# Vanguard Nexus

Nexus – Database Editor User Manual

**February 2019**

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# Table of Contents

# 1 Introduction

The Nexus Database Editor allows the user to modify the source locations and operations areas (Op Areas) in a Nexus database.

The user interface consists of two tabs,

## 1.1 Definitions

### 1.1.1 Source Location

A source location in Nexus corresponds to a physical location at which equipment can be placed. This is the most fundamental way in which equipment position is stored in Nexus. The calculation engine is able to calculate noise impacts from a source location using entries in the TLs table.

Source locations can either be single points or multi-segment lines.

### 1.1.2 Op Area

An op area is a collection of source locations that will be used together to perform an activity. Most commonly an op area consists of a pit at which stationary machinery (for the duration of the activity) is situated, and a haul road along which haul trucks operate.

### 1.1.3 Location Category

Location categories are used in Nexus to identify which equipment should be placed at each source location when an activity is created on a particular op area.

### 1.1.4 Activity Category

A particular type of activity that will be used within Nexus. An activity category has a name and a template of equipment that is created whenever an activity of that category is instantiated.

### 1.1.5 Fixed Activity

A special type of Activity Category that can only be placed on one op area. Equipment in a fixed activity all have specific locations, and the cannot be changed.

## 2    Using the Database Editor

### 2.1    Startup

On starting, the database editor will present a dialog box to allow the user to set database connection settings as shown in Figure 1.



**Figure 1 Database connection settings**

Enter the appropriate database server and database name of the database to connect to.

If using active directory authentication, check 'Use Windows Authentication', otherwise enter the SQL Server user name and password in the appropriate boxes.

### 2.2    Imports

The main point of user interaction in the Database Editor is through the import options. These allow the user to perform mass database operations by preparing appropriately formatted files. The user should review the log after an import is complete to ensure that there were no problems.

File formats are described in section 3.

#### 2.2.1    Import Block Deletions

This function allows the user to import a list of op areas and source locations to remove.

### 2.2.2 Import Block Locations

This function allows the user to import a list of new op areas and source locations to store in the database.

### 2.2.3 Import Haul Roads

This function allows the user to import a list of new haul roads.

In order to enable rapid calculation of predicted noise levels when using the application, Nexus relies of pre-calculated data for every source location in the database. When importing new haul roads, the Database Editor must prepare the data necessary for calculations, and this can take a considerable amount of time if importing a large number of haul roads.

The op areas to which the new haul roads will be assigned must already exist in the database. This means that usually the block import must be performed before the haul road import.

## 2.3 Main Window

The main window consists of three major components: The menu bar, the active tab, and the log, as shown in Figure 2.



**Figure 2 The main window**

## 2.4 Log

The log will display any warnings, errors, or information messages that occur in the operation of the Database Editor. The log is also saved to disk, at `<DOCUMENTS>\Nexus Db Editor Logs`.

The user can press the "Clear" button to clear the log – this might be desired after completing one operation and before starting the next. The Clear button only affects the displayed log, and does not affect the log that is saved to disk.

The log can be hidden by clicking on the pin in the top right-hand corner.

## 2.5 Op Areas Tab

The op areas tab displays a list of every op area in the database, and more details on the currently selected op area below. It is shown in Figure 3.



**Figure 3 The op areas tab**

### 2.5.1 Main List

The main list of op areas contains four columns:

- **Name:** The name of the op area
- **Owner:** The op group to which the op area belongs
- **In Use:** Indicates whether there are, or have been in the past, any scheduled activities on this op area.
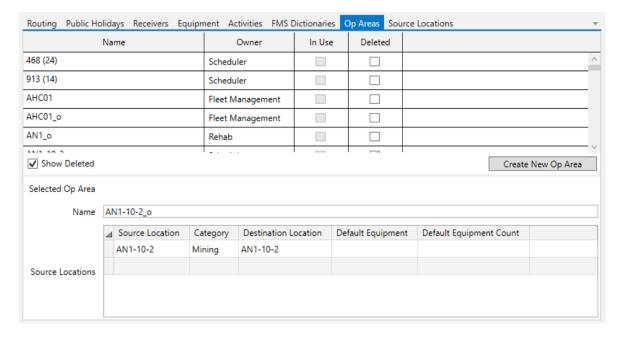- **Deleted:** Indicates whether this op area is effectively 'deleted' from the database, and only maintained for referential integrity.

