SECTION I

ADVANCED FACADE DESIGN & CONSTRUCTION

OVERVIEW

JB Corn

The plans contained herein are not for beginners. This is an advanced project. Portable temporary structures are dangerous. By design they must be modular and easy to assemble as well as take apart. It is possible to make an error in assembly that will result in structural failure. The facade described here has withstood 70 mile per hour straight line winds, a small tornado that did minor damage to one corner of the main building and serious thunderstorms. It has stood for seven months: Texas August through February. It is a **temporary portable structure**.

In book one I talked about no spans greater than 16', then offered a special extension of that rule for the raised metal roof design. Here I use a 20' square. Three sides of the square are added to the front of the attraction. The facade is 24' high in the front two towers, 20' high down each side and 16' high down the back wall shared with the attraction. The battlements add 8" to the height of the towers. This design uses an attraction front wall height of 12'. If used as a stand alone facade (i.e. for a tent), the floor frame must be anchored to a concrete slab or 4' deep piers set in concrete every 4' around the perimeter and down the middle. Consult an architect or structural engineer.

GENERAL CONSTRUCTION NOTE

This statement is for those who do not own Book One. I do not like cutting lumber. Not because I can't, but because it does not grow back. The one thing I do know about Dark Attractions is that we are all constantly changing our minds and improving our attraction. I go out of my way to design elements with as little cutting as possible. When I do cut, I try to cut in standard lengths and even numbers. This makes it easier to re-use lumber from an obsolete item.

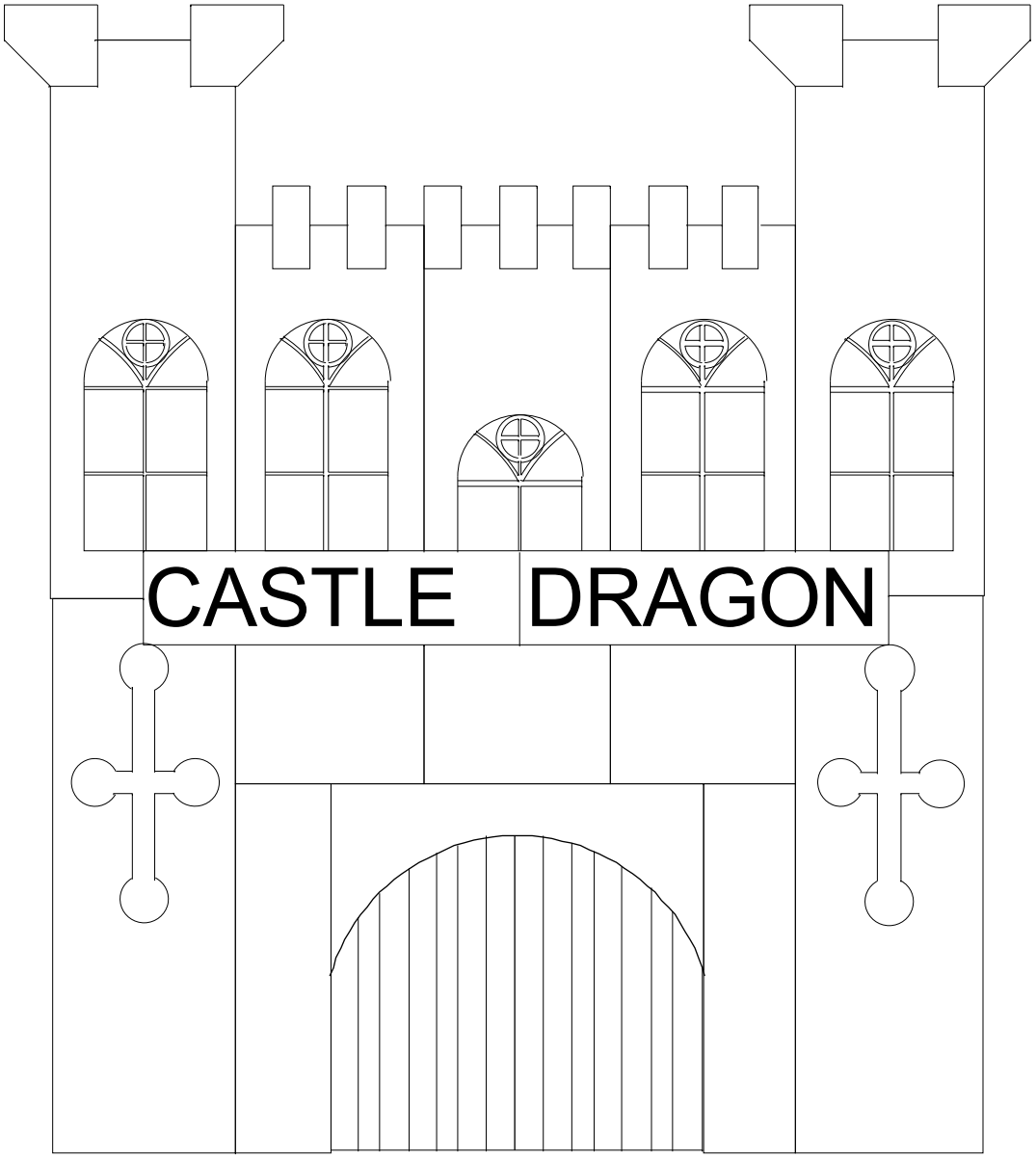
Castle Dragon Grand Entry/Facade

Castle Dragon uses a 20'x20' facade entry area called the Grand Entry. It is a separate building. If you have read "How to Build a Portable Modular Dark Attraction", it contained contradictory statements. First I said not to have any spans greater than 16', a very good rule for beginners. Second, I detailed a metal roof design marrying a 16' 2x6 to another 2x6 over the central corridor that yields a free span of approximately 17'6", a more advanced and potentially stressful situation. The key to this roof design is the 2x6 joiner made with two ¾" plates and a 2x3. Likewise, there is a way to build an inexpensive portable facade of great size. Here facade is synonymous with the Grand Entry building. Traditionally, a facade is a false front wall attached to a stable structure. This is possible if you are in a stable structure. If you are portable, then it is not possible to raise a stable structure much over 16' with out guy wires.

I have seen scaffolding erected to form towers and other structures. The scaffolding was guy wired and covered with canvas or plywood. It looked OK from a distance but close-up… In 1994, I saw what the wind did to one of these structures, a twenty foot tower. One of the guy wires was poorly attached to a portion of a tent pole (if you read book one, then you know how much I hate tents). The pole collapsed on the front of the tent and ticket booth. The good news is that the attraction was not open at the time.

The main problem with guy wires is that when one goes, so goes the structure. Most structures of this type are flimsy at best. The covering becomes a sail. Anchoring guy wires is just one of many problems. Scaffolding was not designed to become an enclosed structure. True, it has great strength, but…

The Castle Dragon facade is 20'x20' square, 24' tall and attached to the 12' high front wall of the attraction. It uses 4'x8' and 4'x12' panels. All of the upper level 12' panels have a large window opening that is covered after structural completion. The key to this large structure is the 4' wrap-around floor at 8' high. This effectively raises the ground level 8'. So in reality we are adhering to the 16' high rule of stability without guy wires. However, we are not building a true facade, but a small building of grand scale as a facade. This design has no free span greater than 10' and no post in the center of the floor.



CASTLE DRAGON GRAND ENTRY

FRONT VIEW

Front view of Castle Dragon Grand Entry. The two first level end panels and the five second level window panels are 4x12. The door unit is 8x12 and has two 2x8 panels, a door archway unit and two 4' wide doors. The door unit is a considered one 8x12 unit. A 12' 2x4 ties the two 2x8s together through the archway unit. The archway unit has tabs at each end that slip into the 2x8s. When this is assembled it makes a solid base to swing the doors from and to place the second level on.

The windows are ¼" translucent Plexiglas with a painted design. They are installed after all the walls, roof and illuminated sign are in place. Their absence makes it easier to construct the towers, reinforce the walls, raise the sign and attach the sign to electrical.

Design

JB Corn

Let's examine Castle Dragon's Grand Entry. The simplified floor plan (page 5) shows only the Grand Entry. Two complete floor plans of Castle Dragon, including the Grand Entry are on page 48 & 49. Additional examples are below.

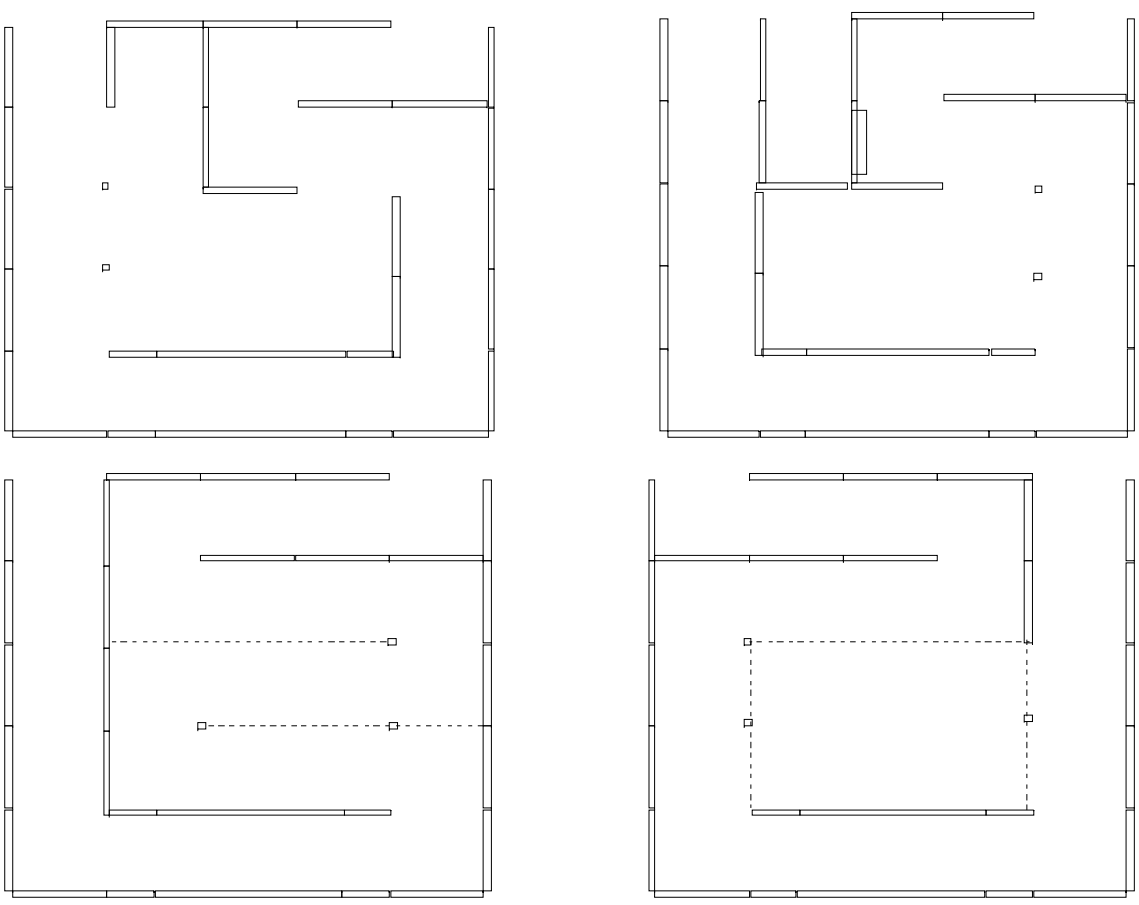
A customer entering the front door can see through the bars in the wall (view "E", page 7) and into the waiting area. The central area can be additional line queue or an area for merchandising. Customers enter on the right and exit from the left. Signs on wall "E" indicate entrance and exit. On busy nights, I open both doors and place stanchions to divide the double doors into entrance and exit lines.

The main advantage to this arrangement is for security. One person can monitor the entrance and exit easily. Another advantage is the entertainment value provided by exiting customers for those waiting in line. This could also be a disadvantage if your actors fail to entertain (refer to book two). The decoration of this room also helps to set the mood. Castle Dragon has paintings of dragons, period shields and other props to set the theme visually.

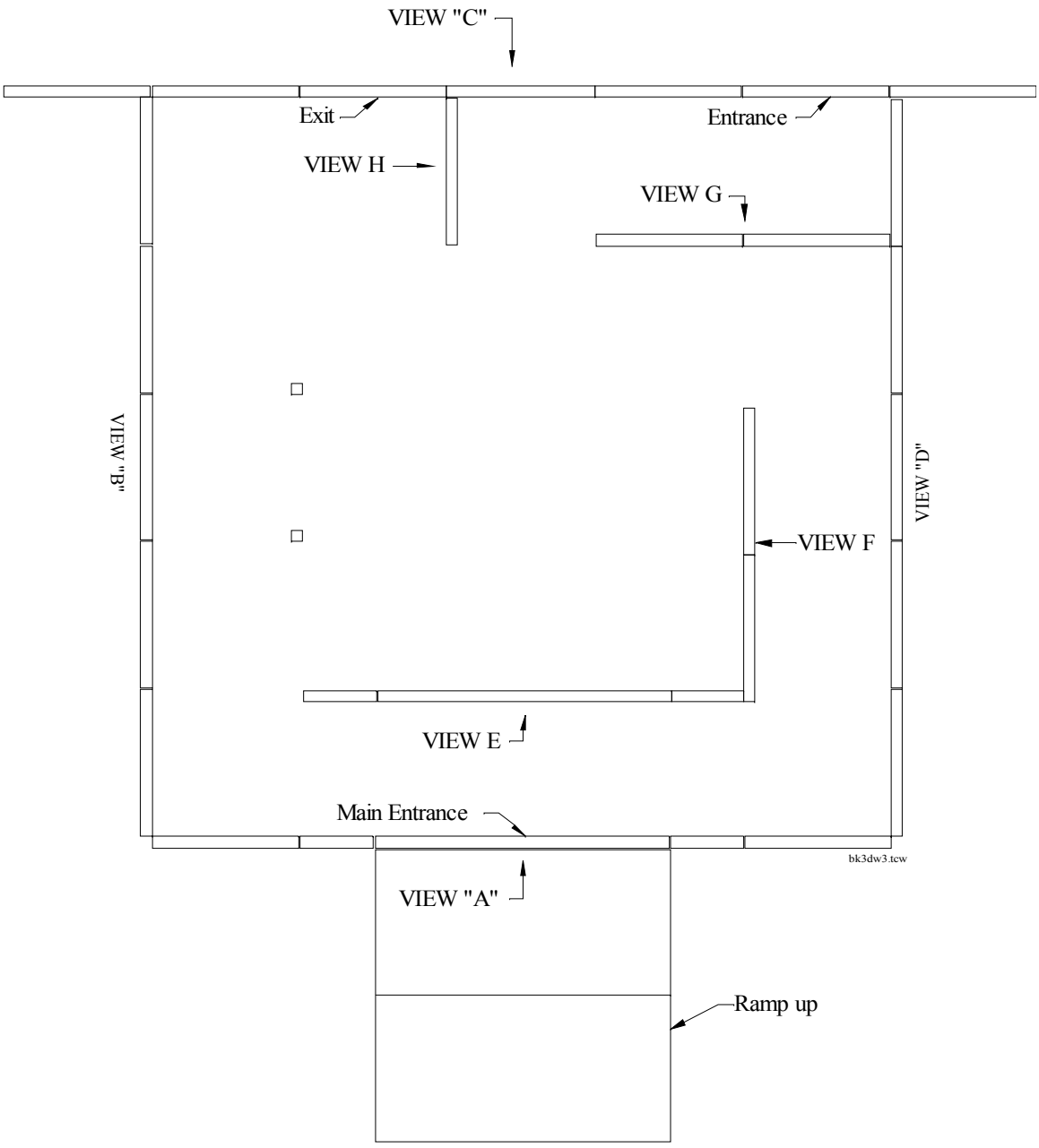
This plan does not include a ticket booth. This floor plan was used with a hay ride and the two attractions had a central ticket booth. The floor plan on page 49 shows the Grand Entry with a ticket booth, but the exit is not in the Grand Entry.

Any floor plan must meet your needs. The modular system allows for many variations. The floor plan opposite is just an example and can be arranged in many different configurations. Some of the considerations for the floor plan are: ticket booth, entry, exit, merchandising, photo-op, security, entertainment value and ease of construction. Interior panels should be flexible enough to be placed anywhere within a floor plan. In 1996, I changed the layout three times after the Grand Entry was completed. See page 7 for interior panel designs.

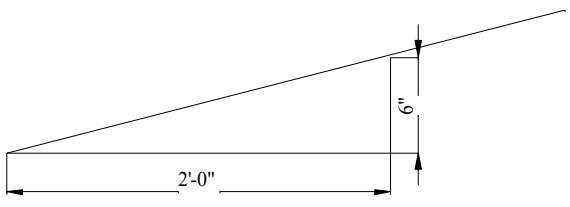
View "A" is the front, "B" the left, "C" the back (the wall shared with the attraction) and "D" the right. The



other views are of interior walls. All drawings of the Grand Entry will be oriented this way.



If your floor is raised above ground level, all entrances and exits will have ramps, check with your building department for slope. Usually it is 1 to 4, i.e. for each inch of rise there will be 4 inches of travel.



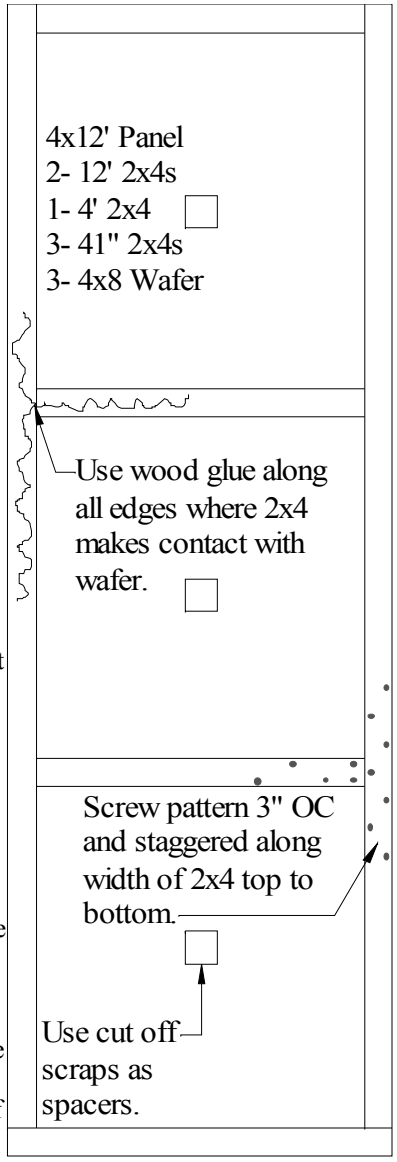
PANEL CONSTRUCTION

There are two basic types of panels used in this construction. Double sided and single sided. A double sided panel has a plywood covering on both sides and the single sided panel is covered on only one side.

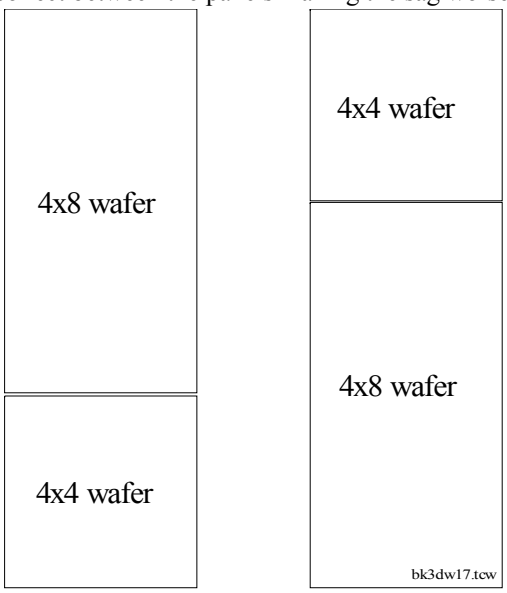
The panels are of various sizes and construction, (see also pages 8 & 9) according to your design. I use a variety. Book One "How to Build a Portable Modular Dark Attraction" contains more ideas.

The proper construction of all panels, units and supports is critical. This is a portable design using standard building materials with the minimum amount of sizing. When possible, I do not cut lumber or cut to a size that appears frequently in all my designs. This way I can change panels at will. The only drawback is when using glue. The glued panels are dedicated and not meant to be taken apart. The wood glue takes stress off the screw heads during handling of the panels from storage to final placement. A 4x12 panel takes a lot of stress during placement. If a good crew handles the panels correctly, some panels may not need to be glued. This is a decision you have to make.

The 4x12 panel here contains lumber of sizes used throughout this design method. The blocks of wood are important as spacers. During storage and construction panels may be stored flat in stacks. Without the blocks of wood, the wafer board will sag and rain water will collect between the panels making the sag worse. The blocks of wood reduce water damage by reducing the amount of sag.



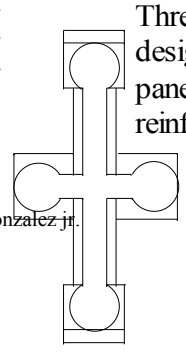
I alternate the position of the wafer of my First Level 4x12 panels. This adds additional strength. It doesn't matter which side is out or in, I use it as indicated. All Second Level panels are single sided.



Wafer board placement is reversed front to back.

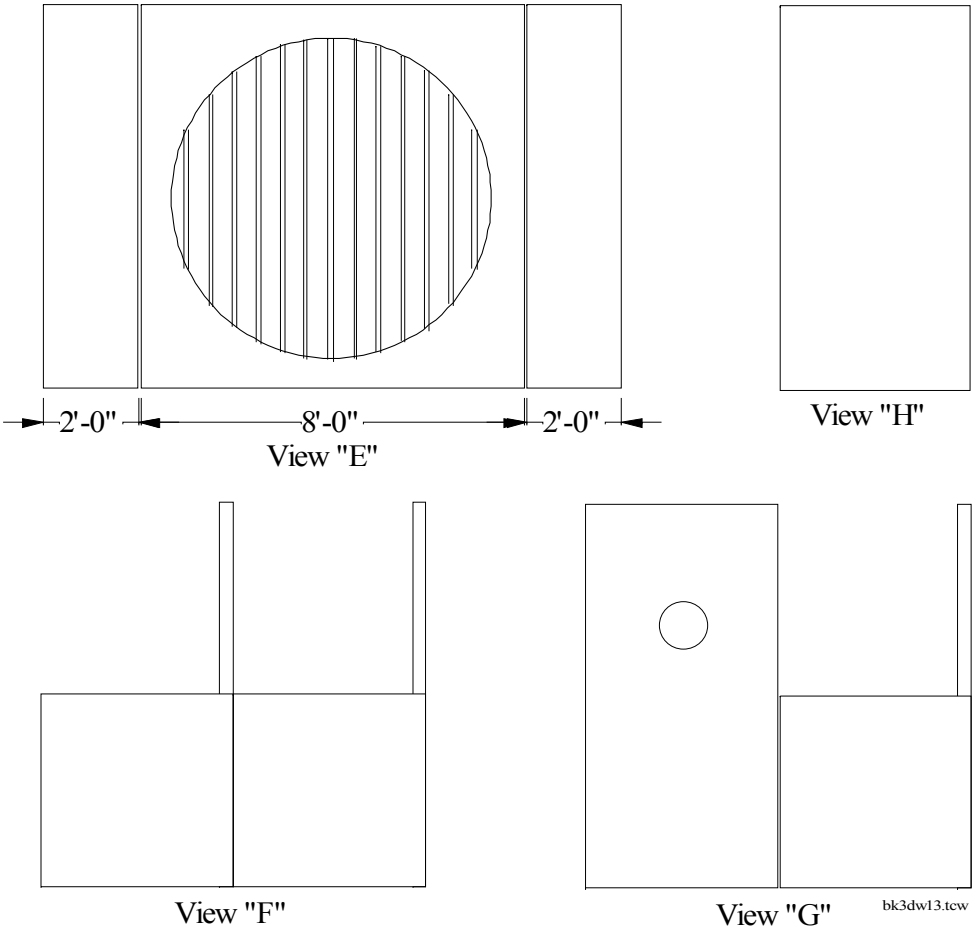
A major thought for consideration is the thickness of the wafer board. ¼" wafer works for attraction panels. 7/16" is recommended for attraction exterior walls and lower level facade walls. Second level panels are single sided and can be made with ¼" wafer.

Not all wafer is manufactured the same. It used to be pressed and a ¼" sheet was about 3/8". It is now cold rolled and a ¼" sheet is ¼". This new process makes a weaker sheet. I use 7/16" wafer and ¼" or 3/8" plywood. Wafer board tends to peel with latex paint. Wafer will last longer with oil based paints.



