DRAFT

GUIDE TO TNM DEFAULTS

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Abstract

Default methodology for creating a TNM 2.5 analysis for the Nevada Department of Transportation

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This guide was created to assist noise specialists create, update, and run TNM 2.5 models following Nevada Department of Transportation standards. With these lessons learned and best practices, it may help prevent a bit of frustration working with this 20+ year old program. When TNM 3.x is released operationally and adoption mandated, this guide will be updated. The aim is most functions and workflows shown will still operate similarly.

This document has been updated to reflect the October 2022 changes to the NDOT Traffic and Construction Noise Analysis and Abatement Policy.
https://www.dot.nv.gov/home/showpublisheddocument/14255/636637253326570000

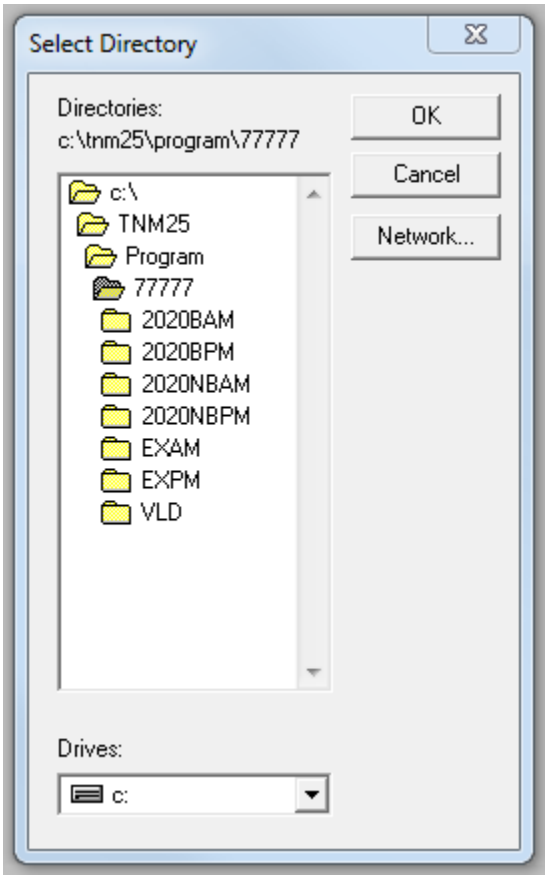
Contents

Starting a new TNM file:

File → New → c:\TNM25\Program**\ENTER SHORT FILE NAME HERE** to the below naming conventions. Try to limit the number of characters, as there is a limit due to age of software.

TNM 2.5 will only run off C:.

You can get more descriptive in the Run Identification



- ProjectNumber/YEARNBAM (No Build AM volumes)
    - SW1 (subfiles can be named by area- i.e., soundwall 1)
    - Oasis SW2 (or labeled by area protected)
- ProjectNumber/YEARNBPM (No Build PM volumes)
- ProjectNumber/YEARBAM (Build AM volumes)
- ProjectNumber/YEARBPM (Build PM volumes)
- ProjectNumber/EXAM (Existing AM volumes)
- ProjectNumber/EXPM (Existing PM volumes)
- ProjectNumber/VLD (validation)

- If there is only one traffic volume for each year, you'll only need one build model.

  ProjectNumber/YEARBuild (Build one traffic volume)

It is best to have a master file for each run with perturbed barriers, in case something gets corrupted. From the master file you can break up smaller runs by barrier, by segment (with multiple barriers), by geographic area (i.e., west leg), or other division as needed, this will help reduce runtimes. I usually have the master run (i.e., 2040BAM) as my master file and then create a subfolder with variations on barriers. Ideally the master file will be a file that has been run, but sometimes due to size and time constraints it is just a base file that you can pull from.

TIP: The existing and no-build models will have the exact same linework. Only the traffic volumes will change. When you have a good existing model, SAVE AS -> YearNBAM/YearNBPM/YearNB. Update traffic and you're good to go. First thing I do when I do this is delete the traffic volumes in each segment, but not the traffic speed. This will create an error message in the system that will prompt you to adjust prior to being able to run the no-build model. This SAVE AS trick will also work for the Build models if you have AM & PM.

You would not need to do subfolders or even have a separate master file for the VALIDATION, EXISTING and NOBUILD conditions, as there will be no walls to perturb (greatly reducing the runtime and likelihood or crashes). IF things do get corrupted (and unfortunately, they will at some point), don't try and salvage. Create new run from scratch. You don't know where the glitch was and don't want to inadvertently carry it over to the new model. Create dummy receivers, roadway segments, barriers, etc. and then copy and paste values from your master spreadsheet. Doing this will also avoid input errors from all the manual typing. Make sure you adjust the each of the new individual points to the correct naming conventions. I know it sounds like much ado about nothing, but you will thank yourself when you are searching for an error and know right where to look to fix it.

The individual barrier names will be at your judgement. Use logic moving from one end of the project to the other. Common practice is to follow the stationing of mainline of the project. All further documentation on the walls will follow this naming convention. If you end up needing to rename/renumber do it early in the process to ensure all references are updated. Make sure barrier names and aliases are prominently identified in the master spreadsheet for the project.

Set Up → Run Identification

Run Title: Must be filled in correctly, adjusted per run. This is your opportunity to provide longer description than is allowed in file name of run. All keyboard characters are valid.

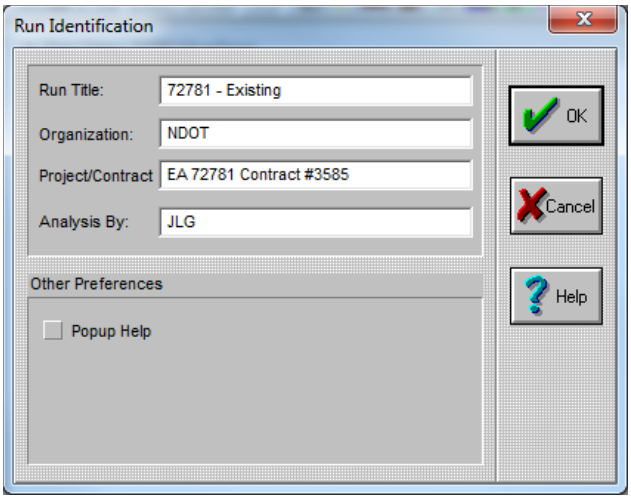
Organization: NDOT (or consultant)

Project/Contract: put in EA or variation if it a sub run (i.e. Barrier 2 with taper)

Analysis By: Your Name or initials

These fields will follow to the reports that could be printed and are the best way to stay organized. Adjust this first when creating a new file.

Make sure to uncheck the Popup Help. If you don't, a non-functional help screen will come up every time you try to cut a skew section.



Set Up → General

Units: **English**

Type: **LAeq1h Hourly** (generally)

Relative Humidity (%): **50**

Temp (deg F): **68**

Default Ground Type: **Lawn** (while this isn't the existing ground surface across the state, within the program limitations it works best to get most accurate models to account for other variability within the software). Validation readings can have ground type adjusted to field conditions if "lawn" doesn't validate. Documentation is required for this change.

