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**Federal Highway Administration**

# HELP MENU – USER’S GUIDE

TRAFFIC NOISE MODEL 3.0

FHWA-HEP-20-008  
FEDERAL HIGHWAY ADMINISTRATION  
OFFICE OF NATURAL ENVIRONMENT  
Washington, D.C.

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13. ABSTRACT (Maximum 200 words) The Federal Highway Administration (FHWA) with the assistance of the Volpe Center Acoustics Facility finalized the Traffic Noise Model (TNM) version 3.0. This document is the information found in the Help Menu inside TNM 3.0. It is being provided as a separate report, in addition to being embedded inside TNM 3.0, to assist users prior to using the model for the first time.				
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<b>SI* (MODERN METRIC) CONVERSION FACTORS</b>				
<b>APPROXIMATE CONVERSIONS TO SI UNITS</b>				
<b>Symbol</b>	<b>When You Know</b>	<b>Multiply By</b>	<b>To Find</b>	<b>Symbol</b>
<b>LENGTH</b>				
<b>in</b>	inches	25.4	millimeters	mm
<b>ft</b>	feet	0.305	meters	m
<b>yd</b>	yards	0.914	meters	m
<b>mi</b>	miles	1.61	kilometers	km
<b>AREA</b>				
<b>in<sup>2</sup></b>	square inches	645.2	square millimeters	mm <sup>2</sup>
<b>ft<sup>2</sup></b>	square feet	0.093	square meters	m <sup>2</sup>
<b>yd<sup>2</sup></b>	square yard	0.836	square meters	m <sup>2</sup>
<b>ac</b>	acres	0.405	hectares	ha
<b>mi<sup>2</sup></b>	square miles	2.59	square kilometers	km <sup>2</sup>
<b>VOLUME</b>				
<b>fl oz</b>	fluid ounces	29.57	milliliters	mL
<b>gal</b>	gallons	3.785	liters	L
<b>ft<sup>3</sup></b>	cubic feet	0.028	cubic meters	m <sup>3</sup>
<b>yd<sup>3</sup></b>	cubic yards	0.765	cubic meters	m <sup>3</sup>
<b>NOTE: volumes greater than 1000 L shall be shown in m<sup>3</sup></b>				
<b>MASS</b>				
<b>oz</b>	ounces	28.35	grams	g
<b>lb</b>	pounds	0.454	kilograms	kg
<b>T</b>	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
<b>oz</b>	ounces	28.35	grams	g
<b>TEMPERATURE (exact degrees)</b>				
<b>°F</b>	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C
<b>ILLUMINATION</b>				
<b>fc</b>	foot-candles	10.76	lux	lx
<b>fl</b>	foot-Lamberts	3.426	candela/m <sup>2</sup>	cd/m <sup>2</sup>
<b>FORCE and PRESSURE or STRESS</b>				
<b>lbf</b>	poundforce	4.45	newtons	N
<b>lbf/in<sup>2</sup></b>	poundforce per square inch	6.89	kilopascals	kPa

<b>SI* (MODERN METRIC) CONVERSION FACTORS</b>				
<b>APPROXIMATE CONVERSIONS FROM SI UNITS</b>				
<b>Symbol</b>	<b>When You Know</b>	<b>Multiply By</b>	<b>To Find</b>	<b>Symbol</b>
<b>LENGTH</b>				
<b>mm</b>	millimeters	0.039	inches	in
<b>m</b>	meters	3.28	feet	ft
<b>m</b>	meters	1.09	yards	yd
<b>km</b>	kilometers	0.621	miles	mi
<b>AREA</b>				
<b>mm<sup>2</sup></b>	square millimeters	0.0016	square inches	in <sup>2</sup>
<b>m<sup>2</sup></b>	square meters	10.764	square feet	ft <sup>2</sup>
<b>m<sup>2</sup></b>	square meters	1.195	square yards	yd <sup>2</sup>
<b>ha</b>	hectares	2.47	acres	ac
<b>km<sup>2</sup></b>	square kilometers	0.386	square miles	mi <sup>2</sup>
<b>VOLUME</b>				
<b>mL</b>	milliliters	0.034	fluid ounces	fl oz
<b>L</b>	liters	0.264	gallons	gal
<b>m<sup>3</sup></b>	cubic meters	35.314	cubic feet	ft <sup>3</sup>
<b>m<sup>3</sup></b>	cubic meters	1.307	cubic yards	yd <sup>3</sup>
<b>mL</b>	milliliters	0.034	fluid ounces	fl oz
<b>MASS</b>				
<b>g</b>	grams	0.035	ounces	oz
<b>kg</b>	kilograms	2.202	pounds	lb
<b>Mg (or "t")</b>	megagrams (or "metric ton")	1.103	short tons (2000 lb)	T
<b>g</b>	grams	0.035	ounces	oz
<b>TEMPERATURE (exact degrees)</b>				
<b>°C</b>	Celsius	1.8C+32	Fahrenheit	°F
<b>ILLUMINATION</b>				
<b>lx</b>	lux	0.0929	foot-candles	fc
<b>cd/m<sup>2</sup></b>	candela/m <sup>2</sup>	0.2919	foot-Lamberts	fl
<b>FORCE and PRESSURE or STRESS</b>				
<b>N</b>	newtons	0.225	poundforce	lbf
<b>kPa</b>	Kilopascals	0.145	poundforce per square inch	lbf/in <sup>2</sup>

\*SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380. (Revised March 2003)

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# WELCOME TO THE FEDERAL HIGHWAY ADMINISTRATION'S (FHWA) TRAFFIC NOISE MODEL (TNM) ONLINE HELP

The Federal Highway Administration (FHWA) Traffic Noise Model (TNM) is a computer program that is used to analyze highway traffic noise to assist in the design and development of highway noise barriers. TNM computes the effect of intervening ground (defined by its type, or optionally by its flow resistivity) with theory-based acoustics that have been calibrated against field measurements. In addition, TNM allows sound to propagate underneath selected intervening roadways and barriers, rather than being shielded by them. During calculation, TNM perturbs intervening barriers up and down from their input height, to calculate for multiple heights. Then during acoustical design of selected barriers, combined with selected receivers, TNM displays sound-level results for any combination of height perturbations. It also contains an input height check, to determine if noise barriers break the lines-of-sight between sources and receivers. In addition, it provides summary cost and benefit information for each barrier design, from user-supplied unit barrier costs and land-use information. For selected cross sections, TNM also computes the effect of multiple reflections between parallel barriers or retaining walls that flank a roadway. The TNM user can then enter the computed parallel-barrier degradations as adjustment factors for individual receivers in TNM's calculation of receiver sound levels.

The TNM is provided by FHWA as a Standalone Application and includes a batch processing tool as well. This User Guide specifically covers the functionality provided by the TNM Standalone Application.

Detailed instructions on how to operate the TNM Standalone Application are comprised of the following topics:

1. [TNM Homepage](#)

2. [TNM Toolbar](#)
3. [Legend Pane](#)
4. [View Pane](#)

5. [Edit Pane](#)
6. [Search Pane](#)
7. [Object Details Pane](#)
8. [Drawing on the Map](#)

---

## CONTACT TECHNICAL SUPPORT

If you need assistance with TNM contact [TNMHelp@dot.gov](mailto:TNMHelp@dot.gov) or for general comments email [TNMComments@dot.gov](mailto:TNMComments@dot.gov).

---

## TNM HOMEPAGE

The TNM User Homepage consists of the toolbar and individual function panes. The homepage is designed to be user-friendly. The mouse and keyboard are used to navigate, draw, and perform TNM noise modeling. The homepage contains the following functional areas:

### [TNM Toolbar](#)

The toolbar contains Open, Home, Edit/Modify, View, Settings, Calculate, Barrier Analysis, Contours, Reports, Windows, and Help tabs.

[Legend Pane](#)

The Legend Pane shows layers and/or features that have been added to the legend.

[View Pane](#)

The View Pane lists the Plan View, 3D View, Section View, and Report View sub-panes.

### [Edit Pane](#)

The Edit Pane lists the sub-panes for objects that can be edited including barriers, building rows, contour zones, ground zones, receivers, roadways, terrain lines, and tree zones.

[Search Pane](#)

The Search Panes include sub-panes for Search, Bookmarks, Annotation, and Geocode functions.

### [Object Details Pane](#)

The Object Details Pane, located at the base of the user interface, allows the user to review the individual attribution of each object in the TNM project being viewed.

[Drawing on the Map](#)

TNM provides multiple drawing functions that are used to add objects to a map for noise modeling.

---

# TNM TOOLBAR

The TNM Toolbar is used to perform various functions of the TNM. You can minimize or maximize the toolbar by right clicking and selecting Minimize the Ribbon.



*Figure 1 TNM Toolbar*

**The toolbar consists of the following tabs:**

Open Tab

[Edit/Modify](#) Tab

[View](#) Tab

[Settings](#) Tab

[Calculate Tab](#)

[Barrier Analysis Tab](#)

[Contours](#) Tab

[Reports](#) Tab

[Tools](#) Tab

[Help](#) Tab

Click each toolbar function for more information.

## OPEN TAB

The Open Tab is used to create New Projects, Open and Close Projects, Save Projects, Print Projects, Import and Export Projects, and Exit the TNM software.

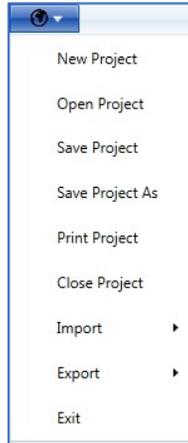


Figure 2 Open Tab and Menu

## CREATING A NEW PROJECT

To create a new project:

1. Click the Open Tab.
2. Click New Project. The New Project window displays.

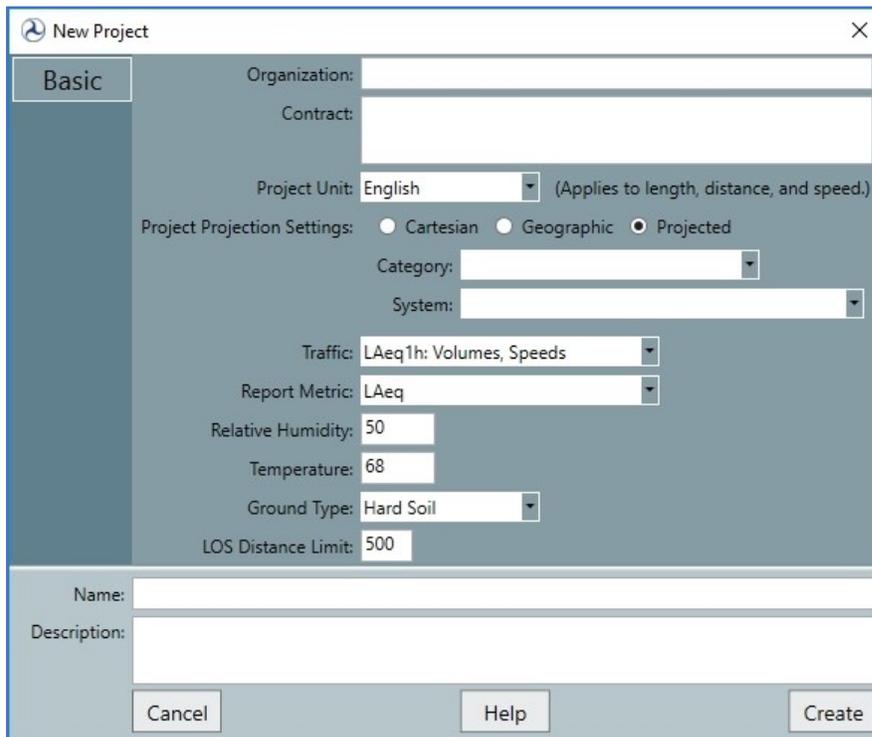


Figure 3 New Project Window

3. Enter the Organization for the project.
4. Enter the Contract for the new project.
5. Select a Project Unit of measure that would be used for all unit calculations and labeling within the application. Choose from English or Metric in the drop-down list.
6. Define the Project Projection Settings by selecting one of the Cartesian, Geographic, or Projected radio buttons. Please note that depending on that selection you might need to also select a value from the Category and System pull down lists.
  - *Cartesian* coordinates are based on spatial positions described by a pair of coordinates indicating that position's relationship to a fixed origin on a 2-dimensional plane of infinite distance. This system is most often utilized in Computer Aided Design (CAD) software, and may or may not have a direct relationship with known coordinates on the Earth. The recommended Geographic Category and System selections from their respective pull-down menus to utilize in TNM for new projects in North America are Category = 'Cartesian' and System = 'Cartesian 2D (Meters)'. Cartesian coordinates correspond to the Orthographic system used in TNM 2.5. When importing a project from TNM 2.5 to TNM 3.0 users should verify that the Project is using Cartesian for this value.
  - *Geographic* coordinates base spatial positions on a 3-dimensional spherical model of the earth and are often described in terms of longitude, latitude, and elevation. Latitude and longitude designations are typically described using decimal degrees or in degrees, minutes, and seconds. The recommended Geographic Category and System selections from their respective pull-down menus to utilize in TNM for new projects in North America are Category = 'World' and System = 'WGS1984' to leverage the WGS84 (EPSG: 4326) decimal degrees, since this is a standard in cartography and navigation/global positioning systems.
  - *Projected* coordinates are based on a model of the surface of the Earth where the Earth's surface is rendered as a flat, 2-dimensional surface. Different projected systems preserve or alter distance, shape/areas, and North directionality, among other factors that should be taken into consideration when selecting a projected system. The recommended Projected settings to utilize in TNM for new projects in North America are Category = 'World' and System = 'WebMercator' to leverage the WGS84 Web Mercator (EPSG: 3857) meters, since it is the de facto standard for web mapping applications.
7. Select the Traffic. Choose from:
  - $L_{Aeq}1h$  - Volumes, Speeds
  - $L_{Aeq}1h$  - Percent Volumes, Speeds
  - $L_{dn}$  - Day Night
  - $L_{den}$  - Day Evening Night

8. Enter Report Metric.
9. Update the Relative Humidity value, if needed.
10. Update the Temperature value, if needed.
11. Select a Ground Type. Choose from:
  - Pavement
  - Lawn
  - Water
  - FieldGrass
  - HardSoil
  - GranularSnow
  - LooseSoil
  - PowderSnow
12. Update the LOS Distance Limit to define the Line of Sight distance, if needed.
13. Enter a Name for your new project.
14. Enter a Description of the new project.
15. Click Create to create the New Project.
16. Click Cancel at any time to cancel the new project creation.