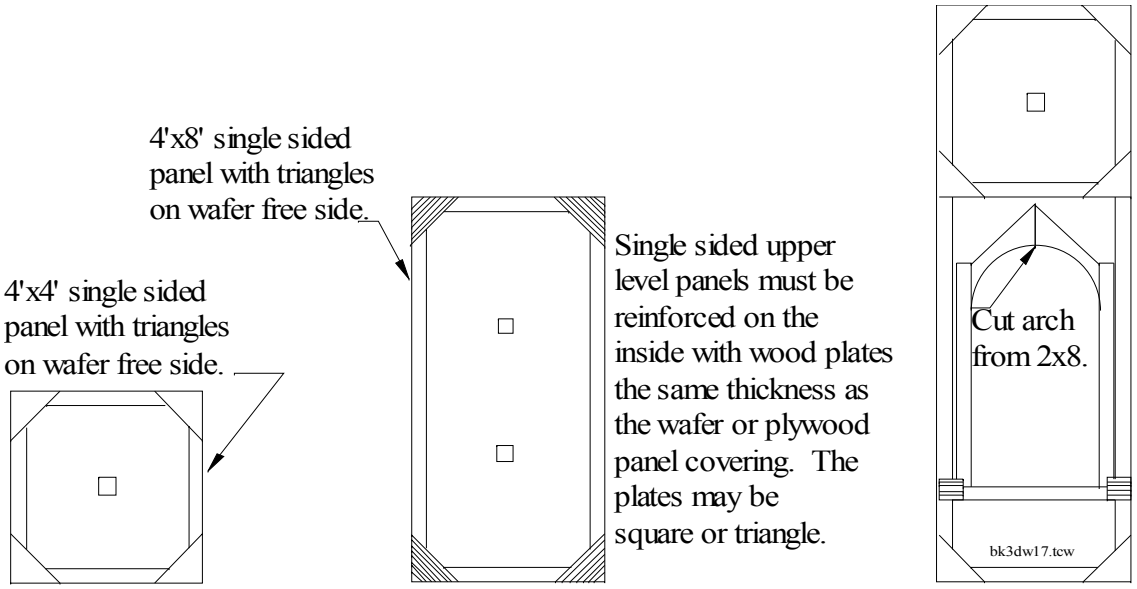
Three dimensional designs in 4x12 panels must be reinforced. bk3dw17.tcw

My Grand Entry has four panels with this design. They make up the tower base and visually enhance the castle theme . All pieces are glued to the wafer and double the number of screws is used. The pattern is drawn on the wafer, the 2x insert lumber is set in place, glued and screwed. One side of the panel is completely assembled, then the pattern is cut through the wafer and 2x inserts. The back side wafer is attached and the panel is ready to be painted.



These panels are interior panels. They are also structural and need to be constructed properly. These panels, along with posts and joists, will support the second level wrap-around deck which, in turn, supports the roof. The second level wrap-around deck makes the second level possible and easier to construct.

I have cut designs in the center of my half panels. Attention to detail adds to the customers experience and prepares them for the surprises yet to come.



The 4x4 panel is used to frame the other two sides of each tower. The 4x8 panels complete most of the second level as indicated. Seven 4x12 window panels are used on the second level. Placement of the arch window within the panel may vary. One 4x8 panel on the back wall (view "C", page 16) has an entry point for access to the second level.

The inside edge and most of the arch of the 4x12 window panels is routed ¼" deep to allow for Plexi glass installation. Once the Plexi is in place I use small metal plates to hold it.

Single sided panels should be reinforced with glue along all edges where covering and 2x make contact.

BILL of MATERIALS

4x12 standard panel: 2- 2x4x12', 3- 2x4x41", 1- 2x4x4', 3- 2x4 wood blks, 3- 4x8 wafer, screws & glue

4x12 arch window: 2- 2x4x12', 3- 2x4x41", 2- 2x4x5', 1- 2x4x4', 2- 2x8x30", 1- 4x8 wafer, 1- 4x4 wafer, 8 triangle or square joiners, 1- 2x4 wood blk, screws & glue

4x8 standard panel: 2- 2x4x8' (cut to 92.5"), 1- 2x4x41", 1- 2x4x4', 2- 2x4 wood blks, 2- 4x8 wafer, screws & glue

4x8 single sided: 2- 2x4x8' (cut to 92.5"), 1- 2x4x41", 1- 2x4x4', 2- 2x4 wood blks, 1- 4x8 wafer, 4 triangle or square joiners, screws & glue

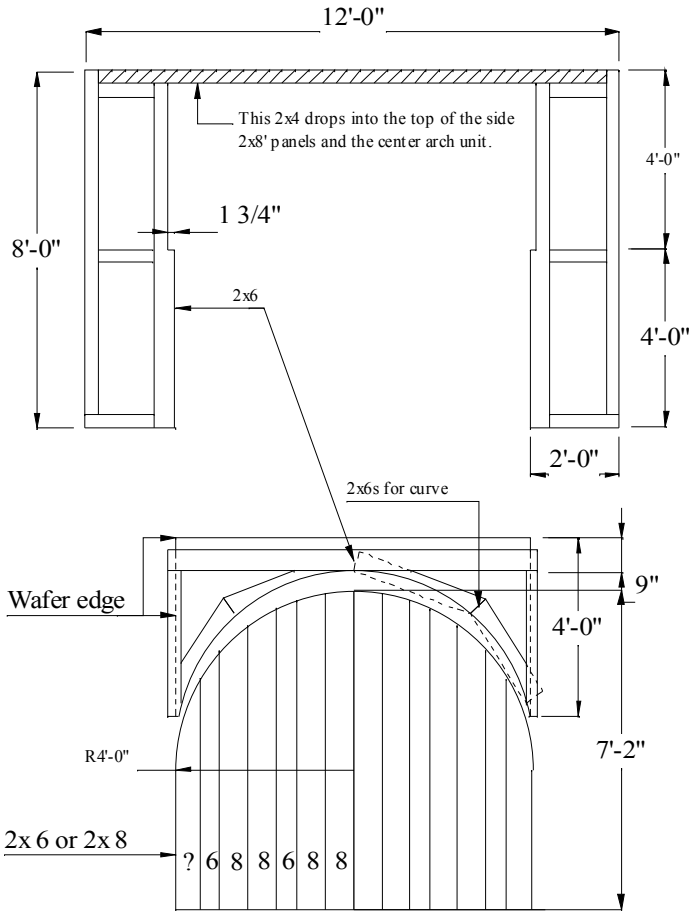
4x4 standard panel w/post: 1- 2x4x8' (cut to fit under wrap-around deck support level), 1- 2x4x4', 1- 2x4x41", 1-2x4x44 ½", 2- 4x4 wafer, 1- 2x4 wood blk, screws & glue

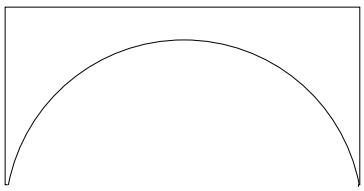
4x4 single sided: 2- 2x4x4', 2- 2x4x41", 1- 4x4 wafer, 1- 2x4 wood blk, screws & glue

2x8 special panel: 1- 2x4x8' (cut to 92.5"), 1- 2x6x8' (cut to 92.5" & notched), 1- 2x4x18.5", 2- 2x4x15", 2- 2x8 wafer, screws & glue

8' wide door archway: 1- 2x4x12' (cut to 11' 5"), 1- 2x6x8', 2- 2x4s less than 4' (will vary with design), 1- 2x6x10' (cut to form archway), 2- 4x8 wafer (serious waste here), screws & glue

Double Arch Doors: 6- 2x6x8' (cut to length with arc & two to make four 4' back door braces), 1- 2x6x10' (back angle door brace), 10 2x8x8' (arc cut), 86 ¼" bolts 2 ½" long, 4- hinges & 2- handles

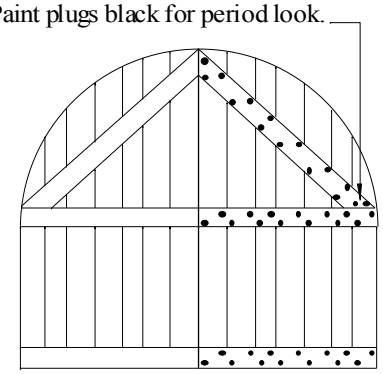




Cut wafer for front and back of arch.

Build door with a mix of 2x6s and 2x8s. Water seal all boards, especially the ends.

Countersink bolts front & back. Fill front holes with plastic wood & sand smooth. Paint plugs black for period look.



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GRAND ENTRY DOUBLE DOORS

The double front door unit is 8x12. It is made up of two special 2x8s, one solid archway and a 12' 2x4 that ties all three together. The double doors fill in the space and hang from the two 2x8 panels. Tabs from the archway piece fit into the 2x8s and the 12' 2x4 drops into the top of all three pieces. Once assembled, it becomes one rigid unit. The addition of the two 10' 2x4s (from inside, see page 24) flush with the top to tie all five front panels together and provide the support for the second level wrap-around deck joists makes it even stronger.

The doors are built from 2x6s and 2x8s (as noted). Depending on the size of the lumber you are working with, one each of either door's end 2x8s may have to be trimmed lengthwise. Use a plane or rip fence. I use ¼" bolts, as indicated by dots on the right hand door, to tie all the pieces together. The holes are countersunk front and back. The front holes are filled with plastic wood and painted black. The hinges are also installed the same way using bolts. A pair of gate handles are added to the front and the door secured with a 12' 2x4 dropped into open bar holders..

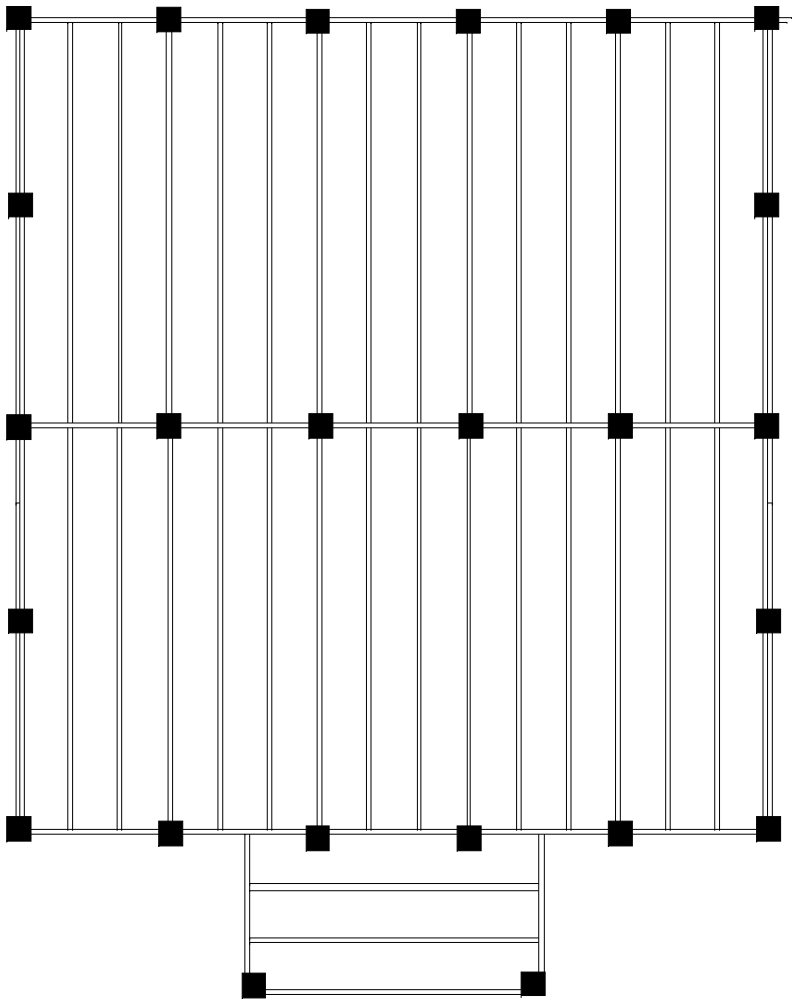
The arch is 4' 8"x 8'. The extra 8" at the tips of the arch can be filled in with scrap wafer or the diameter of the circle can be increased and the arch reduced to fit on a 4' wide wafer. The width of the archway at center point is 12 inches. This dimension may vary with your design, but should be no less than 9", the width of a 2x4 (3 1/2") plus the width of a 2x6 (5 1/2").

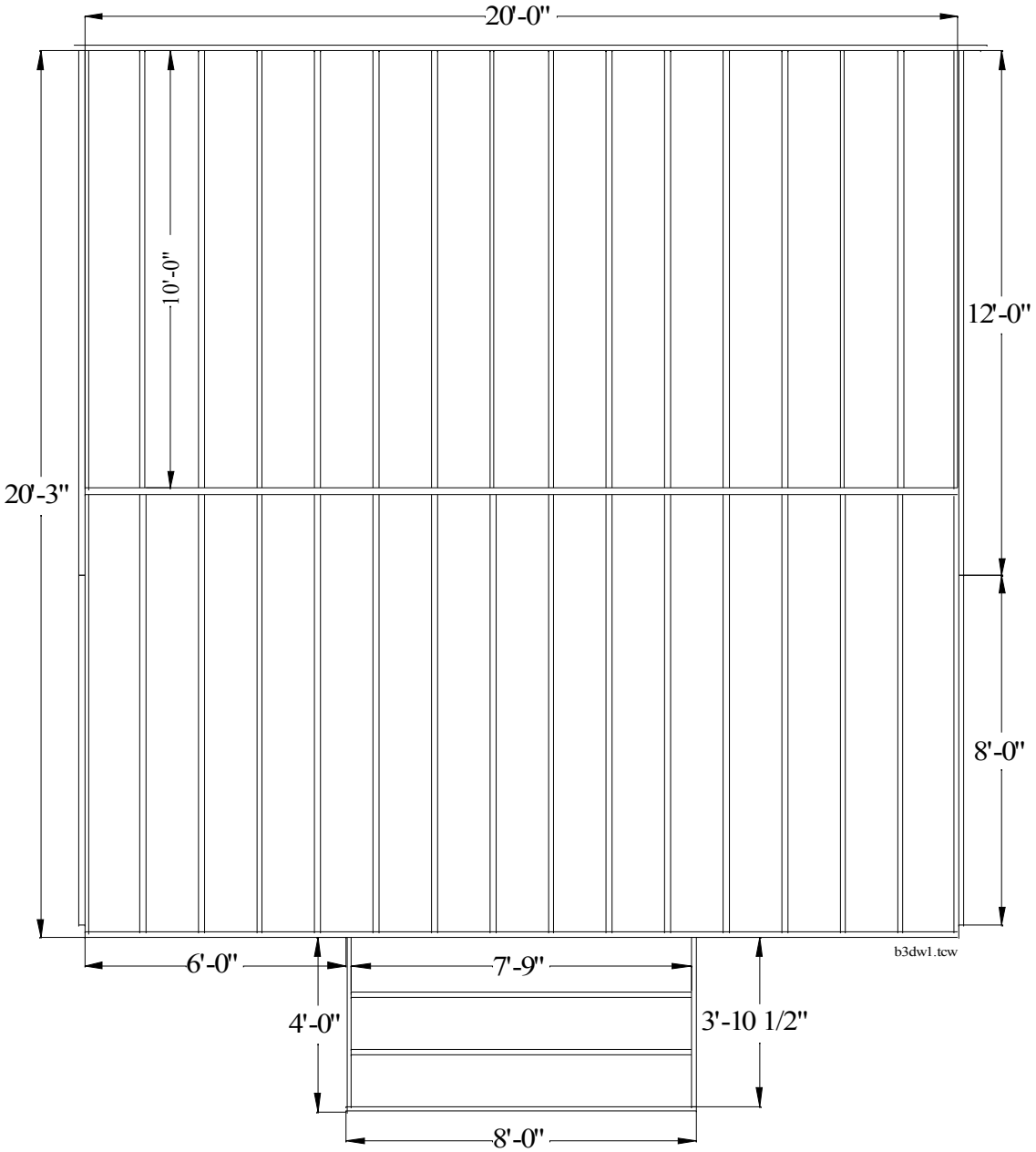
Note that the 2x6 door cross member rests on the 2x4 archway tabs. This will transfer any load to the 2x6s in the two 2x8 side panels. Most of the load will rest with the top 12' 2x4 and the two 10' 2x4s on the inside used to support the wrap-around deck joists.

THE DECK FRAME

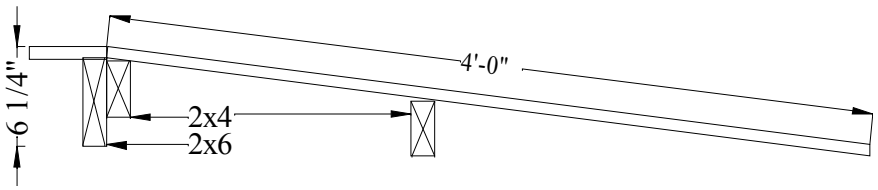
The deck is framed with 2x6s. Support the edges along joist supports 4’ OC (On Center), along the joist outside edge 5’OC and support the porch at the corners (drawing below). Use joist hangers to attach the joists to the supports. Note an additional 2x4 attached to the outside edges of the deck, this will be explained later. Do not cut the 2x6 joists, except to make them all 10' long (lumber is a little longer than its given measurement). This will make the deck approximately 20’3” instead of 20’. Square the deck by measuring the diagonals. A water level is best for erecting and leveling large decks.

BILL of MATERIALS
38- 2x6x10' floor joists
4 - 2x6x8' cut for front porch
2 - 2x4x8' for ramp
2 - 2x4x8' for outside edge of deck
2 - 2x4x12' for outside edge of deck
70- 2x6 joist hangers
1 1/4" and 3" screws
assorted materials for leveling





To support the ramp screw one 2x4x8' to the front 2x6 of the porch with 3" screws.



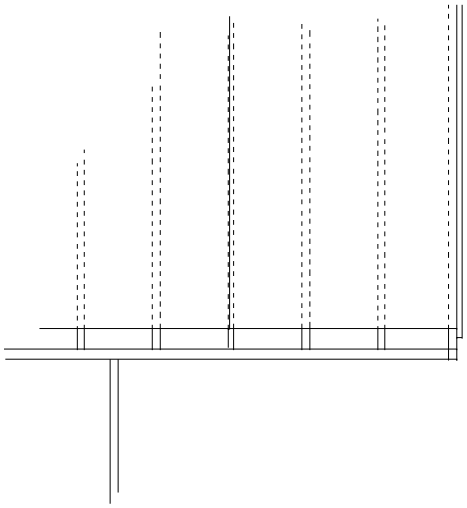
Adjust the height of the 2x4 for the angle of the ramp, so that the top of the ramp is flush with the deck floor. An additional 2x4 is placed mid-way as noted.

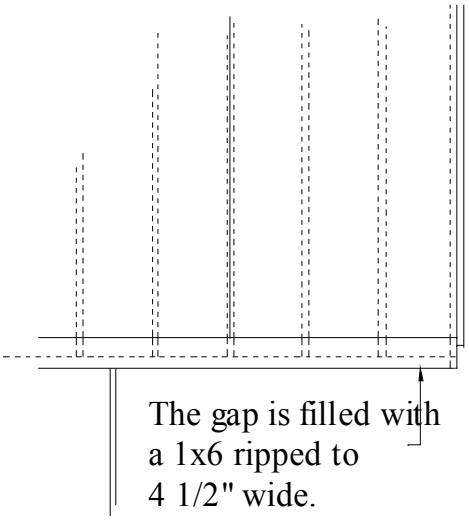
DECK

Different materials may be considered for the deck itself. Any material considered must be at least ¾" thick. I used T&G (Tongue & Grove). There are advantages and disadvantages to T&G. T&G is more difficult to install and can be damaged, making it harder to install. It does not require cross bracing at the joints and once you get used to working with T&G, it is easier to use. Regular CDX plywood will require cross bracing of unsupported joints. Install the plywood as indicated. Add a 12' + 8' 2x4 to the outside edges, making the deck 20'3" wide (see detail drawing page 13). The 2x4 is flush with the plywood deck.

NOTE: T&G is not as wide as regular plywood. The gap between the deck frame and the plywood will be greater if you use T&G. No matter what you use, there must be a gap. The deck frame must measure at least 20' 3", no less. Fill this gap with 1x4(s), it is OK for them to overlap the front edge.

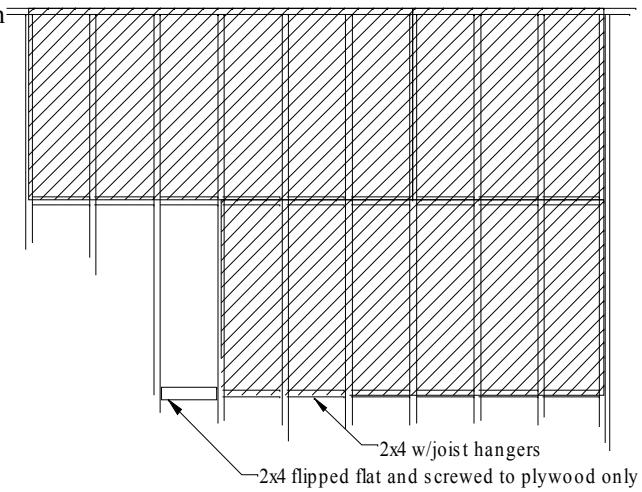
BILL of MATERIALS
12- 4x8x3/4 (one for porch and one for ramp)
5 - 4x4x3/4



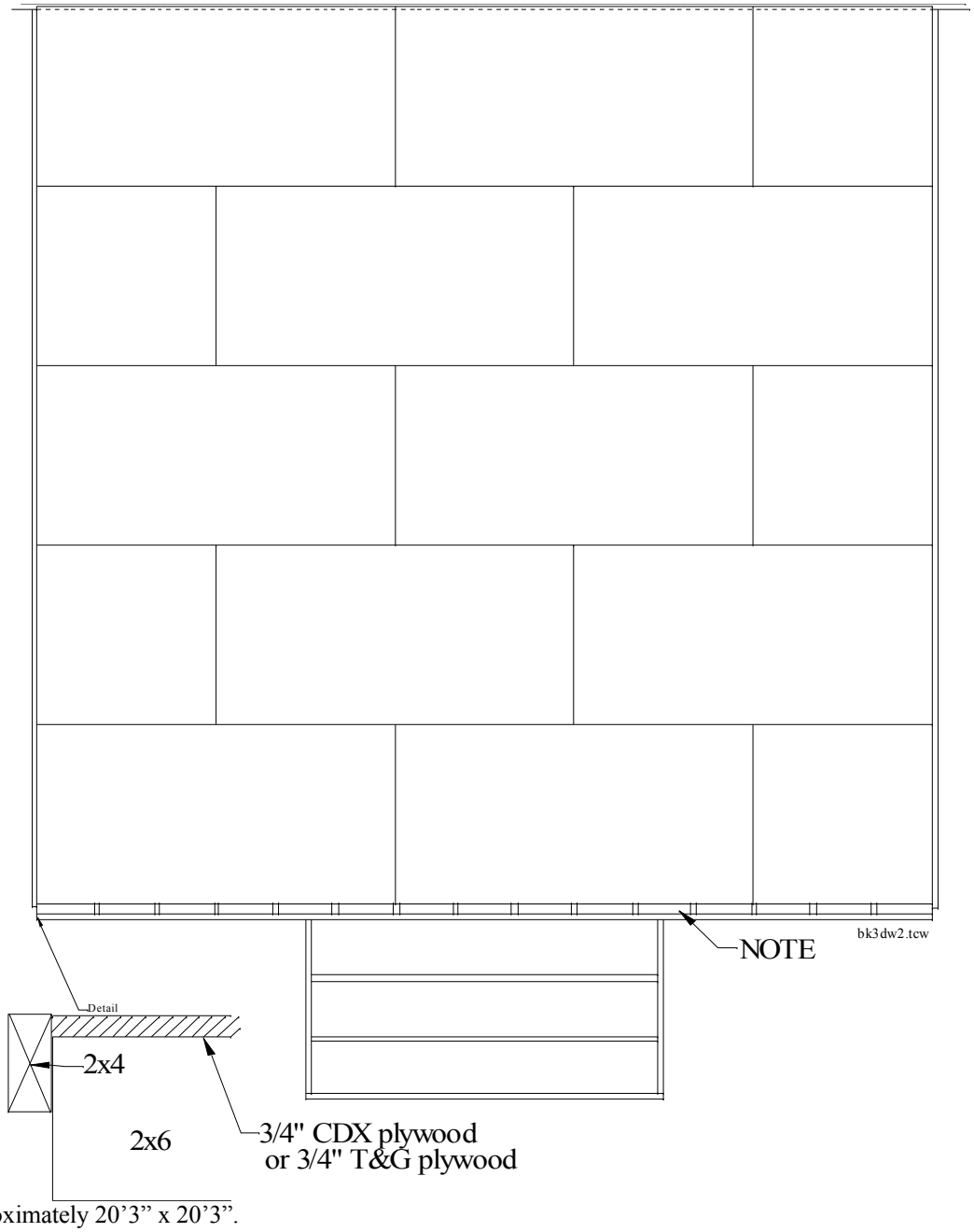


NOTE:

The 10' 2x6 joists are not cut less than 10'. Some 2x lumber comes as much as 1" longer than the length it is named, cut these to 10'. This will make the deck about 3" wider with a gap in the front between the edge of the plywood and the frame. If you use T&G plywood the gap will be wider because T&G is less than 48" wide. Fill this gap with 1x4 (¾" x 3 ½") or 1x6 (¾" x 5 ½"). An exact dimension is hard to figure in advance, so be prepared to rip a piece to fit. The extra deck size is needed to place the walls.