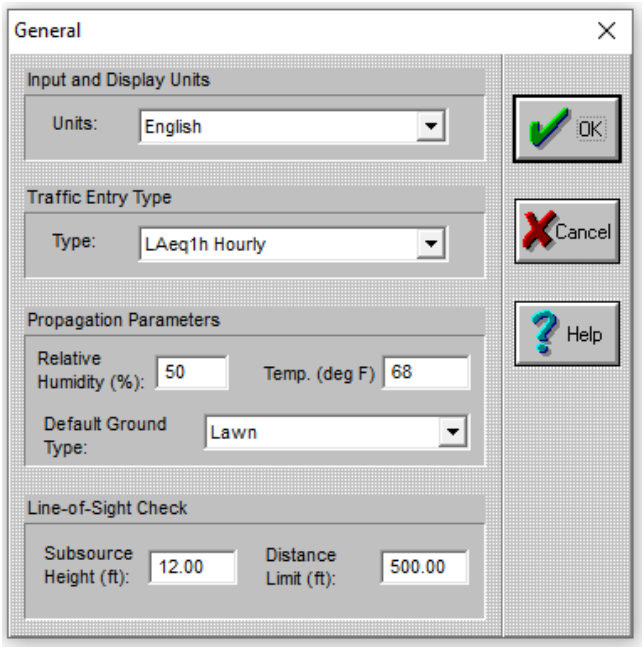
Subsource Height (ft): **12.00**

Distance Limit (ft): **500.00**

Unless Specifically Documented otherwise, all modeling will be for AM and PM peak hours for all models (labeled as below Existing, XXXXNBAM (for No Build AM), XXXXBPM (for Build PM), etc.). Traffic volumes will be provided and blessed by NDOT Traffic, or in conjunction with them and consultant prior to use.

Unless Specifically Documented otherwise, all modeling will include each travel lane (shoulders will usually be modeled but verify with NDOT noise analyst for your specific project). Barrier rail will usually be modeled but check with NDOT noise analyst for your specific project. Due to model size and complexity, shoulders and barrier rail may be excluded when approved and documented by NDOT noise analyst, in advance and in writing.

Unless Specifically Documented otherwise, existing concrete barriers (i.e., private privacy walls outside of NDOT R/W) will be modeled in all TNM files when 6' tall or greater.


General
Input and Display Units
Units:
English
Traffic Entry Type
Type:
LAeq1h Hourly
Propagation Parameters
Relative Humidity (%):
50
Temp. (deg F)
68
Default Ground Type:
Lawn
Line-of-Sight Check
Subsource Height (ft):
12.00
Distance Limit (ft):
500.00
OK
Cancel
Help

Input Parameters, Naming Conventions, and Guidelines

Roadways

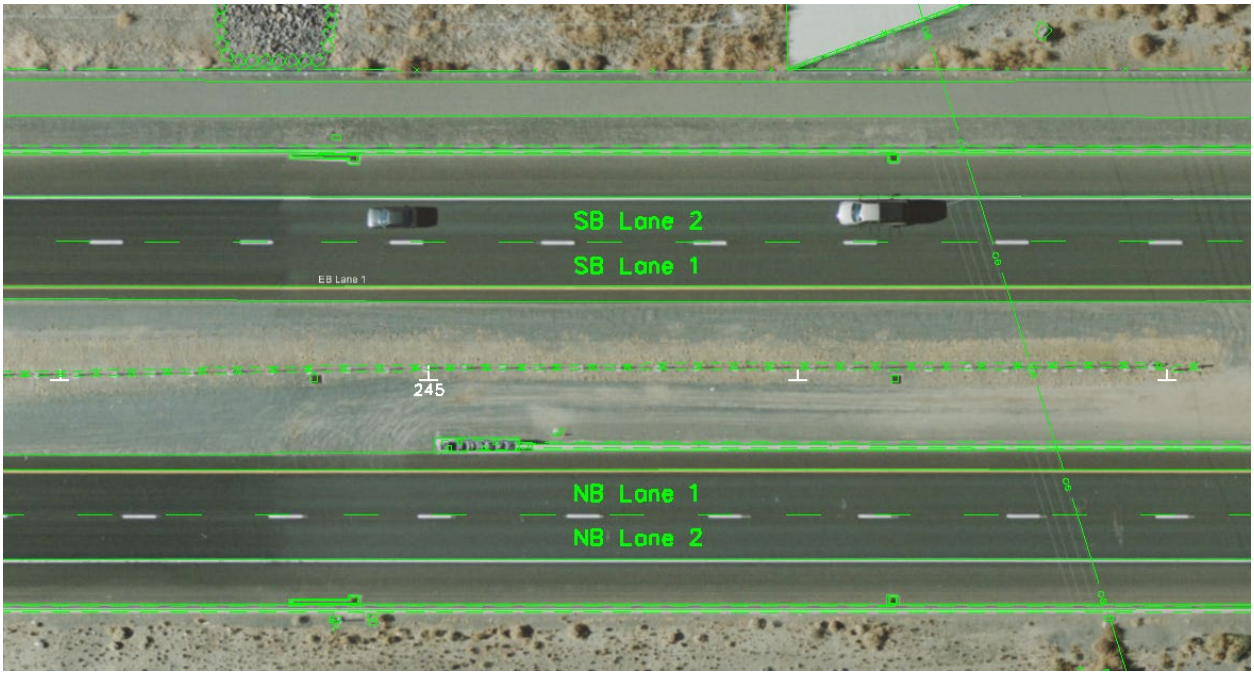
General Tab

All Roadway sections should have a descriptive name. This should include directionality (i.e., NB for Northbound), name of roadway or shortened derivative and Lane placement (i.e. NBIS (northbound inside shoulder), SBLane1, EBLane2). They can also be named by stationing.

Points along each roadway should be placed no more than 500 feet apart to aid in modeling triangulation. Model uses a straight-line model, so curves will be multiple points. Where roadways meet/break a point should also be placed.

Unless specifically documented otherwise, in advance and approved by NDOT noise analyst, paved shoulders will be modeled.

NDOT labels lanes from the inside out. See below for basic example.

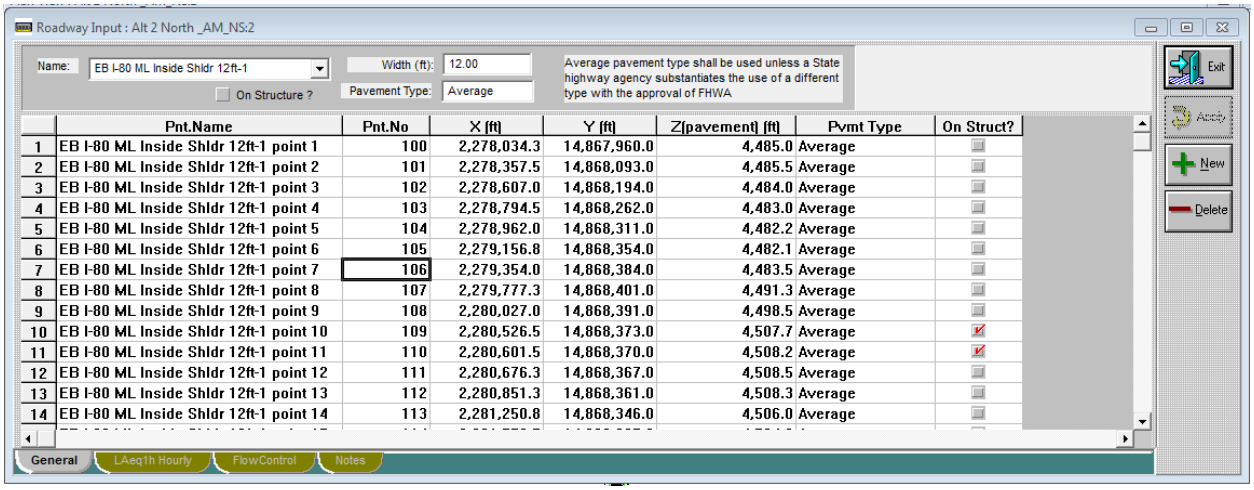


Lane widths should be adjusted when set up is done for each group of lanes. (In the example below, width of Lane 1 is 12'). All additionally added points will have this value. Roadway sections of different widths (shoulders) can be modified manually after they are created.