## OPENING A PROJECT

To open an existing project:

1. Click the Open Tab.
2. Click Open Project. The Open Project window displays.

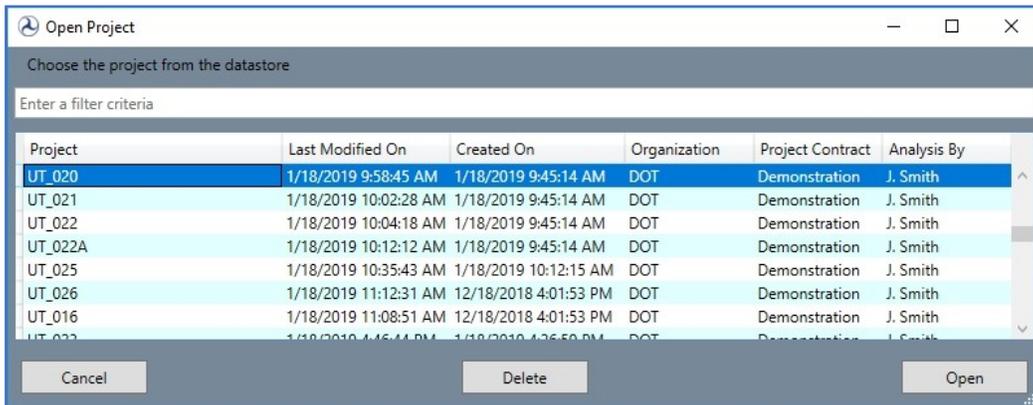


Figure 4 Open Project Window

3. If desired, enter criteria to filter the list of existing projects located in the project datastore.
4. Click a project name in the list of the existing projects.
5. Click the Open button to open the project.
6. Click Cancel at any time to cancel opening a project.

7. Click Delete to delete an existing project from the datastore.

**NOTE: THIS WILL COMPLETELY DELETE THE PROJECT.  
ONLY CLICK DELETE IF YOU NO LONGER WANT THE PROJECT.**

## SAVING A PROJECT

To Save a Project or Save a Project As:

1. Click the Open Tab.
2. Click Save Project. The project is now saved.
3. Click Save Project As.
4. Enter a Project Name and Click Save.

## PRINTING A PROJECT

To Print a Project:

1. Click the Open Tab.
2. Click Print Project.

## CLOSING A PROJECT

To close a project:

1. Click the Open Tab.
2. Click Close Project.

## IMPORTING A PROJECT

To Import a Project:

1. Click the Open Tab.
2. Click Import.
3. Click Import from TNM, Import from XML, Import from GDB, or Import from CAD.
4. Select the appropriate TNM, XML, GDB, or CAD file from the location. (Note, GDB and CAD are experimental.)
5. Click Open. The imported project is now imported into the project datastore and can be opened.

## EXPORTING A PROJECT

To export a Project:

1. Click the Open Tab.

2. Click Export.
3. Select Export to TNM, Export to XML, Export to GDB, or Export to CAD. (Note, GDB and CAD are experimental.)
4. Select a location to export the project to.
5. Click Save. The project is now exported in the format chosen.

## **EXITING**

To Exit the TNM software:

1. Click the Open Tab.
2. Click Exit. The TNM software closes.

## EDIT/MODIFY TAB

The Edit/Modify tab lists [Shared Tools](#) Function, [Receivers](#), Barriers, Roadways, Tree Zones, Building Rows, Terrain lines, Ground Zones, and Contour Zones Select Functions, **Error! Reference source not found.**, [Receivers](#), Barriers, [Roadways](#), [Tree Zones](#), Building [Rows](#), Terrain lines, [Ground](#) Zones, and Contour Zones Select Functions selection and edit functions. When editing a feature, you must first select that feature on the map. A feature can be selected on a map by clicking on that feature with the mouse or by using the Edit/Modify tab to easily access multiple feature selection options.

## SHARED TOOLS FUNCTION

The Shared Tools function provides Delete, Undo, Redo, Edit, Segments, and Enable Object Add buttons for features that have been selected on the map.



*Figure 5 Shared Tools Function*

To delete a feature that has been selected click the Delete button.

To undo or redo adding and removing of objects click the Undo or Redo buttons.

To edit a feature that has been selected click the Edit button. See

[Edit](#) Pane for more specific information on editing a feature.

To edit segments of a feature that has been selected click the Segments button. See

[Edit](#) Pane for more specific information on editing a feature.

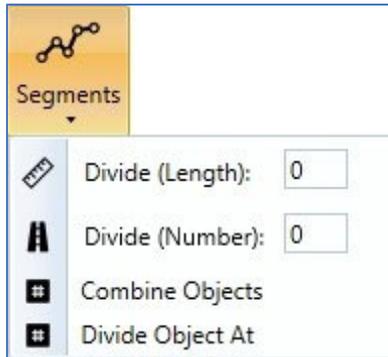


Figure 6 Segments Button and submenu

1. In the Segments function window enter a Divide (Length) to divide a feature by length.
2. Enter a Divide (Number) to divide a feature by a number amount (i.e. divide into 4 sections).
3. Click Combine Objects to combine selected objects on the map.
4. Click Divide Object At to select a point to divide combined objects.

The Enable Object Add button acts as the "D" key to enable drawing of objects. It can be toggled on and off.

## RECEIVERS, BARRIERS, ROADWAYS, TREE ZONES, BUILDING ROWS, TERRAIN LINES, GROUND ZONES, AND CONTOUR ZONES SELECT FUNCTIONS

1. To edit receivers, barriers, roadways, tree zones, building rows, terrain lines, ground zones, or contour zones you must first select the feature. To select a feature on the map, click the Selection button for that object. You may also single click the object to select it.
2. Click Select, Select All, or Deselect All to edit the chosen feature on the map.

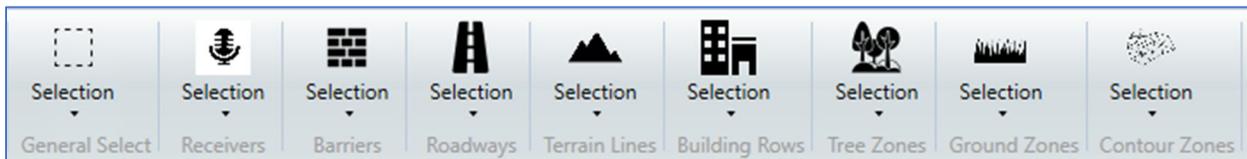


Figure 7 Available Select buttons with Icons

In the

[Edit](#) Pane, the selected feature's attributes are displayed and can be edited. See

[Edit](#) Pane for more specific information on editing a feature.

## VIEW TAB

The View tab lists [Sync 3D Geometry](#) Function, [Sync 3D View](#) Function, [Exaggerate Heights](#) Function, [Zoom Extent](#), [Start Section](#) Function, [Toggle All Point Labels](#) Function and [Toggle All Object Labels](#) Function functions.

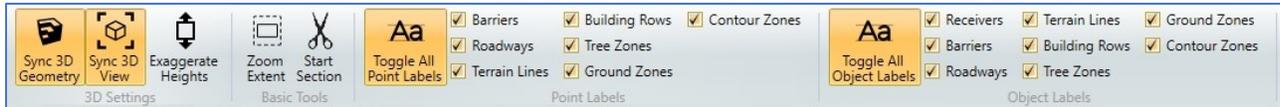


Figure 8 View Tab

## SYNC 3D GEOMETRY FUNCTION

To sync the 3D geometry:

1. Click the Sync 3D Geometry button.
2. The Plan View and 3D View will refresh and display identical data in their respective formats.

## SYNC 3D VIEW FUNCTION

To sync the 3D view:

1. With both the Plan view and 3D View windows open click the Synch 3D View button.
2. The 3D View and Plan View will refresh and display the same features.

## EXAGGERATE HEIGHTS FUNCTION

If you wish to exaggerate the height of any object when viewing it in the 3D View, click the Exaggerate Heights button. Objects that have height will be exaggerated on the 3D View Map.

## ZOOM EXTENT FUNCTION

Selecting the Zoom Extent button will zoom the map to visually include all objects.

## START SECTION FUNCTION

To make a Selection:

The Start Selection Function allows you to select a section of the map to view details of the items on the map.

1. Click the Start Selection button.
2. Click and drag a line across the map to select all of the features that line crosses.
3. The Section View will now display all of the features that are included in the section you created.

## TOGGLE ALL POINT LABELS FUNCTION

The Toggle All Point Labels allow you to show or hide the point labels on the map.

## TOGGLE ALL OBJECT LABELS FUNCTION

The Toggle All Object Labels allow you to show or hide the object labels on the map.

## SETTINGS TAB

The Settings Tab contains the

[Application Settings](#) Function and [Project Settings](#) Function functions.



Figure 9 Settings Tab

## APPLICATION SETTINGS FUNCTION

Prior to opening or creating a project you can apply specific settings to the application. Applying these settings allows you to tailor the application to your own preferences to be used every time you create a new project.

To adjust the Application Settings, click the Application Settings button. The Application Settings dialog box appears.

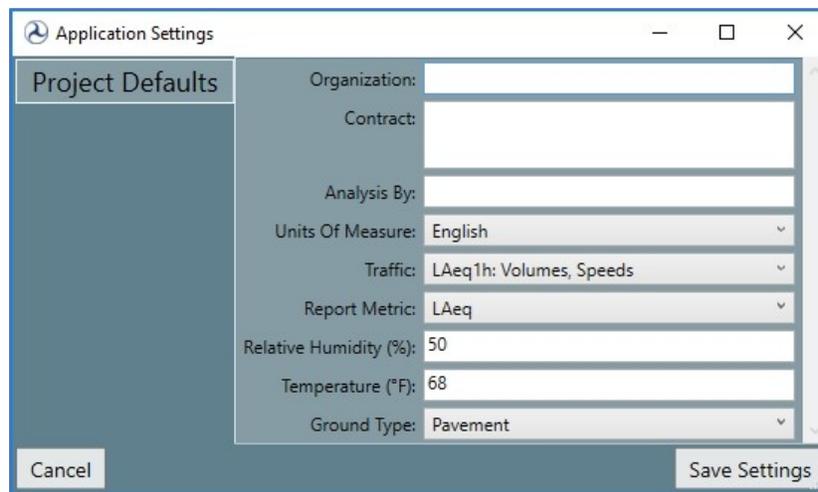


Figure 10 Application Settings dialog box

1. In the Application Settings dialog box click Project Defaults in the left column. Settings you choose here will be applied to all newly created reports.
2. Enter an Organization Name.
3. Enter a Contract.
4. Select a Unit of Measure from the drop-down list. Choose English or Metric.

5. Select a Traffic measurement from the drop-down. Choose from:
  - $L_{Aeq}1h$  - Volumes, Speeds
  - $L_{Aeq}1h$  - Percent Volumes, Speeds
  - $L_{dn}$  - Day Night
  - $L_{den}$  - Day Evening Night
6. Enter a Relative Humidity.
7. Enter a Temperature.
8. Select a Ground Type form the drop-down. Choose
  - Custom
  - Pavement
  - Water
  - HardSoil
  - LooseSoil
  - Lawn
  - FieldGrass
  - GranularSnow
  - PowderSnow
9. Click Save Settings to save the settings.
10. Click Cancel to abandon the changes.

## PROJECT SETTINGS FUNCTION

Project Settings can be changed for any project that has been created. Any Application Settings that have been made will be applied to Project Settings.

To adjust the Project Settings, click the Project Settings button. The Edit Project dialog box appears.

