.
    b. All window sills to be at 33-1/2" above finished floor. All windows shall be 48" tall.
    c. The rough opening for all exterior doors is 36" for single doors and 6'-0" for pairs of doors.
    d. Interior swinging doors are 2'-6", except for closet doors that are 2'-0" wide. Sliding doors have a total opening width of 6'-0". The pocket door is 30" wide.
18. Indicate door and window sizes for each door and window in an opening schedule(s). Make sure each door and window is scheduled with a unique door number and window letter.
    a. Include the openings schedule on the same drawing sheet as the floor plan.
19. Do not include electrical information.

Exterior Elevations - Computer-Generated Drawings

Provide three exterior elevations; the South, North and West elevations.

The elevations must be plotted on the same sheet as the other required CAD (or manually drafted) elements.

-Draft the South elevation at a scale of ¼" = 1'-0".
-Draft the North and West elevations at a scale of 1/8" = 1'-0".
-Provide proper annotation and dimensioning.

Interior Elevation - Computer-Generated Drawing

Draft an interior elevation as indicated on the attached floor plan sketch.

-Scale of elevation to be ½" = 1'-0".
-Show casework cabinets and all appliances as required at the kitchen.
-Show all other elements that would be visible in the elevation.
-Dimension and notate appropriately, including material designations as required.

Wall Section – Hand Sketch

Using the basic list of construction items provided below, the information previously stated in this document about the exterior wall construction types, and all notes included throughout this packet as applicable, develop a hand sketch of an exterior wall section including footing, foundation, first floor construction, second floor construction and roof framing. Wall section to be cut as indicated on floor plan sketch.

-Hand draw the sketch at 1/2" = 1'-0" on the provided paper. Put your contestant number in a 1" x 1" square at the bottom right corner of the hand sketch sheet.

-Provide all necessary components, as well as notes, dimensions, and material hatching on your sketch. Include the entire wall from the footing/foundation, wall framing, up to, and including, the roof rafters and eaves. Break lines may be used to allow the sketch to fit on the sheet.

Include, at a minimum, the following on your hand sketch:

1. Concrete footing and foundation
2. Grade (especially as related to first floor)
3. First floor construction
4. Exterior wall construction, including finishes
5. Ceiling joist(s)
6. Roof trusses with insulation
7. Eave and soffit with appropriate depth overhang
8. Metal roofing system
9. Appropriate dimensions
10. Quality lettering

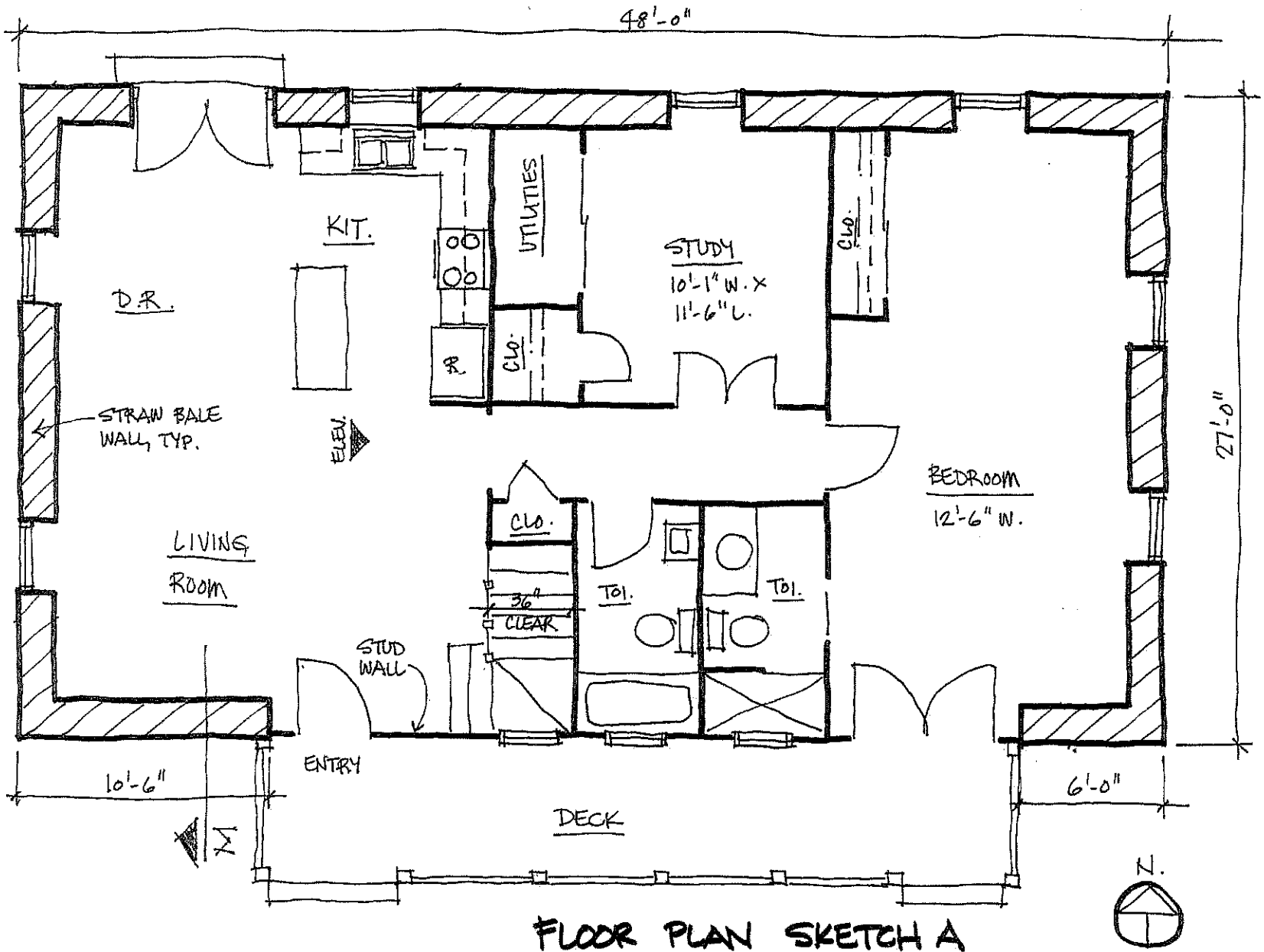
**NOTE: Considering all notes and dimensions as listed in this document, how many "courses" of straw bales are required at the exterior walls? Print the answer on the hand sketch sheet in the following format:

