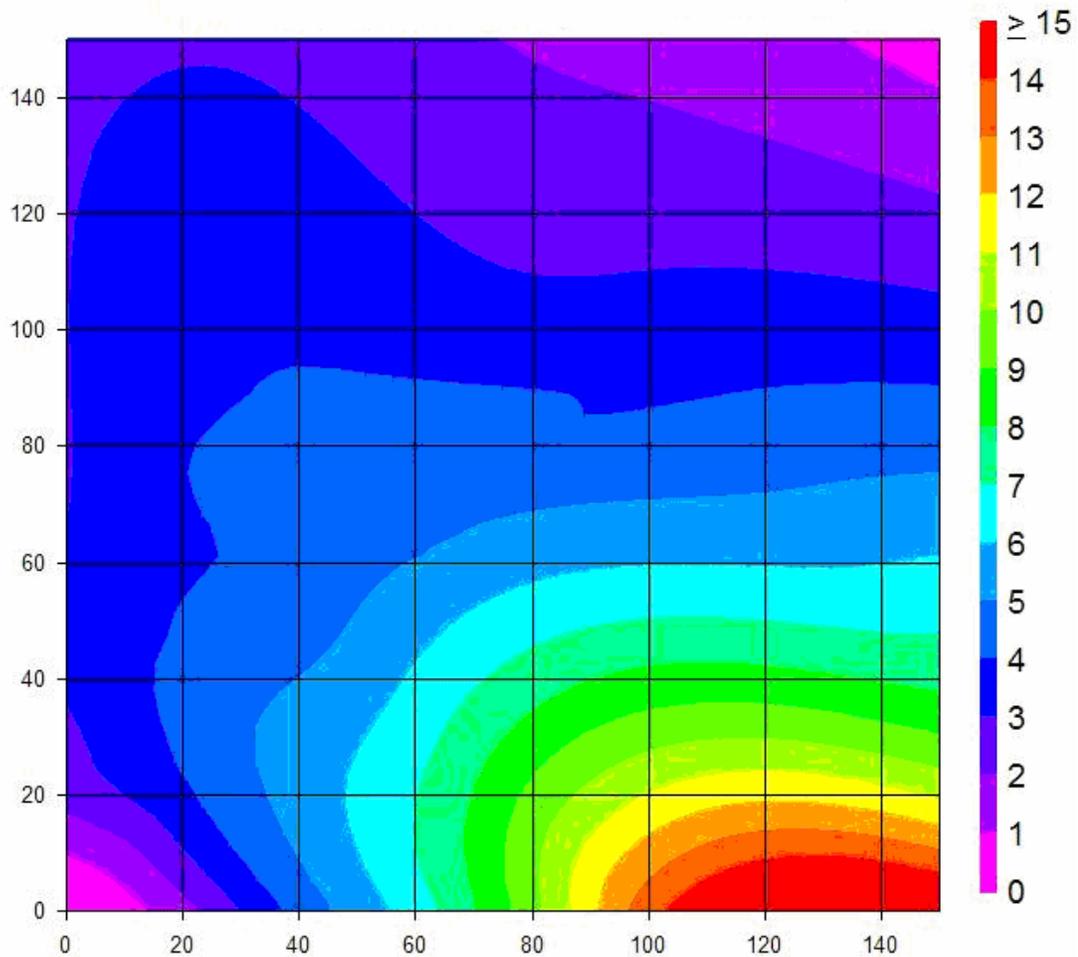


University of Central Florida



FDOT SHADOW USER GUIDE

October 27, 2007

INTRODUCTION TO PROGRAM

This program, FDOT Shadow, permits a visual representation of the shadow zone behind highway noise barriers. It is more accurate than that from TNM due to real world constraints. It can be used in the design process and to estimate benefits when combined with TNM or CAD programs.

The program requires the user to have previously run TNM. From this run the barrier coordinates and the insertion loss 30 meters (~ 98 feet) behind the barrier (TNM_L) at a height five feet above the ground plane is required.