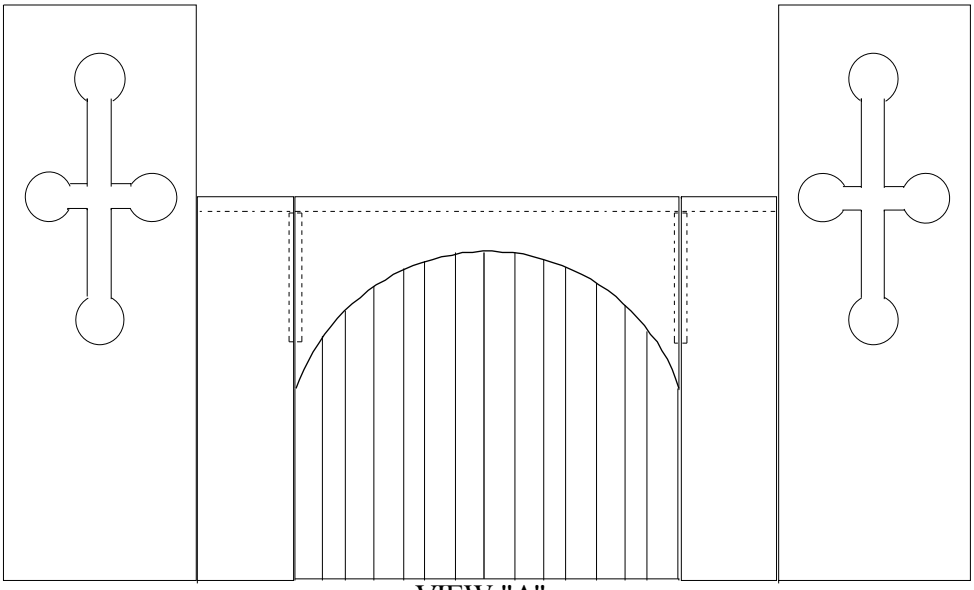


The detail on page 13 shows adding a 2x4 to the edges of the deck. Now the deck is

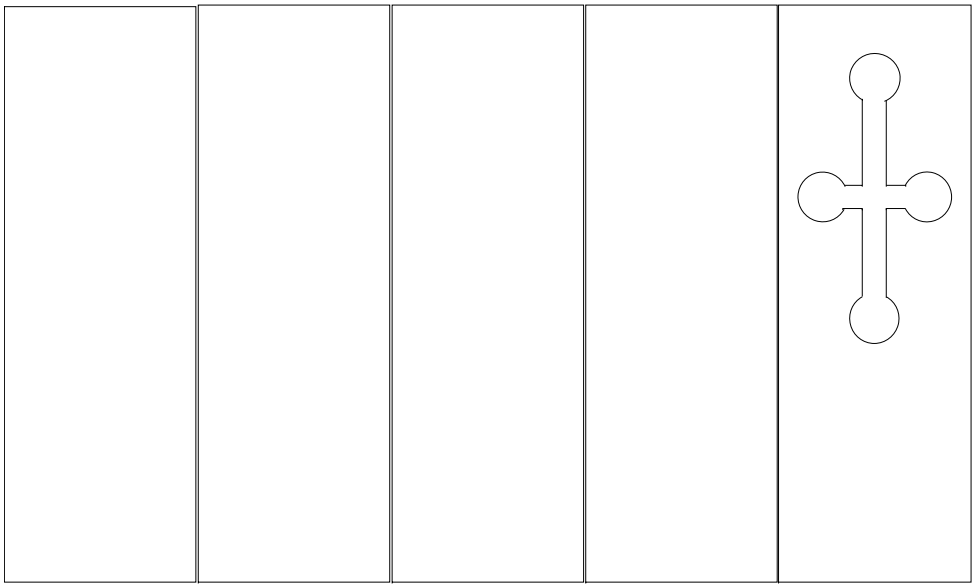


approximately 20’3” x 20’3”.

NOTE: Additional explanation see Note Page 12. The deck frame will extend beyond the deck floor. The ¾” T&G wafer is a money saving feature. If you use CDX, additional supports will have to added between joists at the seam of the plywood. Use joist hangers or turn them flat (page 12).



VIEW "A"



VIEW"B"

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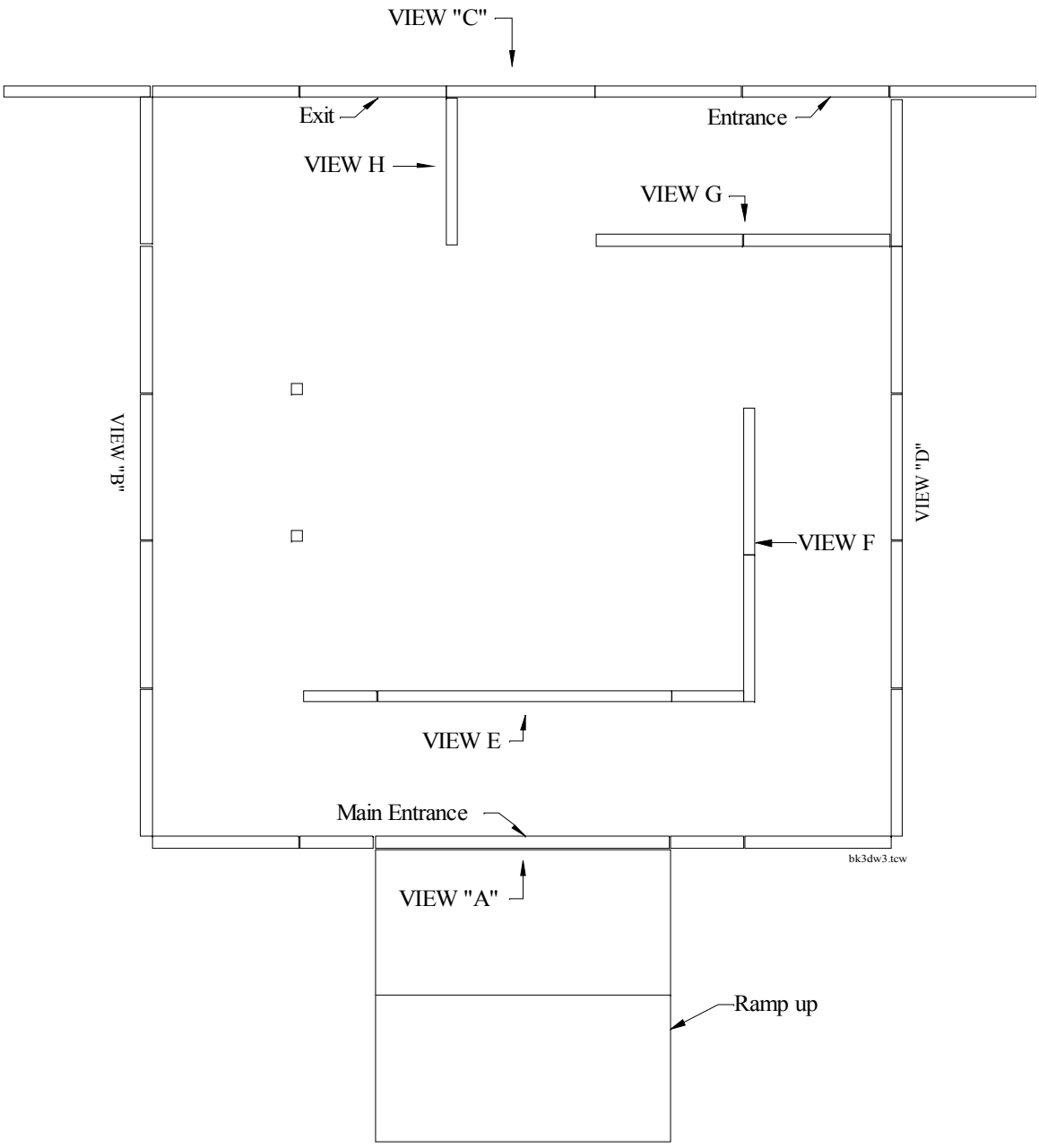
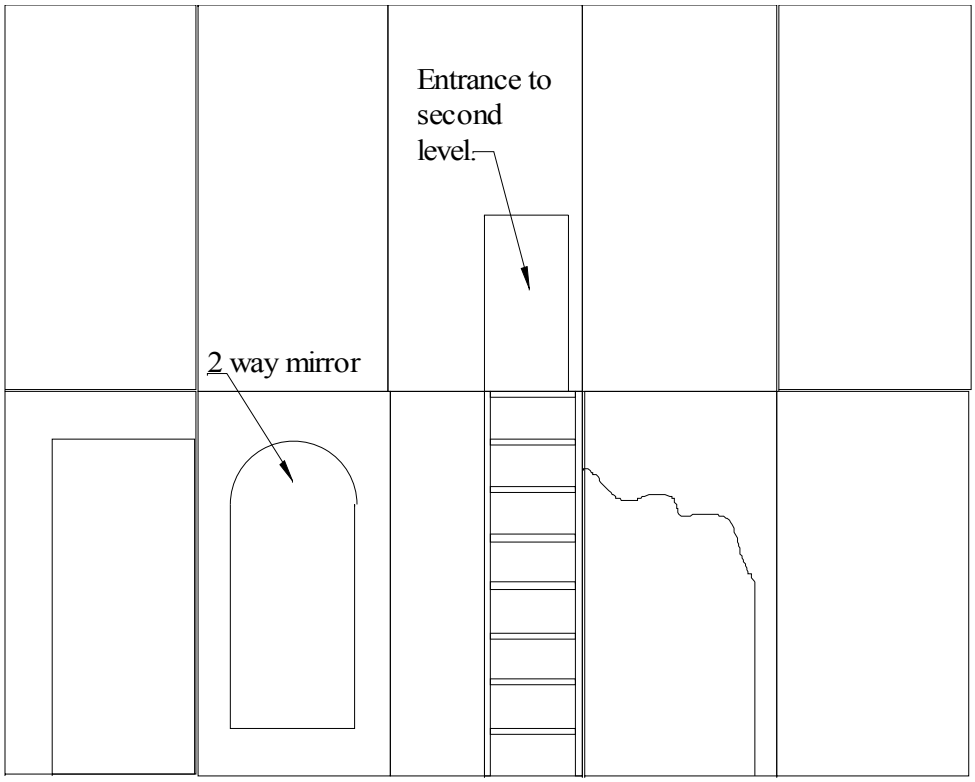
View “A” is a front view of the first level panels. Note the dotted lines. At first glance, it appears that the central door unit section is several separate panels. It is. However, they must be connected to form one base unit. This is different than regular panel installation.

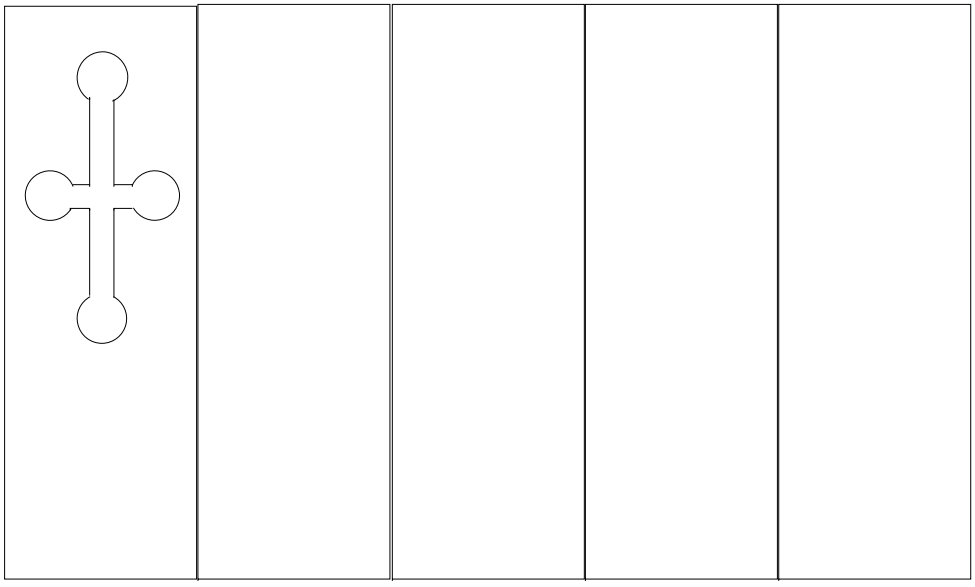
View “B” is the left side first level panels.



The interior floor plan may be rearranged to suit any design. The key is to remember to place as many walls and posts directly under the second level wrap-around deck as possible. The central space has a high ceiling. I closed this off with fabric attached to the edge of the second level deck and pulled to the center point, creating a fabric pyramid. In 1995, I left this open and placed actors on the second level to entertain and/or frighten the customers as they waited.



VIEW "C"
First & Second level panels



VIEW "D"

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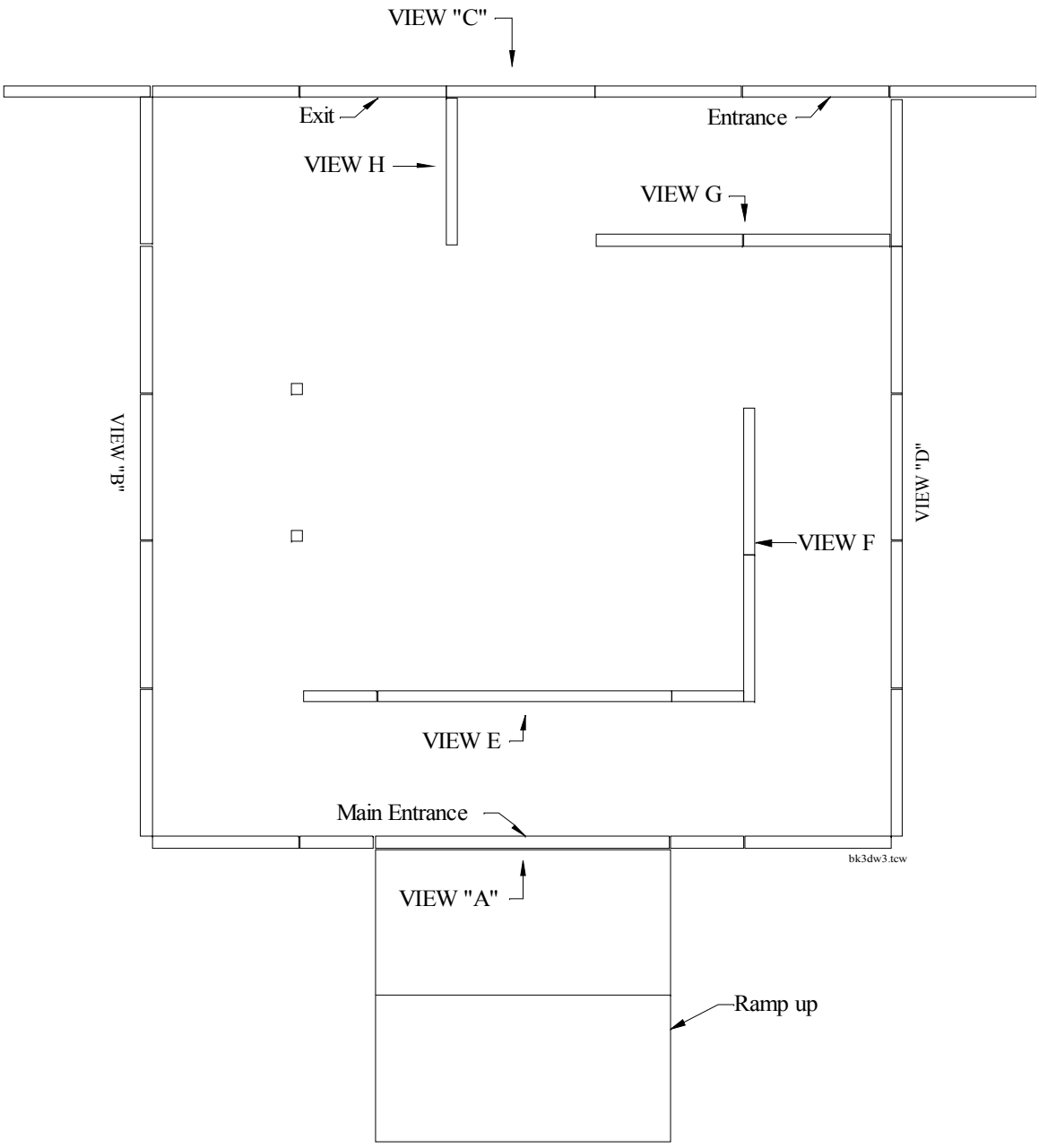
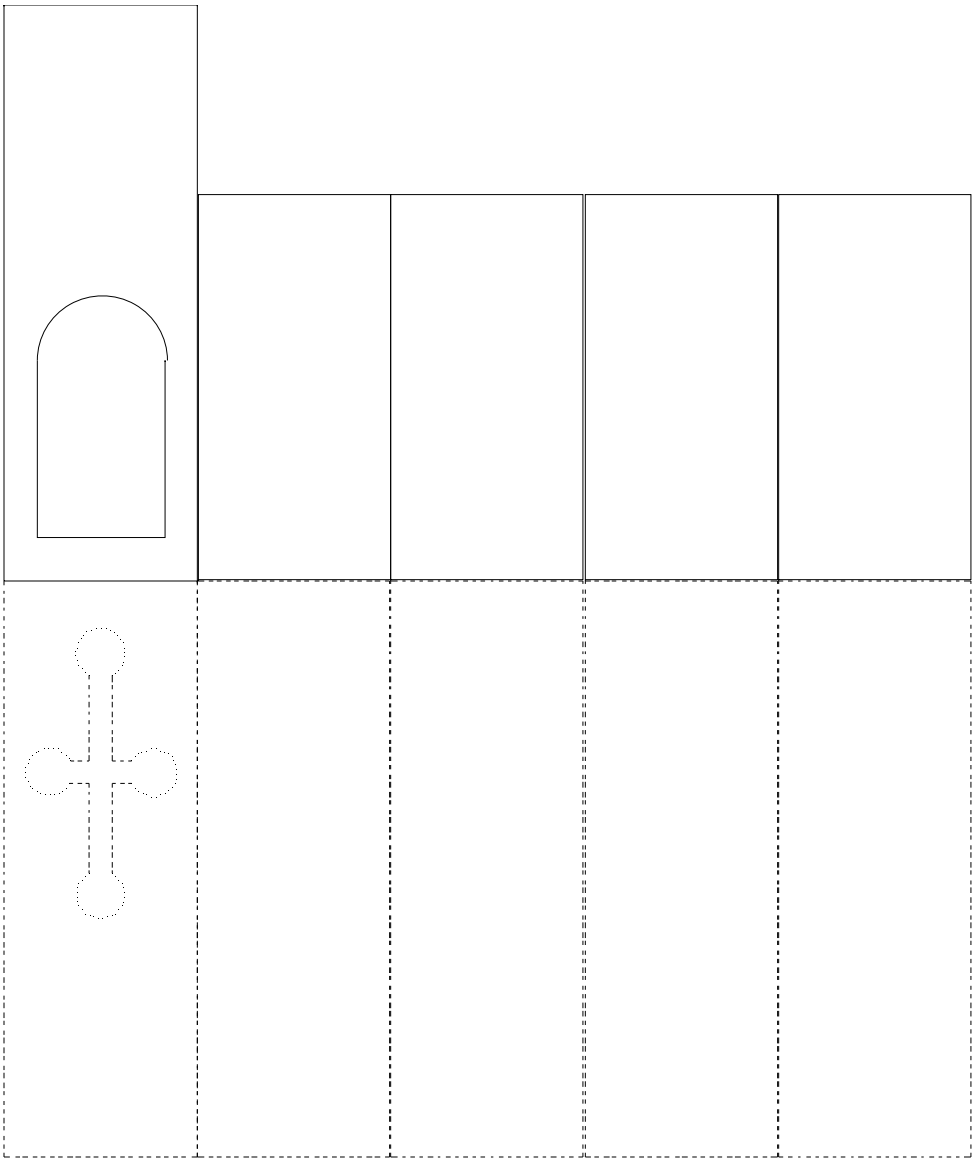


Page 16. View “C” is first and second level panels as viewed form inside the attraction. First level contains (from left to right) the entrance into the attraction from the entry area. A two way mirror panel (I use this to view the customers before they enter, learn their name or frighten them by cross fading lights to place a creature in the mirror with them). The ladder is the only access to the second level wrap-around deck. Next is a creative treatment for the exit. And last a standard panel.

View “D” is the right side outside view of the entry area.



VIEW "D"

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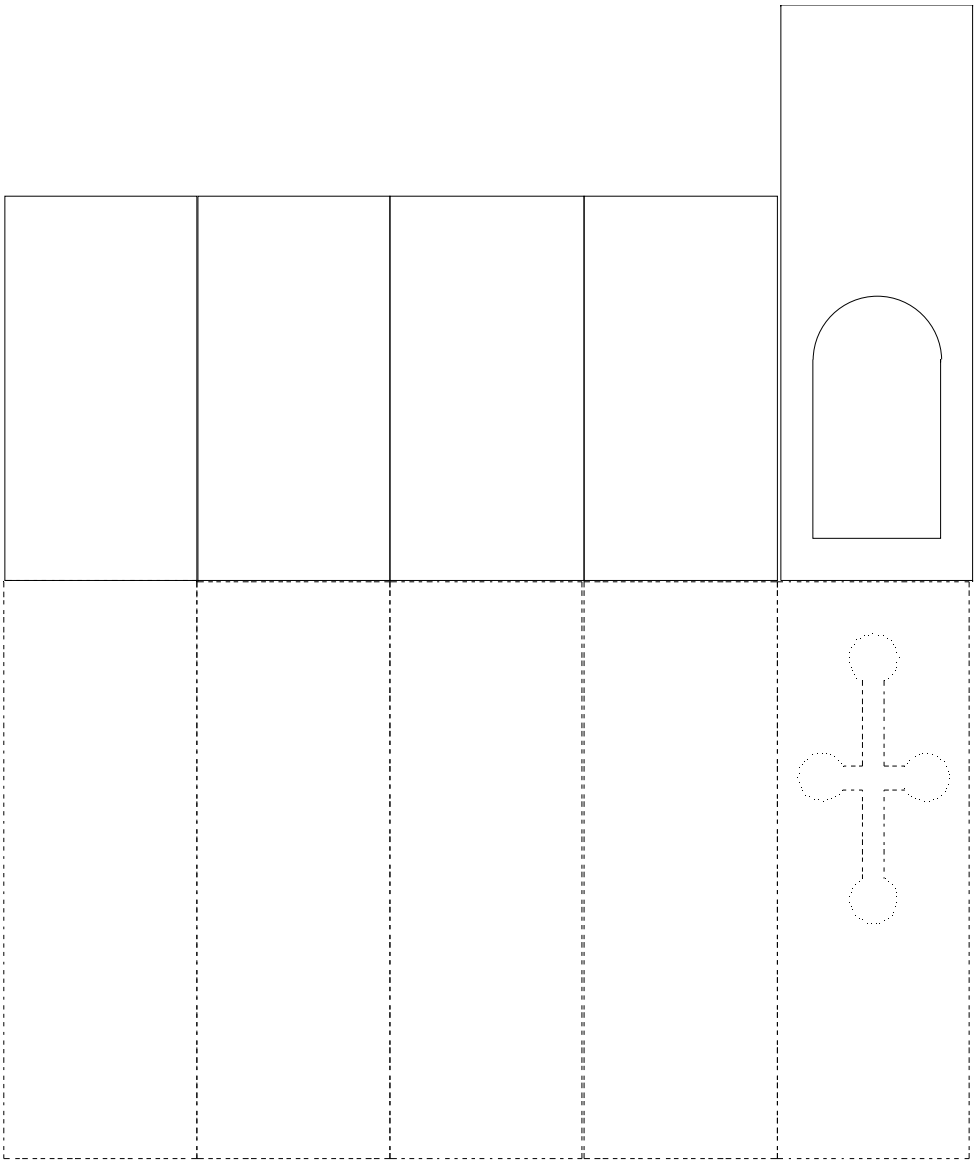
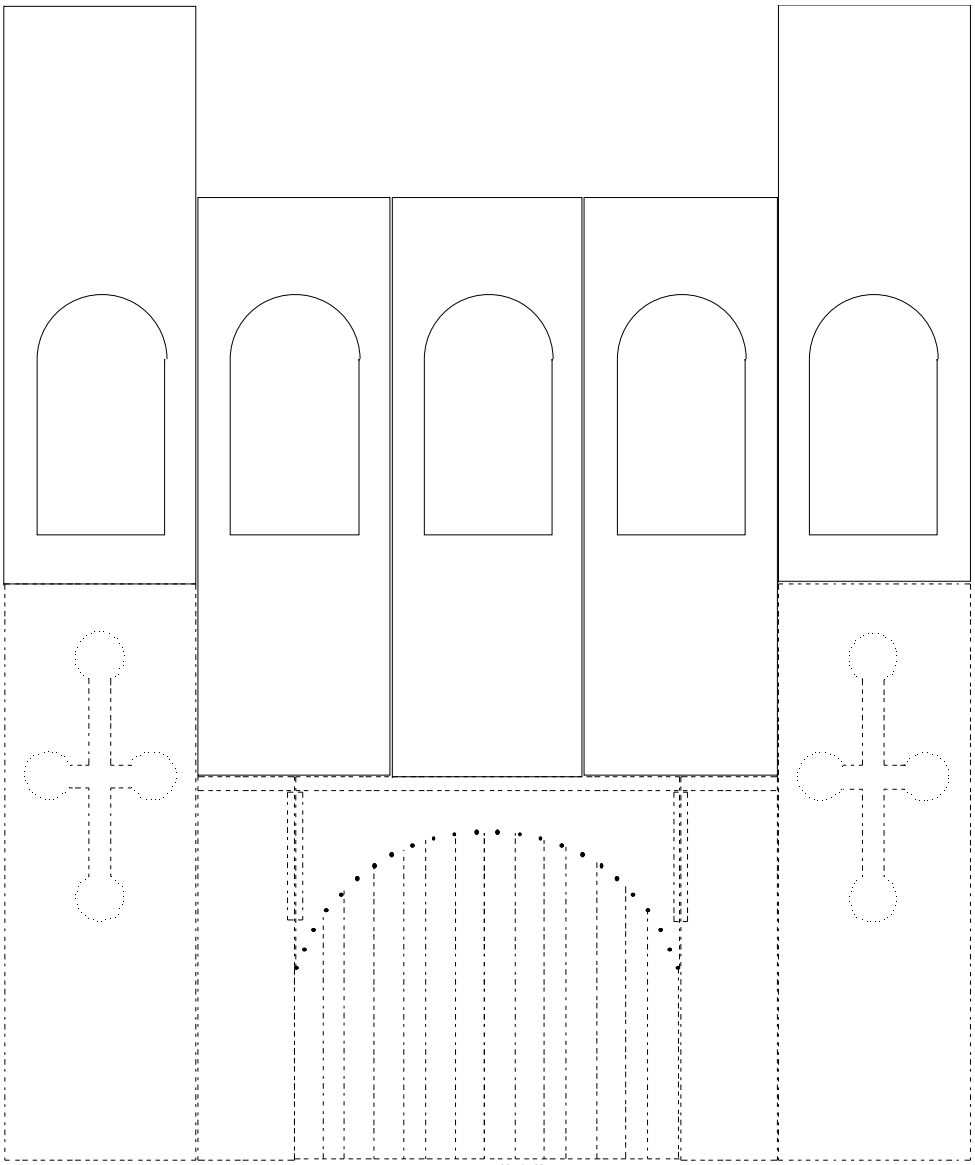
The 4x8 single sided panels on the second level may not be installed until both the front 4x12s forming the tower are in place.