The 'Show Deleted' checkbox determines whether Op Areas flagged as deleted will be shown.

### 2.5.2 Single Op Area Details

The details section below the list shows the name of the op area and a list of source locations that have been assigned to the op area.

The user can change the name of the op area by editing the name textbox.

The user can delete source locations from the op area by selecting a source location and pressing the "DELETE" keyboard button.

The user can add a new source location to the op area by selecting a source location and category in the last row of the source location list.

Existing source locations or categories can be changed by clicking again on the relevant box in the list.

## 2.6 Source Locations Tab

The source locations tab displays a list of all source locations in the database and detailed properties of the selected source location below that. This is shown in Figure 4.



**Figure 4 The source locations tab**

### 2.6.1 List

The source locations list contains four columns:

- **Name:** The name of the source location
- **Calculated:** If checked, indicates that the particular source location has its own set of TLs to allow calculations. If unchecked, the source location is a proxy that relies on a different entry to perform calculations.
- **Deleted:** Indicates whether the source location has been effectively 'deleted' from the database, and is maintained only for referential integrity or to be used by a proxy.
- **Type:** Indicates whether the source location is a single point or a line.

### 2.6.2 Details Panel

The details panel displays the name, coordinates, any op areas the source loc is used in, and the geometry of the source location if it is a line. The user can modify the name of the source location, but all other properties are read only.

## 2.7 FMS Dictionaries

The FMS dictionaries can be used to translate between activity and equipment names that the fleet management system knows and those that Nexus knows.

### 2.7.1 Equipment

Each piece of equipment that requires translation can have an entry in the 'Equipment' list. The columns are:

- **FMS Identifier** specifies what the FMS system will report.
- **Nexus Equipment** determines what equipment in the Nexus database will be used to model the machinery reported by the FMS. A blank entry in the Nexus Equipment column indicates that Nexus should ignore any equipment from the FMS system with that FMS Identifier.
- The **Dictionary Type** column is used to determine whether this will be applied to a particular equipment identifier, or all equipment that reports a particular type.

### 2.7.2 Activities

Each activity that requires translation can have an entry in the Activities List. Usually it is not necessary to populate this list, as Nexus can create an activity with the same name as specified by the Fleet Management System, even if there is not an Activity Category with that name in the Nexus database.

## 2.8 Activities

The Activities tab displays a list of all activity categories available in Nexus. These activity categories are used when the user creates a new activity, when activities are imported, and by the Fleet Management System.

### 2.8.1 Main List

The upper portion of the tab shows a list of all activities, and some details about each activity. The columns are:

- **Name:** The name of the activity
- **Op Group:** The Op Group that can use the activity
- **Fixed:** Indicates whether the activity is only able to be placed at a single op area. This can be changed in the detail panel, explained below.
- **Deleted:** Deleted activity categories are no longer useable but are kept in the database to ensure referential integrity.
- **User Placeable:** Indicates whether the activity can be placed through the user interface. Non user-placeable activities can still be used by some other parts of the program, for instance the fleet management system.
- **Should Animate:** Indicates whether the activity should be animated if it includes any line source. Generally, activities with trucks on roads should be animated, while fixed activities should not.

### 2.8.2 Single Activity Details

Details of the currently selected activity are shown in the user portion of the tab.

The type and count of the default equipment is to be included with the activity is specified in the op area list.

The 'Location Cateogry Override' can be used to change where the equipment is placed when the activity is instantiated. If used, the equipment will be placed at the source location with a location category that matches the override (rather than the default behaviour of placing the equipment at the source location that matches the equipment). For instance, a truck might have a location category override of "Overburden" when used in an overburden removal activity, and the op area might have a matching haul road with location category of "Overburden" which goes to where overburden material should be placed rather than the ROM pit.

If the activity is a fixed activity, to only ever operate at one location, it can be assigned to an op area through the dropdown at the bottom of the panel. Fixed activities should have a specific source location defined for each piece of equipment in the activity.

## 2.9    Equipment

The equipment tab shows which equipment is available in the Nexus database. The upper panel contains a list of all the equipment in the database. The column meanings are:

- **Name:** Name of the equipment
- **Type:** The type of the equipment. The equipment type is only used in the automated activity importer; if non-default equipment is specified in an import, Nexus will use the Equipment Type to determine which equipment is to be replaced.
- **Icon:** The icon used to display the equipment on the map
- **Deleted:** Deleted equipment is no longer useable, but is kept in the database to ensure referential integrity.
- **Speed:** Specifies the speed of the equipment, to be used when animating the equipment. A default speed of 60km/h is used if none is specified. Only relevant for equipment that will travel on haul roads.