Pavement type will ALWAYS be average, this is set as the default in TNM 2.5.

If any point of the roadway section is on a structure, then the box on the far right needs to be checked for each point (ingress, egress and everything in between). Additional shielding information will be needed to be added to these sections in the BARRIER-Shielding sub-section.

Rename each point name with the name of the roadway and the individual point name for section. Much easier to find and fix when the section is described as "NB Golden Off Lane 1 point 7" than "Roadway 222, point 23".



	Pnt.Name	Pnt.No	X [ft]	Y [ft]	Z[pavement] [ft]	Pvmt Type	On Struct?
1	EB I-80 ML Inside Shldr 12ft-1 point 1	100	2,278,034.3	14,867,960.0	4,485.0	Average	
2	EB I-80 ML Inside Shldr 12ft-1 point 2	101	2,278,357.5	14,868,093.0	4,485.5	Average	
3	EB I-80 ML Inside Shldr 12ft-1 point 3	102	2,278,607.0	14,868,194.0	4,484.0	Average	
4	EB I-80 ML Inside Shldr 12ft-1 point 4	103	2,278,794.5	14,868,262.0	4,483.0	Average	
5	EB I-80 ML Inside Shldr 12ft-1 point 5	104	2,278,962.0	14,868,311.0	4,482.2	Average	
6	EB I-80 ML Inside Shldr 12ft-1 point 6	105	2,279,156.8	14,868,354.0	4,482.1	Average	
7	EB I-80 ML Inside Shldr 12ft-1 point 7	106	2,279,354.0	14,868,384.0	4,483.5	Average	
8	EB I-80 ML Inside Shldr 12ft-1 point 8	107	2,279,777.3	14,868,401.0	4,491.3	Average	
9	EB I-80 ML Inside Shldr 12ft-1 point 9	108	2,280,027.0	14,868,391.0	4,498.5	Average	
10	EB I-80 ML Inside Shldr 12ft-1 point 10	109	2,280,526.5	14,868,373.0	4,507.7	Average	☑
11	EB I-80 ML Inside Shldr 12ft-1 point 11	110	2,280,601.5	14,868,370.0	4,508.2	Average	☑
12	EB I-80 ML Inside Shldr 12ft-1 point 12	111	2,280,676.3	14,868,367.0	4,508.5	Average	
13	EB I-80 ML Inside Shldr 12ft-1 point 13	112	2,280,851.3	14,868,361.0	4,508.3	Average	
14	EB I-80 ML Inside Shldr 12ft-1 point 14	113	2,281,250.8	14,868,346.0	4,506.0	Average	

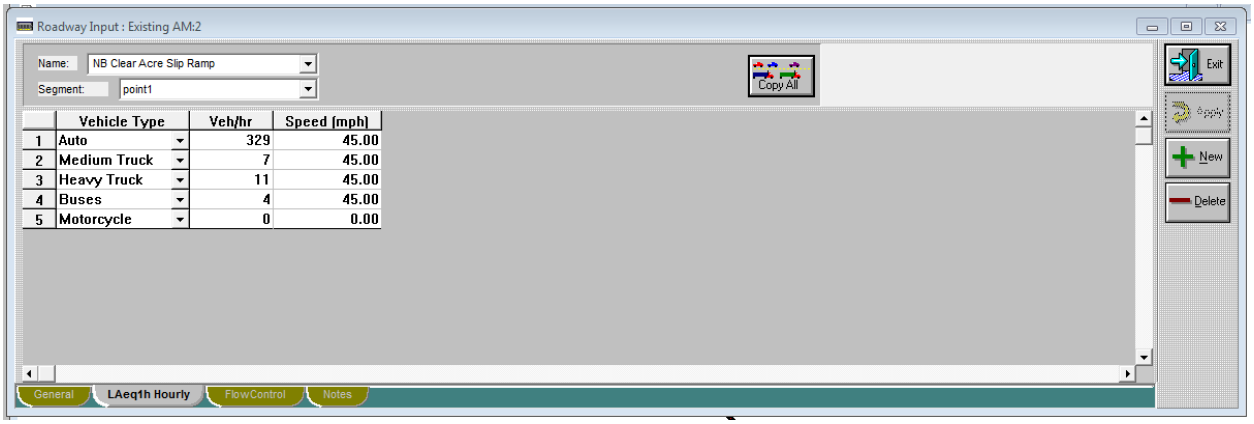
LAeq1h Hourly (or LAeq1h Percent, very rarely used) Tab

Ensure you have number (or percentage) of vehicles and speeds for each vehicle type being used. Input data from master traffic tab on master TNM spreadsheet. TNM spreadsheet should be complete for each model prior to starting to input traffic data. If the vehicle volumes are the same for the entire roadway (all traffic below is from single lane offramp), then after you have hit apply on the first one, you can hit copy all in the upper right. It will ask you to verify this for the rest of the segments of this roadway. Make sure you then hit ok, then apply. Save the run often while you are building the model. REMINDER: posted speed limit shall be used as speed in all mainline modeling. Documented methodology should include speed to use on ramps. If the traffic counts vary over the length of the roadway, you'll have to update them by segment, saving after each input.

Usually, you will have hourly actual volumes for each used vehicle type, not percentages.

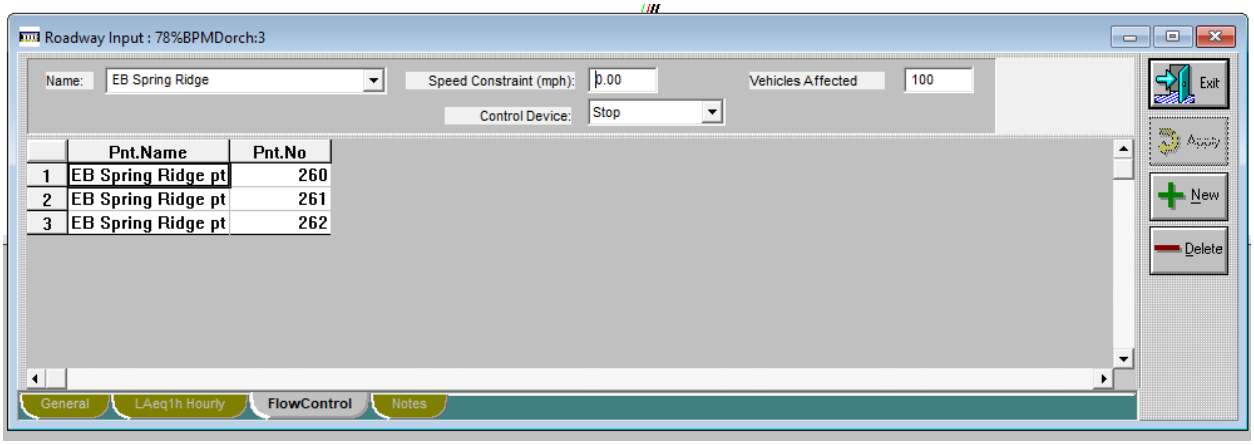
As a check prior to begin running a model, TNM will verify that there is a speed attached to each vehicle type in each segment of roadway with traffic on it. This check only works if you put value information in at least one of the two spots. If they are both empty, the model will run without any traffic volume or speed on that segment. This overlook in the built-in model checking procedure shows just one more reason that each section and segment of each input type needs to be checked to ensure model results produced are accurate.