VIEW "B"

Again, do not install the 4x8 second level panels until the two 4x12 panels forming the corner tower are in place.



VIEW "A"

bk3dw8.tcw

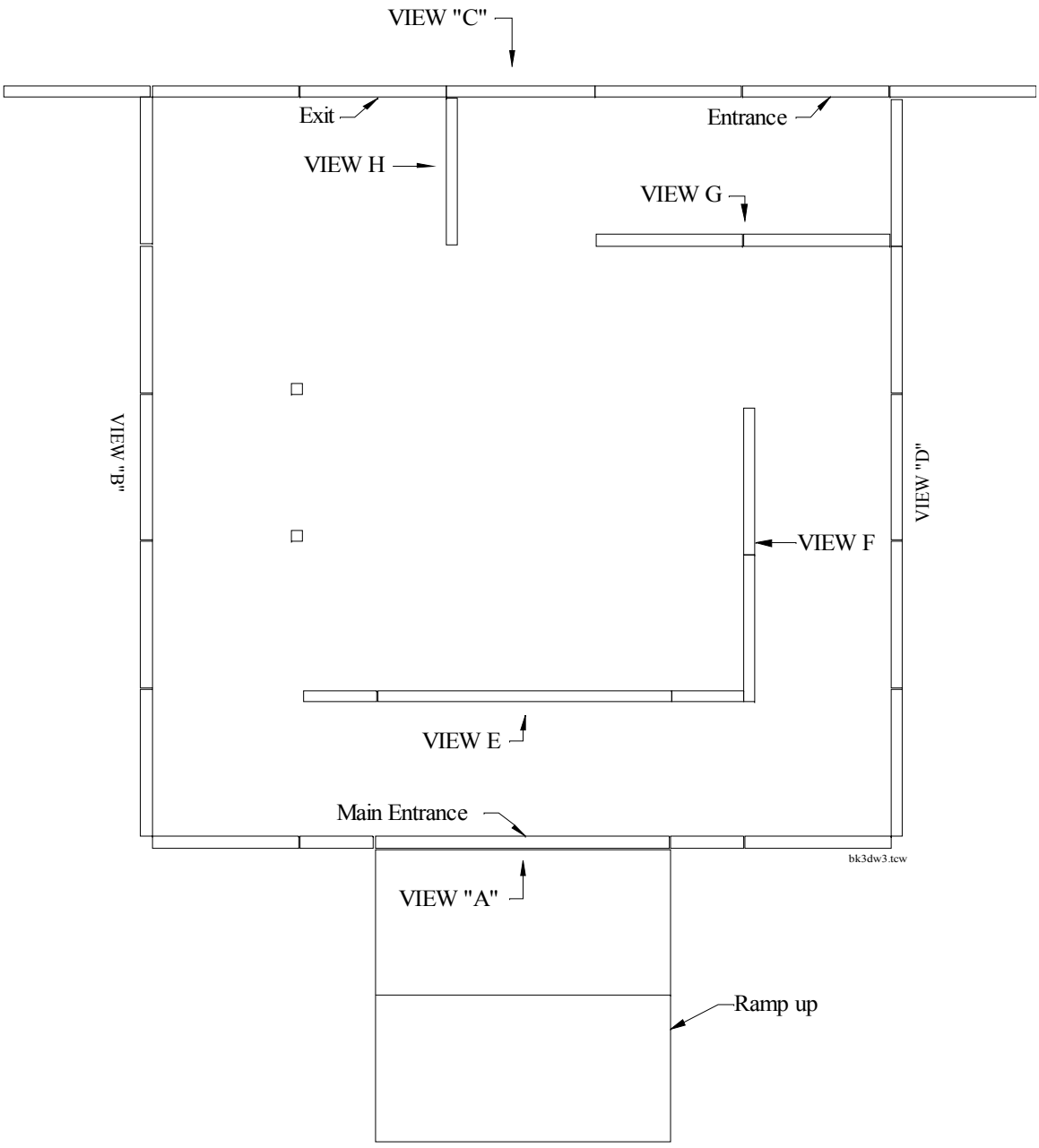
The second level has 7 - 4x12 window panels. They are installed before any 4x8 second level single sided panels . See second level tower erection page 29.

The central door unit is connected together with 1 12’ 2x4 through the top and two smaller 2x4s that connect the archway unit with the 2x8 panels on either side. The connection between second level panels and the first level door unit is made with a 12’ 1x4 (or 1x6) screwed to both levels of panels.

FIRST LEVEL WALL ASSEMBLY SEQUENCE

The facade is constructed after the front wall of the attraction (including first level View “D” panels) is in place. Build View “B” wall first. Set the first panel in place on top of the 2x4 added to the edge of the deck (detail bottom page 22, lower left). Secure this panel to the front wall of the attraction with an 8’ angle to the inside corner and a 10’ angle to the outside corner (page 34 for example).

Add two more panels. Each panel must be braced with a 10’ 2x4 attached to the deck four feet from the base of the panel with 90 degree steel angles top and bottom. Use a flat steel plate (4x4” or 4x8”) on the top. The top steel plate should stick above the panel (see page 30 detail) tying (connecting) two 4x12 panels together with the two 4x8 second level panels. The bottom plate should be a 4x4 by 4x4 - 90 degree plate tying two panels together and to the deck. (continued bottom next page)



When three panels are in place, tie them together with a 10’ 2x4. This 2x4 is screwed flat to the panels with 3” screws. The top of the 2x4 is 8’ from the deck (page 23 & 24, left diagram). These 2x4s tie the panels together and support the wrap-around deck joists.

Add two more panels, turn the corner and secure the corner to the deck with a steel strap (see page 22). Place the next 10’ 2x4 as above, tying all five panels together. Do not remove the 10’ angle braces.

Install the front wall double door unit. Connect it with 2x4s as noted (see pages 22 & 24). Build wall View “D” from the attraction out, place View “G” wall perpendicular to View “D” wall as you build to the corner. Use one 16’ 2x4 to tie four panels together (see page 24).

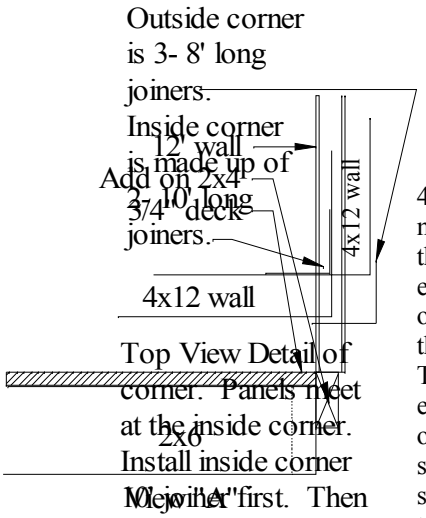
View “H” wall can be added at any time. Once all the exterior first level walls are in place, place all the interior walls, posts and second level supports for the wrap-around deck.

One of the keys to construction is the use of galvanized steel in selected areas (see page 34). The tower corners must be reinforced with steel. I recommend using steel in other areas as noted.

The outside corner is reinforced with three 8’ pieces. The inside corner is reinforced with two 10’ pieces.

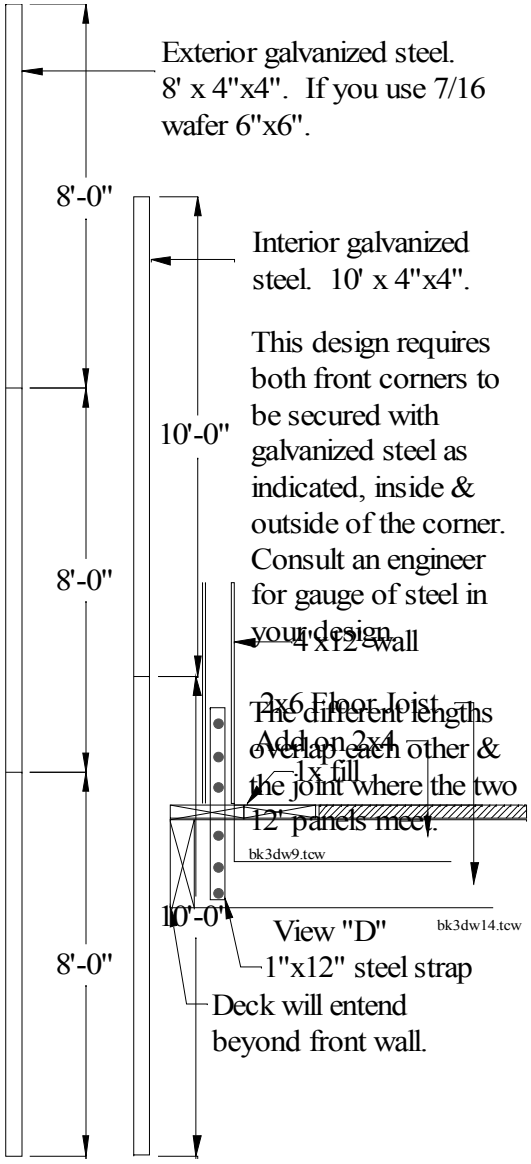
When the fifth View “B” panel is installed and secured with braces, attach the 10’ inside steel piece. Add the first front wall 4x12 panel to make the left corner, attach it to the steel of the fifth panel, to the floor with 90s and brace it.

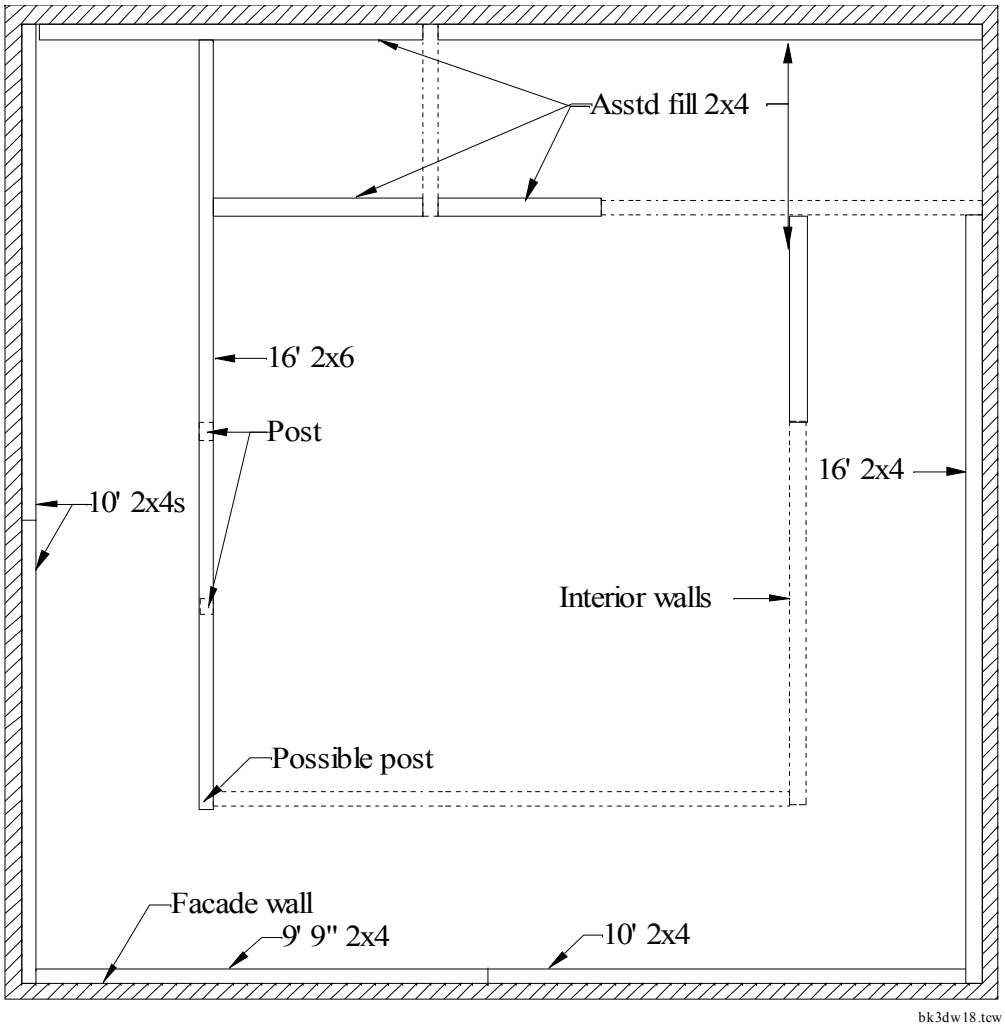
Drawings below are of right front corner.



extend beyond the front wall.

The front 4x12 panels making the base of the towers are even with the outside edge of the plywood deck. The 2x4s added to extend the width of the deck fall short, leaving a space at the corner to attach the panel to the deck with a steel strap. The deck itself will

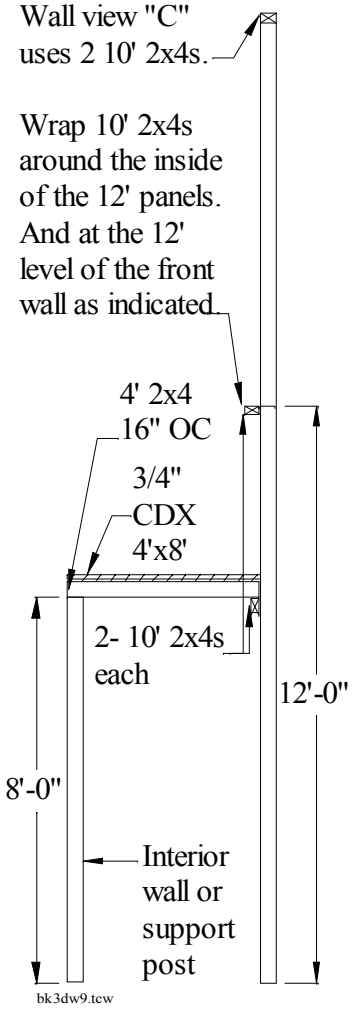




All the first level exterior walls are in place. The interior steel angles for all four corners are attached. The outside tower corners have 2 - 8' steel angles attached. Remove all interior temporary braces as you install interior walls, posts to support the second level deck and second level deck joists.

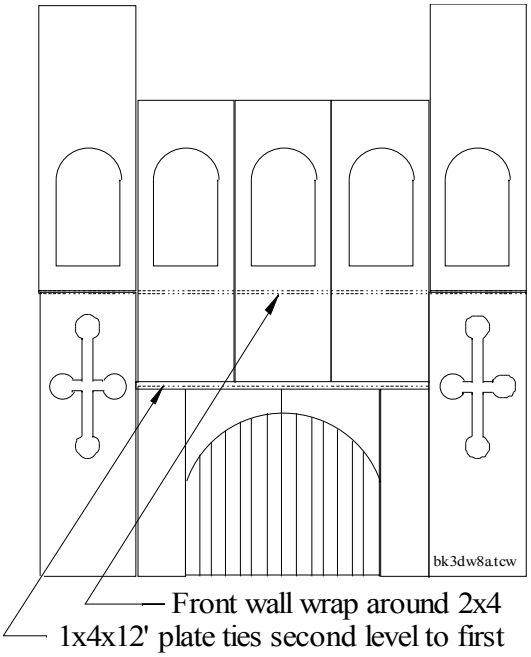
The drawing above indicates progress. The 2x4s with top heights at 8' wrap around the first level panels as noted. The 16' 2x6 support is on its posts, screwed to the wall at the possible post location and set in a joist hanger at the other end. The other fill in 2xs are attached and this base is ready for second level floor joists.

WRAP-AROUND DECK



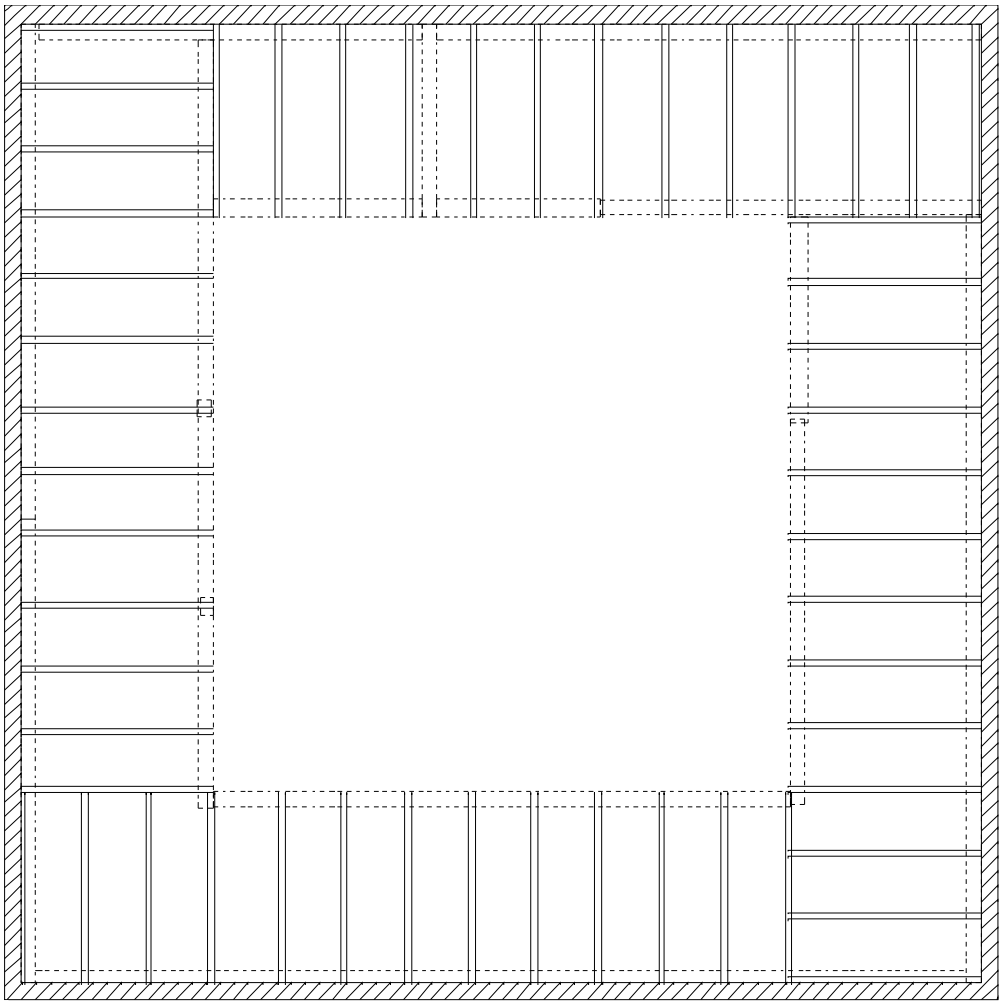
This is a cut away view of the right wall, View "D", with the wrap-around deck in place. The interior wall (or post with support) makes the base for the wrap-around deck floor joists. The joists are 4' long and spaced 16" OC. Metal ties are used to attach the joists to the top of wall units, supports and the 2x4 along the outside wall.

The 8' level 2x4s are obscured by the 12' 1x4 across the front used to tie first and second level panels together. The 2x4s used for joist support add strength to the central double door unit.



NOTE: If you have purchased Video # 3, you will notice that the center window is lower than the other windows. It is also shown in the example on page 3. The center window is the same size, just lowered behind the Castle Dragon sign. The space is used to hook up the electrical for the chase lights used in the sign.