Input requires the barrier coordinates to be in sequential order and the number required varies for each barrier design depending on complexity. These, receiver location results from TNM, serve as reference points and increasing the number results in increased accuracy. Hence the need to increase the number for complex designs. Where the barrier height is constant, the traffic mix is not changing, and local structures/topography remain somewhat constant, values from one receiver may be representative of other locations in the same area and only one value is needed and can be repeated as input in FDOT Shadow. If a barrier has sections of different heights, traffic is changing, near the end of the barrier, or local structures do not remain constant, the number of actual modeled points in TNM must be increased. For a very complex design, changing topography, or changing barrier heights by section, a value is needed for TNM_L for each barrier segment.

The barrier coordinates for TNM are also required as input to FDOT Shadow. This permits FDOT Shadow to define one of the needed boundaries of the shadow zone. Each coordinate value for the barrier requires an x, y and z coordinate value, i.e., a point in space. The program assumes that the points are in sequential order. The user can simply copy and paste these values from TNM to FDOT Shadow.

USING THE PROGRAM

Starting the program is similar to other Windows based programs. After installation the user starts the program by clicking with the left mouse button on the Start button at the bottom of the Window's screen. The user should select All Programs to allow Shadow to be selected from the list of installed programs. A screen to similar to Figure 1 will appear. FDOT Shadow Zone should be selected. A window such as shown in Figure 2 will appear. This is the working window of FDOT Shadow. Of note is the menu bar, graphic window, the two spreadsheet inputs and the control buttons.