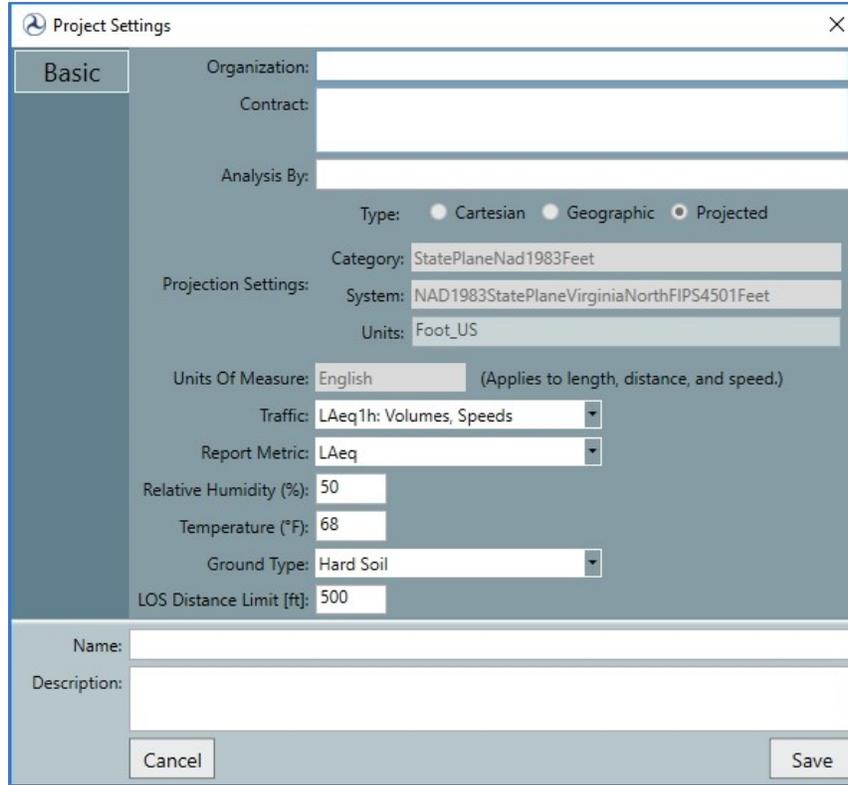


Figure 11 Project Settings Dialog Box

1. Enter or change the Organization Name.
2. Enter or change the Contract.
3. Select or change the Project Unit of measure. Choose English or Metric.
4. Select or change the Project Projection Settings through adjustments to the three radio buttons and their corresponding pull-down menu Category and System values.
5. Select or change the Traffic measurement from the drop-down. Choose from:
  - $L_{Aeq,1h}$  - Volumes, Speeds
  - $L_{Aeq,1h}$  - Percent Volumes, Speeds
  - $L_{dn}$  - Day Night
  - $L_{den}$  - Day Evening Night
6. Select or change the Relative Humidity.
7. Select or change the Temperature.
8. Select or change the Ground Type from the drop-down. Choose
 

<ul style="list-style-type: none"> <li>• Custom</li> <li>• Pavement</li> <li>• Water</li> <li>• HardSoil</li> <li>• LooseSoil</li> </ul>	<ul style="list-style-type: none"> <li>• Lawn</li> <li>• FieldGrass</li> <li>• GranularSnow</li> <li>• PowderSnow</li> </ul>
--	--

9. Select or change the LOS Distance Limit.
10. Enter a name for the Project.
11. Enter a Description for the project.
12. Click Save Settings to save the settings.
13. Click Cancel to abandon the changes.

## CALCULATE TAB

The Calculate tab lists the [Shared](#) Function, [Receivers](#) Function, [Parallel Barrier](#) (Calculate Section) Function, and [Parallel Barrier](#) (Calculate Section) Function

The Parallel Barrier Calculate Section Function allows the user to define a section line between two parallel barriers and calculate the degradation of sound levels taking into consideration the sound way bouncing between those two parallel barriers.

1. To initiate the section line, press the Calculate Section button.
2. Hover your cursor over the point at which you want to begin the section line.
3. Click the left mouse button once to start the section line and move the cursor to the final end position and click the left mouse button a second time.
4. View the resulting calculation.

Input Checking Function functions. After setting up a project and applying all the needed features to the map, you can calculate the noise level of traffic via noise receivers that have been strategically placed in the area of interest. These calculations are used to assist in the design of noise barriers.



Figure 12 Calculate Tab

### SHARED FUNCTION

The Shared Function contains the Cancel Calculation button. The Cancel Calculation button is enabled when a calculation is running and disabled when a calculation is not running. Click the Cancel Calculation to cancel a running calculation.

### RECEIVERS FUNCTION

The Receivers Function contains the Set Active, All Receivers, and Active Receivers buttons.

1. The Set Active options allow you to toggle the activation of receivers to be used for the calculate functions.
2. To calculate all active and inactive receivers click the All Receivers button.
3. To calculate only the active receivers, click the Active Receivers button.

### PARALLEL BARRIER (CALCULATE SECTION) FUNCTION

The Parallel Barrier Calculate Section Function allows the user to define a section line between two parallel barriers and calculate the degradation of sound levels taking into consideration the sound way bouncing between those two parallel barriers.

5. To initiate the section line, press the Calculate Section button.
6. Hover your cursor over the point at which you want to begin the section line.
7. Click the left mouse button once to start the section line and move the cursor to the final end position and click the left mouse button a second time.
8. View the resulting calculation.

## INPUT CHECKING FUNCTION

The Input Checking Function contains the Check Inputs button. Click the button to validate the project data that has been input.

---

## BARRIER ANALYSIS TAB

The Barrier Analysis tab is used when analyzing the different features of barriers that have been applied to the project. The Barrier Analysis tab list the [Mode](#) Function, [Current Analysis](#) Function, and [Existing Analysis](#) Function functions. The user cannot begin to employ the Barrier Analysis Tab tools until they have completed a model run and can now analyze the results of that model.



*Figure 13 Barrier Analysis Tab*

## MODE FUNCTION

The Mode Function contains the Start Analysis button. To start an analysis of the barriers for your project click the Start Analysis button. The results of this action will be to set up a

[Plan View](#) window next to a [3D View](#) window with the TNM objects in the project that were just analyzed. At the bottom of the interface the user will see the Barrier Design Table appear with data on Receivers, Barriers, and Roadways. Along the right side of the interface the Barrier Analysis Tool window appears listing each segment of barriers.

After the Barrier Analysis workflows complete, and the user wants to resume their other TNM activities, they would press the End Analysis button.

## CURRENT ANALYSIS FUNCTION

The Current Analysis Function contains the Remember button. The Remember button allows the user to save different barrier analysis designs to identify which would provide the optimal results. To save your current analysis click the Remember button. You will be prompted to enter a name for the analysis file. Only the Name is for the analysis as it is stored in the Project on your local database.

The LOS (Line of Sight) Check function enables the user to validate if the user's barrier design properly breaks the line of sight between the receiver and the roadway. The results provide graphic lines connecting the receivers selected for the analysis to the barriers identified for the analysis. The user must select at least one receiver and one barrier segment for this function to operate. Green graphic rays are properly breaking the line of sight. Yellow graphic rays indicate a partial obstruction, while Red graphic rays indicate a lack of obstruction.

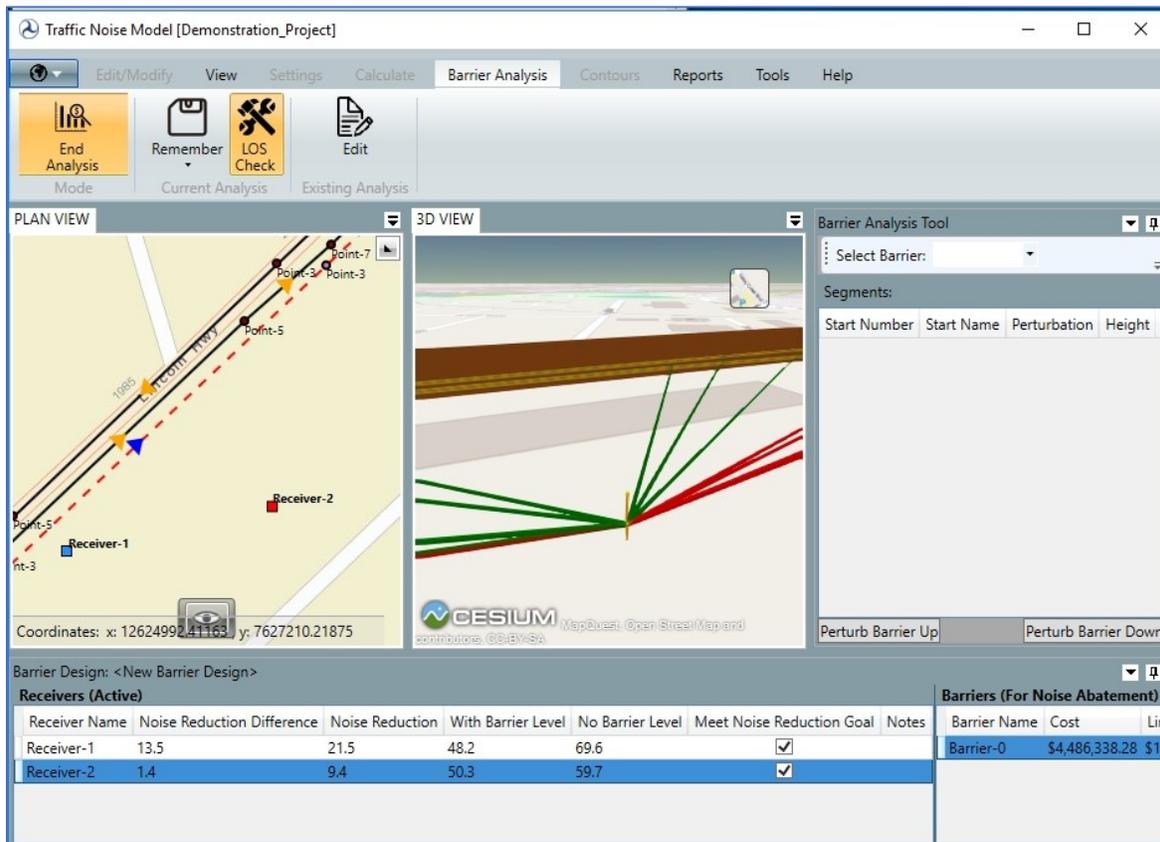


Figure 14 TNM Workspace with Line-of-Sight Check and End Analysis Buttons

## **EXISTING ANALYSIS FUNCTION**

The Existing Analysis function contains the Edit button (see Figure 13). To edit the existing analysis, click the Edit button. The Load Barrier Analysis Edit dialog box appears.

## CONTOURS TAB

The Contours tab is used only after a contour has been selected.

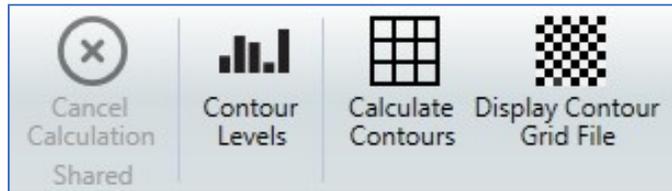


Figure 15 Contours Tab

## CONTOUR LEVELS FUNCTION

The Contour Levels Function allows the user to establish the range of contours that would be drawn based on the noise model outputs.

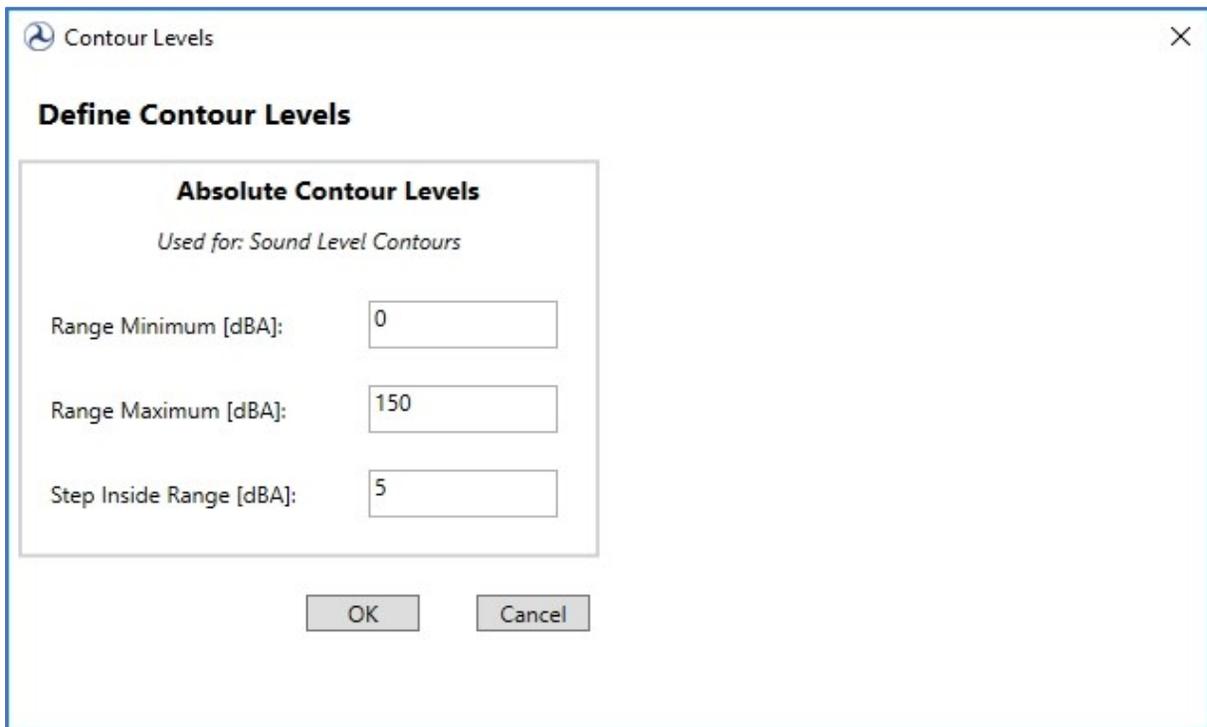


Figure 16 Contour Levels Dialog Box

## CALCULATE CONTOURS FUNCTION

The Contours Function contains the Calculate Contours button and the Display Contour Grid File.