JB Corn



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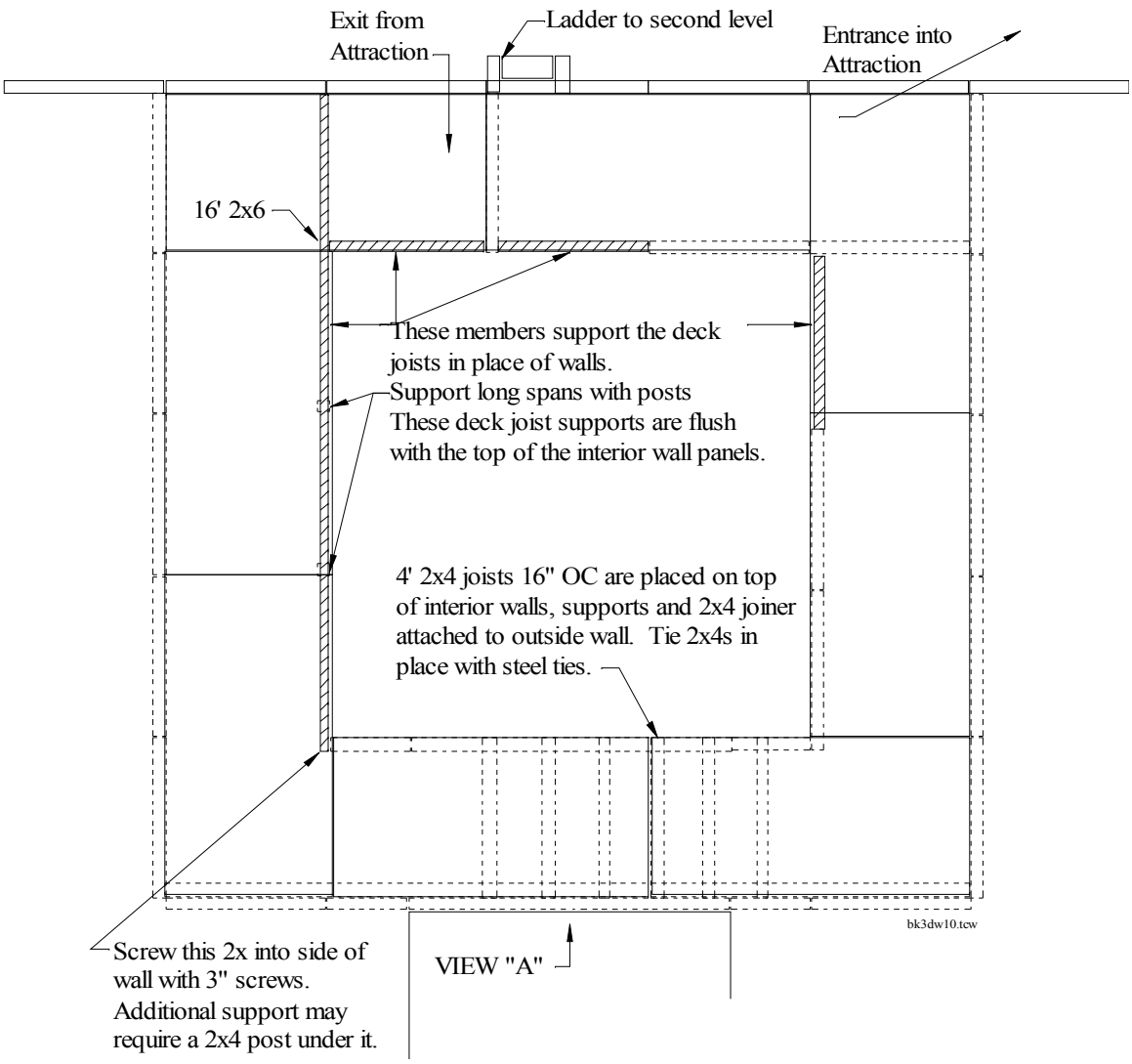
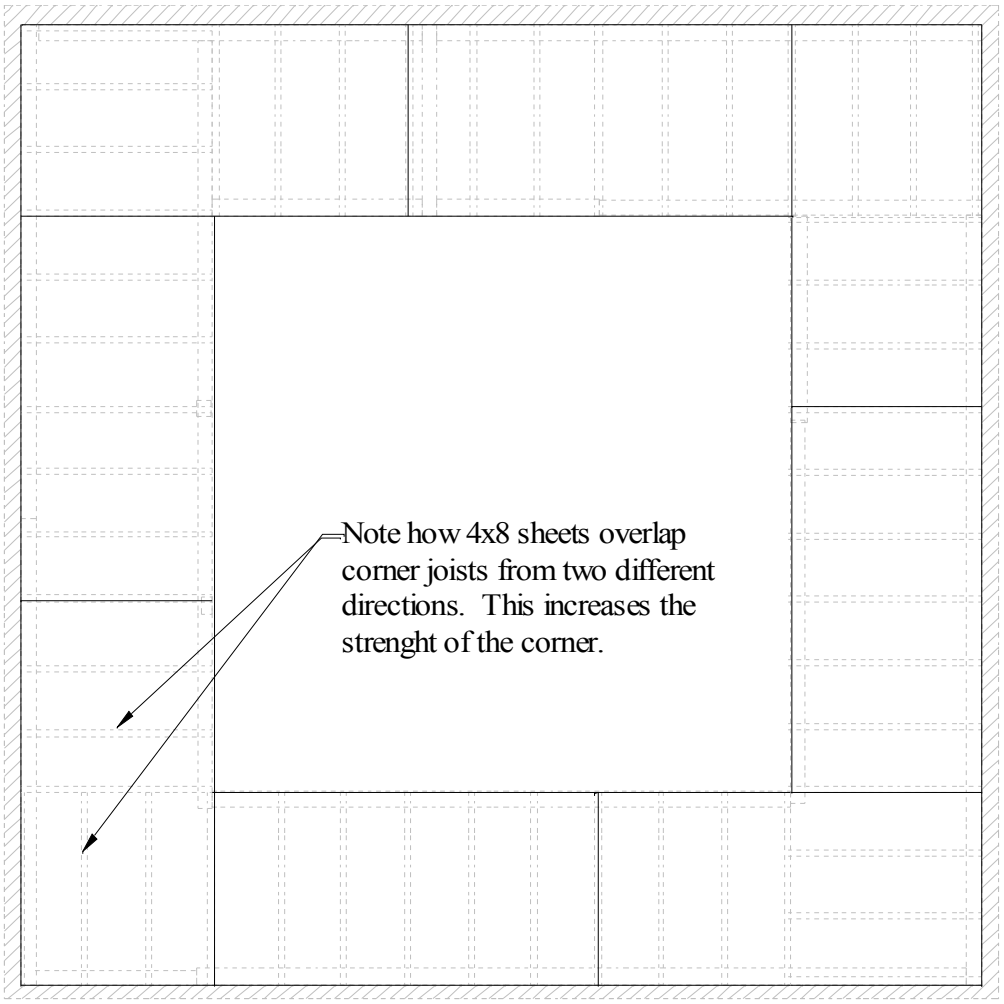
Install the joists with steel ties. The next page shows the 4x8 plywood layout. Install the plywood sheets as you install joists and remove panel braces.. Be careful to center joists on the adjoining edges of the plywood sheets. Use 2x4 joist hangers on joists that butt up to other joists at the corners.

It is important that the deck be as square as possible. Continue to check square as you install the 4x8 plywood sheets for the second level wrap-around deck.

Some 4' 2x4 will be bowed. Place the bow up. The weight of the floor will take the bow out. This is true for all joists. Install them bow up. Do not use twisted joists for spans greater than 4'.



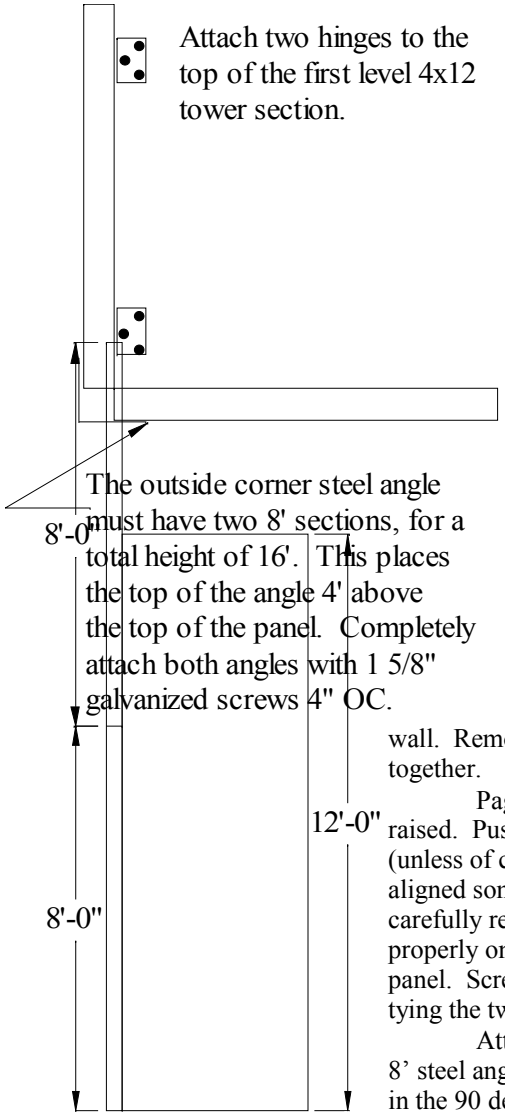
This diagram provides additional details.



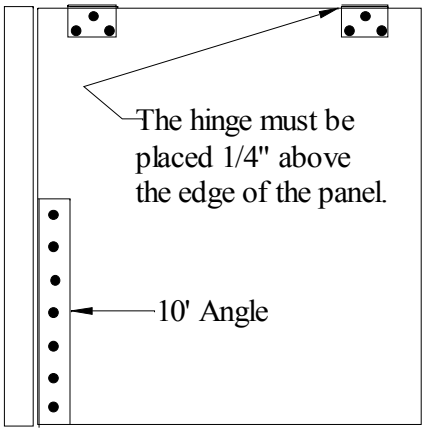
View "A"

With the wrap-around deck completed, second level panel installation is possible. The outside corners of the towers must have two 8' steel angles in place. The front view of this stage of construction is on page 14, View "A".

TOWER ERECTION PROCEDURE



Tower erection is easy. Each tower consists of two 4x12 window panels. Attach two hinges as indicated at left (top view of left corner tower). The second outside corner 8' steel angle must be in place (diagram lower left). Bring the window panel up to the second level and attach it to the hinges.

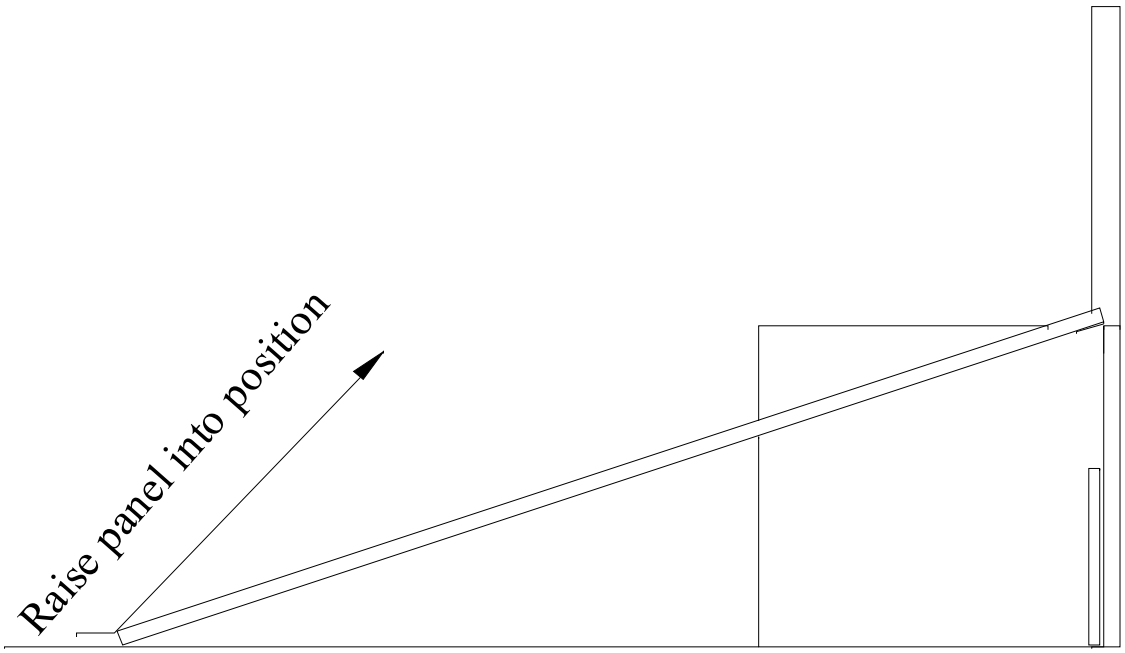


The corner top view is above left and the inside view is above right. Note that the inside corner 10' steel angle sticks up about 20" above the second level floor. The outside corner steel angle sticks up 4' above the wall. Remove the steel plate holding the two first level panels together.

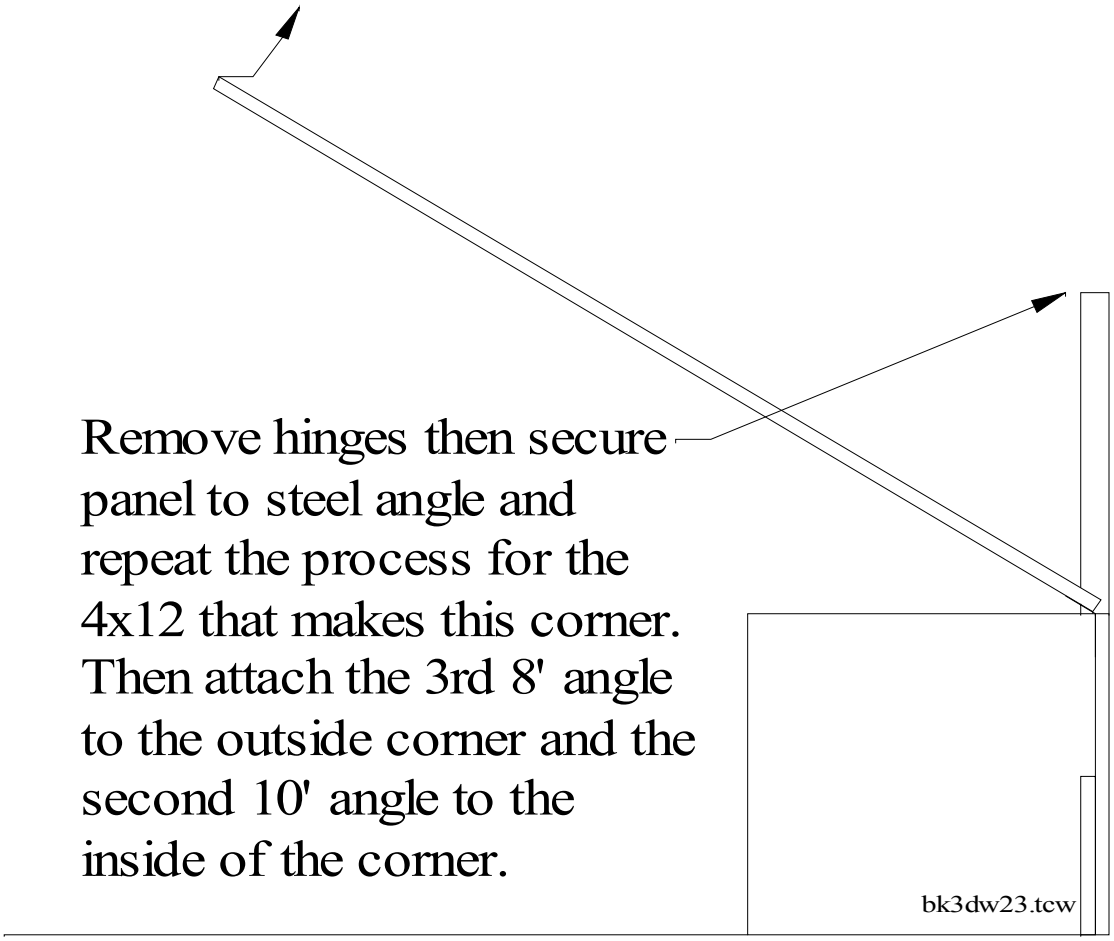
Page 29 shows panel position to be raised and then partially raised. Push the panel all the way up to vertical, it will not fall over (unless of course you forgot to stack the second 8' steel angle or have aligned something wrong, etc.). Hold the panel in position and carefully remove the hinges allowing the second level panel to rest properly on top of the first level panel. Check for alignment panel to panel. Screw the panel to the steel angle and re-attach the flat plate tying the two first level panels together.

Attach the third 8' steel angle to the outside corner. Each top 8' steel angle must have a 3/8" hole drilled one inch OC from the top in the 90 degree turn (see page 47). Place and raise the 4x12 window panel to complete the corner and attach the 10' steel angle to the inside corner. Add a 4x4 by 4x4 - 90 degree plate 4" from the top.

Repeat the process for the second tower. Install the three center 4x12 window panels. Tie these three panels to the first level panels with a 12' 1x4 or 1x6. Page 30 shows placement of 12' high wrap-around 2x4s used to connect View "A","B" & "D" panels together.



View as seen from inside



Remove hinges then secure panel to steel angle and repeat the process for the 4x12 that makes this corner. Then attach the 3rd 8' angle to the outside corner and the second 10' angle to the inside of the corner.

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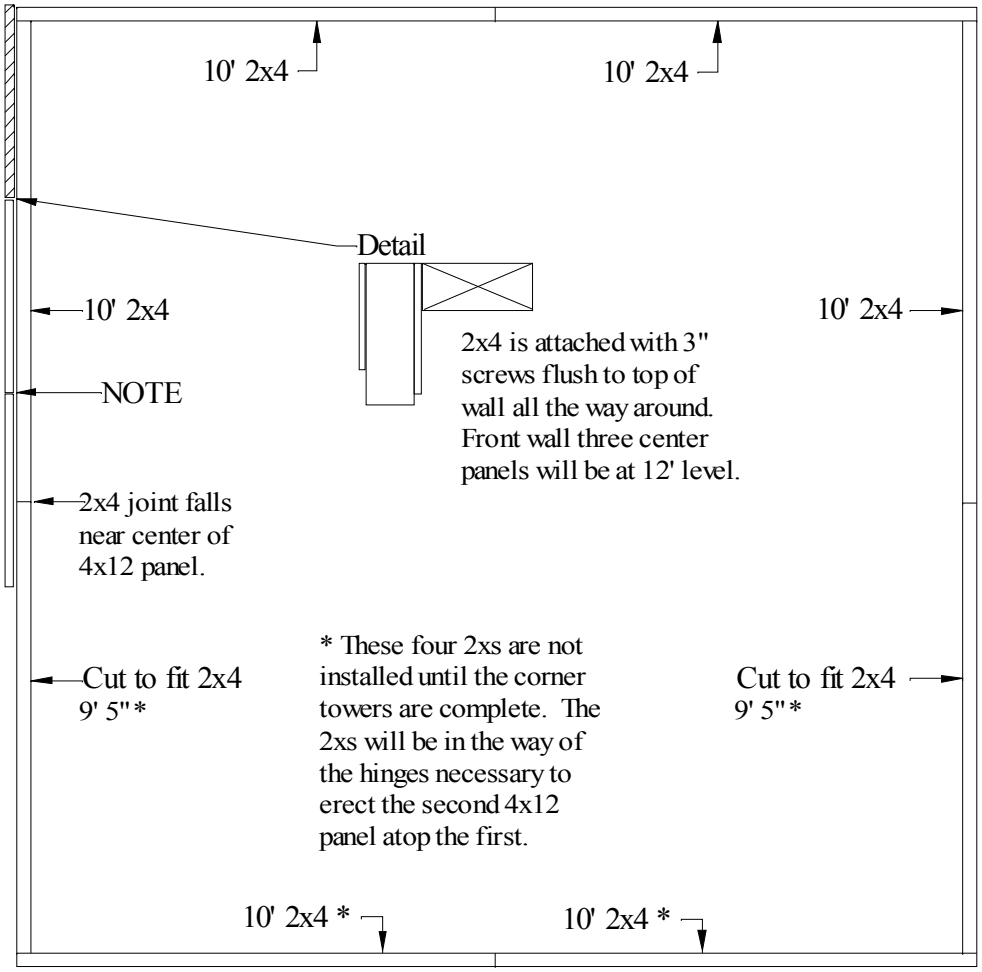
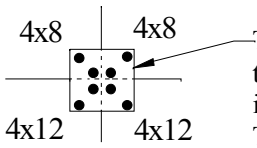




This is a 4" square metal plate. It connects panels. One of these must be installed at each panel boundary. One on the inside and one on the outside before the 2x4s are installed. They will connect the second level 8' panels to the first level 12'

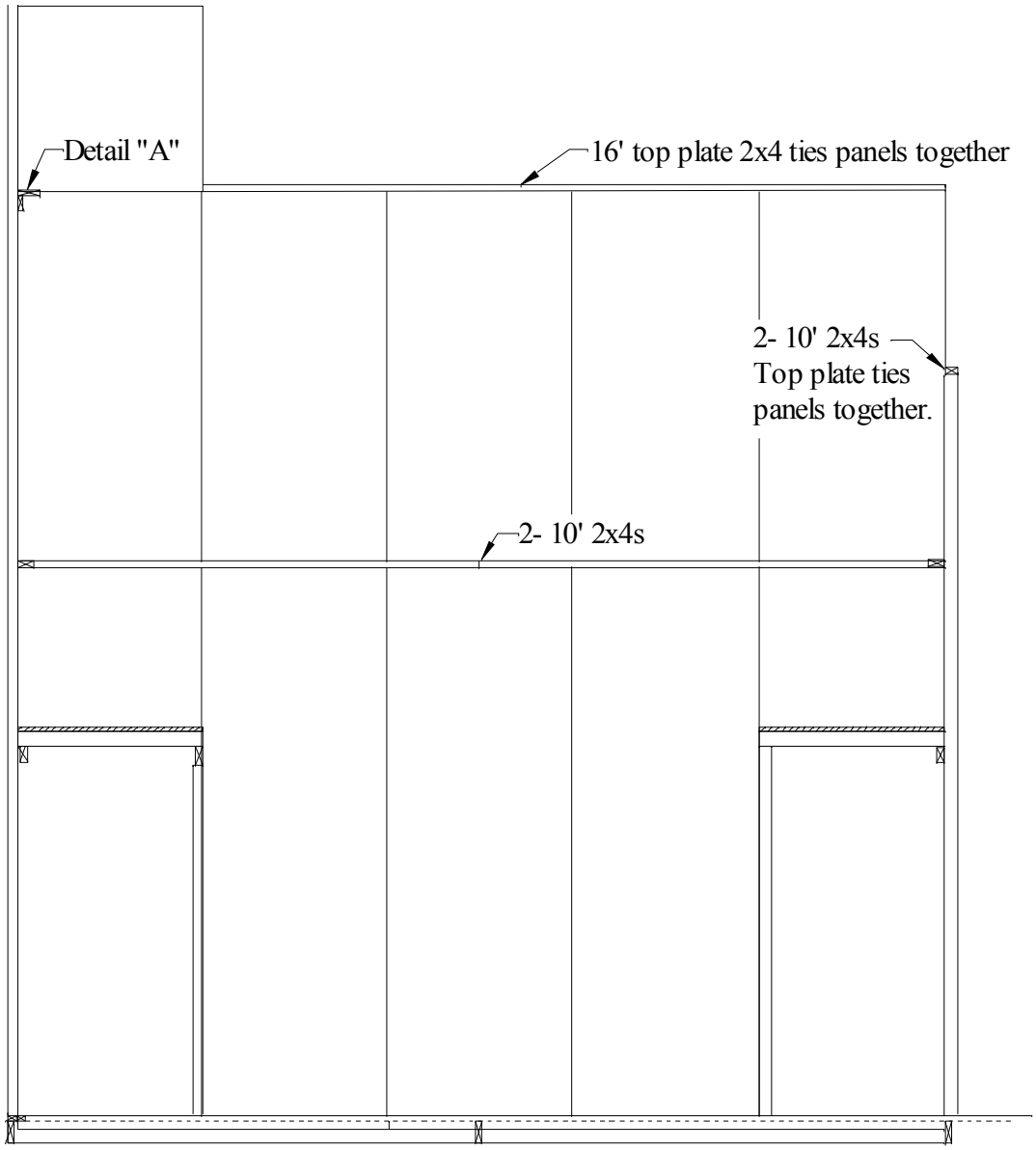
The above for steel plates apply to all panel boundaries.

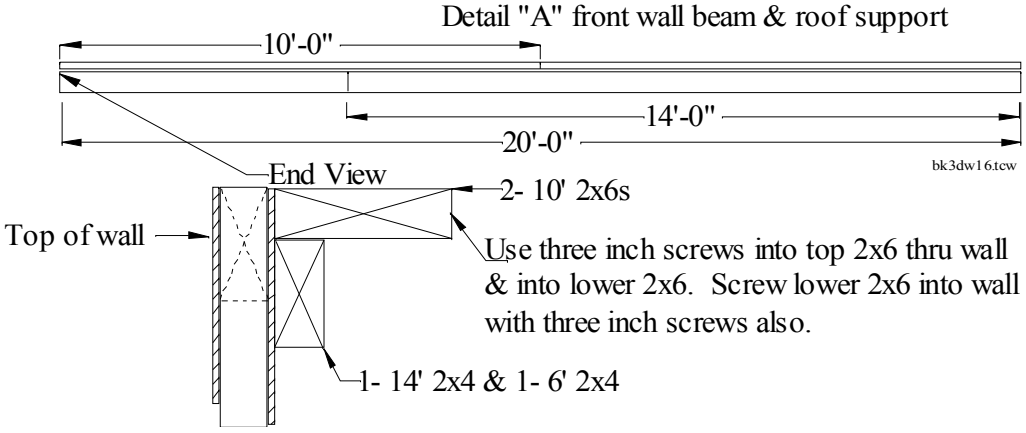
This diagram shows all 12' level wrap-around 2x4s in place. The detail drawing shows that the 2x4s are turned on edge and screwed to the wall from the outside with 3" screws. The back 10' 2x4s cannot be put in place until the 4x8 single sided panels are installed.

The front wall second level panels and towers are in place (the last of the 4x12 panels). All the 12' level wrap-around 2x4s except the back two (View "C") are in place. Install View "C" 4x8 single sided panels and the second level access panel. Attach the 2 - 10' 2x4s at the 12' level. Install View "B" & "D" 4x8 single sided panels. Using the joiner on page 33, attach View "B" & "D" 4x8 panels to the 4x12 panels of the tower.

