

Construction (Models A to C):

The first part of my project will be the construction of the benches. Each bench will be constructed into two pieces for easy transport, installation, and maintenance in the future.

Construction of Bench Seat

Use 4 -2"x 4"x12' pressurized treated wood. Cut 3 of them in half to have 6- 2"x4"x6' boards. The 4th board you cut into smaller pieces to use as spacers between the bigger boards. There will be five spacers per row with seven rows. Each will be 4 inches in length.

Use 1-2"x 6"x12' pressurized treated wood. Cut it into half to use it as outer pieces of the bench seat.

In the end you will round the edges using a scrolling saw and sander

Use polyurethane glue to connect all the boards together.

Once all the boards are connected take drill press and make five holes in each board.

Then you will put 5 -3/8" 18" long threaded drill rods through the previously drilled holes and fasten them into place with 10- 3/8" nuts with nylon insert.

Construction of Legs

Use two 4"x 4" x 8' pressure treated wood. Cut it into a piece 60" long and save remaining amount.

To support the legs and attach them to the seat you will cut 2" x 4"x12' pressure treated wood into 3 pieces that will each be 4 feet long. Then I will taken the 4 foot long pieces and cut them into two 12.25 inch pieces that will be used as the cross braces strengthening the stability of the bench seat. The remaining part of the 4 feet will be used to be nailed into the top piece. (See diagram of how they will be attached)

Connect this all by galvanized screws.

We will then dig a hole which is where the leg will go 36 inches into the ground (below the frost line) and the bench leg will be 24" above the ground to be safely secured. We will cement each of the legs into the ground with about one and a half bags and then top it with dirt. We will be using masonite to make sure that the legs are parallel from each other.

Completion of Bench

The seat will then be attached to the legs using galvanized screws. A ledger board that is 19.5 inches will be centered on the top of each 4x4 leg post. The cross brace will be 11 5/16 inches long. The exact length will be determined by measuring the interior space between the 2x6 fascia. 3/8 x5 lag bolts will be used for securing the ledger to the post. The ledger board will then attach to the seat with three screws on each side.

Materials needed for 5 benches and cleared area.

25- 3/8" 18" long threaded drill rods
32- 2"x 4" x 12' pressure treated wood
6- 2" x 6" x 12' pressure treated wood
60 3/8" nuts with nylon insert
11- 4" x 4" x 8' pressure treated wood
3" decking screws
1- 5 lb box of galvanized screws (3" long)
2 bottles of waterproof glue
5 packages- Sandpaper 60 grit and 80 grit
16- Quick drying cement packages 60 lb
Water (for mixing cement)
Wood Chips 5 cubic yards (A cubic yard covers a 10' x 10' space to a depth of 3 inches)
Masonite
Trash bags (3 boxes)
3/8x5 Lag bolts

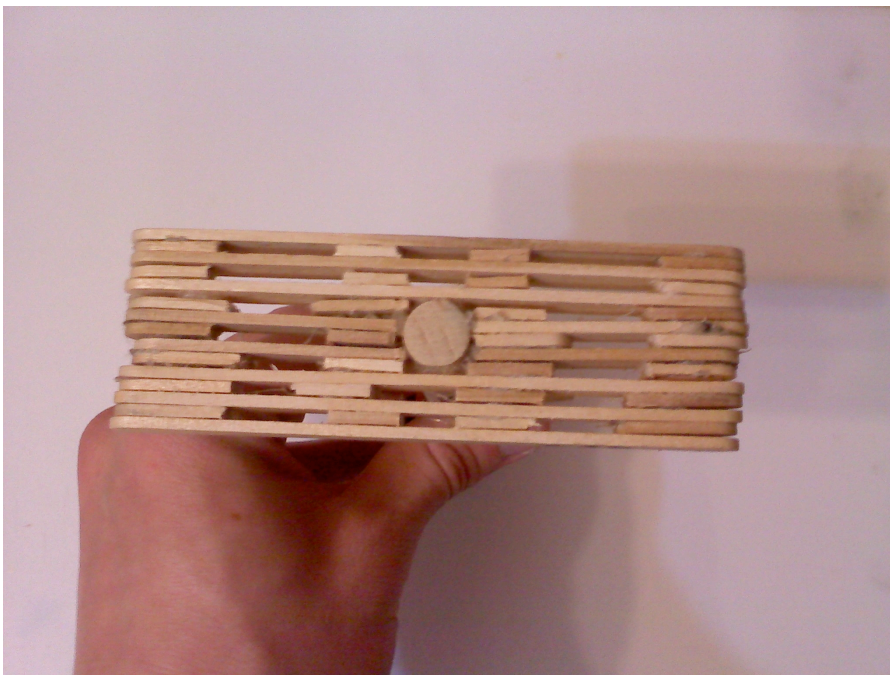
Changes

List any changes made to the original project plan and explain why those changes were made.