Pressing the Calculate Contours will initiate contour calculations. The

[Object Details](#) Pane will switch to the [Calculation Results Detail](#) Sub-pane so that you can track progress. Once the contour is calculated, the grid file will automatically be saved. Once a contour has been generated and the project closed, the contour can be redisplayed by clicking on the Display Contour Grid File icon and selecting the appropriate grid file.

---

## REPORTS TAB

The Reports Tab lists the [Input Reports](#) Function and [Result Reports](#) Functionfunctions. Each Report function contains links to reports that are visible in the

[Report](#) View window.

## **INPUT REPORTS FUNCTION**

The Input Reports Function contains links to Input Reports. Click any report link to view the report in the

[Report](#) View window. The following Input Reports are listed:

- Receivers
- Barriers
- Ground Zones
- Roadways
- Receiver Adjustment Factors
- On-Structure Barriers
- Tree Zones
- Traffic for TNM Vehicles
- Terrain Lines
- Reflecting Barriers
- Contour Zones
- Traffic for User Defined Vehicles
- Building Rows

## **RESULT REPORTS FUNCTION**

The Result Reports Function contains links to Result Reports. Click any report link to view the report in the

[Report](#) View window. The following Result Reports are listed:

- Sound Levels - No Barrier Objects
- Sound Levels Diagnosis by Barrier Segment
- Sound Levels - Input Heights
- Sound Levels Diagnosis by Vehicle Type - Input Heights
- Barrier Descriptions
- Sound Levels Diagnosis by Road Segment
- Barrier - Segment Descriptions

## TOOLS TAB

The Tools tab lists [Navigation History](#) Function and [Measure](#) Function functions. **At present, these functions are currently only available when using the ESRI runtime license.**



Figure 17 Tools Tab (ESRI only)

## NAVIGATION HISTORY FUNCTION

Navigation allows you to view Previous and Next Bookmarks. The Previous and Next buttons cycle recent map locations in the [View Panes](#).

To navigate to the previous and next map location click the Previous button  to go back and click the Next button  to go to the next map location.

## MEASURE FUNCTION

1. Click either the Measure Feet or Measure Meters button.
2. Hover your cursor over the point at which you want to begin measuring a distance.
3. Click your left mouse button once to begin the measuring line.
4. Drag your mouse to the location at which you want to end measuring the distance, noting that the current distance is labelled at the beginning, along, and at the end of the graphic measurement line.
5. Single click the left mouse button to end that measure segment and continue with another segment, or,
6. Double click the left mouse button to end that measurement line.
7. View the resulting measurement line graphic, its distance label at its origin point, and the new entry at the bottom of the Legend pane.
8. Toggle the visibility on or off of a measurement line by checking or unchecking the corresponding box in the Legend.
9. Reduce or increase the measurement line graphics transparency by using the corresponding transparency slider bar.

**NOTE, THE TIME BETWEEN CLICKS FOR THE DOUBLE CLICK NEEDS TO BE ABOUT 1/2 SECOND OR LONGER TO EXIT THE MEASUREMENT MODE.**

---

## HELP TAB

The Help Tab contains a link to the online Help (i.e. this document) for TNM. Click the Help button to access the online Help.



*Figure 18 Help Tab*

---

## LEGEND PANE

The Legend Pane displays the layers and/or features that have been added to a project map. When you apply a feature to the map, such as a roadway, it will be listed in the Legend Pane. Once a feature is listed in the Legend Pane, you can choose whether to have that feature viewable on the map and you can increase or decrease its transparency.

### To enable/disable legend features on the map:

1. Click the check-box next the feature in the Legend Pane.
  2. To view the feature, ensure the check-box is checked.
  3. To adjust the transparency of the legend item on the map use the slider bar  by sliding it left to increase transparency and right to decrease transparency.
  4. To remove the feature from the map, un-check the check-box.
-

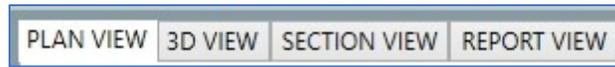
## VIEW PANE

The View Pane display the map and associated map data using different visualization methods. The View Pane is comprised of the following four sub-panes used to represent project data in various visualization forms:

[Plan View](#), [3D View](#), [Section View](#), and

[Report View](#).

**To select a View Sub-pane:**



*Figure 19 View Pane Tabs*

1. Click the sub-pane or click the down arrow  in the right corner of the sub-pane.

## PLAN VIEW

The Plan View sub-pane displays the map in a top-down 2D format in which the user designs projects. The majority of project design is done in the Plan View.

### To view the map in Plan View:

1. Click the Plan View sub-pane. The map will be displayed.
2. Click and hold the left mouse button and drag the mouse to pan the map left or right.
3. Roll the mouse wheel to zoom in and out of the section view.
4. Click right mouse button to bring up a drop-down list of the following functions:
  - Zoom to Best View
  - Clear Selection
  - Select All
  - Select All of Type: Receivers, Barriers, Roadways, Terrain lines, Building Rows, Tree Zones, Ground Zones, or Contour Zones

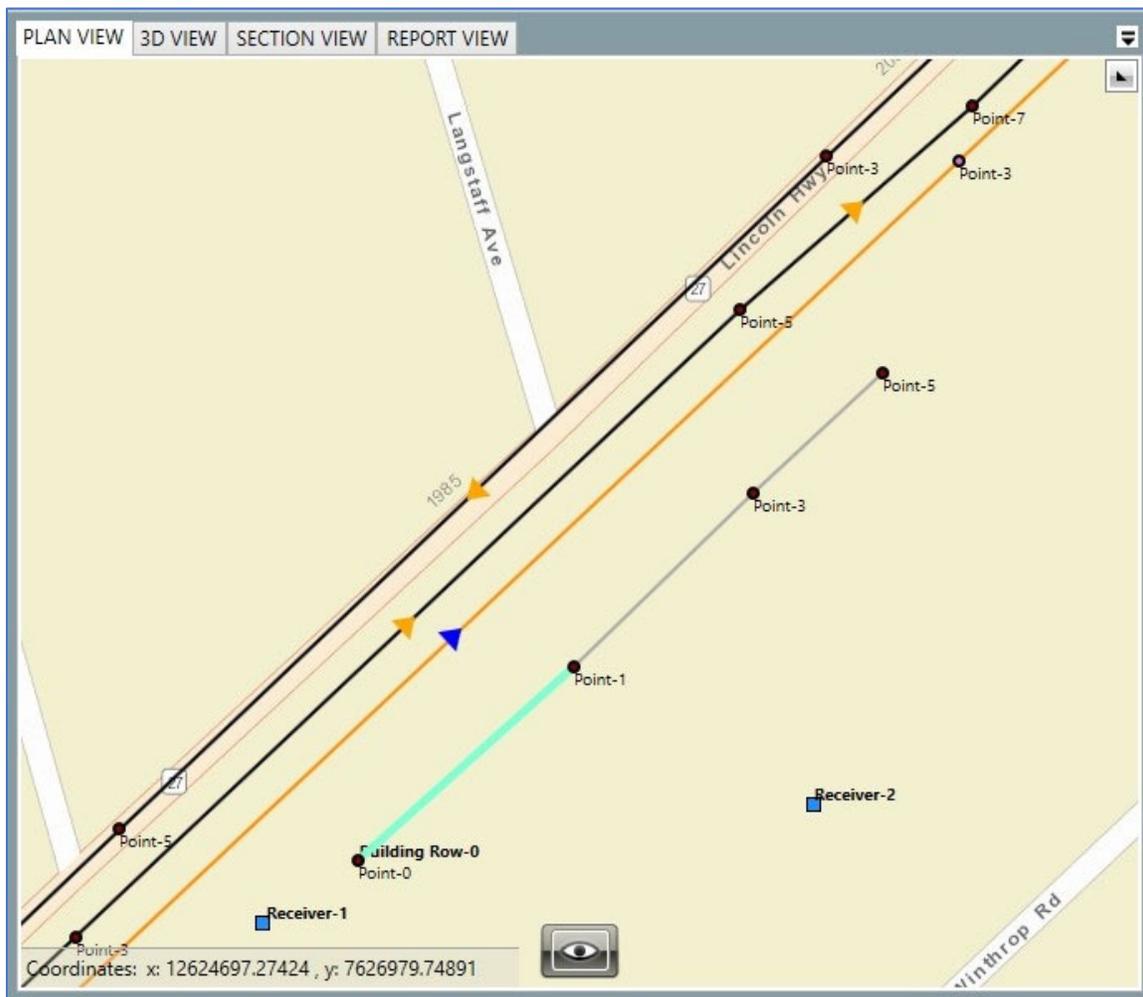


Figure 20 Plan View

## 3D VIEW

The 3D View sub-pane displays the map in a three-dimensional format. The 3D view is a three-dimensional representation of the 2D view. Viewing the map in 3D allows you to see contours and heights of terrain.

### To view the map in 3D view:

1. Click the 3D View sub-pane. The map will be displayed in a three-dimensional format.
2. Click and hold the right mouse button and drag the mouse to pan the map left or right.
3. Click and hold the middle mouse wheel and drag the mouse to rotate the map on an axis.
4. Click and Hold the left mouse button and drag the mouse to zoom in and zoom the map.



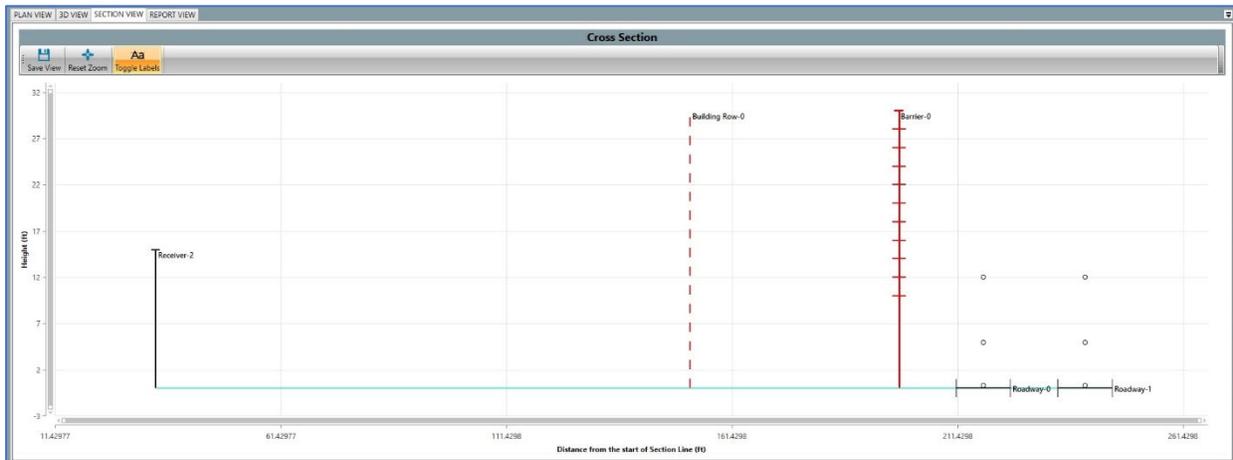
Figure 21 3D View

## SECTION VIEW

The Section View sub-pane displays a cross section of the map where sector lines have been drawn using the Start Selection Function. The Section View is used to show distances and elevation changes.

### To view the map in Section view:

1. Click the Start Section icon in the Basic Tools.
2. Click with the left mouse button in the plan view.
3. Move the cursor, drawing a sector line through the objects that you want to see in the Section View.
4. Click with the left mouse button in the plan view again to end the cut.
5. The Section view will display the cross section selected.
6. Roll the mouse wheel to zoom in and out of the section view.