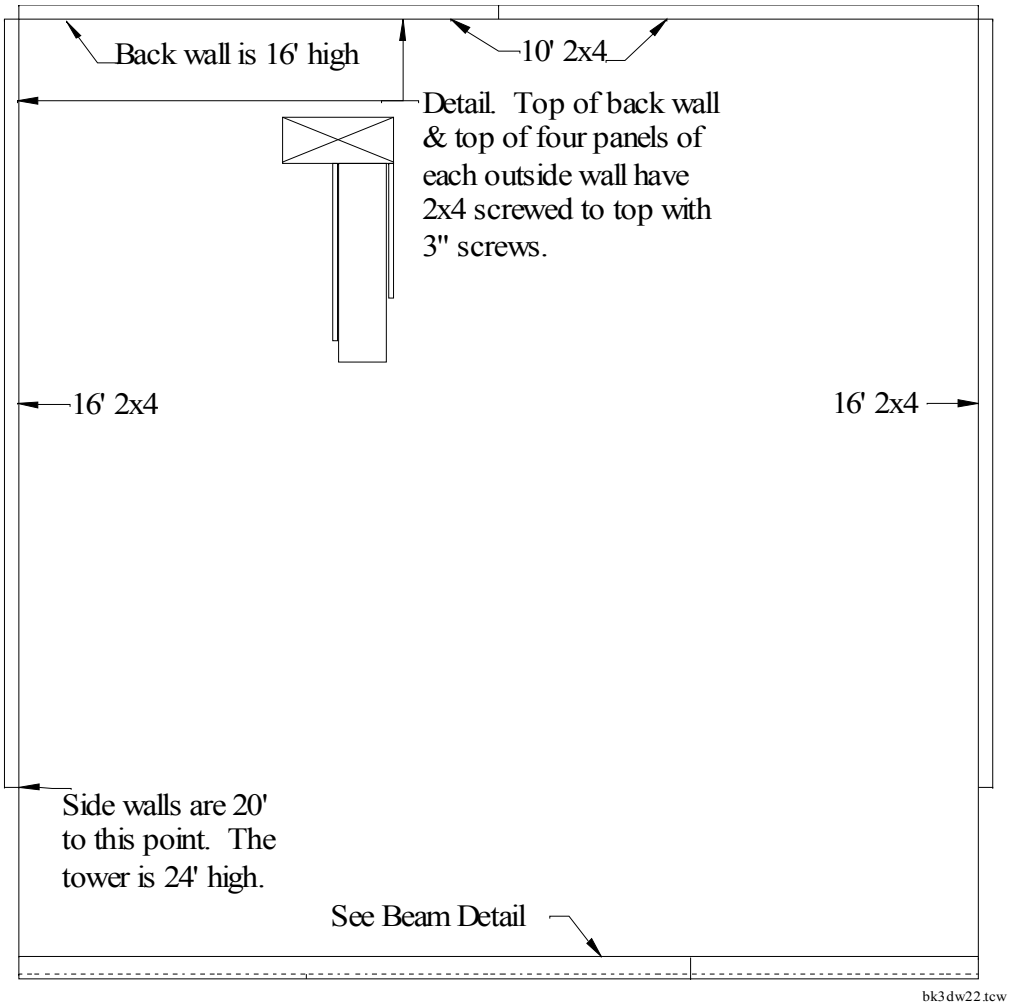
The side cut away view on the next page shows all View "B" panels in place from the inside (View "B" is from the outside). It also shows the 2x4s that tie the tops of the back four panels together. View "D" panels are the same. This wrap-around deck diagram is different to make the following examples (the tower window is not present). The left deck view shows the deck joists supported by a 2x6 on a post. The right deck view shows the deck joists supported by a wall. Page 32 is a top view of 2x4 placement.

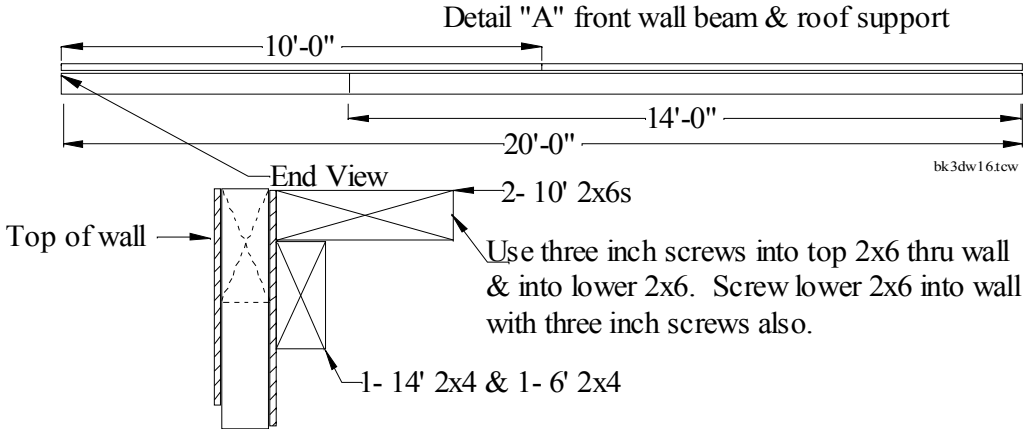
Detail "A" is the front wall beam & roof support. The castle battlements are also attached to this beam.

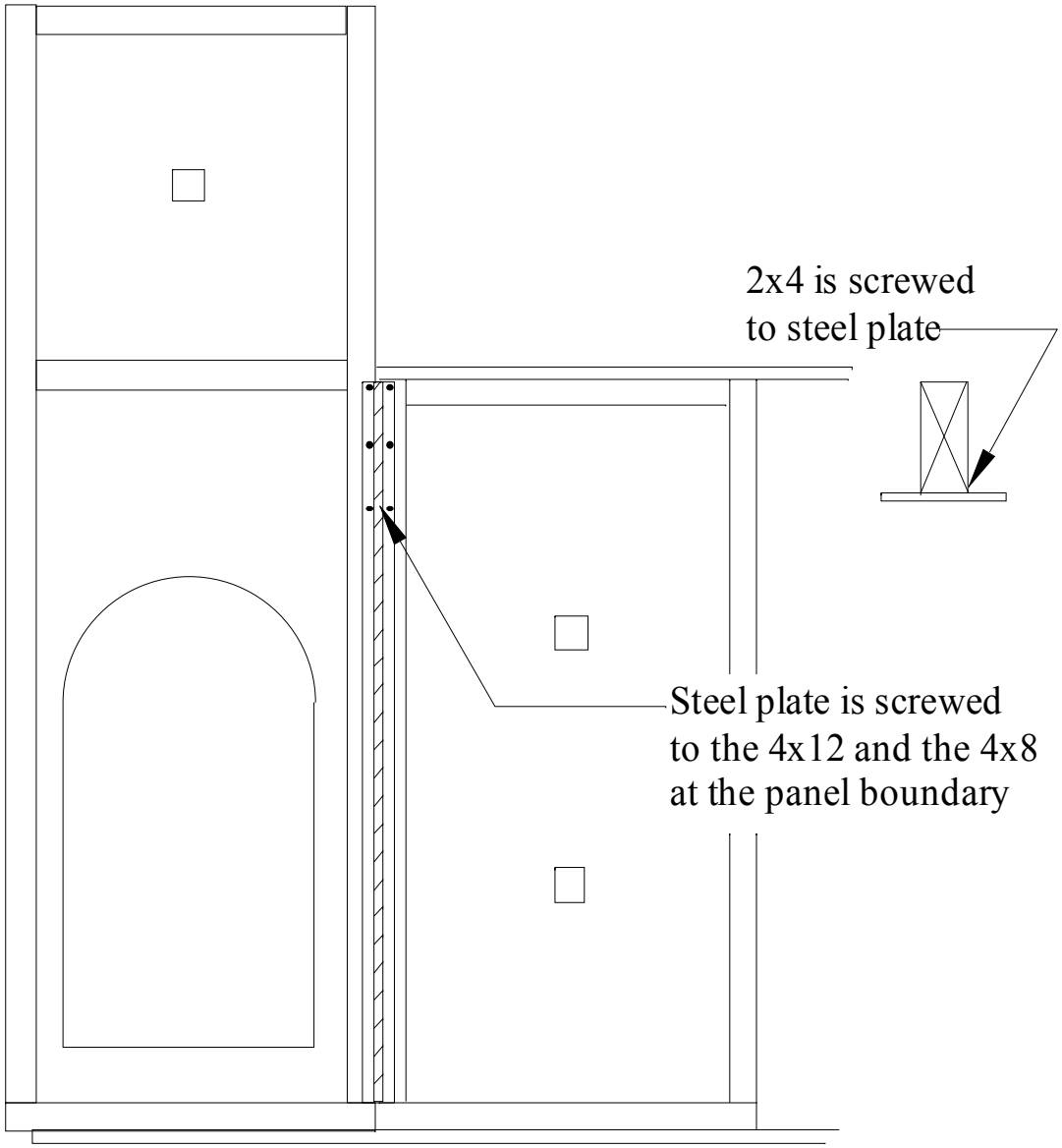




JB Corn







Inside view of View “B” wall. The tower and 4x8 single sided panel are in place. Use a 4” wide steel plate 8’ long. Drill three rows of holes 12” OC top to bottom. Screw an 8’ 2x4 to the center set of holes. Center the unit on the panel boundary and screw in place. Repeat for the other side.

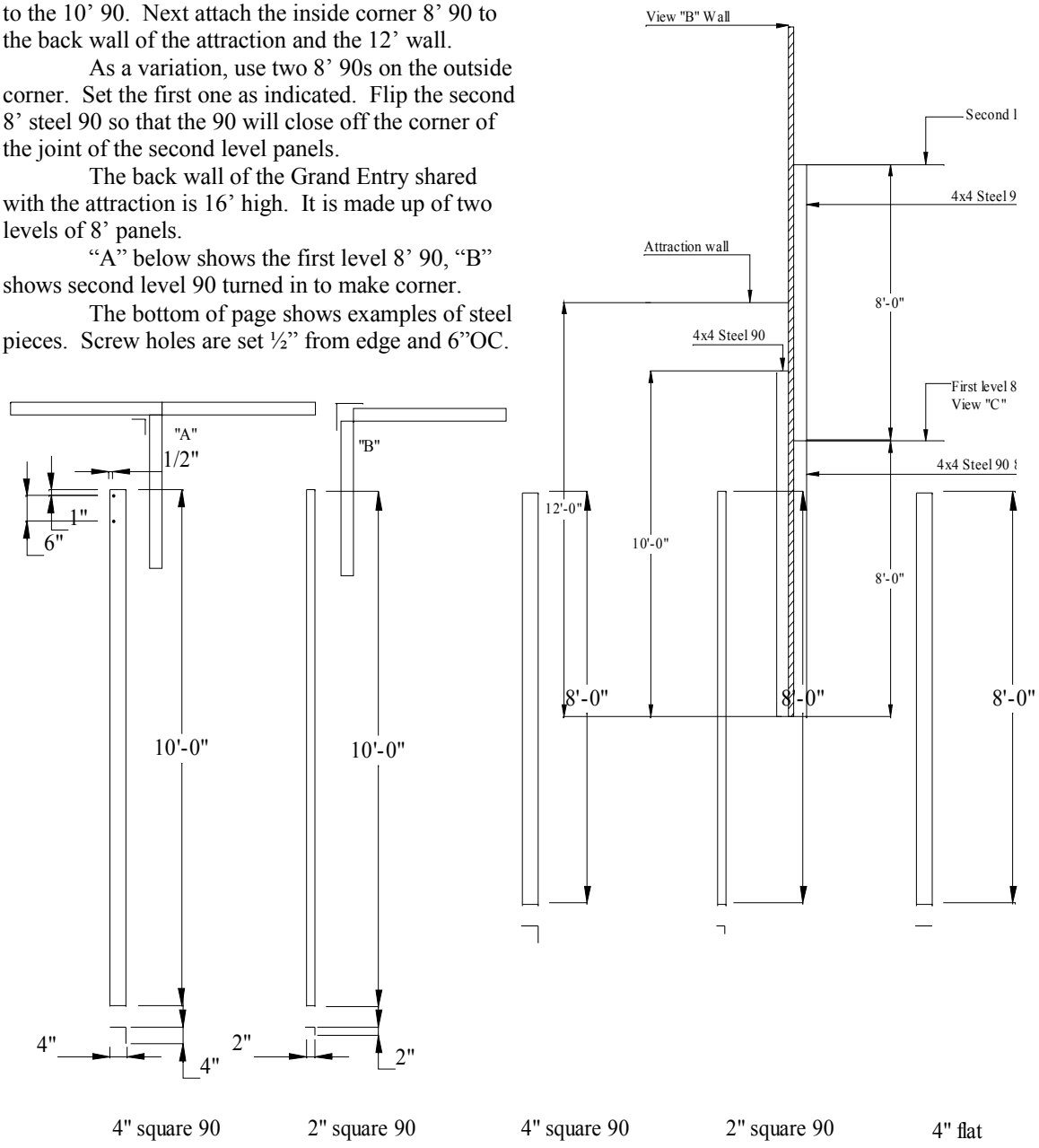
Detail drawing at right is an end view of the first 12’ with its 8’ panel on top. Attach the 10’ 90 to the attraction. Then set the12’ wall in place and attach to the 10’ 90. Next attach the inside corner 8’ 90 to the back wall of the attraction and the 12’ wall.

As a variation, use two 8’ 90s on the outside corner. Set the first one as indicated. Flip the second 8’ steel 90 so that the 90 will close off the corner of the joint of the second level panels.

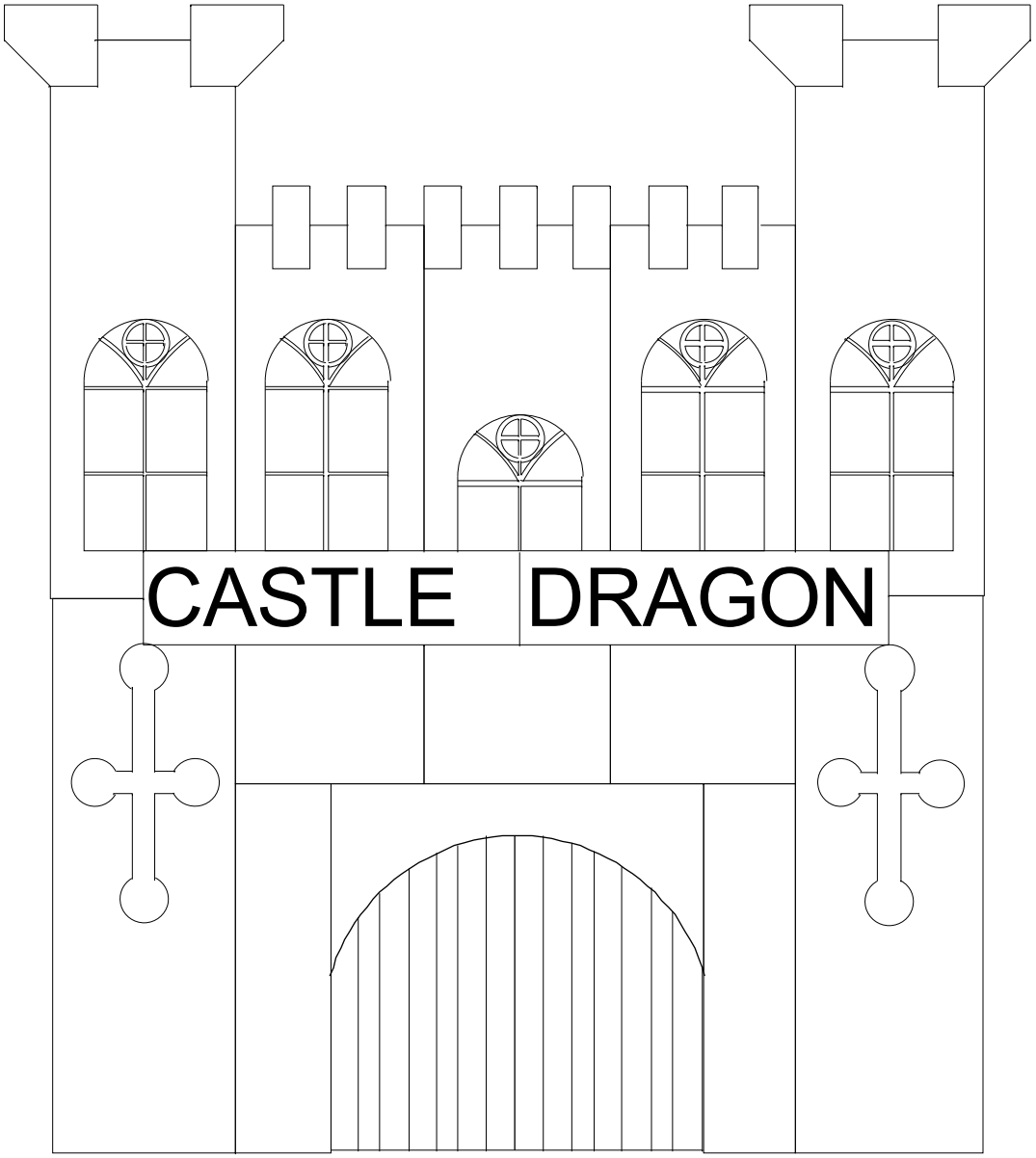
The back wall of the Grand Entry shared with the attraction is 16’ high. It is made up of two levels of 8’ panels.

“A” below shows the first level 8’ 90, “B” shows second level 90 turned in to make corner.

The bottom of page shows examples of steel pieces. Screw holes are set ½” from edge and 6”OC.

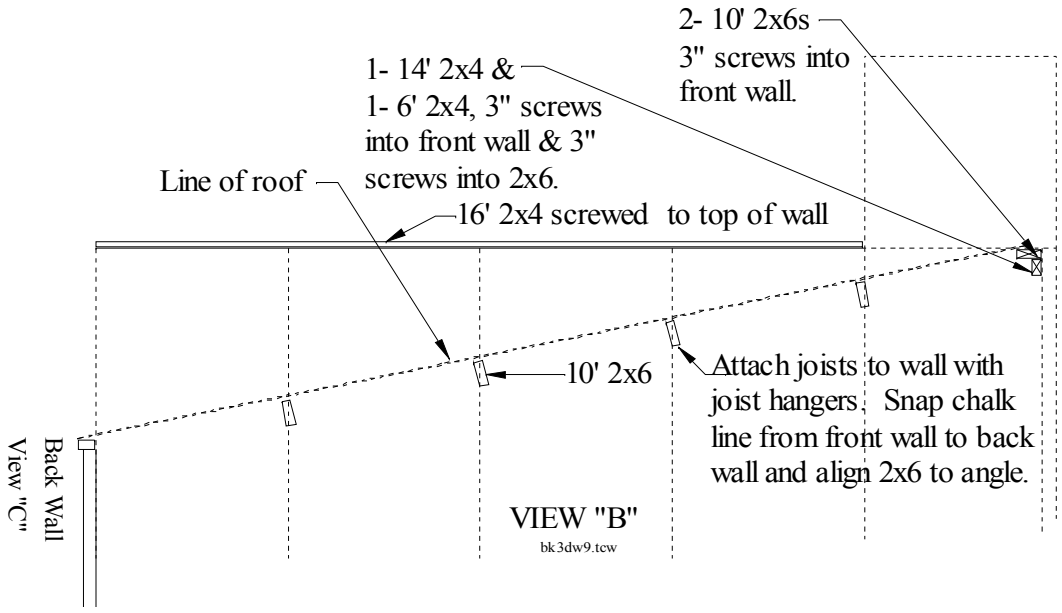


4" square 90 2" square 90 4" square 90 2" square 90 4" flat



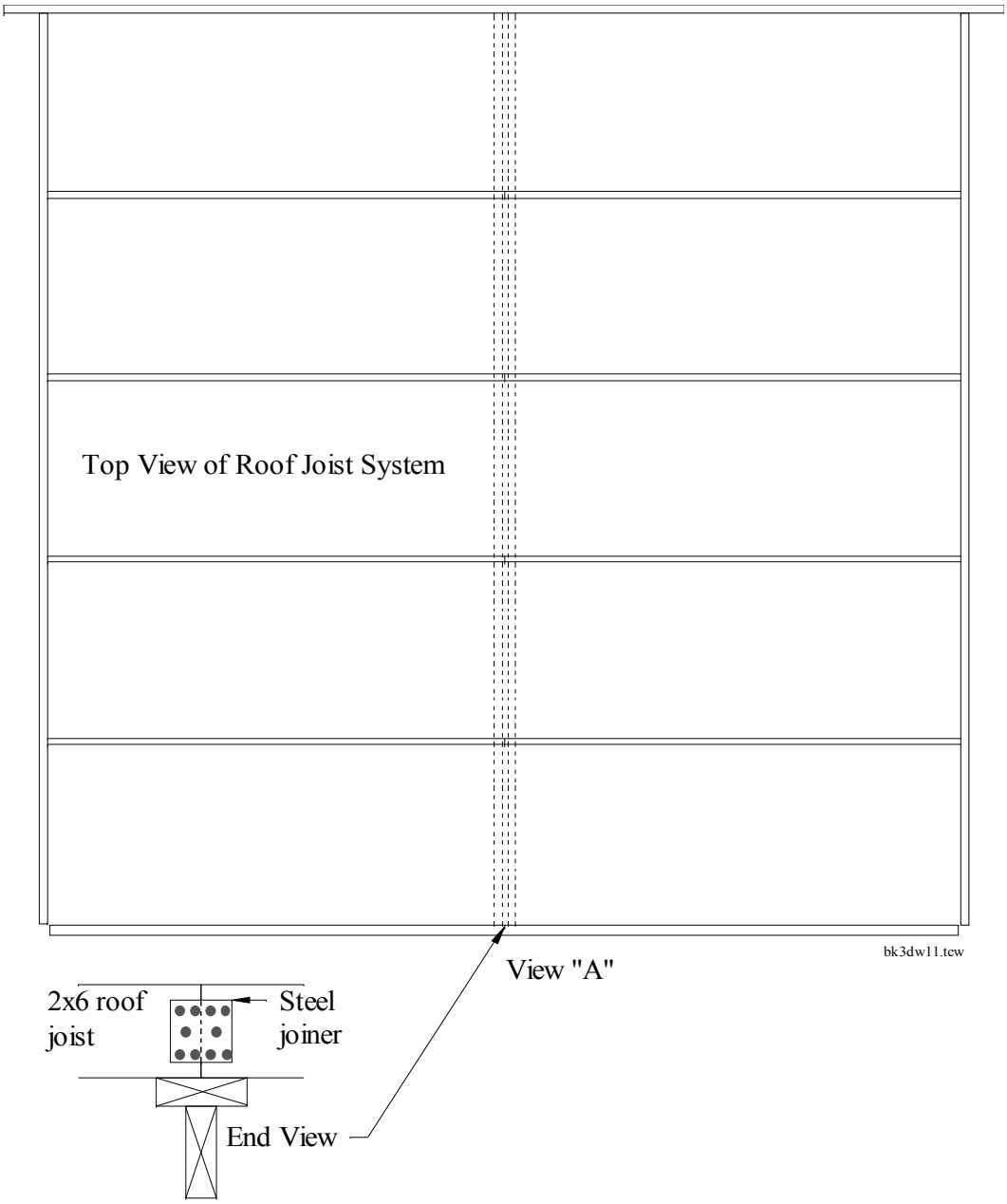
GRAND ENTRY ROOF SYSTEM

JB Corn



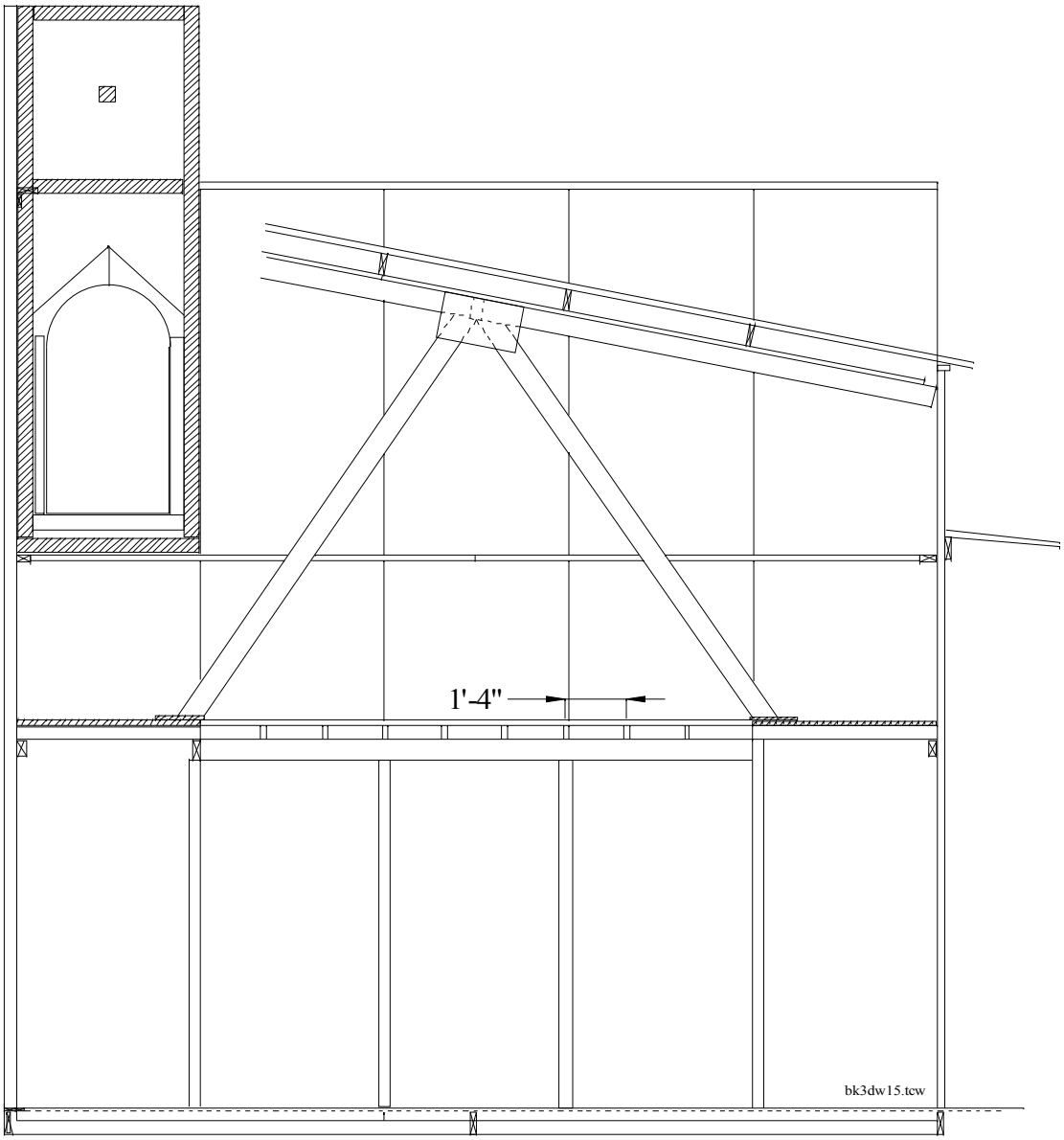
This profile of a see-through View “B” shows the roof sloping from 20’ at the front of the wall to 16’ at the back wall shared with the attraction (approximately 11.5 degree slope). The roof joists are secured to the outside walls with 2x6 joist hangers centered on the panel boundary (4’ OC).