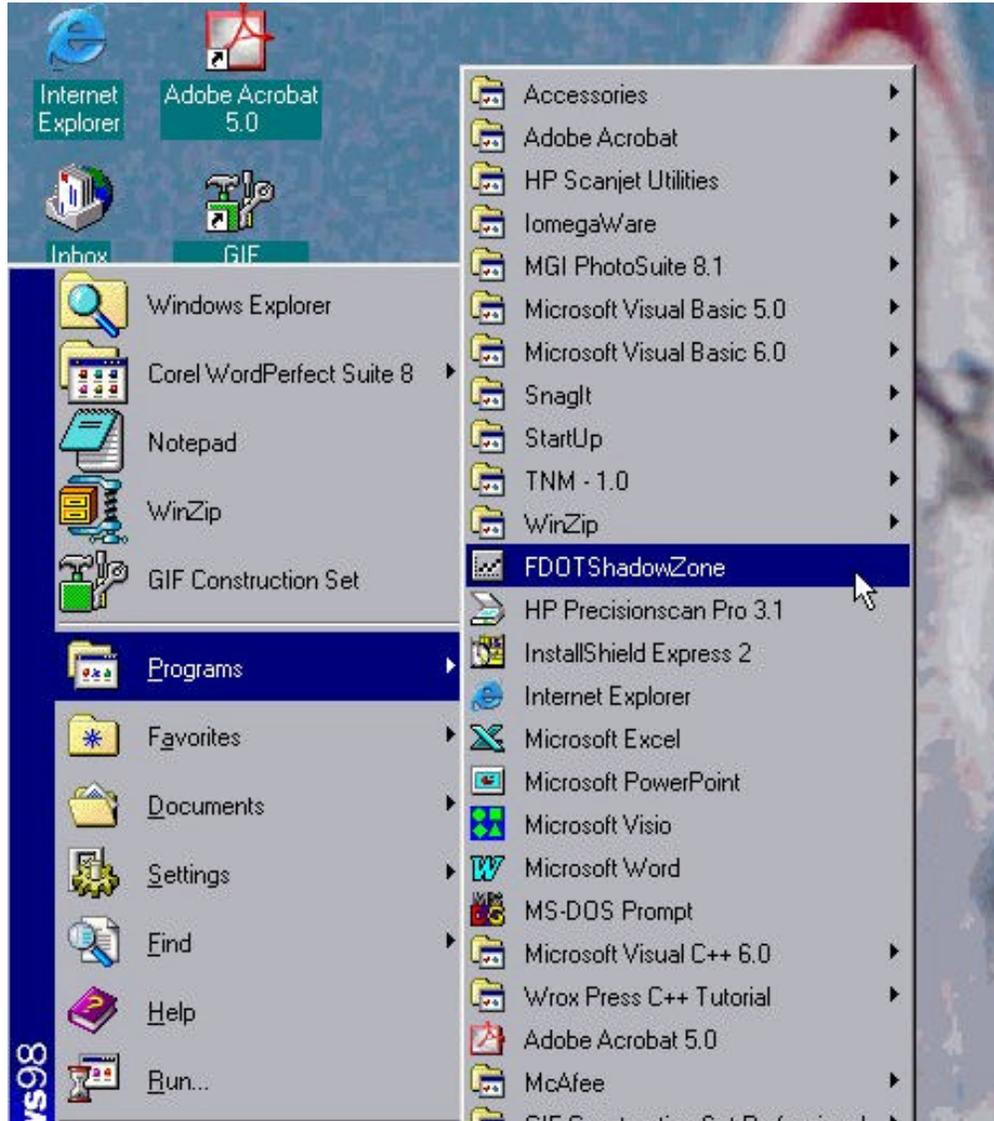


Figure 1. Selection of FDOT Shadow in the Windows Programs Folder

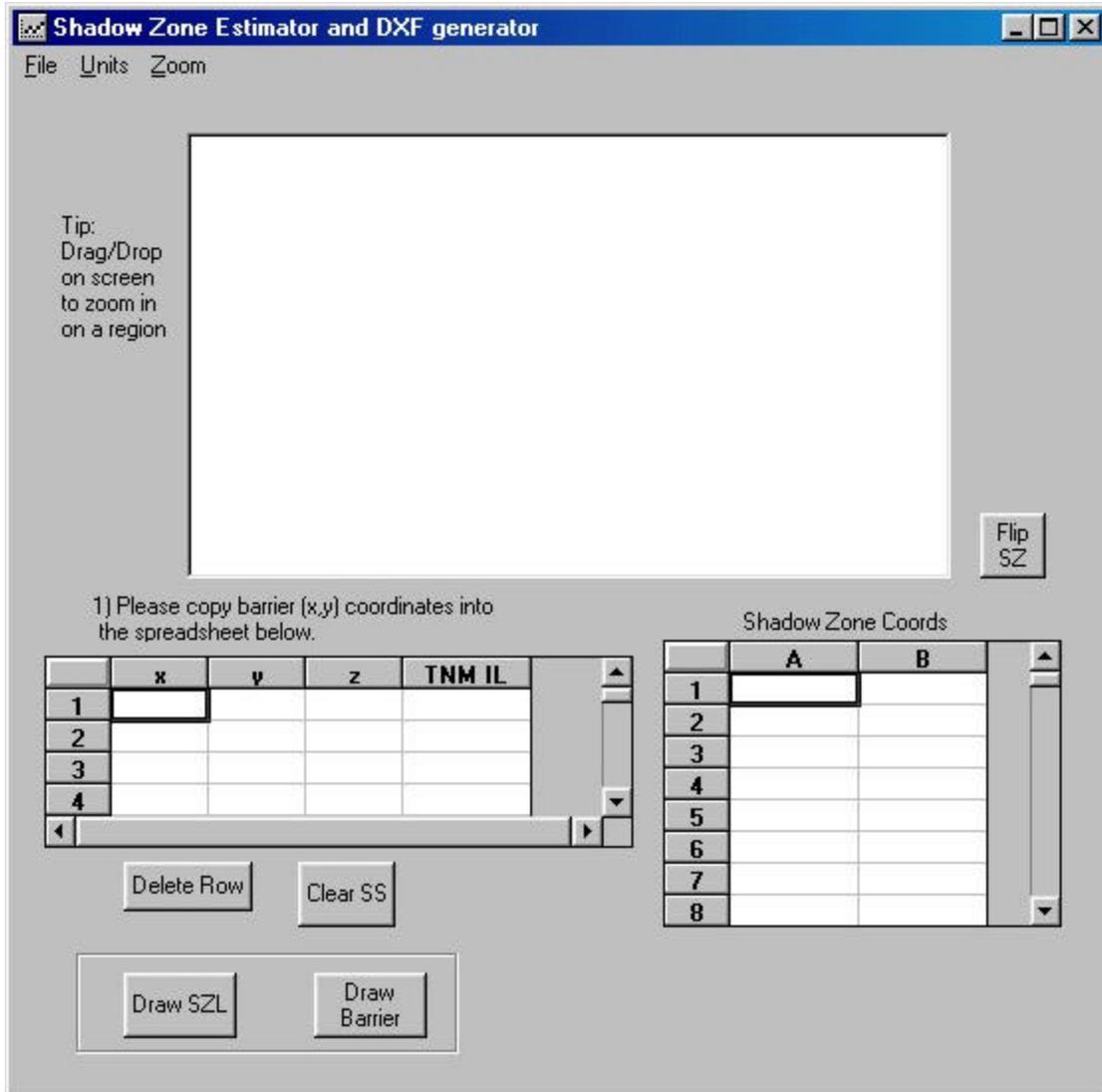


Figure 2. Interface of FDOT Shadow Zone Program.

The menu bar allows results to be saved, files opened, units of either English or metric selected, and zooming to see the graphics in greater detail. The graphic window will allow the shadow zone and barrier to be reviewed graphically. The spreadsheet input on the left is to allow input of the sequential barrier coordinates and calculated insertion loss (noise reduction) values (copy and paste from TNM is suggested). The spreadsheet on the right will contain the shadow zone coordinate generated by FDOT shadow. These coordinates can be copied and used in other graphic or CAD programs. The buttons are for program control and described in the following discussion.

The typical process of using the program is as follows:

1. Copy coordinate information from TNM into the FDOTSZ spreadsheet input (left spreadsheet).
2. Provide TNM_L input (results 30 meters or 98 feet behind the barrier, 5 feet above the ground plane) in column 4 of the left spreadsheet for each barrier section (see previous notes to reduce input time for unchanging barrier height). The user can edit the spreadsheet by typing in the spreadsheet, deleting an entire row with the “Delete Row” button, or clear all input from the spreadsheet by using the “Clear SS” button.
3. Review the barrier design by clicking the “Draw Barrier” button which will show the barrier in the graphic window.