**Figure 22 Section View**



## EDIT PANE

The Edit Pane contains all of the editing functions for TNM object default values. To edit default values, click the Edit tab in the Tools Window. The following editing functions are listed:



- Editing Receivers



- Editing Barrier Defaults



- Editing Roadway Defaults



- Editing Terrain Line Defaults



- [Editing](#) Building Row Defaults



- [Editing](#) Tree Zone Defaults
- Editing [Ground Zone](#) Defaults
-  [Editing Contour](#) Zone Defaults

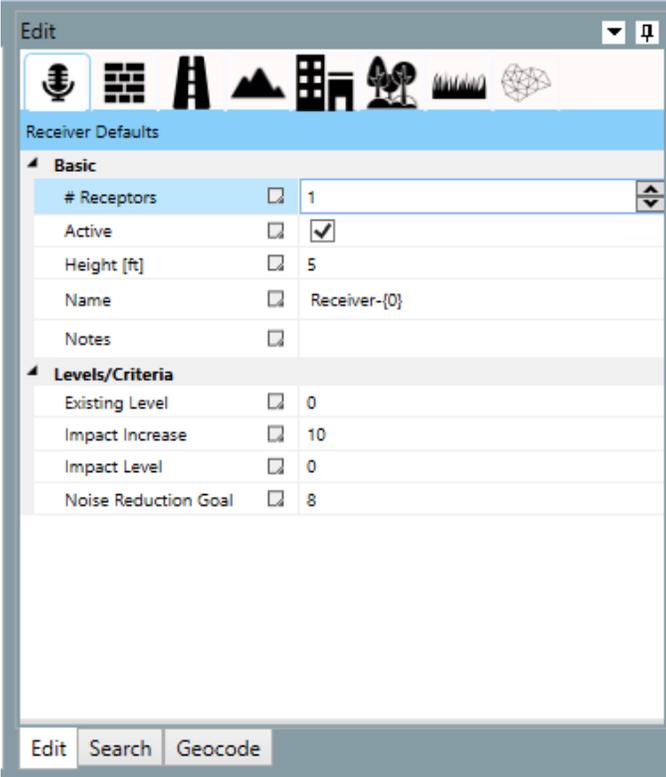
Click each function for more information.

## EDITING RECEIVERS

The Edit Receivers Pane provides functions to edit receiver defaults for all receivers that **have not** yet been added to the map. Default changes will not apply to receivers that have already been added to the map.

### Edit Receivers Pane

To edit receiver defaults, click the Receiver icon  .



The screenshot shows the 'Edit Receiver Pane' window. At the top, there is a toolbar with several icons, including a microphone icon. Below the toolbar is the 'Receiver Defaults' section, which is divided into two sub-sections: 'Basic' and 'Levels/Criteria'. The 'Basic' section contains a table with the following fields:

Field	Value
# Receptors	1
Active	<input checked="" type="checkbox"/>
Height [ft]	5
Name	Receiver-{0}
Notes	

The 'Levels/Criteria' section contains a table with the following fields:

Field	Value
Existing Level	0
Impact Increase	10
Impact Level	0
Noise Reduction Goal	8

At the bottom of the pane, there are three buttons: 'Edit', 'Search', and 'Geocode'.

Figure 24 Edit Receiver Pane

### TO EDIT THE BASIC FEATURES OF A RECEIVER

1. Enter or use the up/down arrows  in the fill box to change the # of Receptors.
2. Check or Un-check the Active check-box.
3. Enter or use the up/down arrows  in the fill box to change the height of the selected receiver.
4. Enter or use the up/down arrows  in the fill box to change the Name of the selected receiver.
5. Enter or use the up/down arrows  in the fill box to change any Notes.

### TO EDIT THE LEVELS/CRITERIA FEATURES OF A RECEIVER

1. Enter or use the up/down arrows  in the fill box to change the Existing Level.

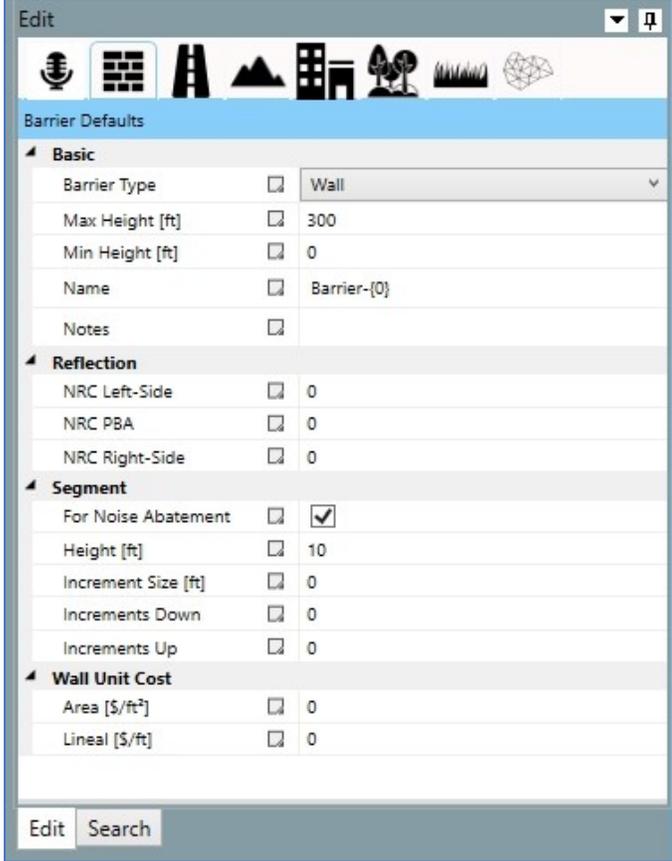
2. Enter or use the up/down arrows  in the fill box to change the Impact Increase.
3. Enter or use the up/down arrows  in the fill box to change the Impact Level.
4. Enter or use the up/down arrows  in the fill box to change the Noise Reduction Goal.

## EDITING BARRIER DEFAULTS

The Edit Barriers Pane provides functions to edit barrier defaults for all barriers that **have not** yet been added to the map. Default changes will not apply to barriers that have already been added to the map.

### Edit Barriers Pane

To edit barrier defaults, click the Barrier icon .



Barrier Defaults		
<b>Basic</b>		
Barrier Type	<input type="checkbox"/>	Wall
Max Height [ft]	<input type="checkbox"/>	300
Min Height [ft]	<input type="checkbox"/>	0
Name	<input type="checkbox"/>	Barrier-{0}
Notes	<input type="checkbox"/>	
<b>Reflection</b>		
NRC Left-Side	<input type="checkbox"/>	0
NRC PBA	<input type="checkbox"/>	0
NRC Right-Side	<input type="checkbox"/>	0
<b>Segment</b>		
For Noise Abatement	<input checked="" type="checkbox"/>	
Height [ft]	<input type="checkbox"/>	10
Increment Size [ft]	<input type="checkbox"/>	0
Increments Down	<input type="checkbox"/>	0
Increments Up	<input type="checkbox"/>	0
<b>Wall Unit Cost</b>		
Area [\$/ft <sup>2</sup> ]	<input type="checkbox"/>	0
Lineal [\$/ft]	<input type="checkbox"/>	0

Figure 25 Edit Barrier Pane

### TO EDIT THE BASIC FEATURES OF A BARRIER

1. Enter or use the up/down arrows  in the fill box to select the Barrier Type.
2. Enter or use the up/down arrows  in the fill box to select the Maximum Height (ft).
3. Enter or use the up/down arrows  in the fill box to select the Minimum Height (ft).
4. Enter or change the Name of the barrier.
5. Enter or change any Notes about the barrier.

**To EDIT THE WALL REFLECTION FEATURES OF A BARRIER**

1. Enter or use the up/down arrows  in the fill box to increase or decrease the NRC Left-Side.
2. Enter or use the up/down arrows  in the fill box to increase or decrease the NRC PBA.
3. Enter or use the up/down arrows  in the fill box to increase or decrease the NRC Right-Side.

**To EDIT THE SEGMENT FEATURES OF A BARRIER**

1. Check or un-check the check-box to apply the For Noise Abatement feature.
2. Enter or use the up/down arrows  in the fill box to select the Height in feet (ft).
3. Enter or use the up/down arrows  in the fill box to increase or decrease the Increment Size (ft).
4. Enter or use the up/down arrows  in the fill box to increase or decrease the Increments Down.
5. Enter or use the up/down arrows  in the fill box to increase or decrease the Increments Up.

**To EDIT THE WALL UNIT COST OF A BARRIER**

1. Enter or use the up/down arrows  in the fill box to increase or decrease the Area dollar amount per square foot (\$/ft<sup>2</sup>).
2. Enter or use the up/down arrows  in the fill box to increase or decrease the Lineal dollar amount per linear foot (\$/ft).

## EDITING ROADWAY DEFAULTS

The Edit Roadways pane provides functions to edit roadway defaults for all roadways that **have not** yet been added to the map. Default changes will not apply to roadways that have already been added to the map.

### Edit Roadways Pane

To edit roadway defaults, click the Roadway icon .

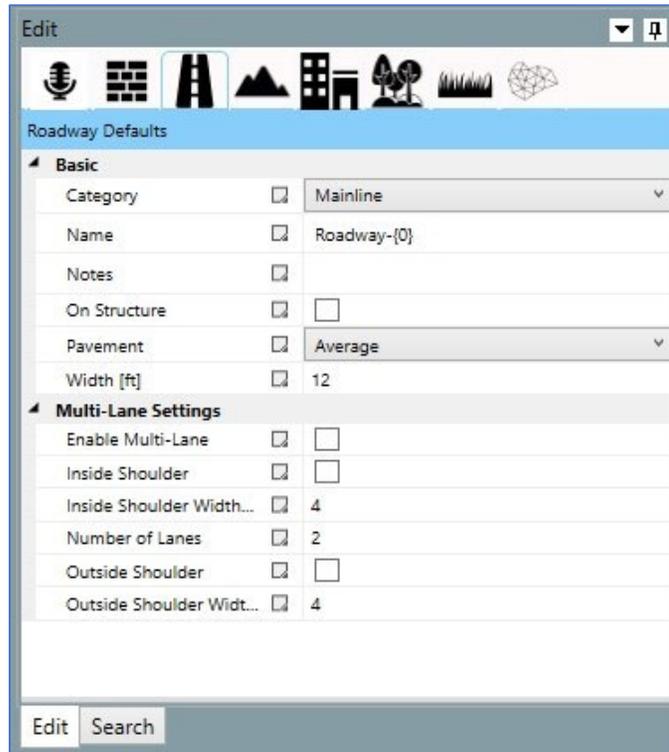


Figure 26 Edit Roadway Pane

### TO EDIT THE BASIC FEATURES OF ROADWAYS

1. Use the drop-down list to select or change the Category. Choose from:
  - Mainline
  - Ramp
  - Shoulder
2. Enter or change the Name of the roadway.
3. Enter or change any Notes for the roadway.
4. Check or un-check the check-box to apply the On Structure feature.
5. Use the drop-down list to select or change the roadway Surface. Choose from the following Pavement types:

- Average
- DenseGradedAsphalt
- OpenGradedAsphalt
- PortlandConcrete

6. Enter or use the up/down arrows  in the fill box to select or change the Roadway Width.

## **To EDIT THE MULTI-LANE SETTINGS OF ROADWAYS**

1. Check or un-check the check box to Enable Multi-Lane settings.
2. Check or un-check the check box to indicate the presence of an Inside Shoulder.
3. Enter the value of the Inside Shoulder Width.
4. Enter the number of lanes in the Number of Lanes row.
5. Check or un-check the check box to indicate the presence of an Outside Shoulder.
6. Enter the value of the Outside Shoulder Width.

## EDITING TERRAIN LINE DEFAULTS

The Edit Terrain Lines pane provides functions to edit terrain line defaults for all terrain lines that **have not** yet been added to the map. Default changes will not apply to terrain lines that have already been added to the map.

### Edit Terrain Lines Pane

To edit terrain line defaults, click the Terrain Line icon .

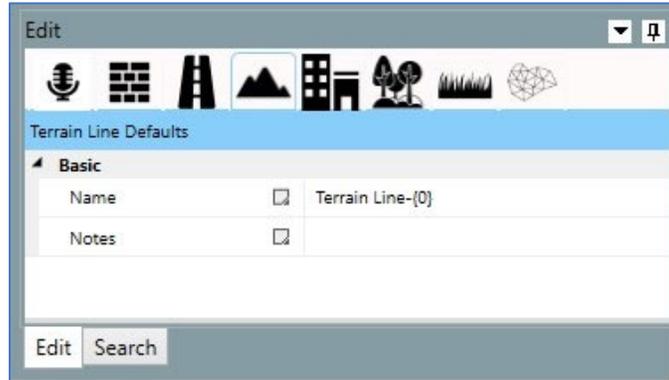


Figure 27 Edit Terrain Line Pane

### TO EDIT THE BASIC FEATURES OF TERRAIN LINES

1. Enter or change the Name of the terrain line.
2. Enter or change any Notes for the terrain line.

## EDITING BUILDING ROW DEFAULTS

The Edit Building Row pane provides functions to edit building row defaults for all building rows that **have not** yet been added to the map. Default changes will not apply to building rows that have already been added to the map.

### Edit Building Row Pane

To edit Building Row defaults, click the Building Row icon .