In the lower panel, the spectrum of the equipment is shown. A list of location categories at which the equipment can be used is also shown. The location category of equipment is used to determine at which op areas an activity category that uses the equipment may be placed, and where the equipment will be placed when the activity category is instantiated.

## 2.10    Receivers

The receivers panel shows a list of all receiver locations that have been modelled in the database.

The columns are:

- **Name:** The name of the receiver.
- **Category:** The user can change the receiver category. Receivers can be in three categories.
    - **Contour** receivers are used only to calculate contours.
    - **Logged** receivers are used for any locations where the user may want to view a history of predicted level versus time, but there are not regulatory levels that must be met at that receiver.
    - **Assessed** receivers are locations where noise levels must meet particular thresholds. Levels at these receivers affect most of the user feedback that Nexus provides.
- **Threshold Adjustment:** Applies only to Assessed Receivers. The threshold levels applied to each receiver can be uniformly increased or decreased by changing this value.
- **X, Y:** The UTM coordinates of the receiver

Because the Nexus database keeps a large index on all TLs based on receiver category, changing a receiver category forces the database engine to recompile that index, which can take a very long time. To reduce the impact of this, the Database Editor offers the option to start a list to change multiple receivers in one operation, so that the index only has to be rebuilt once.

## 2.11    Public Holidays

This tab shows a list of all public holidays in the database. This is not editable through the user interface.

## 2.12    Routing

The routing tab show a map which displays all routable roads in the Nexus Database. If there are no routable roads, a world map is shown. This can be used to verify the Nexus routing engine. The user can click on two locations on the map, and the interface will show the route that would be used to connect those locations.

The database editor offers the ability to check whether routing will work. During this, the editor checks that a route can be found from every source location to every other source location, and checks that the route only goes through modelled areas. Because the number of possible routes is equal to the number of source locations squared, this operation can take a very long time; to speed it up the coverage of the check operation can be changed.

If there are multiple distinct road networks in the database, a warning is shown on this page. Each network will be given a different colour. Nexus is unable to calculate a route through distinct road networks; usually the presence of multiple networks will cause Nexus to be unable to find routes. See 5.7

# 3    File Formats

The Nexus Database Editor is able to read comma separated variable (csv) and Microsoft Excel (xlsx) files to perform bulk operations. Each file format is fully configurable, this section describes the information that the files must contain and the default configuration settings.

## 3.1    Block Deletions

Nexus is only interested in a single column of the block deletion file: The column that nominates the names of blocks to be removed. The default header for this column is `Block_ID`.

## 3.2    Block Locations

Each line of the file must contain the following:

| Required | Default Column Name | Description | Example | ConfigDb Entry |
|---|---|---|---|---|
| Yes | Block_Id | The name of the block to be created. The Database editor will create a source location and op area with this name | N1N-4-6 | Name ColumnId |
| No | X | The X-coordinate of the centre of the block, in UTM. If not specified, the source loc must already exist. | 555096 | XColumnId |
| No | Y | The Y-coordinate of the centre of the block, in UTM. If not specified, the source loc must already exist. | 8550564 | YColumnId |

The following columns are not present in the default file format, but can be specified in custom file formats

| | | | | |
|---|---|---|---|---|
| No | *Not Present* | The name of the op area to create or assign the source loc. If not present, Nexus will use the value in the Name column. | NIN-4-6 | OpArea ColumnId |
| No | *Not Present* | The Op Group to which the op area will belong | Scheduler | Owner ColumnId |
| No | *Not Present* | The location category that the source location will have, determining which equipment can be placed there | Mining | Location Category ColumnId |
| No | *Not Present* | The Op Area group to which the op area will belong (largely ignored) | N1N-4-6 | Group ColumnId |

## 3.3 Haul Roads

Each haul road will span many lines of the input file. Each line will specify another vertex of the haul road. For properties that apply to the entire haul road (e.g. Op Area, Location Category, Equipment Name and Equipment Location), on the properties specified on the first line will be used.

Haul roads can be imported a single step process if each haul road will only be used in a single op area, and the data file includes the op area and location category of each haul road.

Haul roads must be imported as a two step process is any haul road is to be used in multiple op areas. In that case, the source locations can be imported using the haul road import, then connected to the relevant op areas using the Block – Haul Road Association importer (see 3.6).