4. Once satisfied with the barrier inputs, the shadow zone is generated by clicking the “Draw SZL” button. The shadow zone will appear in the graphic window and the coordinates in the right spreadsheet.
5. If the shadow zone is on the wrong side of the barrier (the program does not know where the roadway is located and assumes lowest to greatest coordinate values which is not always the case) then click on the “Flip SZL” button to flip the shadow zone to the other side of the barrier. Coordinates will be updated accordingly.
6. Once the user is satisfied the shadow zone has been displayed properly (note the zoom control in the menu bar may be used as needed), a dxf or coordinate file can be written using the File menu item. The user may also copy the coordinates directly from the right spreadsheet.

Again, the user should note the barrier coordinates can be copied and pasted directly out of TNM barrier input dialog box by using the Ctrl-C and Ctrl-V keys. The insertion loss (IL) values can be copied from the Noise Reduction Results column of the Sound Level Results Table provided as output by TNM at the conclusion of a run and pasted into the Column 4 of the left spreadsheet.

Figure 3 depicts a barrier and shadow zone that was created by clicking the “Draw SZL” button after input was entered into the spreadsheet. The barrier input (x, y and z coordinates of each barrier point) can be seen in the spreadsheet dialog box. This format is similar to the TNM barrier object format and direct copy and paste from TNM into the FDOT Shadow Zone program is possible as previously mentioned. Also of note is that the x and y coordinates are displayed in the graphical view as the user moves the mouse cursor around in the view.