Most times you will only have enough traffic volume to input the auto, medium truck, and heavy truck categories. More information on how to account for minor bus and motorcycle volumes can be found in the Traffic Info section at end of document.



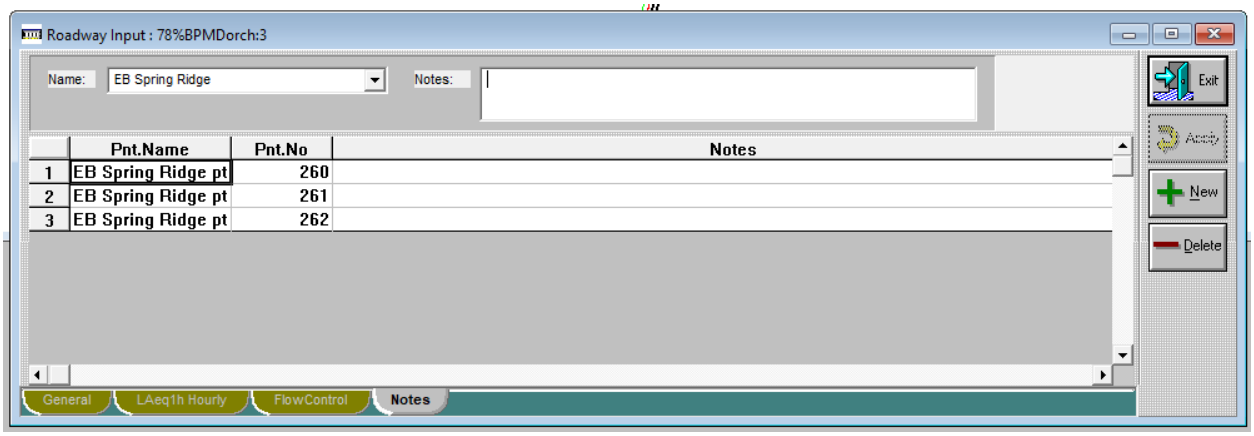
FlowControl Tab

Here you can add a speed constraint, percentage of vehicles affected, and what type of control device is used (i.e., stop sign)



Notes Tab

Rarely used. You can put special information about roadway here.



Receivers

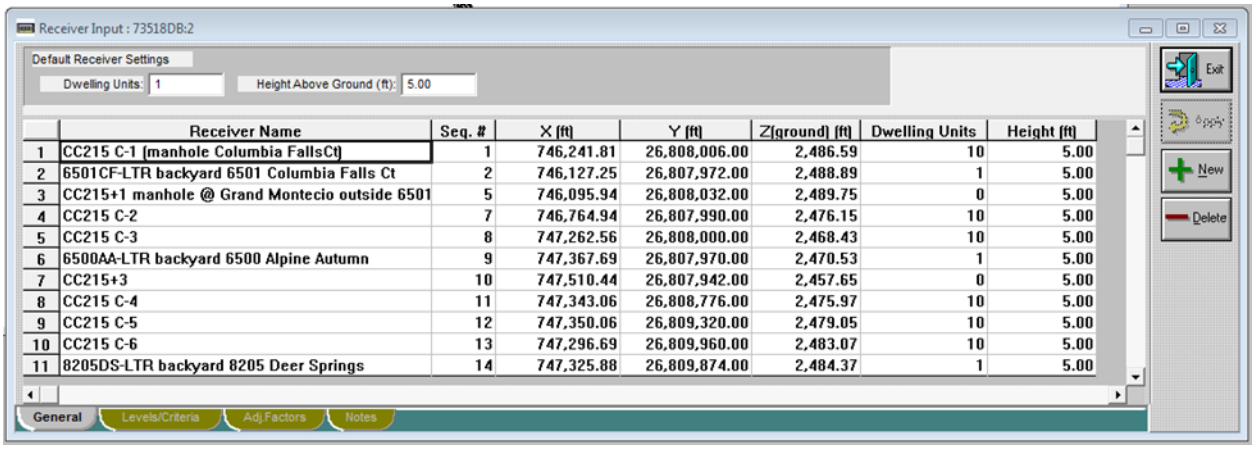
General Tab

Depending on if the project is in a developed area or undeveloped you may not have actual addresses to use. Regardless, make sure you have a great description and photos of each receiver location that you visited in the field all documented in the master TNM spreadsheet on the Receiver Tab. Labeled photos should be placed in the project folder for future reference.

At least one receiver should be on each parcel in the first row, including vacant parcels. Vacant parcels should use consistent offsets from R/W. This information will be provided to the local agency (i.e., city or county) to use as a reference for future land use planning. Land use developments that come in after work are not eligible for a soundwall until, and if, a Type I project comes through the area in the future.

If you have an address, use it as the name of the receiver. Receivers should be placed in the exterior area of frequent human use (EAFHU), generally a yard, patio, playground. In your notes in the master TNM spreadsheet you can add additional information (i.e., utility box in front yard of 123 Main St, corner of back patio 456 Lakes Road, community pool at Mountain View Apts.). This information can also be used in the notes tab mentioned below. Otherwise starting in a similar format as your soundwall naming start (i.e., Receiver1, Receiver2, or Roadway1, Roadway2). If you are first gathering model validation points, you can identify them starting with a "V" (i.e., V1, V2) and provide coordinates, photos, and complete descriptions in the master TNM spreadsheet and document folder.

LTR is shorthand for "long term reading", or a 24-hour measurement.

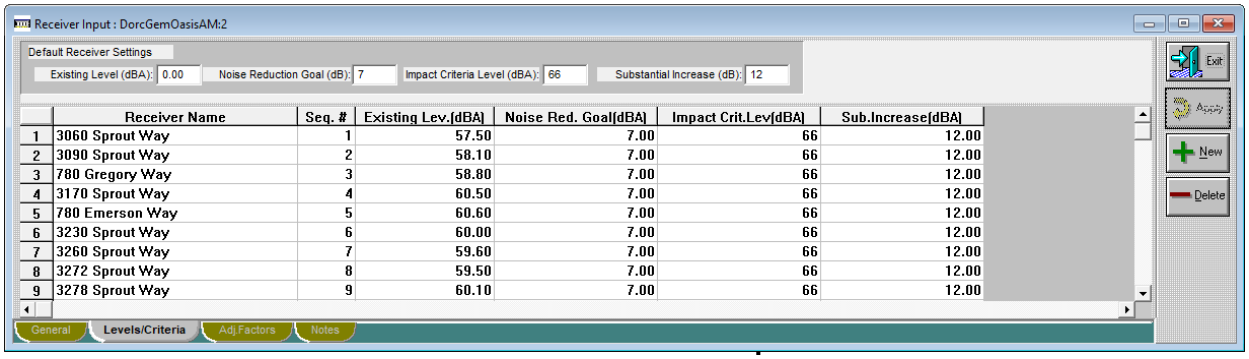


	Receiver Name	Seq. #	X [ft]	Y [ft]	Z[ground] [ft]	Dwelling Units	Height [ft]
1	CC215 C-1 (manhole Columbia FallsCt)	1	746,241.81	26,808,006.00	2,486.59	10	5.00
2	6501CF-LTR backyard 6501 Columbia Falls Ct	2	746,127.25	26,807,972.00	2,488.89	1	5.00
3	CC215+1 manhole @ Grand Montecio outside 6501	5	746,095.94	26,808,032.00	2,489.75	0	5.00
4	CC215 C-2	7	746,764.94	26,807,990.00	2,476.15	10	5.00
5	CC215 C-3	8	747,262.56	26,808,000.00	2,468.43	10	5.00
6	6500AA-LTR backyard 6500 Alpine Autumn	9	747,367.69	26,807,970.00	2,470.53	1	5.00
7	CC215+3	10	747,510.44	26,807,942.00	2,457.65	0	5.00
8	CC215 C-4	11	747,343.06	26,808,776.00	2,475.97	10	5.00
9	CC215 C-5	12	747,350.06	26,809,320.00	2,479.05	10	5.00
10	CC215 C-6	13	747,296.69	26,809,960.00	2,483.07	10	5.00
11	8205DS-LTR backyard 8205 Deer Springs	14	747,325.88	26,809,874.00	2,484.37	1	5.00