The columns that must be present in the haul road file are:

| Required | Default Column Name | Description | Example | ConfigDb Entry |
|---|---|---|---|---|
| The following properties apply to an entire haul road: They will only be read the first time the haul road name is encountered. | | | | |
| Yes | Haul Route Name | The name of the haul route to be created. | N1N-4-6 ORE | SourceLoc ColumnId |
| No | Block_ID | The op area to which this haul route will be added | N1N-4-6 | OpArea ColumnId |
| No | Mining Activity | The location category that determines which equipment or activity will use this haul road | ORE | Location Category ColumnId |
| Column may be blank | Truck Fleet Type | The type of truck that will operate on this haul road | CAT 777 | Equipment Name ColumnId |
| Column may be blank | NO. TRUCKS | The number of trucks that will operate on this haul road | 16 | Equipment Count ColumnId |
| The following properties specify each vertex in a haul road | | | | |
| Yes | *Vertex Number | The ordinal of the vertex being specified. Must start at zero or one. | 1 | Vertex Number ColumnId |
| Yes | *X-Coordinate | The X-coordinate of the current vertex, in UTM | 555096 | XColumnId |
| Yes | *Y-Coordinate | The Y-coordinate of the current vertex, in UTM | 8550564 | YColumnId |

## 3.4 FMS Equipment and Activity Dictionary

This allows for the import of data into the database that correlates the FMS Equipment names with that of the Equipment names used in Nexus. Data format as follows:

FMS Name, Nexus Equipment

## 3.5 Modelled Locations

Additional modelled locations may be imported using this feature. This data has a very specific format; Talis will provide the required files in the correct directory structure. When importing the data, point the program to the runfil.csv included with the provided data.

## 3.6 Block – Haul Road Associations

The Block – Haul Road association importer can be used to connect haul roads that already exist in the Nexus Database to Op Areas that already exist within the database.

The standard workflow is to first create the necessary op areas using the Block Importer, and the necessary haul roads using the Haul Road Importer, the use the Block – Haul Road Association importer to connect these entities.

Alternately, if routing data is present in the database, this tool can be used to import haul roads that are defined by a start and end destination, which Nexus will find a route between. In this case, the column identified by SourceLocColumnId should contain the name of the block, and the column identified by DestinationColumnId should contain the destination of the haul trucks (e.g. ROM PAD).

Each line in the data file specifies one haul road that will be connected to one op area, and which location category should be assigned to that haul road in that op area.

The columns that must be present in the linkage file are:

| Required | Default Column Name | Description | Example | ConfigDb Entry |
|---|---|---|---|---|
| The following properties apply to an entire haul road: They will only be read the first time the haul road name is encountered. | | | | |
| Yes | Haul Route Name | The name of the haul route to be connected, or the name of the block if using automatic routing. | N1N-4-6 ORE | SourceLoc ColumnId |
| Yes | Block_ID | The op area to which this haul route will be added | N1N-4-6 | OpArea ColumnId |
| Yes | Mining Activity | The location category that determines which equipment or activity will use this haul road | ORE | Location Category ColumnId |
| Column may be blank | Truck Fleet Type | The type of truck that will operate on this haul road | CAT 777 | Equipment Name ColumnId |
| Column may be blank | NO. TRUCKS | The number of trucks that will operate on this haul road | 16 | Equipment Count ColumnId |
| Column may be blank | N / A | [ONLY when using automatic routing] The name of the destination location of the haul road | ROM Pad | Destination ColumnId |

## 3.7    Routing Data

Nexus supports dynamic assignment of custom haul routes. To be able to create these custom haul routes, Nexus requires a routable dataset of the roads in the mine.

This dataset should be provided as a shapefile, or a CSV file. The requirements on the dataset are:

- Each road segment should be represented by exactly one line in the file: no lines in the file should share common segments.
- Each road intersection must be marked by a vertex on both intersecting lines.
- The input data should be in UTM coordinates.

If the data is provided as a CSV file, it must have three columns: name, X, and Y coordinates.

Note that routing data replaces rather than appends what is currently in the database: importing routing data removes any existing data from the database.

