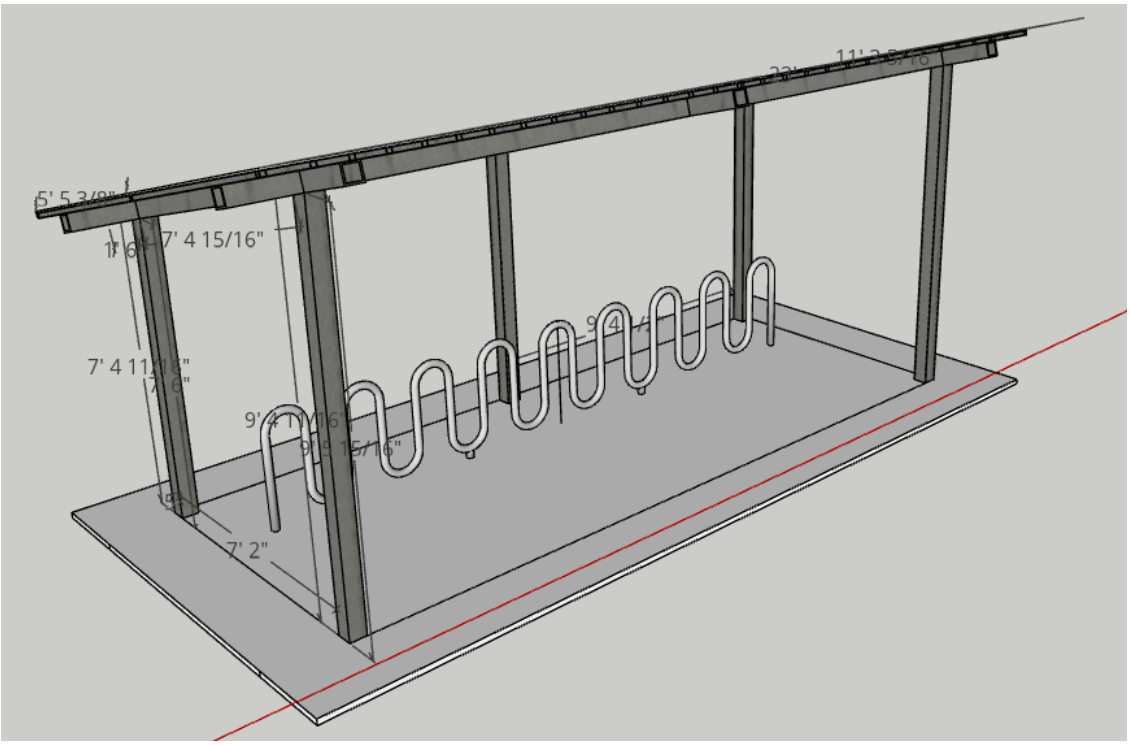
Newton North High School

Bike Shelter

Project Development Guide



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1. What, Why and How

What?

Newton North High School presents the Greengineering Bike Shelter proposal as a guide for all involved parties, in the building of the proposed bike shelter. This guide will cover both the motivations for creating a bike shelter, as well as cover costs of/and materials needed. This guide will also cover why having a bike shelter is beneficial for the Newton North Community.

Why?

The project started in late 2016, when the bike team of the Greengineering program at Newton North, recognized that there is a lack of spaces for people to store their bikes during days of poor weather, causing less people to bike. The largest contributors to this consist of rain, ice, snow, and freezing temperatures which we found from conducting a survey within our school and faculty body. From this data we decided on building a bike shelter on school grounds to give students a place for their bikes in these poor biking conditions.

How?

Over the recent school year, our team has been working on designing a bicycle shelter. Our desire is to start construction by fall of 2017. The plan is to start with one bike shelter in order to ensure the response from stakeholders is positive. Next, we plan on adding this bike shelter in the front of the school on Tiger drive. The plan for how the Greengineering team will achieve this is explained below.

In order to achieve the construction and installation of the bicycle shelter the Greengineering team must work with the appropriate stakeholders. The team has identified the the following stakeholders, but understands that there may be additions or deletions to this list:

- School Administration
- Parent-Teacher-Student Organization (PTSO)
- Carpentry Department
- City of Newton
- Architect/Engineer

This document is meant to provide stakeholders with detailed information about the bike shelter including design specifications, a material list, safety information, and further logistics about the proposed approach.

Stakeholders

The team will work with the school to get initial approval to move ahead with the project. It will also be important to continue to coordinate with the school administration regarding city procedures for construction, city approval, and contractors.

The team will work with the PTSO to gain insight into the work that has already been done towards erecting a bicycle shelter. The PTSO will also be an important resource for fundraising advice.

The team will work with Newton North High School Carpentry program to construct the shelter. The carpentry program has the tools, space, and the expertise for the construction.

The team will work with the town to organize constructions cost, location and property lines, and benefits of the project. The team does not anticipate that the property lines will be an issue because the proposed shelter will be constructed closer to the school away from any neighbors.

Lastly, the Greengineering team will work with an architect/engineer to gain approval of the design. The team will Work with the architect to make sure our design is up to code, and can withstand the elements here in New England.

Design

The shelter will be constructed primarily of wood with plexiglass to protect the solar panels that will be placed on the roof. The solar panels will charge a 12 volt battery that will power LEDs and a compressor for inflating tires. Motion sensors will be used to activate the lights as to not add any further light pollution in the Newton community. The team is also examining the feasibility of using heat wires on the roof of the shelter to prevent snow and ice accumulation, by immediately melting the snow and ice. This feature would eliminate the need

to remove snow from the top of the shelter, which would block the solar panels and cause a potential safety hazard when sliding off the pitched roof. Insert design, chart,.

Material Costs

As seen below in the material cost the team has created a detailed list of materials. (add in estimating construction cost). Chart

2. Where

Where?

Where?

We are planning to build the Bike Shelter in the back of the school near our theater entrance and track. We decided to use this this rack because it is already the most popular one used by students. Also while we don't get direct sun light with this location we still get decent sunlight from around the hours of 1-4 pm with variations depending on weather and season. Lastly by using the rack near the track we don't need to worry as much about neighbor's property lines since the shelter will be close to the main building.

Notes:

3. Prototype:

4. Cost:

For Materials

Part	Material	Dimension (inches)	Quantity	Cost (dollars)	Cost for Parts (dollars)
Short Underside Support	Wood	96.4 x 3.5 x 1.5	10	5.62	56.2
Long Underside Support	Wood	132 x 3.5 x 1.5	2	7.17	14.34
Topside Short Spacer	Wood	96.4 x 1.5 x 1.5	10	2.81	28.1
Topside Long Spacer	Wood	132 x 1.5 x 1.5	2	3.59	7.18
Plexiglass Topsheet	Polycarbonate Glass	99.4 x 132 x .75	1	858.17	858.17
Wooden Topsheet	Wood	99.4 x 132 x .75	1	22.78	22.78
Short Leg Post	Wood	97.4 x 5.5 x 5.5	2	21.57	43.14
Glavanized Post Base	Metal	5.5 x 5.5	4	20.97	83.88
Long Leg Post	Wood	115.7 x 5.5 x 5.5	2	33.67	67.34
12-Gauge Galvanized L-Angle Bracket	Metal	2 x 4	44	1.62	71.28
Galvanized Flat Washers	Metal	1/2	8	0.27	2.16
Galvanized Coarse Nut	Metal	1/2	8	0.49	3.92
Galvanized Bolt	Metal	1/2 x 8	8	1.93	15.44
Screw (Washer Head Lag)	Metal	1/4 x 1	132	0.22	29.04
Total Estimated Cost (Dollars)	1302.97				