Levels/Criteria Tab

Make sure all current default values for state noise reduction design goal, impact criteria, and substantial increase are input in the grey section prior to entering any other data. Then these values will be auto populated (and correct) for any future receivers added. They can also be manually updated within each white cell. Make sure you hit the yellow Apply button and then save often. If you have receivers that are Activity Category A, D, or E; manually adjust their impact criteria values.

If existing data on receivers is available, input it into the Existing Level (dBA) column under the Levels/Criteria Tab. This value will carry over to the reports to show in the modeling the baseline (existing) value and what the noise will be in various scenarios. It will also report the change between existing and no-build or build conditions.



	Receiver Name	Seq. #	Existing Lev.[dBA]	Noise Red. Goal[dBA]	Impact Crit.Lev[dBA]	Sub.Increase[dBA]
1	3060 Sprout Way	1	57.50	7.00	66	12.00
2	3090 Sprout Way	2	58.10	7.00	66	12.00
3	780 Gregory Way	3	58.80	7.00	66	12.00
4	3170 Sprout Way	4	60.50	7.00	66	12.00
5	780 Emerson Way	5	60.60	7.00	66	12.00
6	3230 Sprout Way	6	60.00	7.00	66	12.00
7	3260 Sprout Way	7	59.60	7.00	66	12.00
8	3272 Sprout Way	8	59.50	7.00	66	12.00
9	3278 Sprout Way	9	60.10	7.00	66	12.00

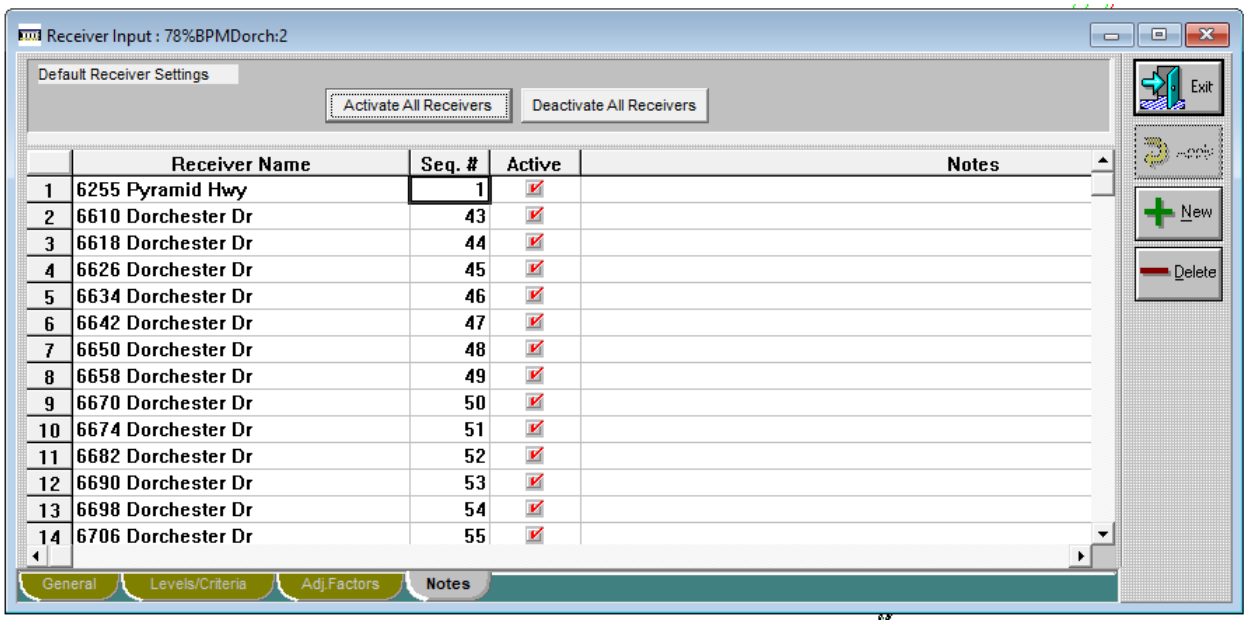
Adj. Factors Tab

Not used

Notes Tab

This is the area where you can turn on/off each receiver. This may be necessary for secondary modeling.

You can put special information about receivers here (i.e., community pool, playground).



	Receiver Name	Seq. #	Active	Notes
1	6255 Pyramid Hwy	1	☑	
2	6610 Dorchester Dr	43	☑	
3	6618 Dorchester Dr	44	☑	
4	6626 Dorchester Dr	45	☑	
5	6634 Dorchester Dr	46	☑	
6	6642 Dorchester Dr	47	☑	
7	6650 Dorchester Dr	48	☑	
8	6658 Dorchester Dr	49	☑	
9	6670 Dorchester Dr	50	☑	
10	6674 Dorchester Dr	51	☑	
11	6682 Dorchester Dr	52	☑	
12	6690 Dorchester Dr	53	☑	
13	6698 Dorchester Dr	54	☑	
14	6706 Dorchester Dr	55	☑	

Barriers

Barrier rail should generally be modeled at vertical height from top of roadway.

Barrier sections should have end points at the abutment slab of each structure. Then removal of the barrier over the structure can easily be shown, if/when necessary.

All solid concrete walls 6’ or taller should be modeled as Barriers (i.e., residential privacy walls).

Buildings, depending on size, can either be modeled as individual barriers or as building rows. Building rows will only provide 20-80% shielding, so a more accurate representation will be as a barrier, but it will lengthen run times (compared to being modeled as a Building Row). Documentation on methodology of which buildings will be modeled as barriers and which as building rows, and why and discussion with NDOT noise analyst must occur early in the process.

General Tab

Each existing barrier should be given either the name from the plan sheets, or a descriptive, location description (i.e., Charleston NB onramp-Pecos Rd, PW (privacy wall) around Del Amo complex)

Each point in the Barrier segment should also be given the name of the barrier followed by point1, point2, etc.

Make sure all the cells in the top grey section are filled out. Doing this before adding points will give all future points these default values for base height, perturbation height, number of perturbations up and down.