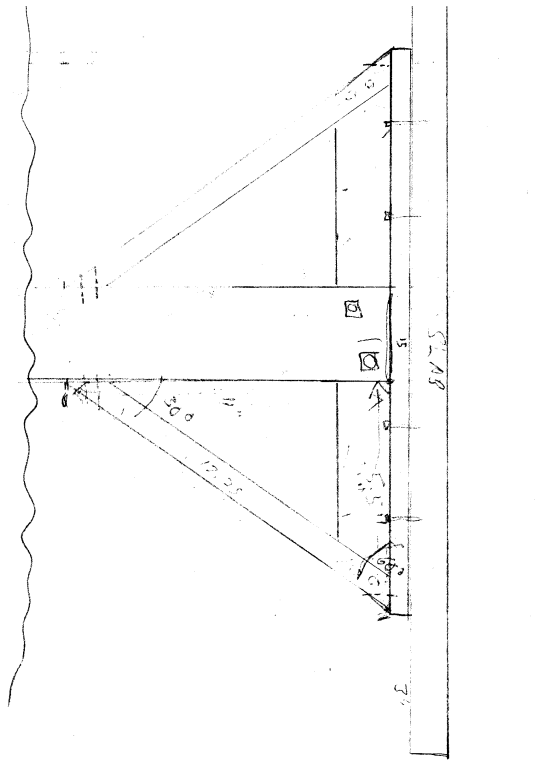
1. During the first day of my project I decided that we were going to need to add a fourth 2 x 4 board in between the two 2 x 6's for the bench seat. This change was not because of structural issues but based on visual perception alone after laying out the first set of cut pieces of wood. Before we made this change I made sure that the extra supply of wood that Stelton Lumber gave me would be enough wood for five benches.
2. Stelton Lumber gave me longer pieces than I requested and they were slightly warped on one end. Rather than cutting some of the pieces in half as I originally planned, I had to cut off part of the piece and make sure that I used the better half.
3. During my project I realized that a 4 inch piece for the seat would be too small, so I decided to increase it to 6 inches for both structural and visual integrity.
4. Originally I had gone through multiple designs to come up with the best way to make the legs of the bench. But during the building process one of the parents who had built benches before showed me a design to attach the leg to the seat.

This design actually gave the bench a lot more stability and they were also a lot easier to make. (See Model G with the change)

5. For extra support, I decided to use five drill rods on each bench instead of four. Originally I was buying 24 inch drill rods and after tightening I would cut off one end. But during my project I had to go out and buy more drill rods, so I bought 36 inch drill rods which we were then able to cut in half and use both halves since the bench seat was 18 inch wide.
6. To make the production of cutting pieces for the bench easier, we made many different types of jigs. This way everything would be constructed in unison. We had one for centering the holes on the spacers, one for drilling the five holes, another for making the spacers 6 inches, and even one for cutting six foot pieces of wood.
7. Originally people recommended that I should go out and rent an auger to dig all my holes. An auger was donated by Home Depot and we tested it out. However, it was not possible to use on the rough and rocky soil of The Highland Park Meadows.
8. If I had more time I would have done my project at a different time of the year since during the summer a lot of people go on vacation or to camp making it more difficult to find volunteers. The summer heat also makes it necessary to take more breaks.
9. When building my bench legs one of the drill bits broke and I had no spares, so I ran out to the store to get more. As soon as I got back and started using the new one it broke as well. Luckily I bought another one just in case and that one worked well.



Model B- Top View



Model C- side view of bench (90 degrees tilted left)

The BOROUGH of HIGHLAND PARK

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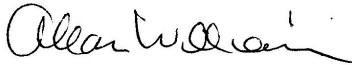
Date: February 8, 2010

Members of the Boy Scout Council and other interested parties:

The Highland Park Environmental Commission (EC) has reviewed Mr. Jon Winter's Eagle Scout Leadership Service Project proposal to construct five benches along the hiking trail in the area of Highland Park known as "The Meadows". The plans and specifications he has submitted, which are as we discussed. The Commission fully approves of the project as proposed.

Mr. Winter's project for the EC in being carried out in order to obtain approval from the Boy Scout Committee for his advancement to the rank of Eagle Scout. The Commission finds that his project will benefit the community by providing places for hikers to rest and enjoy nature and fully supports his effort.

Sincerely,



Allan Williams, Vice Chairman
Highland Park Environmental Commission