## 3.8    Equipment

Additional equipment can be imported into Nexus. The file to import must contain the following data:

| Required | Default Column Name | Description | Example | ConfigDb Entry |
|---|---|---|---|---|
| Yes | Element Name | The name of the equipment. | Cat 777D | EquipmentNameColumnId |
| Column may be blank | LocationCategory | The location categories at which the equipment can be placed. Comma separated | Mining,Mobile | LocationCategoryColumnId |
| Column may be blank | EquipmentType | The type of the equipment. This is used when substituting equipment in an automated activity import | Truck | EquipmentTypeColumnId |
| Column may be blank | Icon | The icon to be used to draw this equipment on a map. | One of: Blasting, Truck, Fixed, Conveyor, Digger | IconColumnId |
| Column may be blank | NoiseCategory | The noise category of the equipment. Generally, this should be left blank unless the equipment is to be used in Blasting. | LAeq | NoiseCategoryColumnId |
| No | Specturm: Low Frequency Columns | 12.5Hz, 16Hz, and 20Hz columns are not required | | Not configurable |
| Column may be blank | Spectrum columns: Third octaves 25Hz – 20kHz | A single column for each spectral entry from 25 Hz to 20kHz, containing the LAeq sound power level in decibels. | Column names:<br>`20Hz, 25Hz, 31Hz, 40Hz, 50Hz, 63Hz, 80Hz, 100Hz, 125Hz, 160Hz, 200Hz, 250Hz,` | Not configurable |

| Required | Default Column Name | Description | Example | ConfigDb Entry |
|---|---|---|---|---|
| | | | 315Hz, 400Hz, 500Hz, 630Hz, 800Hz, 1kHz, 1.25kHz, 1.6kHz, 2kHz, 2.5kHz, 3.15kHz, 4kHz, 5kHz, 6.3kHz, 8kHz, 10kHz, 12.5kHz, 16kHz, 20kHz | |

## 3.9    Activities

New Activity categories can be imported into Nexus.

Each line of the file specifies a particular equipment type to be included with a particular activity category, and the details of that equipment and activity. A single activity can have multiple lines in the same file.

The file must contain the following data:

| Required | Default Column Name | Description | Example | ConfigDb Entry |
|---|---|---|---|---|
| Yes | ActivityName | The name of the activity to be imported | Topsoil Clearing | ActivityColumnId |
| No | PathName | The name of the op area at which the activity is to be placed. Only used for fixed activities where the op area name and activity name are different. | ROM Processing | OpAreaColumnId |
| No | LocationName | The location at which the equipment is to be placed. Only used for fixed activites. | ROM Conveyor | LocationColumnId |
| Yes | EquipmentName | The equipment to be placed when the activity is created. | CAT 777D | EquipmentColumnId |
| Column may be blank | NoiseCategory | The noise category of the activity. Usually this is left blank to use the default noise category. | LAeq | NoiseCategoryColumnId |
| Yes | OpGroup | The op group which can use the activity category | Rehab | OpGroupColumnId |
| No | HaulRoadCategory | A location category override to be used when placing the specified equipment in the specified activity | ORE | LocationCategoryColumnId |
| No | EquipmentCount | The number of equipment that is to be placed in this activity. Defaults to one. | 2 | EquipmentCountColumnId |

## 3.10    Public Holidays

A list of public holidays can be imported into Nexus. The file must contain the following columns:

Name, Date

# 4        Configuration

All format information is specified in the configdb files located at `C:\Program Data\Vanguard\Nexus DbEditor` (this system folder is hidden by default and may be slightly different if the %PROGRAMDATA% environment variable is changed; contact your system administrator if the configuration file requires alteration.) If values are missing the default value will be used.

Columns can be specified either as 1-based column ordinal, or by the column header.

The ConfigDb Editor, included with Nexus, is required to edit configdb files.

Each format definition is described in a sub-key within the specified key. The user can choose different formats from the file type dropdown in the open file dialog.

Every format has some common values that can be set. These are:

| Name | Default Value | Description |
|---|---|---|
| Filter | *.csv | A filter identifying which file types this format applies to. |
| HasColumnHeaders | True | Indicates whether column headers are present in the first row of the file. If column headers are not present, all columns must be identified by their ordinal. |
| Delimiter | , | The character used to delimit different fields. |

## 4.1      Block Deletions

Additional block deletion formats can be located in the `LocalMachine\BlockDeletionFormats` key. The only value of interest is `NameColumnId` which specifies the column that contains the list of block names to delete – default value `Block_ID`