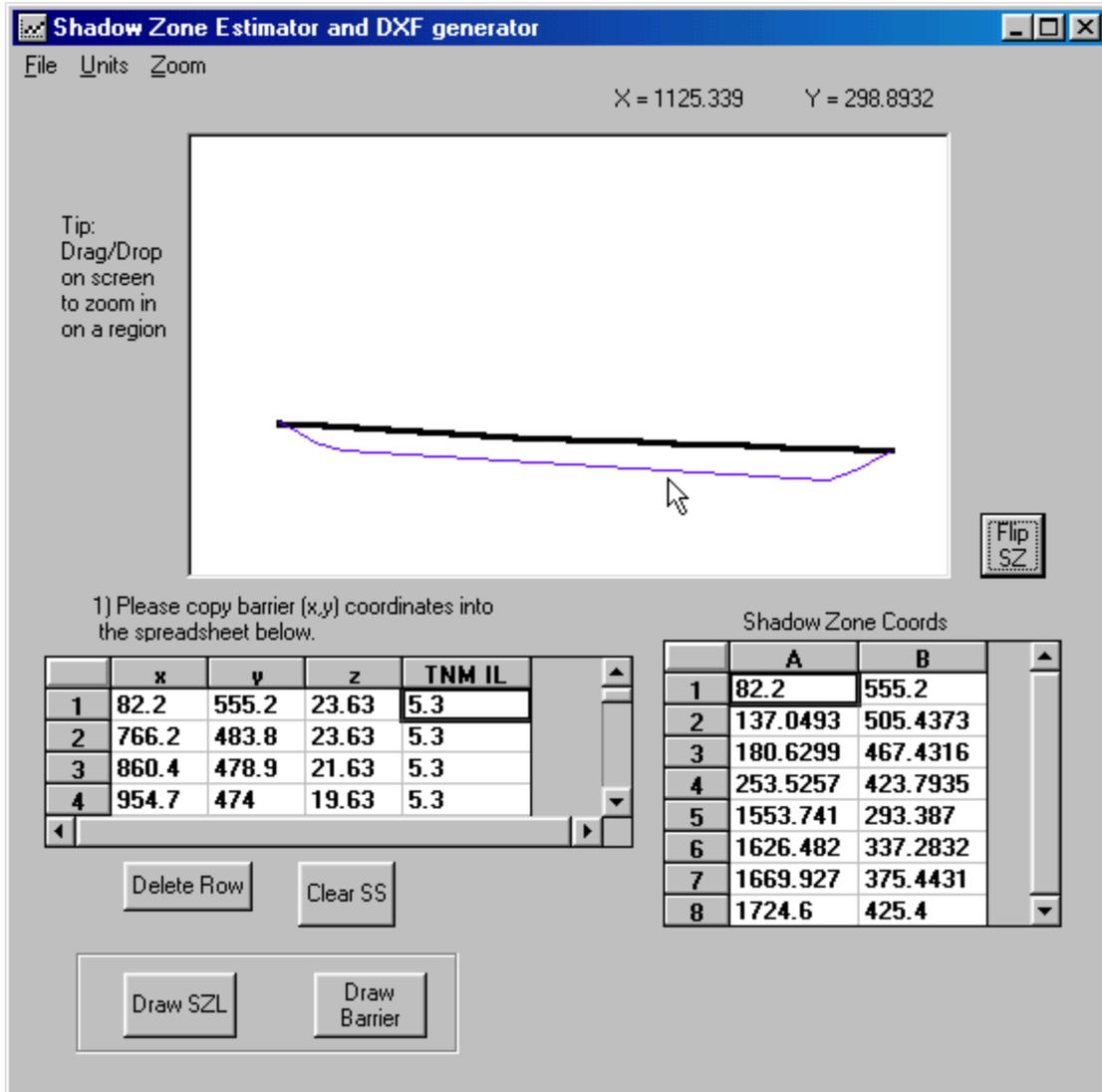


Figure 3. Shadow Zone Has Been Created and Drawn in The Graphic Window.