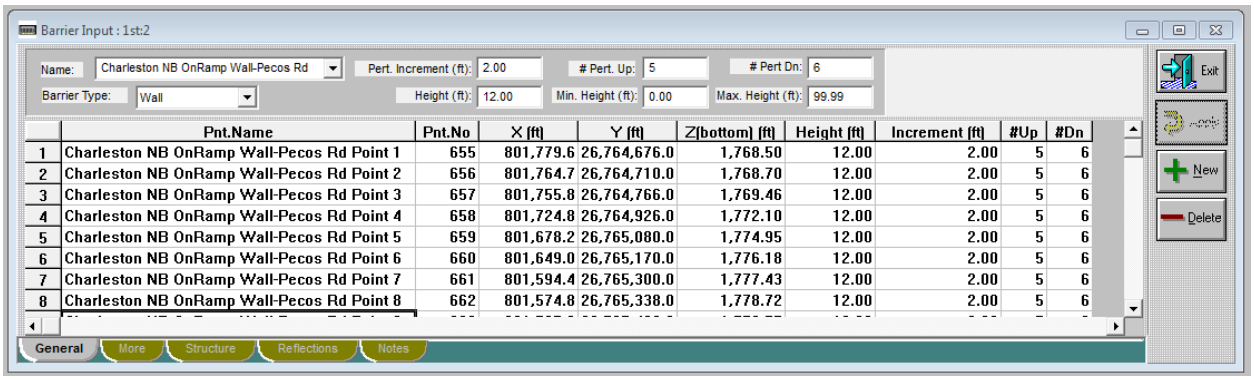
Wall height increment (perturbation) is usually in 2’ steps.

As of 2022, NDOT Landscape & Aesthetics (L&A) would like to have “Big Ugly Rectangles” models for potential walls with minimal stepping. Then they can add their aesthetic end treatments to the ends of walls if there is room available. Locations such as at a bridge abutment may not be able to have an aesthetic treatment. Currently, the end triangle is the preference of NDOT L&A. Soundwalls will be placed, as big ugly rectangles for whatever dimension they need to provide shielding for the adjacent noise sensitive areas. Additional coordination may be required with structures and L&A as a project proceeds and slight modifications made, each being modeled to show noise reduction.

All new Barrier sections should have a descriptive name. This should include directionality (i.e., NB for Northbound), name of roadway or shortened derivative and Lane placement (i.e., NB Parr to McCarran, etc.). They can also be named by stationing.

Rename each point name with the name of the barrier and the individual point name for section. Much easier to find and fix when the section is described as “Charleston NB OnRamp Wall-Pecos Rd Point 22” than “Barrier 12, point 23”.

Make new Barrier Analysis runs for each tweak for modeling. Save As is a helpful tool for not rebuilding from scratch.



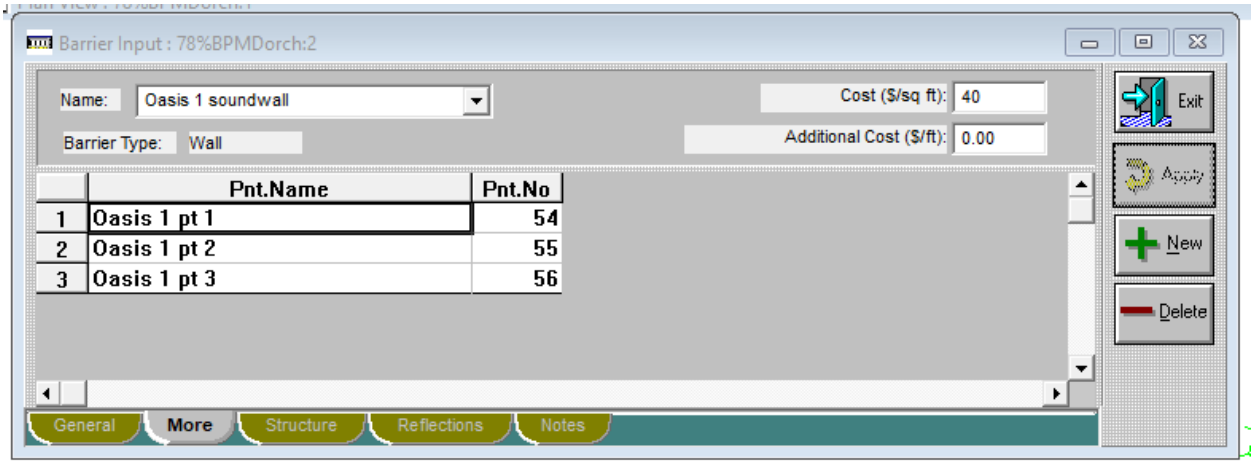
	Pnt.Name	Pnt.No	X [ft]	Y [ft]	Z[bottom] [ft]	Height [ft]	Increment [ft]	#Up	#Dn
1	Charleston NB OnRamp Wall-Pecos Rd Point 1	655	801,779.6	26,764,676.0	1,768.50	12.00	2.00	5	6
2	Charleston NB OnRamp Wall-Pecos Rd Point 2	656	801,764.7	26,764,710.0	1,768.70	12.00	2.00	5	6
3	Charleston NB OnRamp Wall-Pecos Rd Point 3	657	801,755.8	26,764,766.0	1,769.46	12.00	2.00	5	6
4	Charleston NB OnRamp Wall-Pecos Rd Point 4	658	801,724.8	26,764,926.0	1,772.10	12.00	2.00	5	6
5	Charleston NB OnRamp Wall-Pecos Rd Point 5	659	801,678.2	26,765,080.0	1,774.95	12.00	2.00	5	6
6	Charleston NB OnRamp Wall-Pecos Rd Point 6	660	801,649.0	26,765,170.0	1,776.18	12.00	2.00	5	6
7	Charleston NB OnRamp Wall-Pecos Rd Point 7	661	801,594.4	26,765,300.0	1,777.43	12.00	2.00	5	6
8	Charleston NB OnRamp Wall-Pecos Rd Point 8	662	801,574.8	26,765,338.0	1,778.72	12.00	2.00	5	6

More Tab

On the More tab you should input the price per square foot and/or linear foot of wall. This value will be calculated into reports to come up with pricing.

The price used in 2022 was $40/SQFT. This value is based off post and panel pricing and includes all costs associated with the construction of the wall outside of right-of-way. This price was derived from previous actual construction costs on contracts in District 1. NDOT is moving towards using a soundwall SQFT bid item. NDOT Structures Division will be responsible for design of the soundwall. Our job is to provide the measurements and the locations where they are needed. NDOT L&A is responsible for beautification of the walls. This comes out of their budget and is not included in the $40/ SQFT example cost.

The Additional Cost ($/ft) is for linear foot additional cost. Currently, NDOT does not use this additional cost.

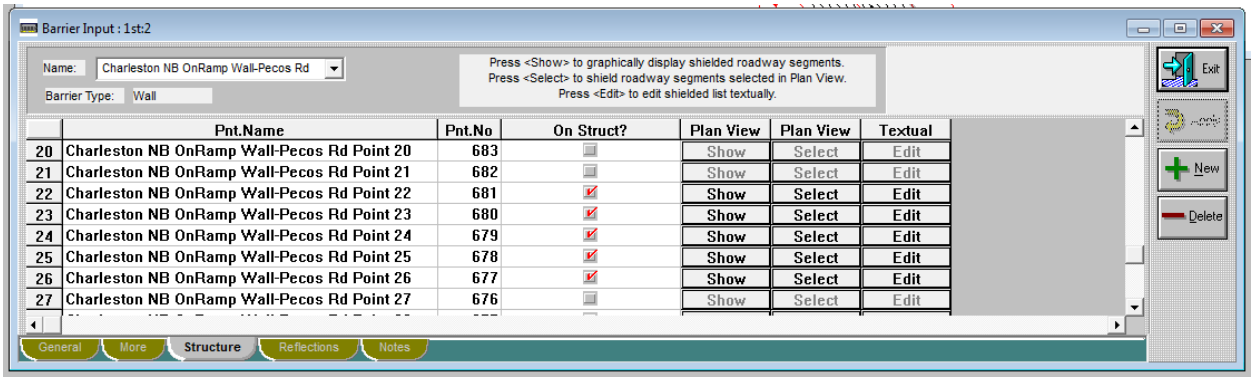


	Pnt.Name	Pnt.No
1	Oasis 1 pt 1	54
2	Oasis 1 pt 2	55
3	Oasis 1 pt 3	56

Structures Tab

If any segment point is on (or part of) a structure the ON STRUCT? Box MUST be checked. You will need to click in the box three consecutive times to get the check box to appear, then once more to turn it off. These sections will also need to have their shielding added. Shielding basically shows that the immediately adjacent roadway section(s) will have their noise shielded by the wall on the structure. This only is done for structure sections. Structures usually have roadways underneath them, but not always. These roadways under structures may or may not be in the model.