To set the proper angle, run a string (or snap a chalk line) from the top of the front wall to the top of the back wall. Center the joist hangers on the joint between panels (4’ OC) and align the joist hanger to the angle of the line.



The 2x6x10’ roof joists meet on top of a central roof joist support beam. Detail above shows the end view of the beam with a pair of roof joists in place. They are joined together with steel tie plates on both sides, then tied to the support beam with steel angle.

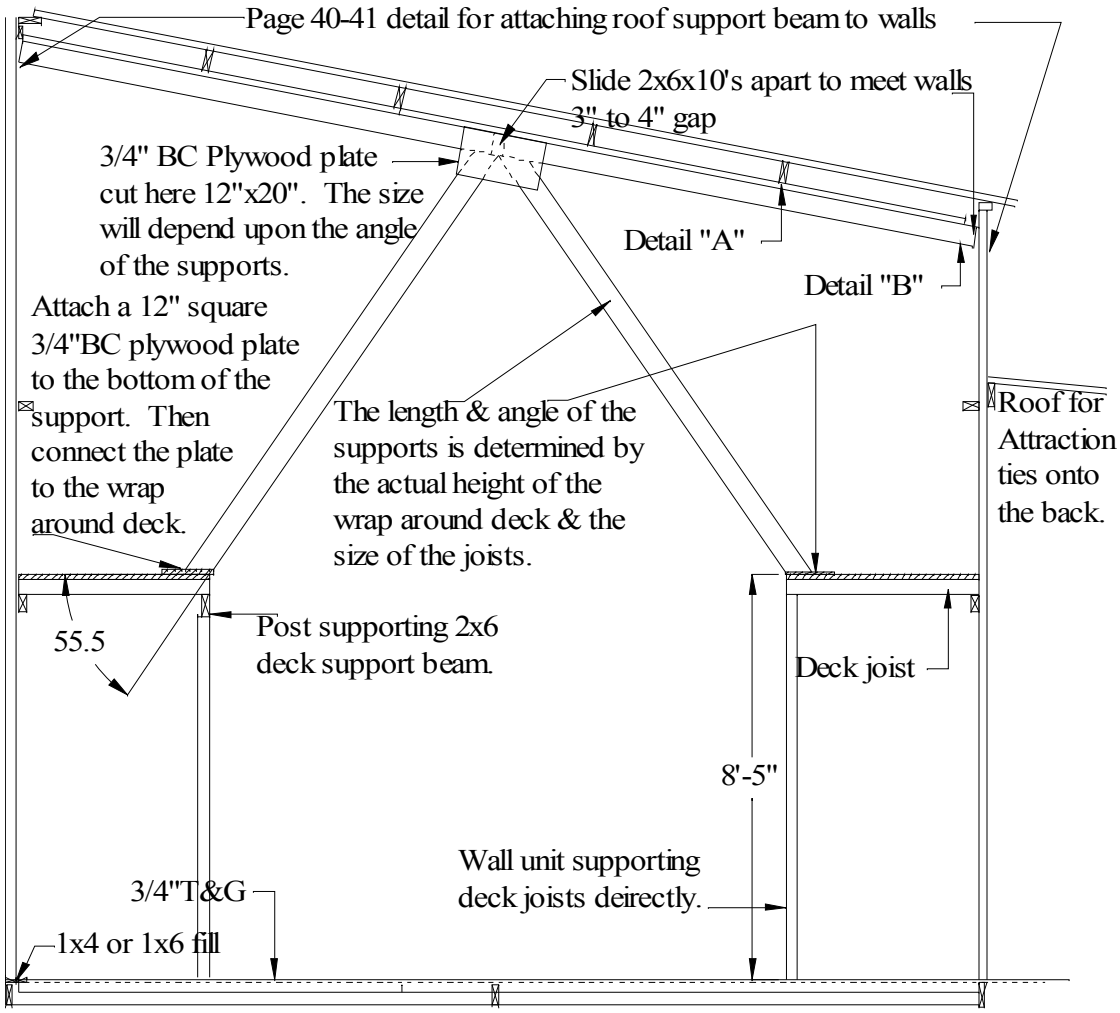
The steel roof panels are installed once the joists are in place. The 12’ back side roof panels are set in place first The 10’ front wall course of roof panels is set next. The roof will leak around the edges, but not enough to worry about.



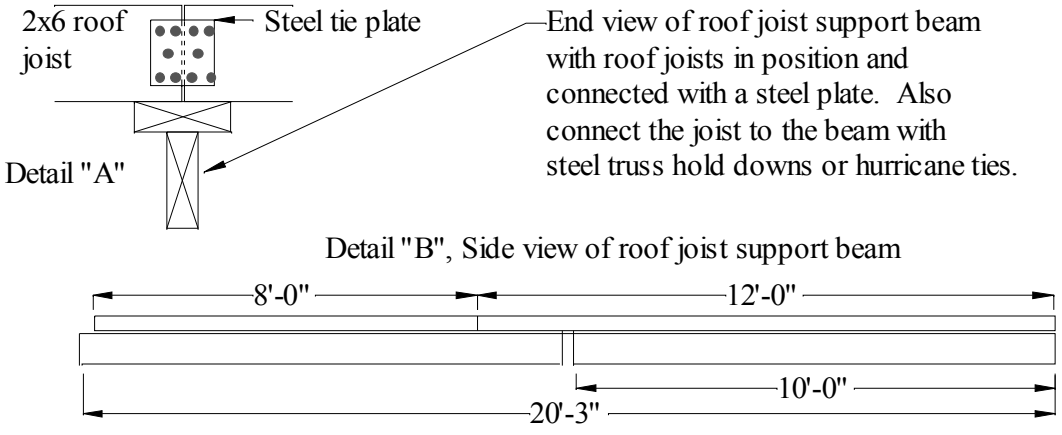
View "D" cut thru view of back of wall "B" & wrap around deck

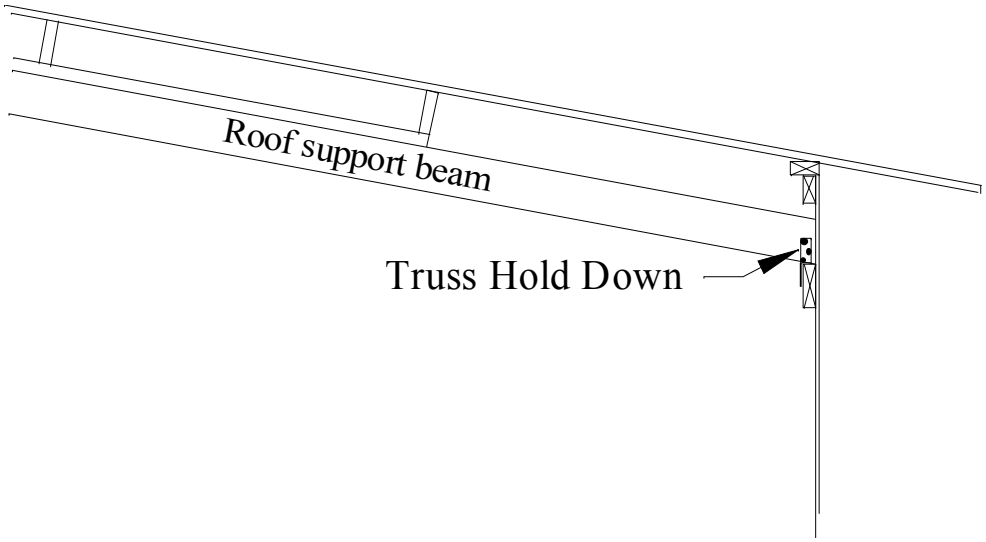
The roof joist support beam is supported by 2 - 2x6s slanted in from the outside edge of the wrap-around deck to the center of the roof joist support beam. The bottom end of the slanted 2x6 is attached to a 12" square ¾" plywood plate that is attached to the deck. The top end of the support is married to the other slanted support with a ¾" plate 12x20". This is large enough to cover both slanted supports plus the bottom of the joist support beam (2x6).

Detail "B", next page, has a space between the 2 - 10' 2x6s. This is created when the 2x6s are slid apart to reach the front and back walls (see detail drawings pages 40 & 41).



VIEW "D" with outer wall removed.



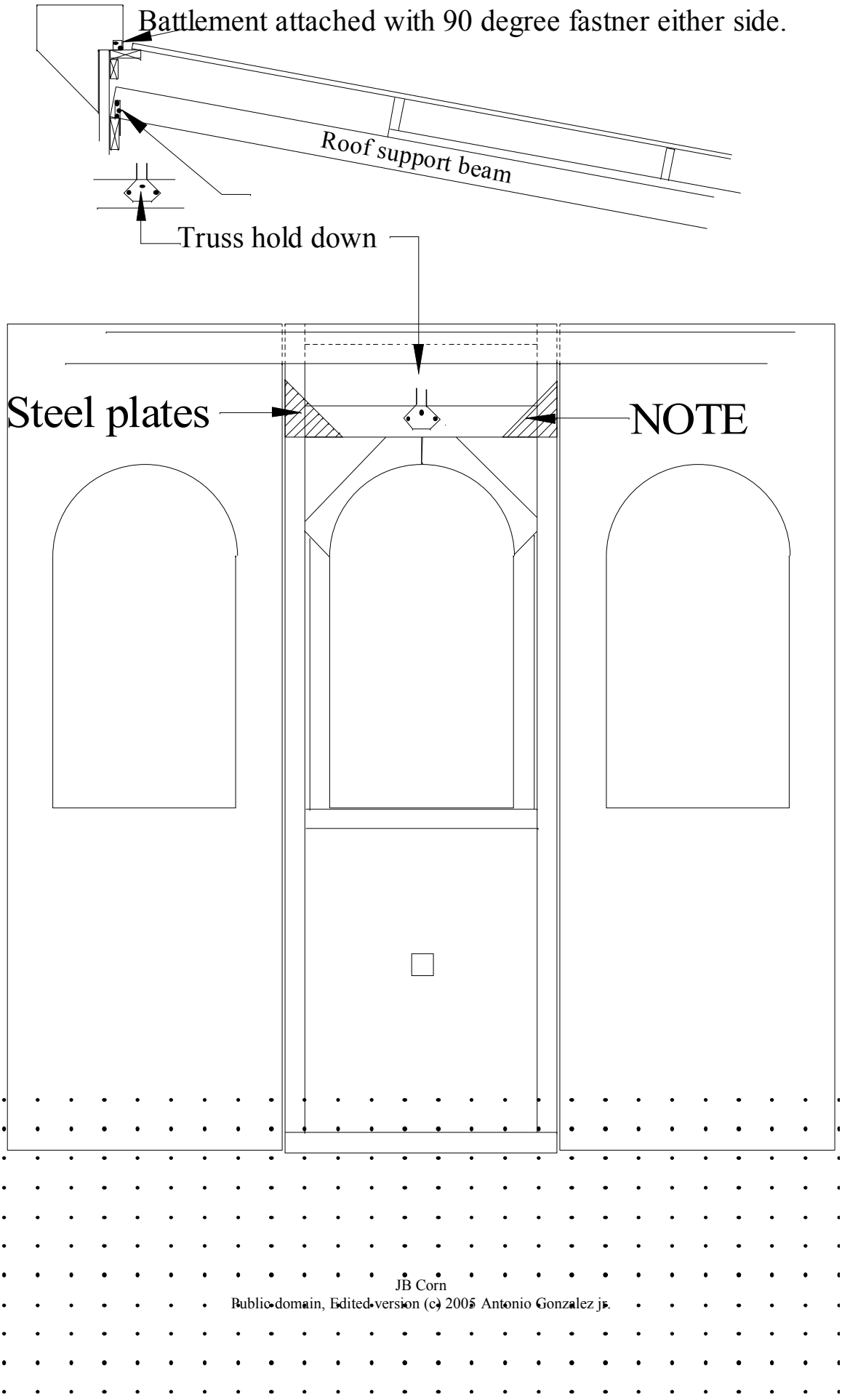


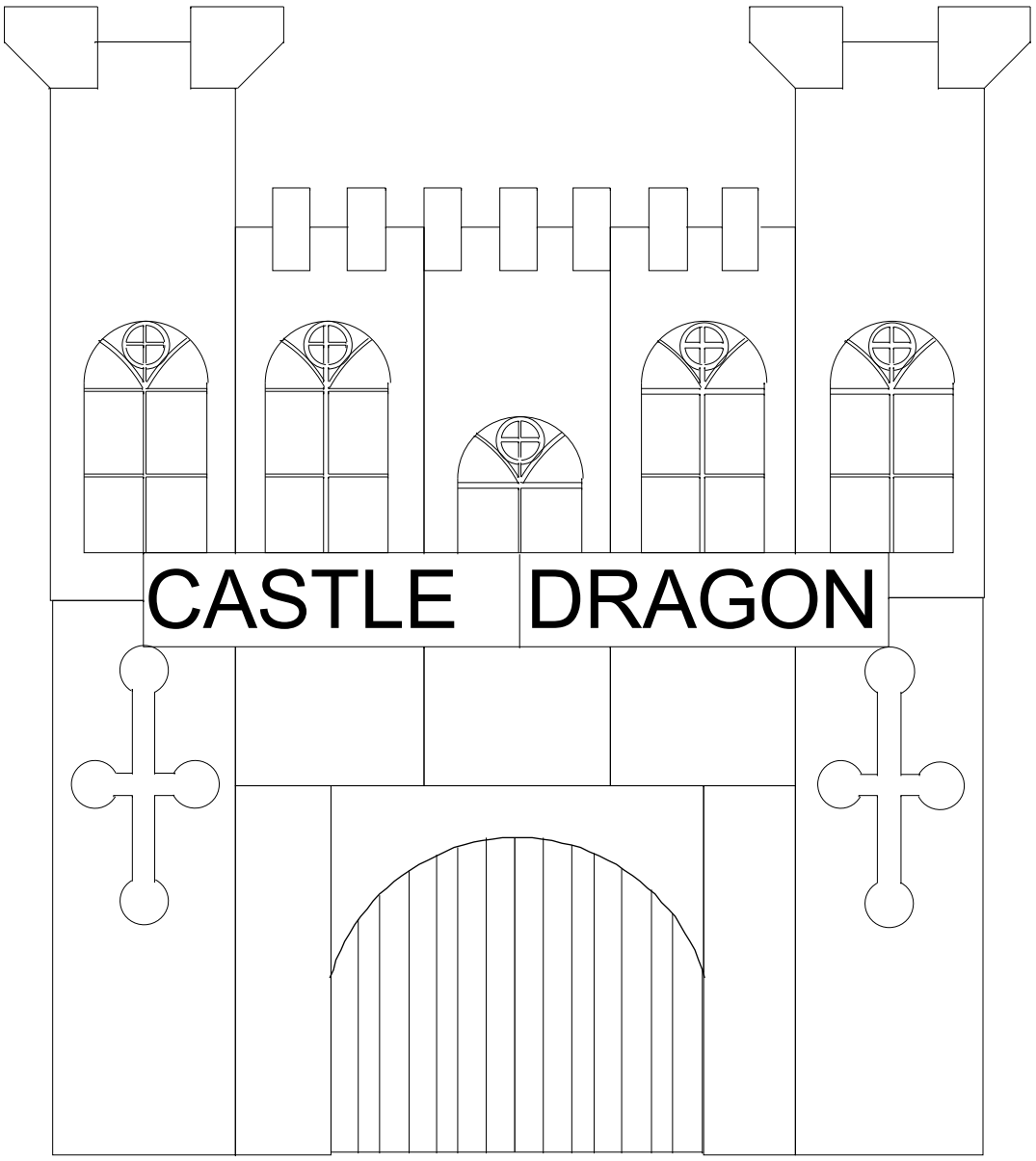
Attach the roof support beam with a truss hold down at either end. The beam rests on a 2x6 set in the panel (see page 41) and attached to the panel 2x4s with steel plates. The support beam will have to be cut at an angle for the back wall.

The above drawing has the panel 2x4 removed to reveal the 2x6 and truss hold down supporting the roof support beam.

Page 41 shows the front wall roof support beam attachment above the center window.

NOTE: Steel plates must be used to hold the 2x6 in place for the roof support beam. Do not use wood. Hurricane ties may also be used to tie 2x6 x10' joists to the roof support beam.





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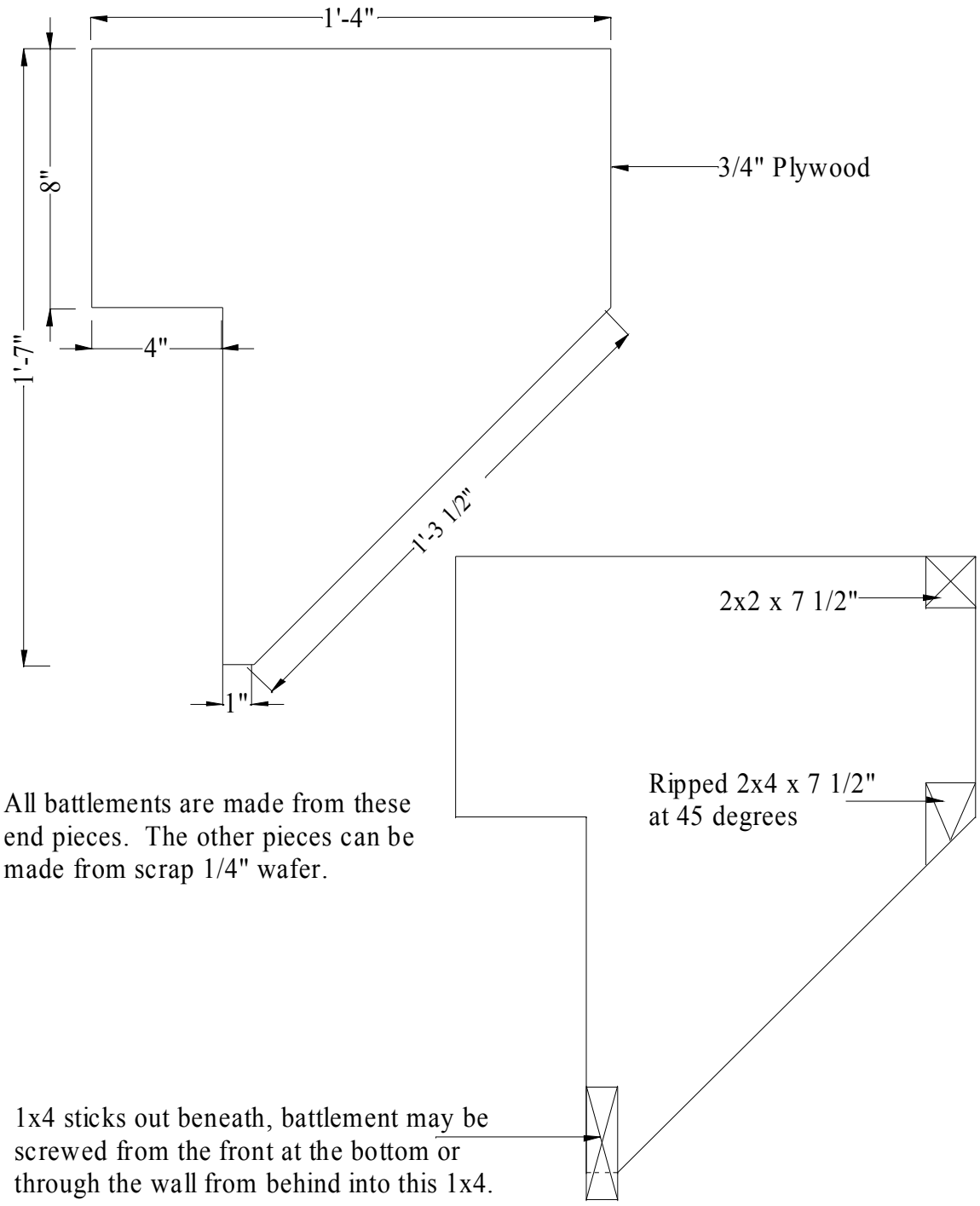
TOWER & BATTLEMENTS DETAIL

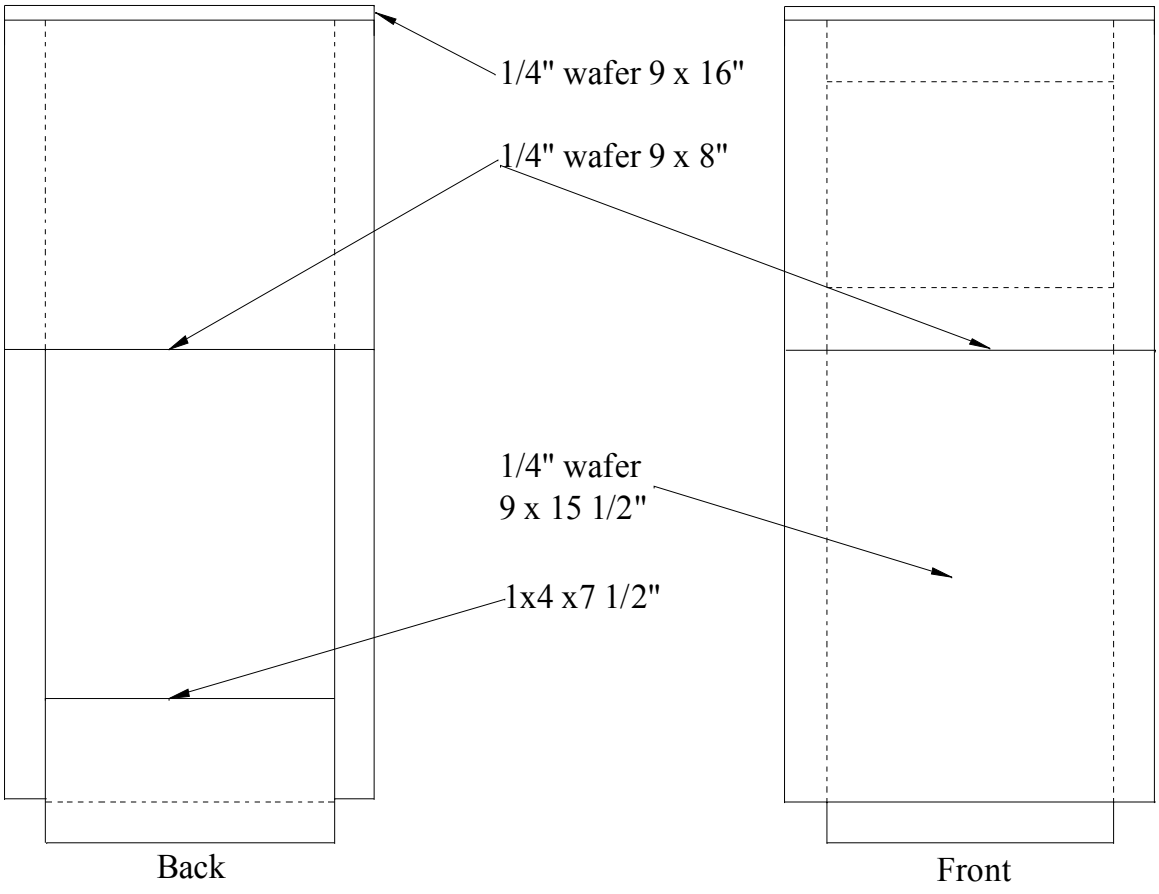


All battlements are made from these end pieces. The other pieces can be made from scrap 1/4" wafer.