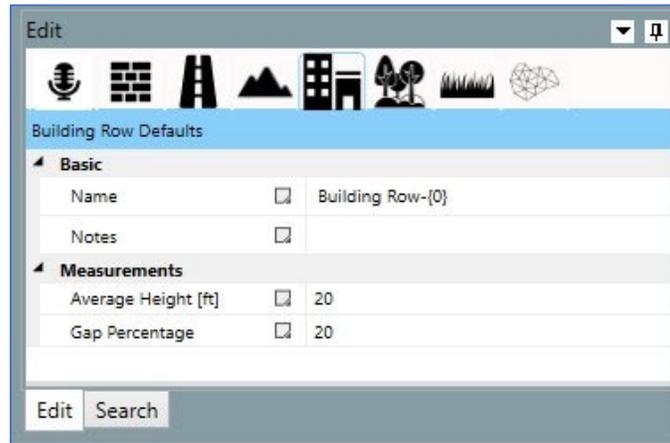


Figure 28 Edit Building Row Pane

### TO EDIT THE BASIC FEATURES OF BUILDING ROWS

1. Enter or change the Name of the building row.
2. Enter or change any Notes for the building row.

### TO EDIT THE MEASUREMENTS FEATURES OF BUILDING ROWS

1. Enter or use the up/down arrows  in the fill box to increase or decrease the Average Height.
2. Enter or use the up/down arrows  in the fill box to increase or decrease the Gap Percentage.

## EDITING TREE ZONE DEFAULTS

The Edit Tree Zones pane provides functions to edit tree zone defaults for all tree zones that **HAVE NOT** yet been added to the map. Default changes will not apply to tree zones that have already been added to the map.

### Edit Tree Zones Pane

To edit tree zone defaults, click the Tree Zone icon .

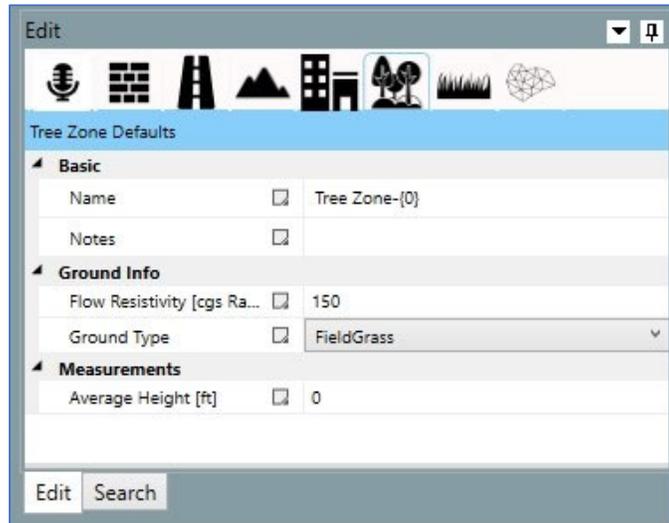


Figure 29 Edit Tree Zone Pane

### TO EDIT THE BASIC FEATURES OF TREE ZONES

1. Enter or change the Name of the tree zone.
2. Enter or change any Notes for the tree zone.

### TO EDIT THE GROUND INFO FEATURES OF TREE ZONES

1. Enter or use the up/down arrows  in the fill box to select the Flow Resistivity.
2. Use the drop-down list to select or change the Ground Type. Choose from:
  - Custom
  - Pavement
  - Water
  - HardSoil
  - LooseSoil
  - Lawn
  - FieldGrass
  - GranularSnow
  - PowderSnow

### TO EDIT THE MEASUREMENTS FEATURE OF TREE ZONES

1. Enter or use the up/down arrows  in the fill box to select the Average Height in feet (ft).

## EDITING GROUND ZONE DEFAULTS

The Edit Ground Zones pane provides functions to edit ground zones defaults for all ground zones that **have not** yet been added to the map. Default changes will not apply to ground zones that have already been added to the map.

### Edit Ground Zones Pane

To edit Ground Zone defaults, click the Ground Zone icon .

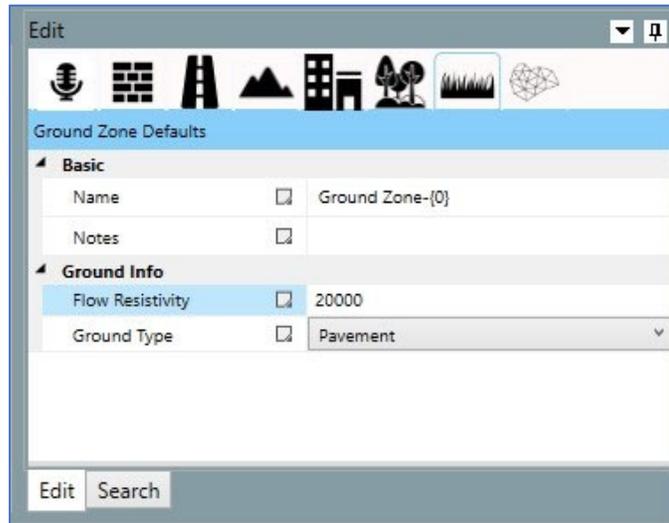


Figure 30 Edit Ground Zone Pane

### TO EDIT THE BASIC FEATURES OF GROUND ZONES

1. Enter or change the Name of the ground zone.
2. Enter or change any Notes for the ground zone.

### TO EDIT THE GROUND INFO OF GROUND ZONES

1. Enter or use the up/down arrows  in the fill box to select the Flow Resistivity.
2. Use the drop-down list to select or change the Ground Type. Choose from:
  - Custom
  - Pavement
  - Water
  - HardSoil
  - LooseSoil
  - Lawn
  - FieldGrass
  - GranularSnow
  - PowderSnow

## EDITING CONTOUR ZONE DEFAULTS

The Edit Contour Zone pane provides functions to edit contour zone defaults for all contour zones that **have not** yet been added to the map. Default changes will not apply to contour zones that have already been added to the map.

### Edit Contour Zone Pane

To edit Contour Zone defaults, click the Contour Zones icon .

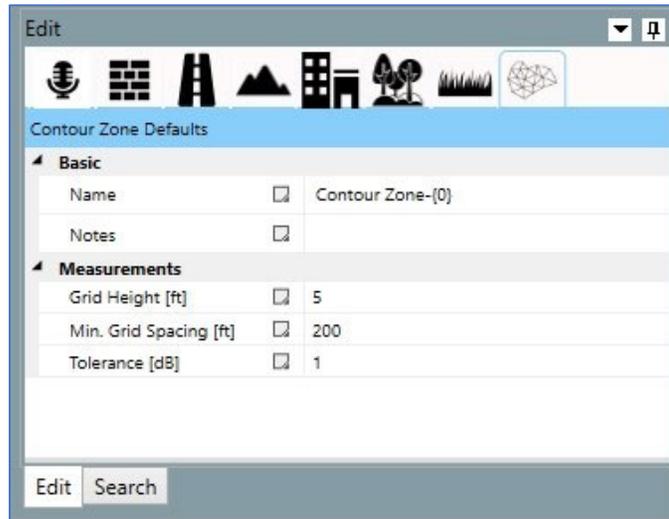


Figure 31 Edit Contour Zone Pane

### TO EDIT THE BASIC FEATURES OF CONTOUR ZONES

1. Enter or change the Name of the contour zone.
2. Enter or change any Notes for the contour zone.

### TO EDIT THE MEASUREMENTS OF CONTOUR ZONES

1. Enter or use the up/down arrows  in the fill box to increase or decrease the Grid Height.
2. Enter or use the up/down arrows  in the fill box to increase or decrease the Min. Grid Spacing.
3. Enter or use the up/down arrows  in the fill box to increase or decrease the Tolerance value.

## SEARCH PANE

The Search Pane is actually comprised of two tabs including [Search](#) and

Geocode functions. Click each sub-pane for more information.

- [Search](#)
-

- [Geocode](#)

---

## SEARCH TAB

The default active sub-pane is Search, which is used to search for items that have been added to the map.

### TO SEARCH FOR AN ITEM

1. Click the Search sub-pane in the Tools window. The Search interface appears.



*Figure 32 Search Sub-pane*

2. Type the name of the item you want to search for.
3. Click the hourglass icon  or hit Enter on the keyboard to begin the search. Results matching your search criteria will display.
4. Click a result to view it on the map.

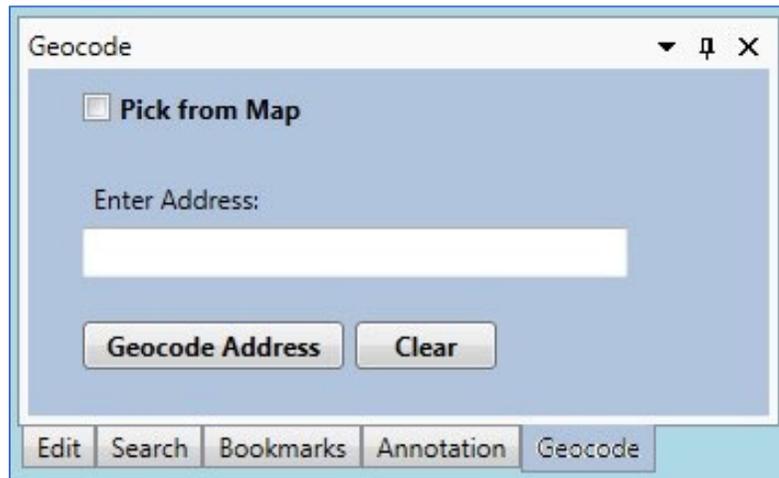
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## GEOCODE TAB

The Geocode Sub-pane is used to obtain Geocode addresses from a location on the map. **At present, this sub-pane is only available when using the ESRI runtime license.**

### TO OBTAIN A GEOCODE ADDRESS

1. Click the Geocode sub-pane in the Tools window. The Geocode interface appears.

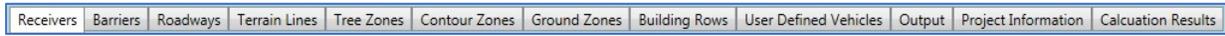


*Figure 33 Geocode Sub-pane (ESRI only)*

2. Check the Pick from Map check-box to obtain a geocode address from a selected point on the map.
  3. Click a point on the map. The Geocode Address displays.
  4. Enter an address to obtain the Geocode Address from a known address.
  5. Click the Geocode Address button. The Geocode Address displays.
-

# OBJECT DETAILS PANE

The Object Details Pane lists the details for each feature that has been added to the project map.



*Figure 34 Object Details Pane Menu*

The Detail panes consist of the following sub-panes:

- [Receivers Detail Sub-pane](#)
- [Barriers Detail Sub-pane](#)
-

- [Roadways Detail Sub-pane](#)
- [Terrain Lines Detail Sub-pane](#)
- [Tree Zones Detail Sub-pane](#)
- [Contour Zones Detail Sub-pane](#)
- [Ground Zones Detail Sub-pane](#)
- [Building Rows Detail Sub-pane](#)
- [User Defined Vehicles Detail Sub-pane](#)
- [Output Detail Sub-pane](#)
- [Project Information Detail Sub-pane](#)
- [Calculation Results Detail Sub-pane](#)

---

## TNM DATA ENTRY EFFICIENCY TIPS

TNM provides multiple techniques and tools that assist users in entering the attribute values for objects to reduce the time necessary to set up complex models. Here are a few tips:

- When editing roadway object segment attributes in the lower data grid, TNM 3.0 allows users to click the Copy Down button for repetitive Traffic attribute copying and pasting full rows of values.
- TNM 3.0 allows the user to select one or more rows from the lower data grid for an object, use Ctrl-C to copy the data, and then in an active MS Excel spreadsheet use Ctrl-P to paste the data into the spreadsheet including the column headings.
- TNM 3.0 allows the user when editing Receivers to establish rows of properly structured values in MS Excel, use Ctrl-C to copy the rows of data in MS Excel, and then in the TNM Receiver data grid the user selects a current row in the Receivers tab, uses Ctrl-P to paste the new row into the table. Please note that due to the need to preserve proper geometries of more complex line and polygon objects, this paste function is limited to only Receivers, whose geometry is a single point, and not the other line and polygon objects.

---

## RECEIVERS DETAIL SUB-PANE

The Receivers Detail sub-pane contains the details for each receiver that has been added to the project map. You can view and edit the Receivers, Level/Criteria, Adjustments 1, Adjustments 2, and Notes of each receiver.

### TO VIEW AND EDIT THE RECEIVERS THAT HAVE BEEN ADDED TO THE PROJECT MAP

1. Click the Receivers Detail sub-pane.
2. Click Receivers in the left column to view the list of receivers.

3. Click Level/Criteria in the left column to view and edit the level/criteria of the receivers.
4. Click Adjustments Factors in the left column to view and edit adjustment factors for specific receiver/roadway pairings.

---

## **BARRIERS DETAIL SUB-PANE**

The Barriers Detail sub-pane contains the details for each barrier that has been added to the project map. You can view and edit the General settings, Points, Segments, Structure, and Reflections of each barrier.