In this example, the coordinates were “going in the wrong direction” resulting in the shadow zone being on the wrong side of the barrier. The user has the ability to click the “Flip SZL” button to have the shadow zone drawn on the correct side of the barrier so that later graphical use of the coordinates is correct. Figure 4 shows the barrier example previously presented as Figure 3 after the shadow zone has been “flipped.”

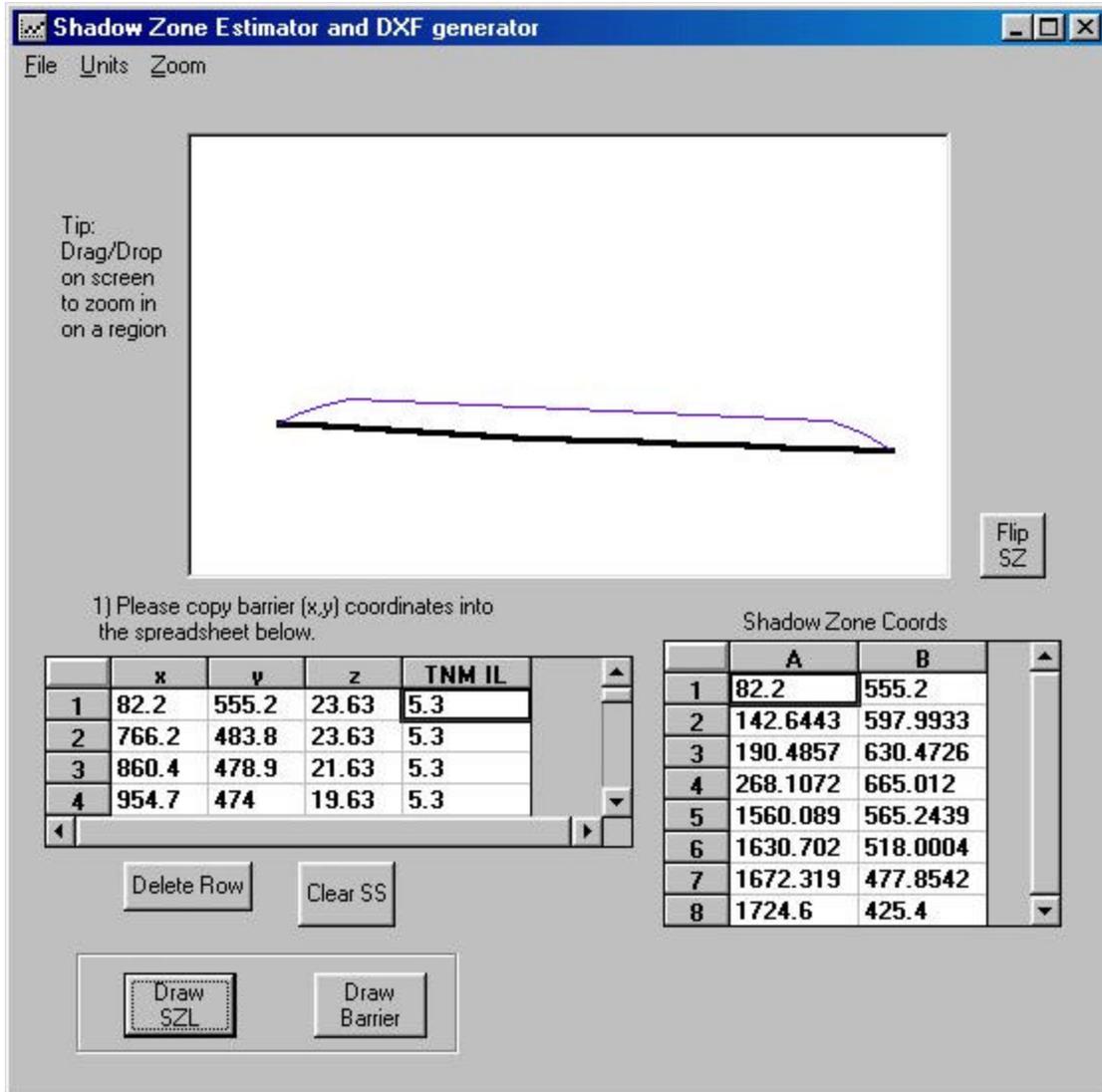


Figure 4. The Shadow Zone Has Been “Flipped” by the User to Be on Correct Side of the Barrier.

The shadow zone boundary may then be saved to a dxf file format and a comma delineated file by selecting the “File/Save dxf File” menu option. This is shown in Figures 5 and 6. There are two options located in the “Save As” dialog that allow the user to specify the shadow zone boundary line width and color in the dxf file (see Figure 6). The line thickness and color do not appear if the shadow zone is imported into TNM due to its graphical limitations but are only present when the file is used in a CAD program. Figure 6 also shows that the user can specify the location the files are being stored. Figure 7 displays a snapshot of a CAD viewer program output after input of the dxf file created by the FDOT Shadow program based on the example results of the barrier model originally shown in Figure 3.