"The number of courses of straw bales required is _____."

Turn in the hand sketch (with the required straw bale information) at the lunch break.

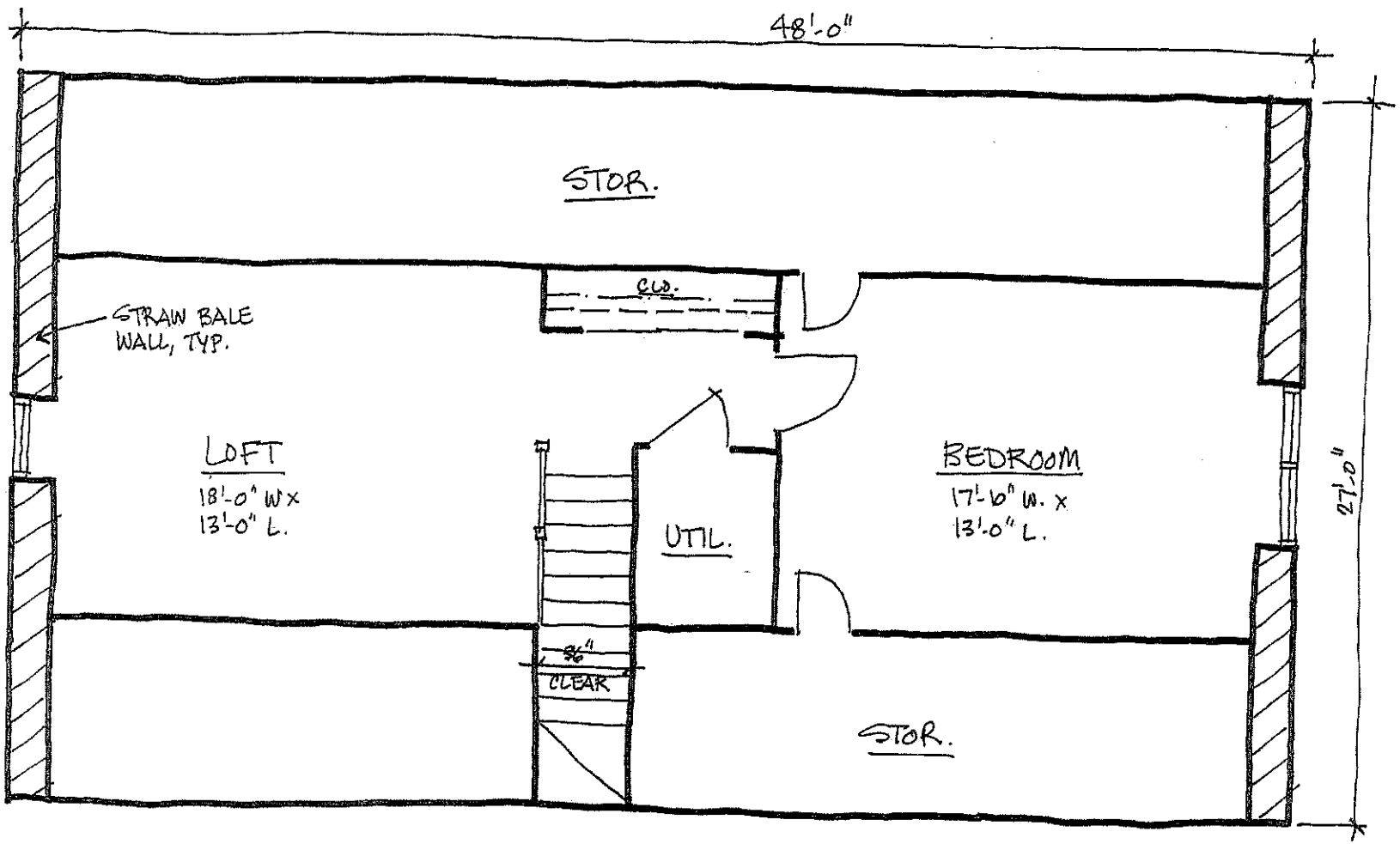
Remember to put your contestant number in the 1" square box on all of your sheets as directed. This shall be the only identifying factor on any of your sheets. Do not put your name on any of your sheets.

Please name all of your electronic files with your contestant number, i.e. 123.dwg, 123.dwf, 123.plt, etc.



FLOOR PLAN SKETCH A

N.T.S.



SECOND FLOOR PLAN

N.T.S.

N.