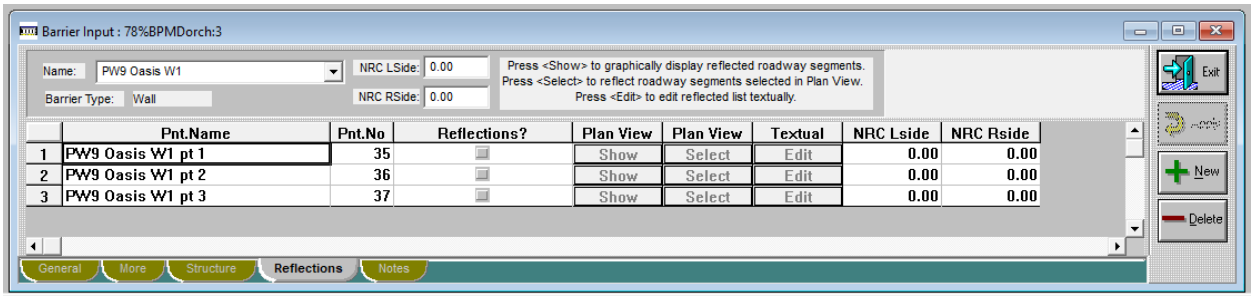
Shielding is added by segment, clicking on segment with barrier shielding, hitting select in box, and while holding down CTRL clicking all segments that are shielded by that barrier. This must be done for each segment. Hitting show when complete will grey-highlight that shielding. Save often. Additional information on shielding can be found in TNM training documents.



	Pnt.Name	Pnt.No	On Struct?	Plan View	Plan View	Textual
20	Charleston NB OnRamp Wall-Pecos Rd Point 20	683	☐	Show	Select	Edit
21	Charleston NB OnRamp Wall-Pecos Rd Point 21	682	☐	Show	Select	Edit
22	Charleston NB OnRamp Wall-Pecos Rd Point 22	681	☑	Show	Select	Edit
23	Charleston NB OnRamp Wall-Pecos Rd Point 23	680	☑	Show	Select	Edit
24	Charleston NB OnRamp Wall-Pecos Rd Point 24	679	☑	Show	Select	Edit
25	Charleston NB OnRamp Wall-Pecos Rd Point 25	678	☑	Show	Select	Edit
26	Charleston NB OnRamp Wall-Pecos Rd Point 26	677	☑	Show	Select	Edit
27	Charleston NB OnRamp Wall-Pecos Rd Point 27	676	☐	Show	Select	Edit

Reflections Tab

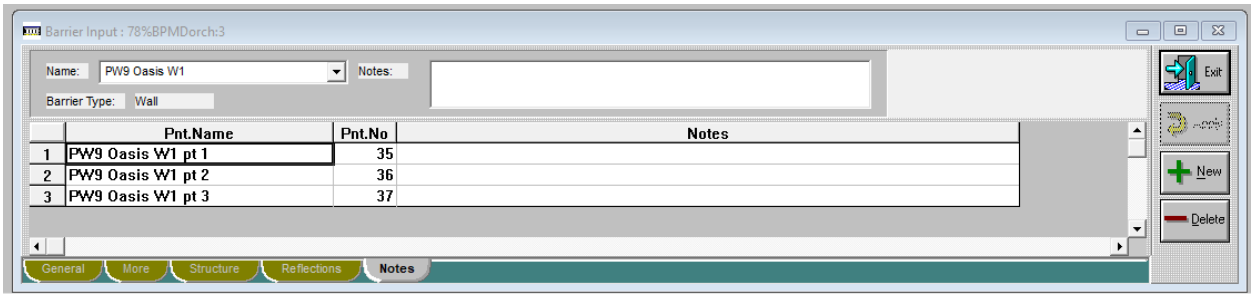
Not used.



	Pnt.Name	Pnt.No	Reflections?	Plan View	Plan View	Textual	NRC Lside	NRC Rside
1	PW9 Oasis W1 pt 1	35	☐	Show	Select	Edit	0.00	0.00
2	PW9 Oasis W1 pt 2	36	☐	Show	Select	Edit	0.00	0.00
3	PW9 Oasis W1 pt 3	37	☐	Show	Select	Edit	0.00	0.00

Notes Tab

Rarely used. You can put special information about barriers here.



	Pnt.Name	Pnt.No	Notes
1	PW9 Oasis W1 pt 1	35	
2	PW9 Oasis W1 pt 2	36	
3	PW9 Oasis W1 pt 3	37	

Building Rows

Building rows are modeled to represent a group of homes, apartments, or other buildings that will provide some sort of noise shielding because they act as one by blocking line of sight. A Building Row input simulates a row of houses as a single long barrier, not with gaps, but with a low transmission loss uniformly along the row, reduction sound levels at receivers behind it. TNM diffracts a portion of the sound energy over the top of the row and allows a portion to pass uniformly through the row. Documentation of how shielding will be modeled, as barrier rows, barriers, or a combination of both, needs to be decided and documented prior to beginning modeling. Modeling individual buildings as barriers in lieu of as a length of barrier row greatly will increase model run times.

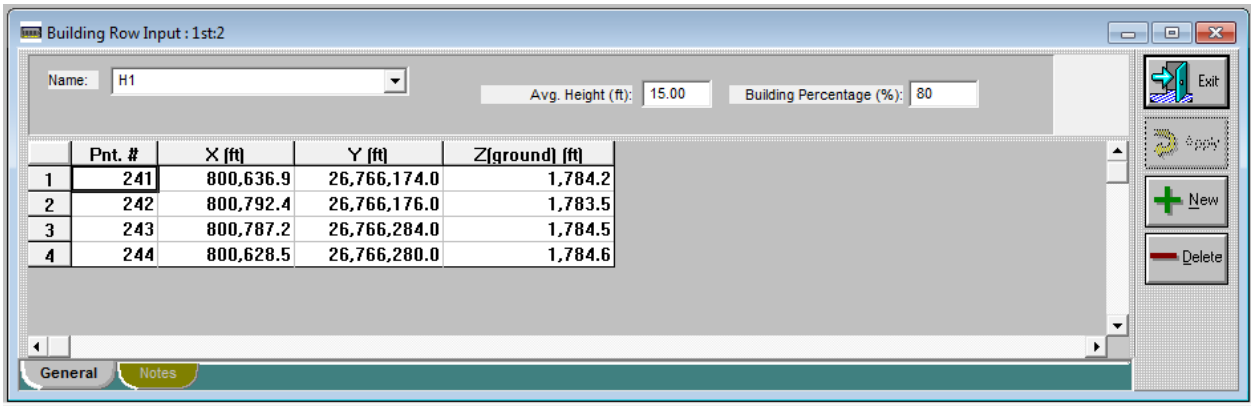
You will need to provide a name for each Building Row. This should include general or identifying location (i.e., Street Name, Oak Hill Mobile Home Park, A1 (referenced in master spreadsheet).