### **TO VIEW AND EDIT THE BARRIERS THAT HAVE BEEN ADDED TO THE PROJECT MAP**

1. Click the Barriers Detail sub-pane.
2. Click Barrier in the left column to view and edit the general settings of each barrier.
3. Click Points in the left column to view and edit the points of each barrier.
4. Click Segments in the left column to view and edit each point of a barrier.
5. Click Structure in the left column to view and edit the structure of each barrier.
6. Click Reflections in the left column to view and edit the reflections of each barrier.

---

## ROADWAYS DETAIL SUB-PANE

The Roadways Detail sub-pane contains the details for each roadway that has been added to the project map. You can view and edit the Roadways, Points, Segments, Traffic, Flow Control, and Notes.

### TO VIEW AND EDIT THE ROADWAYS THAT HAVE BEEN ADDED TO THE PROJECT MAP

1. Click the Roadways Detail sub-pane.
2. Click Roadways in the left column to view and edit the list of roadways.
3. Click Points in the left column to view and edit the points of each roadway.
4. Click Segments in the left column to view and edit the segments of each roadway.
5. Click Traffic in the left column to view and edit traffic of each roadway.
6. Click Flow Control in the left column to view and edit the flow control of each roadway.

---

## TERRAIN LINES DETAIL SUB-PANE

The Terrain Lines Detail sub-pane contains the details for each terrain line that has been added to the project map. You can view and edit the Terrain Lines, General settings, and Notes.

### TO VIEW AND EDIT THE TERRAIN LINES THAT HAVE BEEN ADDED TO THE PROJECT MAP

1. Click the Terrain Lines Detail sub-pane.
2. Click Terrain Lines in the left column to view and edit the list of terrain lines.
3. Click Points in the left column to view and edit the points of each terrain line.
4. Click Segments in the left column to view and edit the segments of each terrain line.

---

## TREE ZONES DETAIL SUB-PANE

The Tree Zones Detail sub-pane contains the details for each tree zone that has been added to the project map. You can view and edit the Tree Zones, Points, and Notes.

### TO VIEW AND EDIT THE TREE ZONES THAT HAVE BEEN ADDED TO THE PROJECT MAP

1. Click the Tree Zones Detail sub-pane.
2. Click Tree Zones in the left column to view and edit the list of tree zones.
3. Click Points in the left column to view and edit the points of each tree zone.
4. Click Segment in the left column to view and edit the segments of each tree zone.

---

## CONTOUR ZONES DETAIL SUB-PANE

The Contour Zones Detail sub-pane contains the details for each contour zone that has been added to the project map. You can view and edit the Contour Zones and Points.

### **TO VIEW AND EDIT THE CONTOUR ZONES THAT HAVE BEEN ADDED TO THE PROJECT MAP**

1. Click the Contour Zones Detail sub-pane.
2. Click Contour Zones in the left column to view and edit the list of contour zones.
3. Click Points in the left column to view and edit the points of each contour zone.
4. Click Segments in the left column to view and edit the segments of each contour zone.

---

## GROUND ZONES DETAIL SUB-PANE

The Ground Zones Detail sub-pane contains the details for each ground zone that has been added to the project map. You can view and edit the Ground Zones, General settings, and Notes.

### **TO VIEW AND EDIT THE GROUND ZONES THAT HAVE BEEN ADDED TO THE PROJECT MAP**

1. Click the Ground Zones Detail sub-pane.
2. Click Ground Zones in the left column to view and edit the list of ground zones.
3. Click Points in the left column to view and edit the points of each ground zone.
4. Click Segments in the left column to view and edit the segments of each ground zone.

---

## BUILDING ROWS DETAIL SUB-PANE

The Building Rows Detail sub-pane contains the details for each building row that has been added to the project map. You can view and edit the Building Rows, Points, and Notes.

### **TO VIEW AND EDIT THE BUILDING ROWS THAT HAVE BEEN ADDED TO THE PROJECT MAP**

1. Click the Building Rows Detail sub-pane.
2. Click Building Rows in the left column to view and edit the list of building rows.
3. Click Points in the left column to view and edit the points of each building row.
4. Click Segments in the left column to view and edit the segments of each building row.

---

## **USER DEFINED VEHICLES DETAIL SUB-PANE**

The User Defined Vehicles Detail sub-pane contains the details for each user defined vehicle that has been added to the project map. You can view and edit the user defined vehicles.

### **TO VIEW AND EDIT THE USER DEFINED VEHICLES THAT HAVE BEEN ADDED TO THE PROJECT MAP**

1. Click the User Defined Vehicles Detail sub-pane.
2. Click UDVs in the left column to view and edit the list of user defined vehicles.

---

## **OUTPUT DETAIL SUB-PANE**

The Output Detail sub-pane is an application log that provides an idea of what is happening at a given moment. The Output Detail sub-pane lists the details for the outputs that were created for the open project.

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## **PROJECT INFORMATION DETAIL SUB-PANE**

The Project Information Detail sub-pane lists the project details for the open project.

---

## **CALCULATION RESULTS DETAIL SUB-PANE**

The Calculation Results Detail sub-pane lists the calculation results of the noise model operations for the open project after the receiver calculations have been generated.

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## DRAWING ON THE MAP

In order to calculate traffic noise levels affecting a specific area several items must be drawn on the map. Items that can be drawn on the map are as follows:

-

- [Adding Receivers to the Map](#)

- [Adding Barriers to the Map](#)
- [Adding Tree Zones to the Map](#)
- 
- [Adding a Roadway to the Map](#)
- [Adding Terrain Lines to the Map](#)
-

- [Adding Ground Zones to the Map](#)
- [Adding Building Rows to the Map](#)
- [Adding Contour Zones to the Map](#)

TNM uses these items to analyze noise emission levels and provides a way to manipulate the items drawn to cause an effect on the traffic noise levels. Without these specific items added to the map, TNM could not model noise levels to assist in the design and development of traffic noise barriers. Click each item above to learn how to draw the feature on the map.

## ADDING RECEIVERS TO THE MAP

In order to calculate traffic noise, receivers must be added to the map. You can add as many receivers to the map as you want to ensure you capture sound frequencies from all of the appropriate locations required to provide a detailed and accurate calculation.

### To add a Receiver

1. Click the Receiver icon . The Receiver Defaults window appears.
2. Hold down the "D" key on the keyboard and click a point on the map where you want to place a Receiver. A blue circle appears at that point indicating that a Receiver has been applied.

Note: To delete the Receiver, right click on the Receiver point and select Delete.

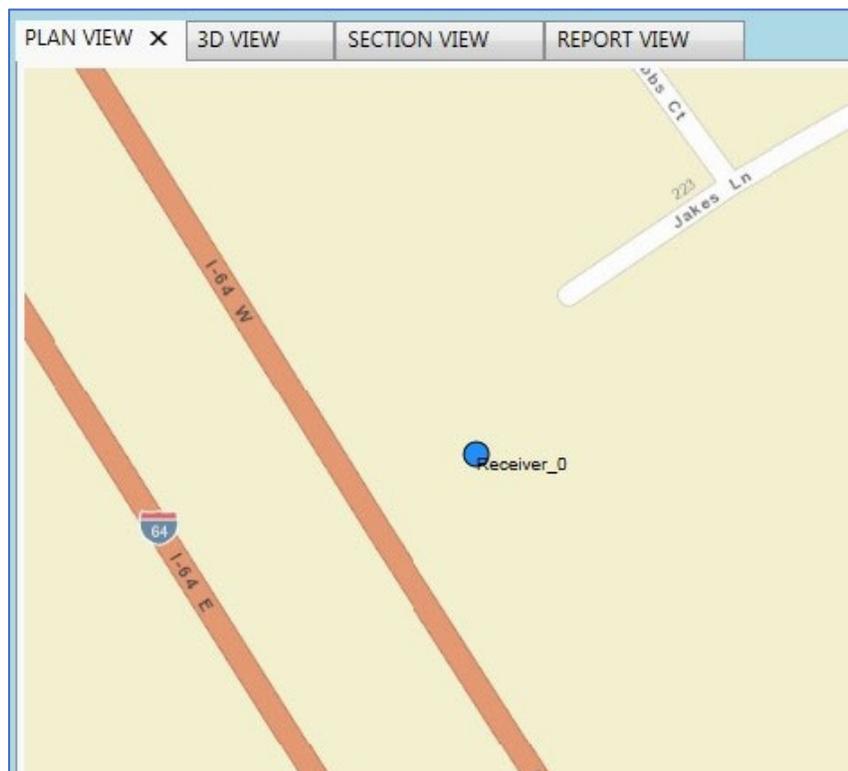


Figure 35 An Added Receiver in Plan View

Now that a Receiver has been added you can edit the details of the Receiver in the Receivers Detail Sub-pane.

## ADDING BARRIERS TO THE MAP

When calculating traffic noise, barriers can be added to the map to help block noise abatements at specific locations. Added barriers can be adjusted to produce the desired level of noise abatement.

### To add a Barrier

1. Click the Barrier icon . The Barrier Defaults window appears.
2. Hold down the "D" key on the keyboard and click a point on the map where you want to begin the Barrier.
3. Continue to hold the "D" key and click a secondary point on the map. A line will appear as you continue to draw the Barrier.
4. Click as many mid-points as you want to draw the Barrier.
5. Double click the end point location for the Barrier. An amber directional line and pink circles appear on the map showing the starting point, mid-points, and end point indicating the barrier has been applied.

Note: To delete the Barrier, right click on the Barrier and select Delete.

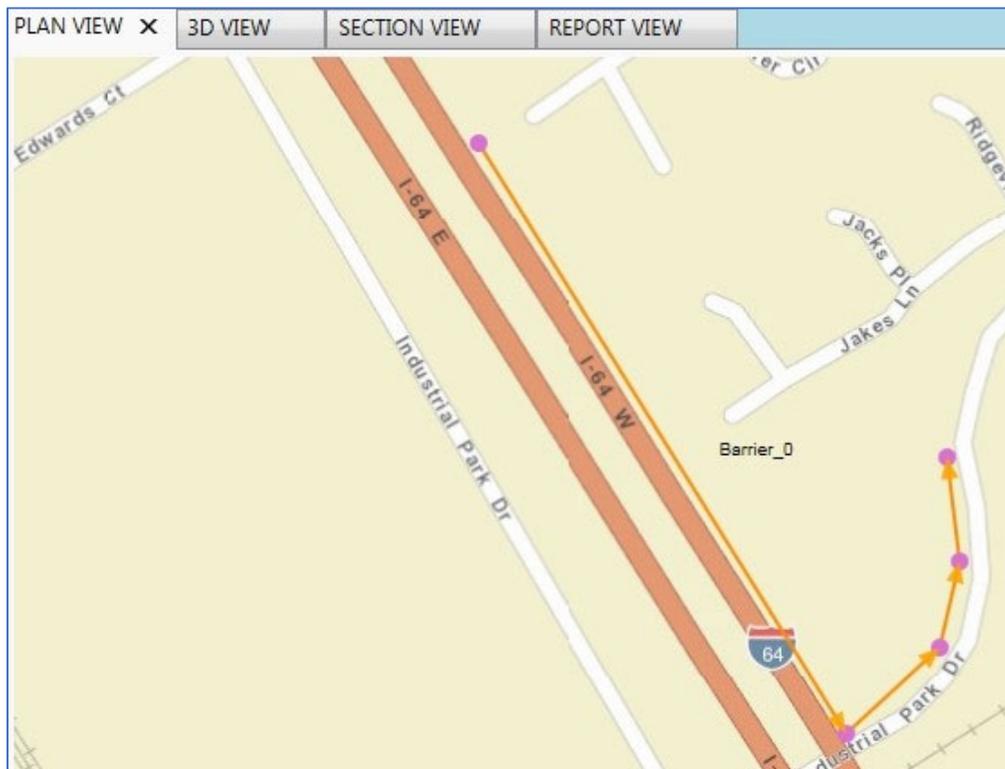


Figure 36 An Added Barrier in Plan View

Now that a Barrier has been added you can edit the details of the Barrier in the Barriers Detail Sub-pane.

## ADDING TREE ZONES TO THE MAP

When calculating traffic noise, Tree Zones can be added to the map to help block noise levels at specific locations. Tree Zones are made up of heavy wooded areas and thick undergrowth located between the roadway and the receiver.

### To add a Tree Zone

1. Click the Tree Zones icon . The Tree Zones Defaults window appears.
2. Hold down the "D" key on the keyboard and click a point on the map where you want to begin the Tree Zone.
3. Continue to hold the "D" key and click a secondary point on the map. A polygon will appear while you continue to draw the Tree Zone.
4. Click as many mid-points as you want to draw the Tree Zone polygon.
5. Double click the end point location for the Tree Zone. A yellow polygon with red circles appears on the map showing the Tree Zone and the mid-points indicating the Tree Zone has been applied.

Note: To delete the Tree Zone, right click on the Tree Zone polygon and select Delete.



Figure 37 An Added Tree Zone in Plan View

Now that a Tree Zone has been added you can edit the details of the Tree Zone in the Tree Zones Detail Sub-pane.

