Windbreak Application Developer Documentation

# Purpose

The Ontario government and local Conservation Authorities provide subsidies for planting trees to landowners as part of the Ontario government’s goal of planting [50 million trees by 2025](http://www.forestsontario.ca/planting/programs/50-million-tree-program/). The purpose of the Windbreak Application is to promote planting tree on property and to allow users to create a map which they can use when planning the creation of a windbreak. This map should provide users with information about the windbreak such as soil type, drainage type, tree type, tree quantities, and much more. The map created by the application should assist foresters, landowners, and any other parties involved in the planning/construction of the windbreak.

# Location of the Code

The code for the application is located at:

[Y:\Work\_in\_Progress\Windbreak Website](file:///Y:\Work_in_Progress\Windbreak%20Website)

It should contain the following files:

|  |  |
| --- | --- |
| Windbreak Application | |
| Language Selection Page (starting page)  Directory: /fr-en/  Index.html  Main.css | Directory: /fr-en/en/  English Windbreak App  Index.html  Main.css  Scripts.js  Species\_info\_test\_values.csv |
| Directory: /fr-en/fr/  French Windbreak App (not translated yet)  Index.html  Main.css  Scripts.js  Species\_info\_test\_values.csv |

The code can also be found on GitHub hosted under Ronald Yu’s account at:

<https://github.com/rcyyu/windbreakapp>

Feel free to copy the code and put it under your own account or email Ronald Yu ([rcyyu@edu.uwaterloo.ca](mailto:rcyyu@edu.uwaterloo.ca)) to add you as a contributor.

# Reason for SPreadsheet

The application uses a spreadsheet over a database as it allows ease of access for updating or adding new tree species. In addition, we wish to host the Windbreak app on our own rather than on the AIA as it allows us to make changes faster than the AIA.

# Requirements

The Windbreak Application runs on ArcGIS API for JavaScript 3.X.

# Recommended Integrated development environment (IDE)

I would recommend using Brackets or Notepad++ when working with this code.

[Brackets](http://brackets.io/) is designed for web designers and front-end developers which is perfect for the Windbreak Application. Brackets also provides a “Live Preview” which allows users to actively see the changes they make in the code in real time.

[Notepad++](https://notepad-plus-plus.org/) is designed for coding in general as it features many languages including HTML, CSS, and JS.

# COntacts

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Peter Roberts – Creator of the Spreadsheets - peter.roberts@ontario.ca

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# Hosting

The Windbreak Application is not available to the public as of yet. The application is currently hosted as a test for demonstrations at: [www.omafra.gov.on.ca/english/landuse/gis/windbreak/test\_values\_csv/index.html](http://www.omafra.gov.on.ca/english/landuse/gis/windbreak/test_values_csv/index.html)

If you need to update the website on the server, email Brooke at brooke.dean@ontario.ca regarding the Windbreak Application. When doing so, remember to zip the files as Outlook deletes the .js file due to being labeled as a hazard.

# Resources

For information regarding the ArcGIS Javascript API go to <https://developers.arcgis.com/javascript/3/>. If you don’t find a solution for a problem on the website, try searching it on Google.

# Features

**Setting Objectives of Windbreak**

Users can select the objective of the windbreak prior to creating it. These objectives include:

* Windbreak
* Visual Barrier
* Sound Barrier
* Pollinator Habitat
* Soil Erosion
* Provide Shade
* No objective at all

Selecting objectives changes which tree can be chosen for the given objective.

**Draw a Polygon**

Users can draw a polygon for where they would like their windbreak to be in.

**Draw a Line**

Users can draw a polyline for where they would like their windbreak to begin and end. This is different from the polygon as it is used to calculate the best spacing, tree amount, affected area caused by the windbreak, and recommended area of the windbreak. (Not complete)

**Measurement Label**

Whenever the user draws a polygon or polyline, the lengths of the object are displayed on the lines.

**Select a Tree**

After selecting a windbreak type, the user can specify which tree they wish to plant. This is subject to change as it does not consider soil/drainage type after intersecting with the polygon/line the user draws.

**Polygon Info Output**

Once a polygon and a tree are selected by the user, the application immediately calculates the properties of the polygon. Information includes Area, Perimeter, Width, Species, Cost, # of Rows, Plants per Row, Total Plants, Total Cost, Primary Soil Types, and Primary Drainage Types.

# Functions

Refer to the commenting in the code on how specific functions work.

# Features to Be added

**AODA Compliance**

The application needs to meet the Accessibility for Ontarians with Disabilities Act.

**French Compatibility**

The application needs to be available in French to meet government standards. Use a toggle button to convert all English text to French as to minimize the need for multiple HTML pages. Main page allows users to select French/English and is linked to their respective applications.

**Print Function**

Users should be allowed to print the map they create. This is under debate as we are not sure if it is necessary. In order to do this, the print function must be activated on the server where the Soils Layer is hosted. An alternative to this is to use Windows print which would printout the webpage.

**Publishing and Editing Page/Tab**

Users should be allowed to edit the map they create, but are only limited to text edits as editing polygons/polylines would require the values to be recalculated.

**Accurate Rows and Plants per Row**

Currently the rows and plants per row are calculated using rough estimation with the formula of width = area/perimeter of the polygon. This method is inaccurate as not all polygons will be rectangular nor will the direction of the rows be correct. A possible solution is to take the shorter length of a polygon as the direction the rows are facing and calculate the rest from there. Another solution would be simply calculating total polygonal area and dividing it be the area required by a tree and not releasing any info on rows/plants per row (kind of sweeping the problem under the rug).

**Use points to Display Placement of Trees**

Optional feature. When a user draws a polygon/line, place points to show where a tree should be placed. It should consider the spacing between the trees and shape of the area.

**Multi-tree-type Windbreak**

Windbreaks may have multiple types of tree species in it for optimal outcomes. To simplify this, windbreaks in this application will have up to two different species.

**LIO Imagery**

The current imagery used in the application is ESRI’s, we want to use our own as it has higher resolution and does not have any black and white sections.

**Climate Layer**

Climate layer is to be added and considered when selecting a tree.

# Known Bugs

* Users can activate the Measurement tools before drawing a polygon/polyline, not a program breaking bug but should be looked at.
* Measurement labels are behind the line/buffer layer when the operation is complete
* If the user doesn’t select a species of tree before they create a polygon then the console produces an error as species as undefined.

# Usage

1. The user would first arrive at the Language selection page, they have the option of choosing English or French.
2. Once a language is chosen, the window becomes the Windbreak Application and prompts the user with a disclaimer similar to that of the AIA. When the user clicks, “I Accept” the prompt is removed.
3. The user is brought to the menu/map. The menu (left) allows users to choose attributes for what their windbreak would be. The map (right) allows users to pan and zoom around the map, it also features a search function and a measurement tool function.
4. The first thing the user must do is to check a windbreak objective. The user may select more than one type of object. This selection determines the type of trees available.
5. Once an objective is chosen, the user selects a tree species with the “Select a Tree” drop down menu.
6. The user can now draw a polygon or a line. The polygon allows the user to draw a definite area for which their windbreak would be planted in. Drawing a line allows the user to choose where their windbreak begins and ends, the application then calculates the area affected by the windbreak using buffers.
7. Once a polygon/polyline is drawn, the user can click the “Polygon Info” tab on the top left which tells details about the windbreak.
8. As of now, the edit and print button do not work.