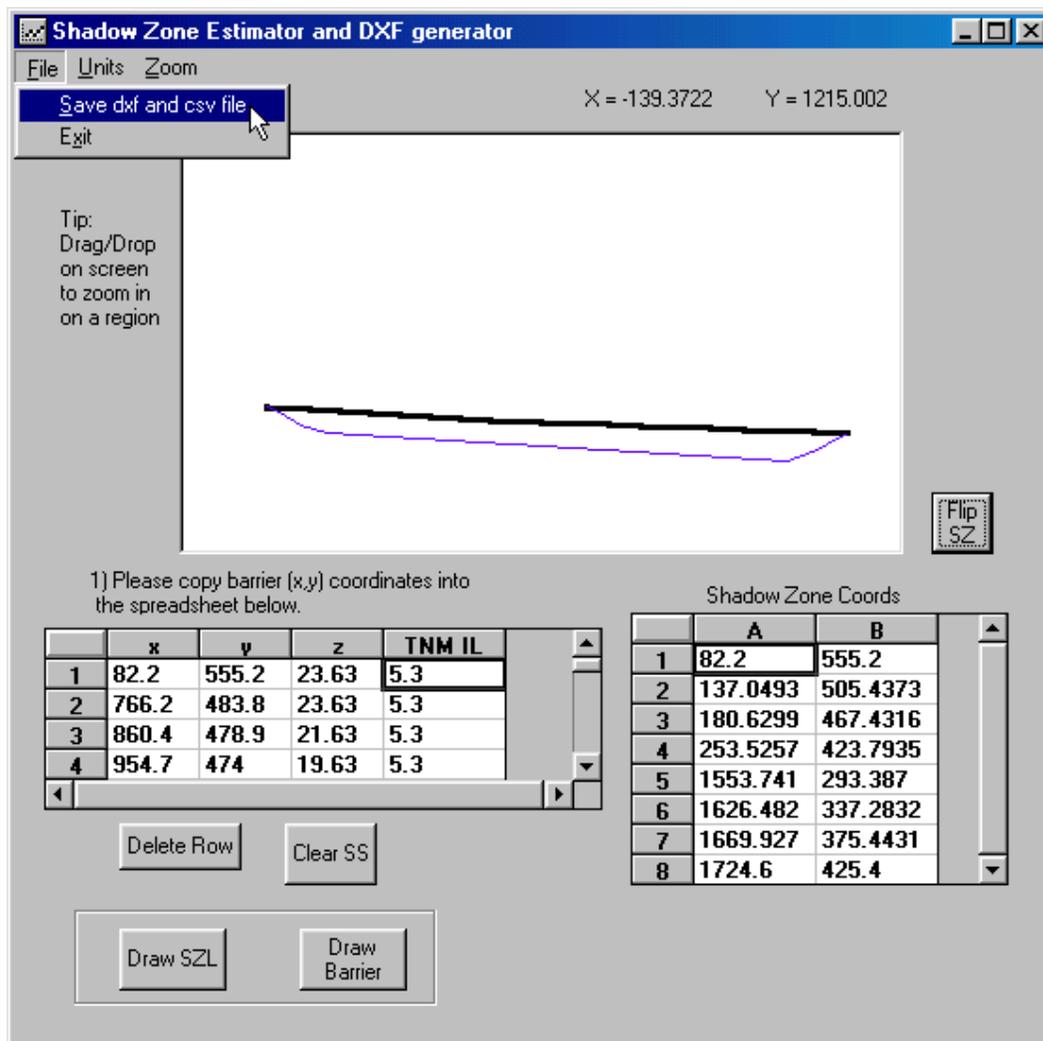


Figure 5. The “File” Menu of the Program that Contains the Option to Build a dxf File and csv File of the Shadow Zone Boundary Coordinates.

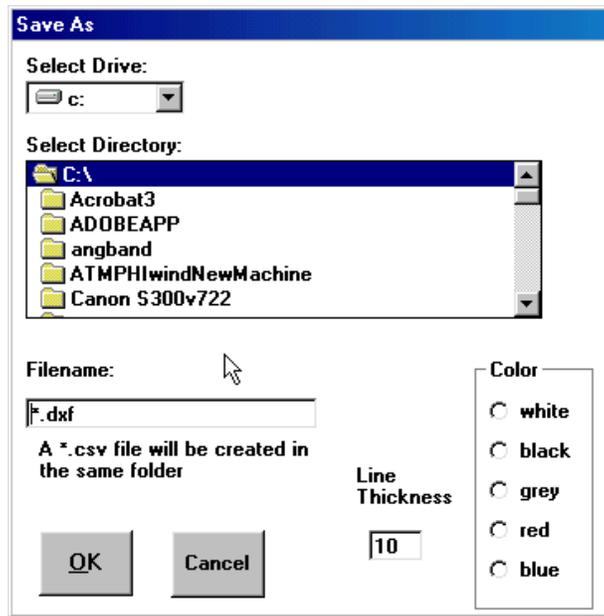