FRONT BATTLEMENTS

Rip ¾" 4x8' plywood sheets into three 16" wide pieces. Make a cardboard pattern and lay out as many battlement end pieces as will fit.

Rip an 8' 2x4 at 45 degrees into two equal pieces.

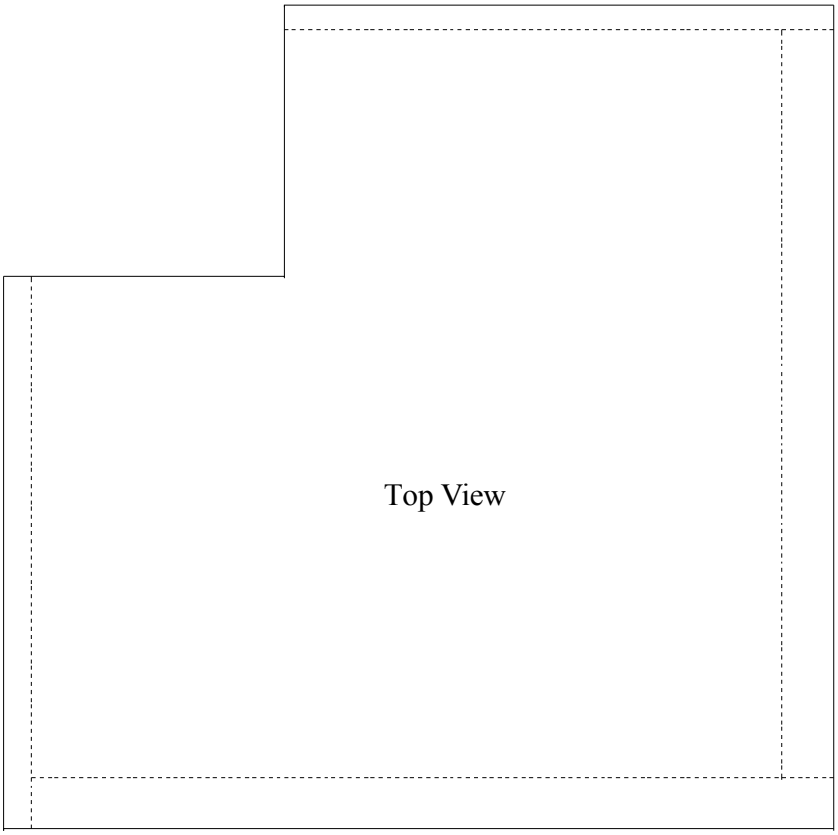


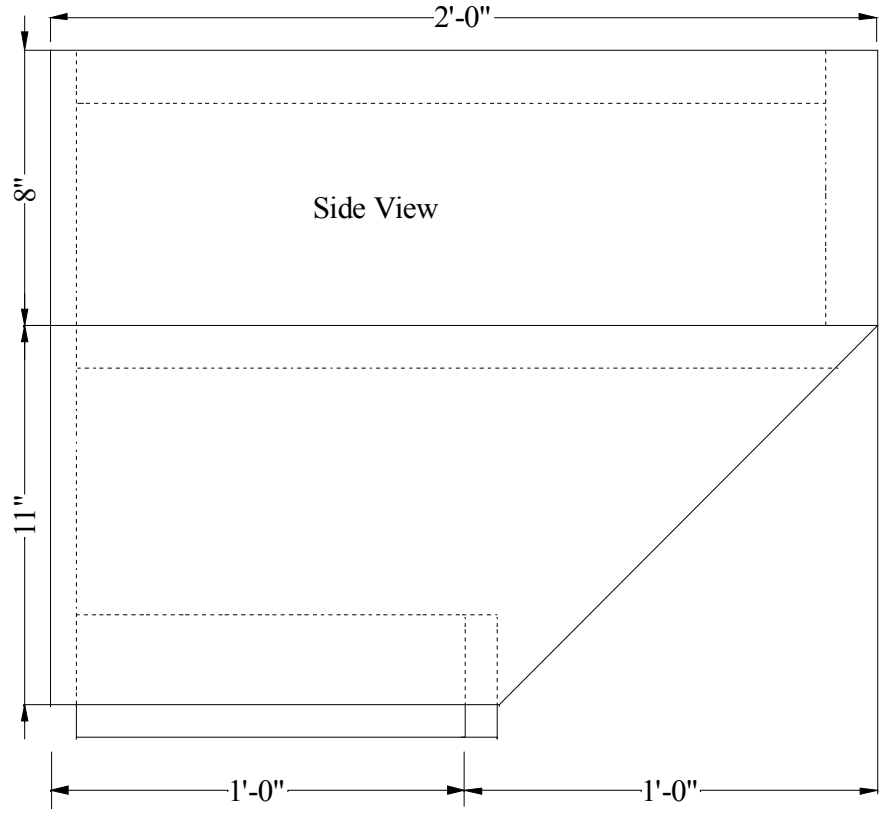
The front battlements are 9" wide. The 1x4 at the base is for ease of attachment to the wall. I screw from the back of the wall into the 1x4 behind the battlement. For applications where blind screwing is not possible, the 1x4 can be screwed in from the front. Pre-drill a pilot hole and do not over tighten the screw. The 1x4 will split.

All cover pieces are scrap wafer. I have been around so long that even the plywood used for the end pieces was scrap. Build all other panels first. Save cut off pieces and you too may have enough scrap wafer to cover the battlements.

See page 41 for example of battlement placement.

JB Corn





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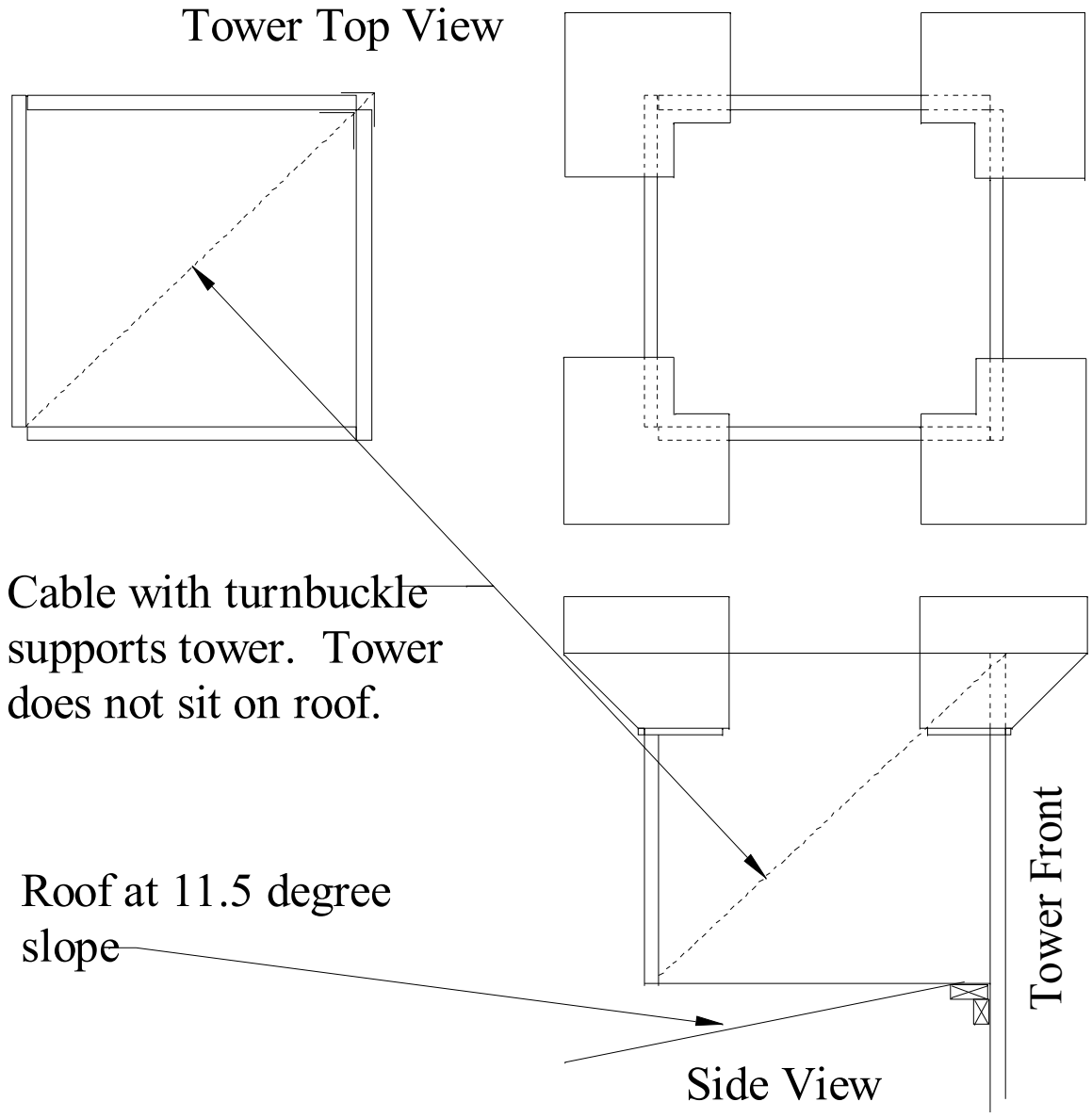


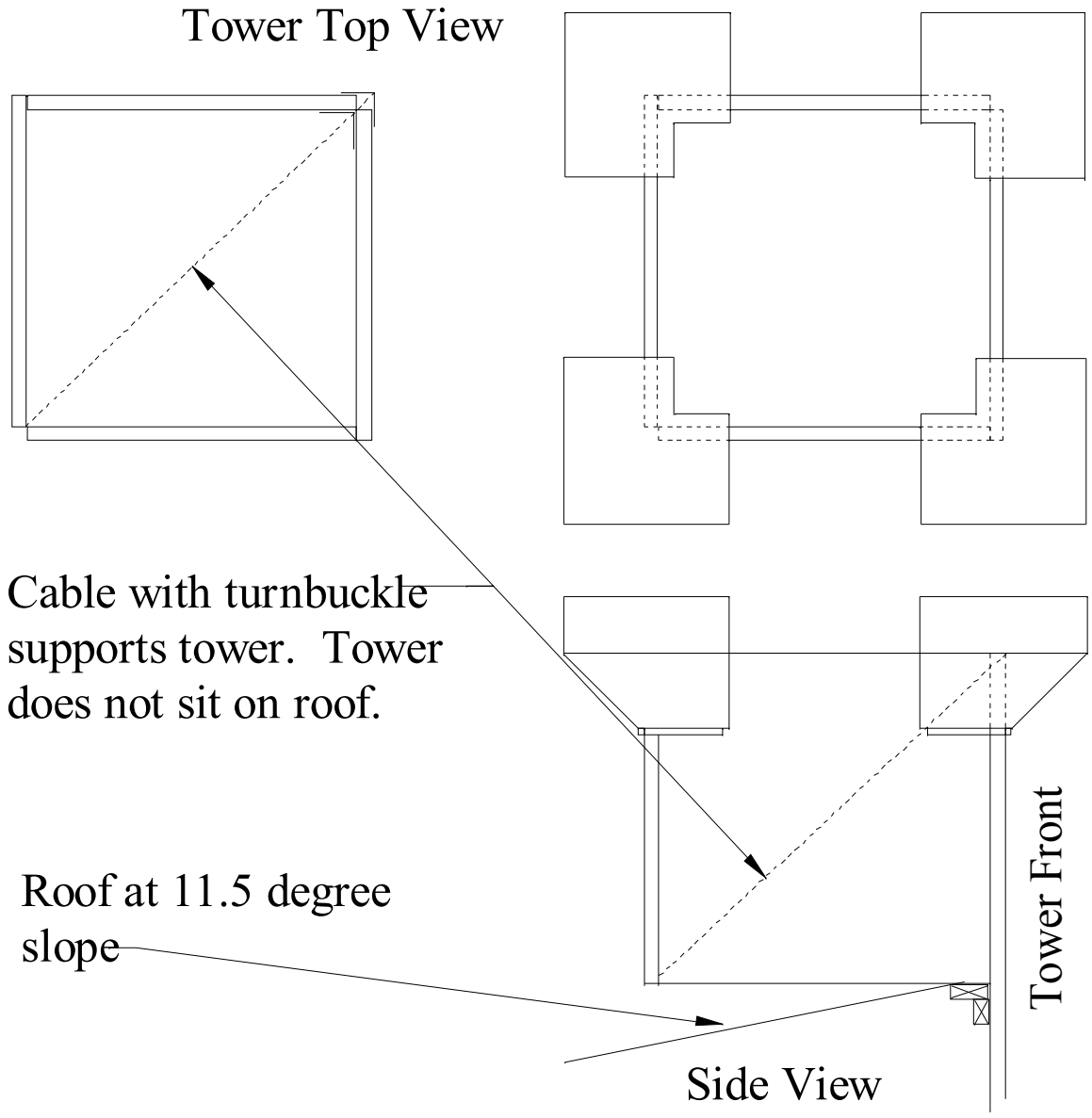
CORNER BATTLEMENTS

Corner battlements use the same end pieces as front battlements. The difference is in covering. Attaching corner battlements is tricky (Video Three). Castle Dragon uses battlements on all four corners of each tower.

Each tower is boxed in with 2 - 4x4' single sided panels. No part of the tower rests on the roof. The back corner of the tower is supported from the front top corner with a cable and turnbuckle. Install a 3/8" eyebolt in the hole of the third 8' steel angle making the front 24' corner of the tower. Set another 3/8" eyebolt at the bottom of the back 4x4 panel and as close to the corner as possible. Thread cable and tighten with a turnbuckle. Set a level on top of the back corner and tighten till level.

The inside steel plate at the corner in the drawing above/left is a 4x4" x 4x4" 90 degree plate set 4" from the top of the panels.

JB Corn



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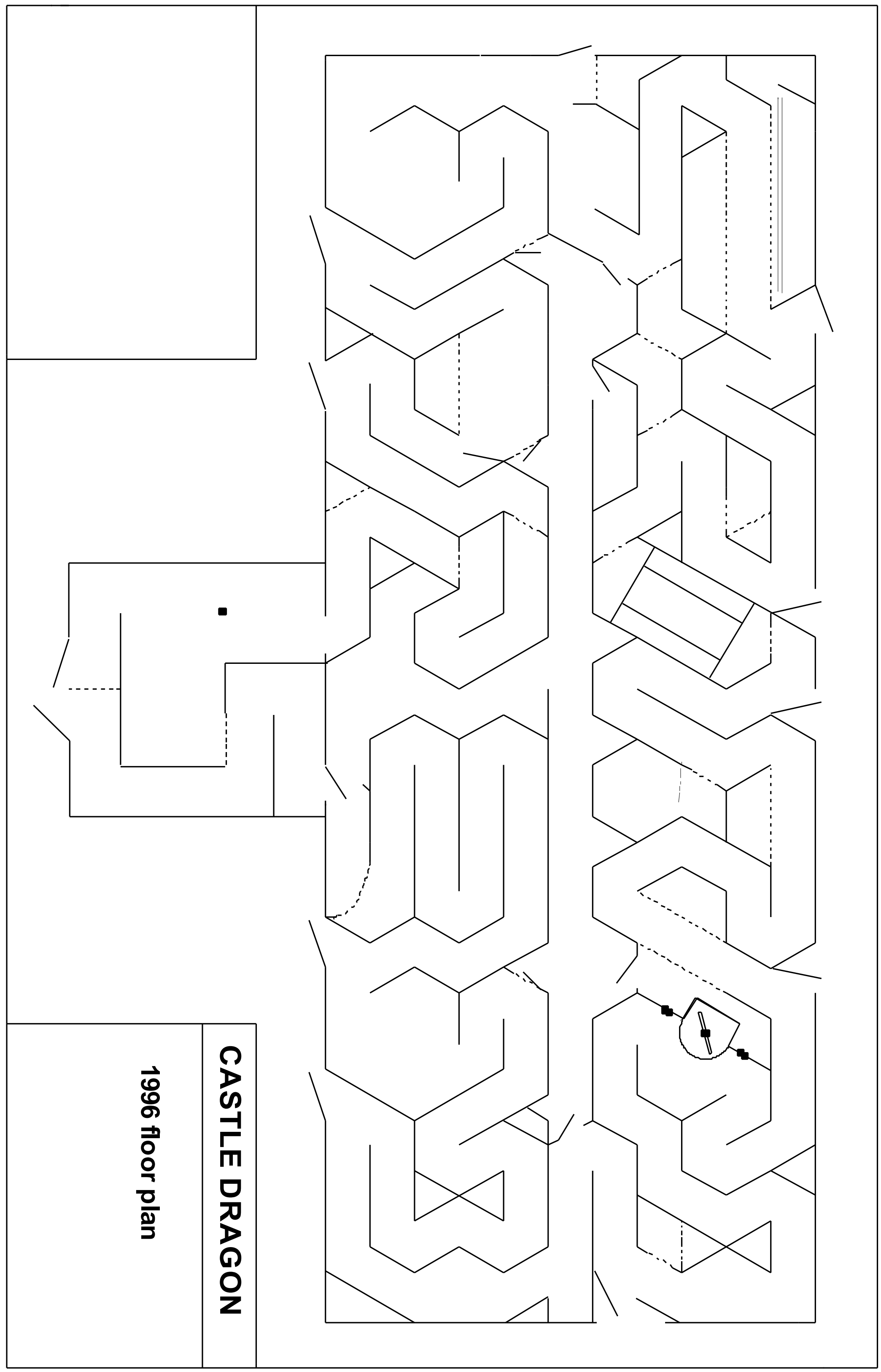
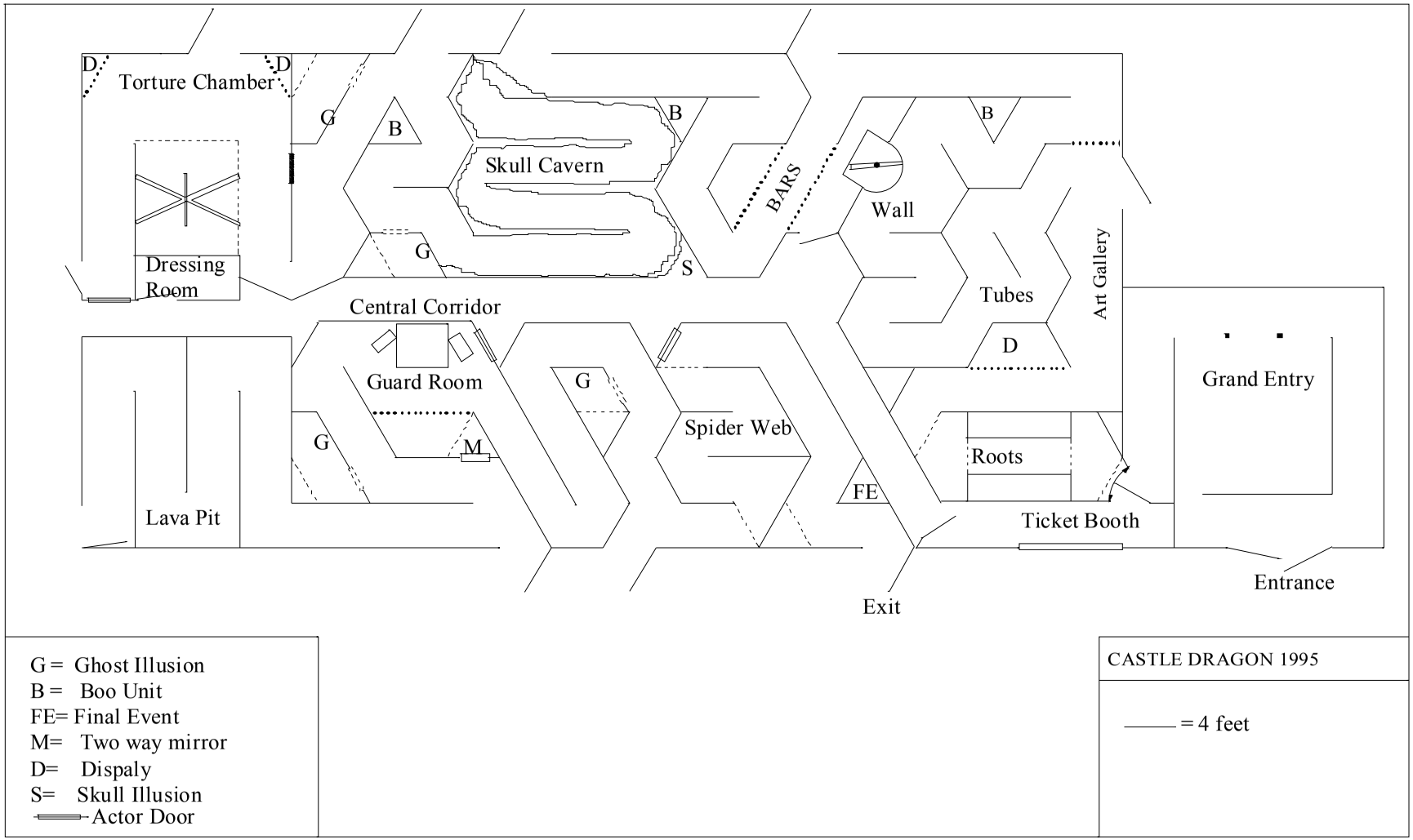
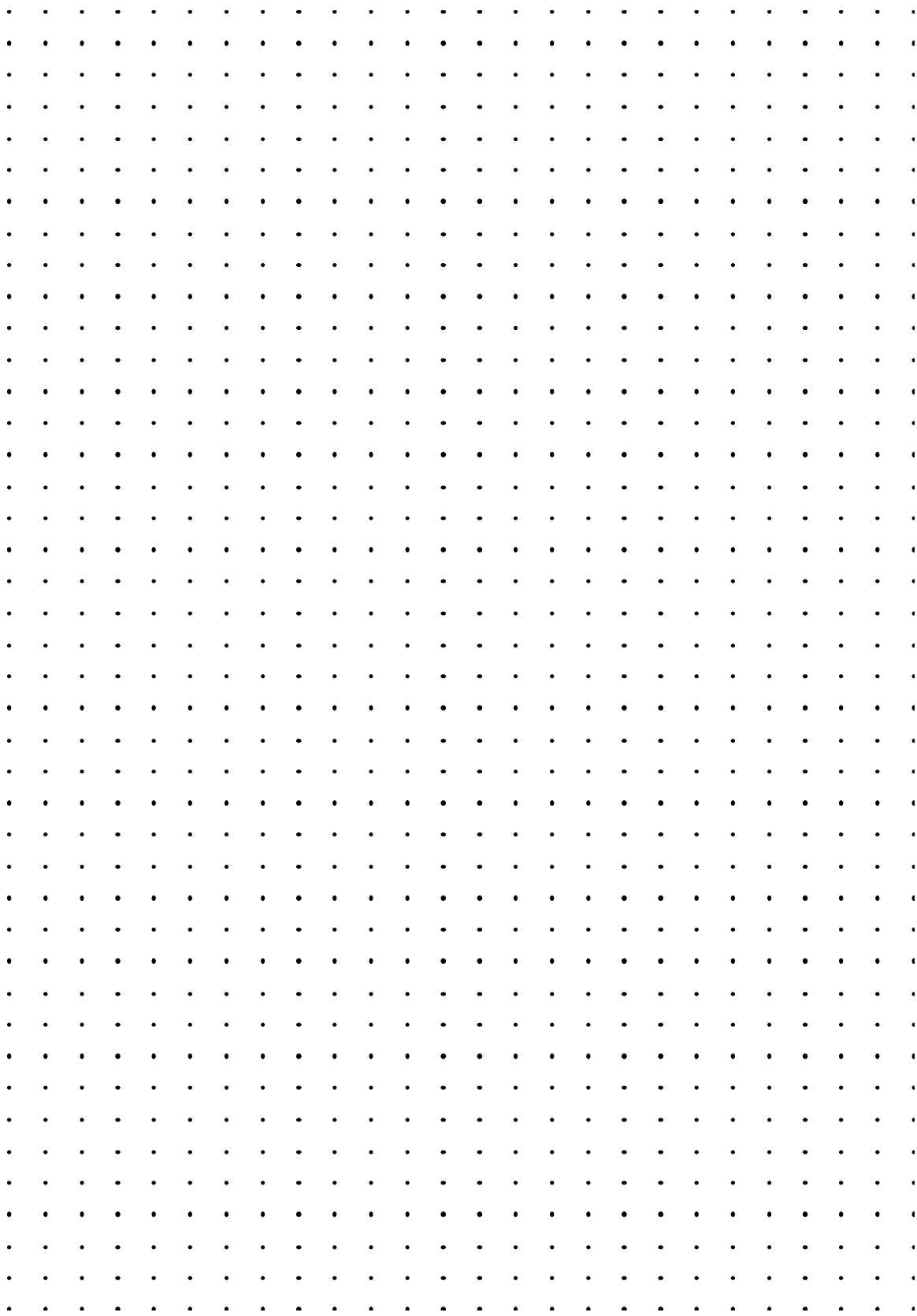


JB Corn





JB Corn