## ADDING A ROADWAY TO THE MAP

Traffic Noise Levels originate from traffic on roadways. As vehicles accelerate and decelerate, the noise emitted increases or decreases based on the contour of the roadway and the direction of traffic flow. To calculate how much noise is emitted from traffic that affects designated areas, a Roadway must be defined to provide a source of the road noise. Each Roadway that is added must be applied directionally (i.e. if a highway has two-way traffic, two roadways with opposite directions must be added to the map).

### To add a Roadway

1. Click the Roadway icon . The Roadway Defaults window appears.
2. Hold down the "D" key on the keyboard and click a point on the map where you want to begin the Roadway.
3. Continue to hold the "D" key and click a secondary point on the map. A line will appear as you continue to draw the Roadway.
4. Click as many mid-points as you want to draw the Roadway.
5. Double click the end point location for the roadway. A black directional line and red circles appear on the map showing the starting point, mid-points, and end point indicating the Roadway has been applied.

Note: For multiple lane roads, individual Roadways must be added equaling the number of lanes on the actual road in the correct direction of traffic flow.

Note: To delete the Roadway, right click on the Roadway and select Delete.

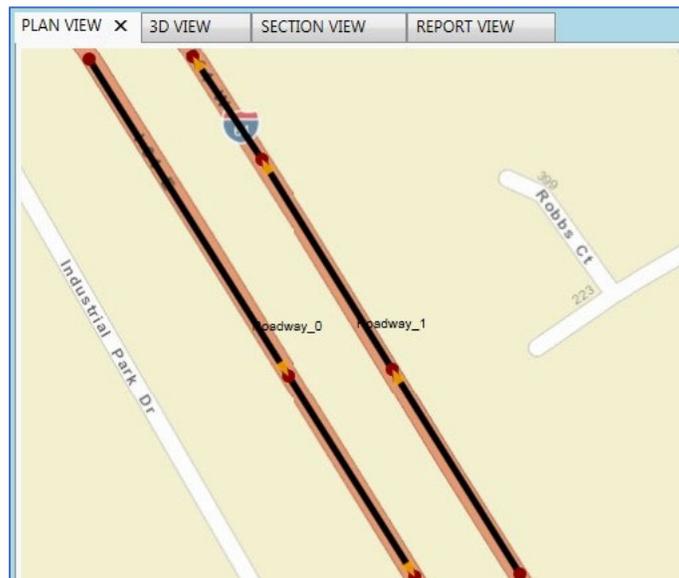


Figure 38 Added Roadways in Plan View

Now that a Roadway has been added you can edit the details of the Roadway in the

Roadways Detail Sub-pane.

## ADDING TERRAIN LINES TO THE MAP

Terrain Lines show the location of surrounding terrain and the horizontal and vertical attributes of the terrain. Terrain lines are used to show where specific areas may be of a certain height or length that they provide barriers or cause an increase in traffic noise levels.

### To add a Terrain Line

1. Click the Terrain Line icon . The Terrain Line Defaults window appears.
2. Hold down the "D" key on the keyboard and click a point on the map where you want to begin the Terrain Line.
3. Continue to hold the "D" key and click a secondary point on the map. A line will appear as you continue to draw the Terrain Line shape.
4. Click as many mid-points as you want to draw the Terrain Line shape.
5. Double click the end point location for the Terrain Line. A polygon with green lines and red circles appear on the map indicating the Terrain Line polygon has been applied.

Note: To delete the Terrain Line, right click on the Terrain Line and select Delete.

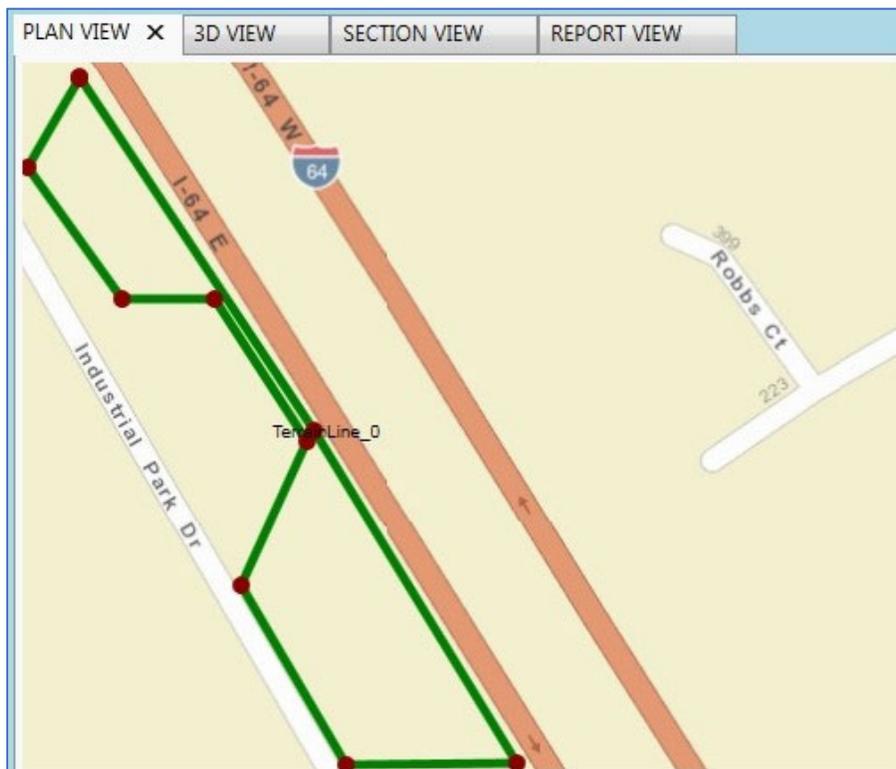


Figure 39 An Added Terrain Line in Plan View

Now that a Terrain Line has been added you can edit the details of the Terrain Line in the Terrain Lines Detail Sub-pane.

## ADDING GROUND ZONES TO THE MAP

Ground Zones are used to define the type of ground located in the area of interest. The ground type of an area has varying acoustical attenuation characteristics that are used when calculating traffic noise levels. For example, a grass covered area provides more sound dampening than a paved area.

### To add Ground Zones

1. Click the Ground Zone icon . The Ground Zone Defaults window appears.
2. Hold down the "D" key on the keyboard and click a point on the map where you want to begin the Ground Zone.
3. Continue to hold the "D" key and click a secondary point on the map. A polygon will appear as you continue to draw the Ground Zone shape.
4. Click as many mid-points as you want to draw the Ground Zone polygon.
5. Double click the end point location for the Ground Zone. A yellow filled polygon with black lines and red circles appear on the map indicating the Ground Zone polygon has been applied.

Note: To delete the Ground Zone, right click on the Ground Zone and select Delete.

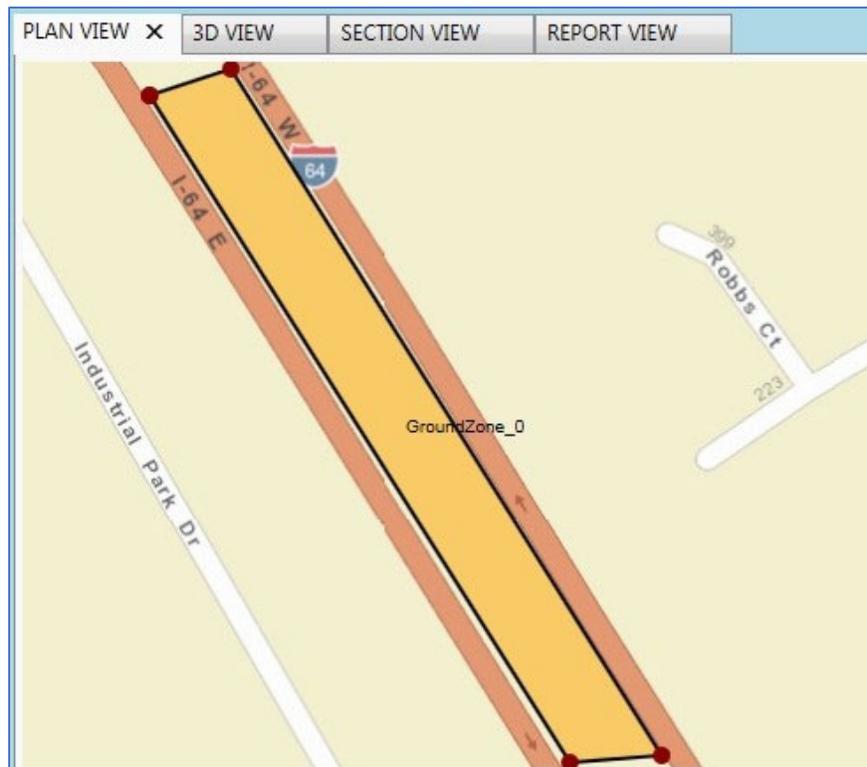


Figure 40 An Added Ground Zone in Plan View

Now that a Ground Zone has been added you can edit the details of the Ground Zone in the Ground Zones Detail Sub-pane.

## ADDING BUILDING ROWS TO THE MAP

Building Rows consist of rows of buildings between roadways and receivers that act like barriers to reduce sound levels. Building Rows that have gaps allow noise levels to travel through these gaps. Building Rows provide sound dampening but at a decreased level due to these gaps.

### To add Building Rows

1. Click the Building Rows icon . The Building Rows Defaults window appears.
2. Hold down the "D" key on the keyboard and click a point on the map where you want to begin drawing the Building Row.
3. Continue to hold the "D" key and click a secondary point on the map. A line will appear as you continue to draw the Building Row shape.
4. Click as many mid-points as needed to create the shape of the Building Row.
5. Double click the end point location for the Building Row. Gray lines with red circles in the shape of the building drawn will appear on the map indicating the building row has been applied.

Note: To delete the Building Row, right click on the Building Row and select Delete.

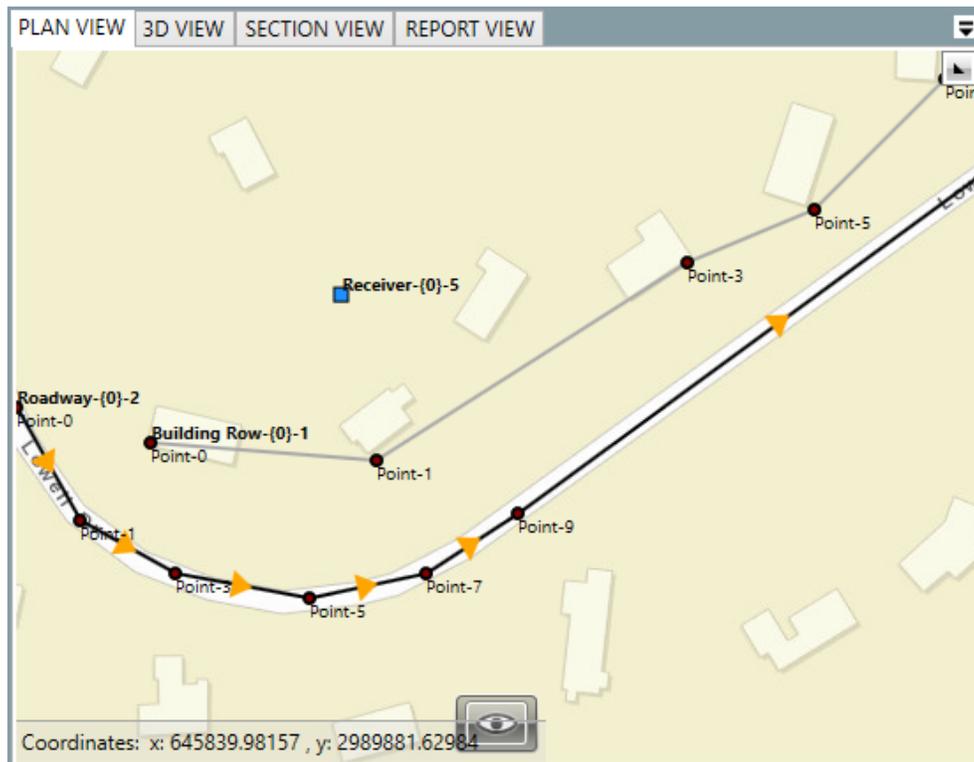


Figure 41 Added Building Rows in Plan View

Now that a Building Row has been added you can edit the details of the Building Row in the Building Rows Detail Sub-pane.

## ADDING CONTOUR ZONES TO THE MAP

TNM contour zones define areas where you wish TNM to compute sound level contours, which displays gradations of sound level change within the limits of the contour zone.

### To add a Contour Zone

1. Click the Contour Zone icon . The Contour Zone Defaults window appears.
2. Hold down the "D" key on the keyboard and click a point on the map where you want to begin the Contour Zone.
3. Continue to hold the "D" key and click a secondary point on the map. A polygon will appear while you continue to draw the Contour Zone.
4. Click as many mid-points as you want to draw the Contour Zone polygon.
5. Double click the end point location for the Contour Zone. A blue polygon with red circles appears on the map showing the Contour Zone and the mid-points indicating the Contour Zone has been applied.

Note: To delete the Contour Zone, right click on the Contour Zone polygon and select Delete.



Figure 42 An Added Contour Zone in Plan View

Now that a Contour Zone has been added you can edit the details of the Contour Zone in the Contour Zones Detail Sub-pane.