Figure 6. The “Save As” Dialog Box and Line Property Selector.

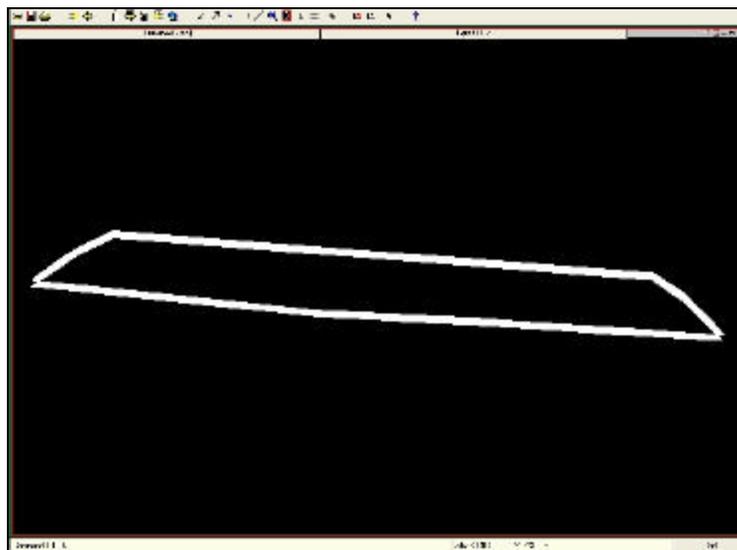


Figure 7. Shadow Zone Boundary of Figure 4 Converted to a dxf File and Imported into a CAD Program.