You will choose an average height for each Building Row.

The Building Percentage (%) is a whole number between 20-80 percent. This is the percentage of "solidness" of the groups of homes. An 80% rating would mean that 80% of the noise is blocked linearly between a point and the roadway.

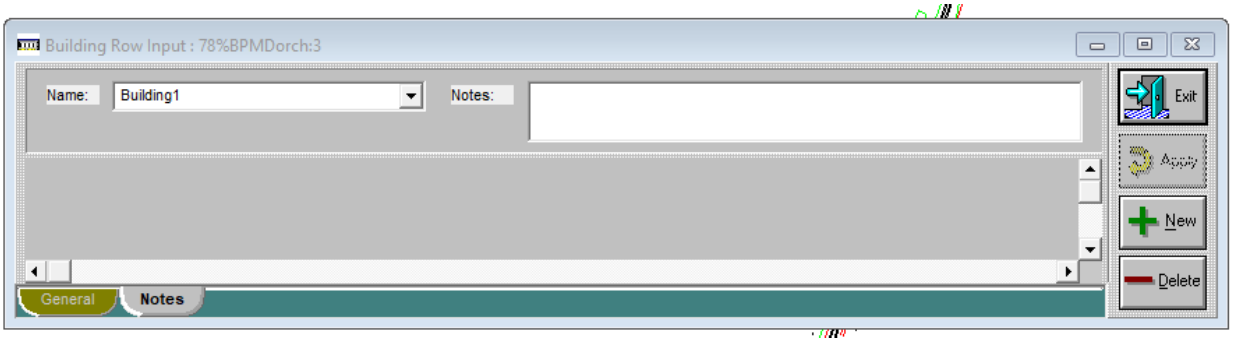
General Tab

Input coordinates, average height, and % of solidness.



Notes Tab

Rarely used. You can put special information about building rows here.

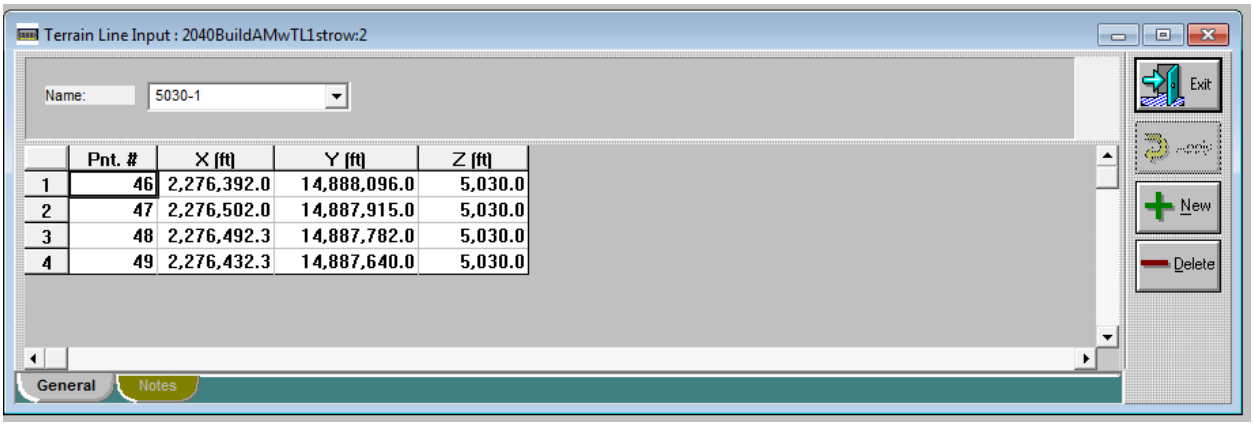


Terrain Lines

Use terrain lines sparingly, they can increase run times greatly. Minimal variations in elevation (<10' may not be necessary). Usually only use them for large, non-gradual elevation changes between inputs (i.e., roadway, barriers, receivers). Remember, TNM assumes a straight-line grade between known points if no elevation is placed. Unless your topography varies greatly from this, you may be able to do without.

General Tab

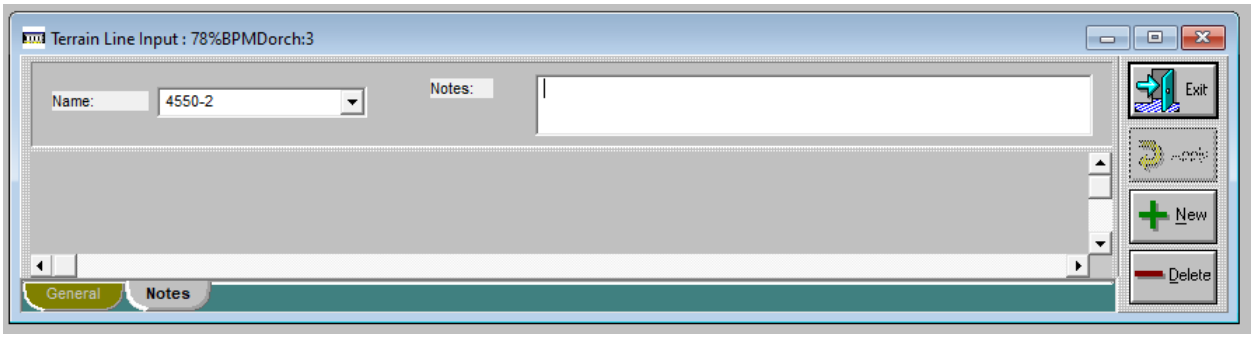
Label terrain lines by their elevation, and number. (i.e., 5740-3 would be the third terrain line at elevation 5740), unless there is a distinctive purpose for line and label with purpose and stationing (i.e., N/S berm between housing development and roadway "S1" 132+50 – "S1" 135.00)



	Pnt. #	X [ft]	Y [ft]	Z [ft]
1	46	2,276,392.0	14,888,096.0	5,030.0
2	47	2,276,502.0	14,887,915.0	5,030.0
3	48	2,276,492.3	14,887,782.0	5,030.0
4	49	2,276,432.3	14,887,640.0	5,030.0

Notes Tab

Rarely used. You can put special information about terrain lines here.



Ground Zones

Not used

Tree Zones

Not used

Contour Zones

Not used

Traffic Volumes (input into Roadways Input)

Generally, you will only have enough variation of traffic types to use the Auto, Medium Truck, and Heavy Truck categories. Put any bus volume in with medium trucks. Do not count motorcycles unless they are a total percentage of volume. If needed, add motorcycles to the total heavy truck counts.

The easiest way to calculate volumes is to take total directional traffic, subtract out Heavy Trucks (3 or more axles), subtract out Medium Truck (including buses). Everything left will be your auto count. Divide each of those values by the total directional traffic and you have your vehicle percentages.

$$Volume\ of\ Autos = Total\ directional\ volume - Heavy\ truck\ volume - Medium\ Truck\ volume\ (and\ buses)$$

Take this total volume (of percentages) and multiply them by the total number of vehicles in each lane segment. In your master spreadsheet you'll want to have each lane segment broken up by travel lane. This breakdown will make entering the vehicle type and volume for each lane segment much easier (and you can use cut and paste from the spreadsheet into the model). Also, if the geometry changes the number of lanes, it's much easier to adjust the spreadsheet and spreadsheet equations to correct the new lane volumes!

Posted speed limit will be the speed in the model, unless otherwise specified in writing, in advance. Consult with noise analyst to verify speed to use on ramps. This is true for all vehicle types. If the project is permanently changing the posted speed limit, the new speed will be used in the Build model. Construction or temporary speed changes are not usually modeled.