# A Place of My Own

## **Project Description**

### Introduction

“If you have built castles in the air, your work need not be lost; that is where they should be. Now put the foundations under them.”

― [Henry David Thoreau](https://www.goodreads.com/author/show/10264.Henry_David_Thoreau), *Walden*

Have you built castles in the air? Have you ever dreamed of having a place of your own? A place where you could do what you wanted when you wanted? A place that you could design to reflect who you are and what you like to do? This week you will build a ‘castle in the air’ and engineer the foundation upon which it will rest.

First you will dream about a place of your own. Next you will design and engineer that place documenting your progress along the way through a combination of narrative, graphical, and algorithmic artifacts. Finally, with a solid foundation in place, you will share your dream with others at the NFB EQ Expo.

### Project Goals

1. Participants will dream up a *Place of My Own*.
2. Participants will engineer the structure for their *Place of My Own*.
3. Participants will document the dreams, designs, and engineering calculations for their *Place of My Own*.
4. Participants will become familiar with appropriate engineering and architectural vocabulary.
5. Participants will share their Place of My Own portfolio and model at the NFB EQ Expo.

### Project Deliverables

1. A portfolio that includes
   1. **Graphical Artifacts**
      1. **Front elevation:** a drawing of your *Place of My Own* structure from the ‘front view’
      2. **Side elevation:** a drawing of your Place of My Own structure from the ‘right side view’
      3. **Structural column-beam plan**: a plan that indicates the location of the columns or posts in your structure.
      4. **Floor Plan**: a plan that shows exterior walls, windows, and doors.
   2. **Narrative Artifacts**
      1. **FInal design brief:** an updated version of the design brief that includes the specifics for your *Place of My Own* structure. The updated document should have the following sections flushed out: building objectives, criteria, constraints, and inspiration and design rationale.
      2. **Self reflection**: complete the self reflection worksheet after completing all other project deliverables except the presentation.
   3. **Algorithmic Artifacts**
      1. **Load calculations:** A document where you show how you took the provided figure for ground snow load and modified by it by the allowable reductions in the building code.
      2. **Column justification**: A document that shows that the columns you have chosen for your design are sufficient to support the load that you are designing for.
      3. **Rafter justification**: Documentation of the math used to determine the spacing and number of your rafters.
      4. **Truss analysis**: A document that includes: 1) a Free Body Diagram (FBD), which represents force interaction and direction at a pin connection between two truss members; 2) an equilibrium equation that represents a summing of known and unknown forces in the x and y directions; and 3) calculations of any unknown forces.
   4. **Scale Model: a model** of your *Place of My Own* structure at a scale of 1 inch = 1 foot. The model should demonstrate knowledge of how building members connect together to form a cohesive post and beam structure that can support live loads, such as snow.
2. Presentation: You will share your portfolio with visitors who attend the NFB EQ Showcase. You should be able to describe: the purpose of your *Place of My Own*; the design rationale that you used in conceptualizing your space; what aspect of your structure each of the drawings you developed represents; and how live and roof snow loads create forces in the structure and how the structure transfers the forces to the footings.

## **Building Design Brief**

### Building Objective

You will outline the objectives for your building. Questions to consider when developing objectives:

1. For what activities will the space be used?
2. What would you like the aesthetic of the space to be? What should the space look and feel like?
3. What aspects of your identity will the space reflect?

### Criteria

Criteria are positive specifications your building must meet.

The criteria for the building you design for the *Place of My Own* project are as follows:

1. The building must be designed using post and beam principles and methodologies in order to meet requirements for new construction in a historical area.
2. The building must have a roof supported by rafters which rest on a beam and a ridge board
3. The building must have an entry
4. The building must have at least one window
5. The building must be an enclosed space
   1. Ex: a garden shed is an enclosed space, a gazebo is not an enclosed space
6. The building must be able to withstand various weather conditions including snow in Alaska.
7. The building must be able to meet the ‘building objectives’, which you will outline for yourself.

### Constraints

Constraints are limitations to your building’s design.

The constraints for the building you design are:

1. The external dimensions of the building shall not exceed 10 ft x 10 ft x 13 ft
2. The building shall not be more than one story
   1. Ex: A ranch-style home with no basement has one story
3. No part of the habitable space of the building shall be underground
   1. Ex: the building will not have a basement nor will it be built into the side of a hill

### Building Elements that are not Part of this Project

The items listed below are outside the scope of the *Place of My Own* project. You do not need to be concerned about any of the following items.

* In constructing the model, you shall only be concerned with the framed structure; the structure’s finishes (floor coverings, wall coverings, etc.) are not part of model construction
* Plumbing
* Electrical
* Insulation
* Roofing materials other than sheathing
* Interior finish products such as sheetrock and baseboard etc.
* Concrete for footings
* Exterior finish products such as siding, vapor barriers, paint

### Materials

The materials available to construct the model-size building are as follows:

* ¼” x ¼” x 2’ Balsa
* ¼” x ⅜” x 2’ Balsa
* ¼” x ½” x 2’ Balsa
* ⅜” x ⅜” x 2’ Balsa
* ½” Glue dots, permanent
* 1 square foot of Balsa Sheathing

### Inspiration & Design Rationale

In this section you will outline the reason why you made the design decisions that you made. For example, why does your building have the footprint that it has? To explain why you made the decisions that you made, you may wish to compare the decisions you made to the alternatives that you rejected and talk about the pros and cons of each.

Example:

Columns - Question: I noticed you chose to use 6 columns instead of four? What made you decide to do that? Answer: I like the cosmetics of the look of the space with 6 columns rather than the four that would be structurally required.

Slope of roof - Question: I noticed your slope is different on your roof than what you were shown, can you explain why you made your roof steeper? Answer: I think my workspace will be built in northern Alberta Canada where the snow is typically of greater depth, so I increased the roof’s pitch so it would shed the snow quicker and reduce the roof loading