## 4.2    Block Locations

These formats are located in `LocalMachine\BlockImportFormats`

In addition to the column names (see 2.2.2), the following configuration values can be set:

| Name | Default Value | Description |
|---|---|---|
| DefaultOwner | *Not Required* | Specifies the op group to which new blocks will be added, if no *OwnerColumnId* is specified. |
| DefaultLocationCategory | *Not Required* | Specifies the location category that the block will be created with, if no *LocationCategoryColumnId* is specified. |
| GroupRegex | (?<group>.*) | Specifies a regular expression that will be applied to the block name to determine the Op Area Group, if no *GroupColumnId* is specified. Must contain a capture group called "group". Regex will be parsed according to .NET regex rules. |

## 4.3    Haul Roads

These formats are located in `LocalMachine\HaulRoadImportFormats`

This configuration sections only allows changing of column names (see 2.2.3) and the common values of Filters, HasColumnHeaders, and Delimiter.

## 4.4    FMS Activities and Equipment

FMS Dictionary custom import formats can be defined in `LocalMachine\FMSEquipmentFormats` and `LocalMachine\FMSEquipmentFormats`

The relevant configuration values for the activity dictionary are `foreignNameColumnId` and `nexusActivityColumnId`.

For the equipment dictionary, the relevant configuration values are `foreignNameColumnId`, `nexusEquipmentColumnId`, and `dictionaryTypeColumnId` (optional)

## 4.5    Modelled Locations

Modelled locations import formats are not configurable.

## 4.6    Block – Haul Road Associations

Custom association import formats can be defined in `LocalMachine\Block_HaulRoadAssociationFormats`

These import formats are a subset of the Haul Road import formats (see 4.3). They do not include any data about the shape of the haul road (i.e. no vertices).

## 4.7　　Routing Data

Custom routing data import formats can be defined in `LocalMachine\RoutingDataFormats`. The following configuration values can be set:

| Name | Default Value | Description |
|---|---|---|
| NameColumnId | *HAUL ID* | The data column that contains the name of each road segment. Not necessary unless NameRequired is set true. |
| XColumnId | *X* | The columns that contain the coordinates of each vertex. Only relevant for csv import. |
| YColumnId | *Y* | |
| InputLatLon | *False* | Indicates whether the input data is in Latitue and Longitude rather than UTM coordinates |
| NameRequired | *False* | Indicates that the database editor should refuse to import the file if it cannot find the specified name column |
| IntersectionTolerance | *1.0* | The distance tolerance in metres used to determine whether vertices on two different lines represent an intersection. |

## 4.8　　Equipment

Custom equipment import formats can be defined in `LocalMachine\EquipmentImportFormats`.

Section 3.8 describes all fields of this data format.

## 4.9　　Activities

Custom activity import formats can be defined in `LocalMachine\ActivityImportFormats`.

Section 3.9 describes all fields of this data format.

If either of location or op area are defined, then both must be defined.

If equipment count or location category are not defined, then op area and location must be defined. (Fixed plant only format).

## 4.10　　Public Holdays

Custom equipment import formats can be defined in `LocalMachine\PublicHoldayImportFormats`.

The required fields are `NameColumnId` and `DateColumnId`. Optionally `DateCulture` can be specified.

# 5      Possible Import Errors

If an error occurs during import, it will be logged and the user will be asked how to continue.

All import functions will fail and abort if the file does not match the required format, or if an unexpected exception occurs.

All coordinates must lie in the same UTM zone. Unless explicitly otherwise stated, all geometric data must be in UTM coordinates.

## 5.1      Block Deletion:

- If the list contains op areas not found in the database, the offending record will cause an error.
- If a source location specified in the list is used in other op areas, or is used for a fixed activity, it cannot be removed.

## 5.2      Block Location

- Because of how Nexus performs noise calculations, new block locations must be within a predefined distance of existing block locations. By default this distance is 100m.
- A source location or op area might already exist in the database with the same name as that specified in the import.

## 5.3      Haul Roads

- Because of how Nexus performs noise calculations, every point on the geometry of the road must be within a predefined distance of existing point source locations in the database.
- A source location with the specified name that already exists in the database will prevent the haul road from being imported.
- The op area to which a haul road should be assigned might not be present in the database.
- The op area to which a haul road should be assigned already contains a source loc with the specified location category
- The location category specified for the haul road may not existing in the database

## 5.4      FMS Dictionaries

- Any Nexus Activity or Nexus Equipment must exist in the database, failure to do so is an error.

## 5.5      Modelled Locations

Modelled locations will be provided as a package by Talis. Please speak to your contact at Talis for technical support importing the data.

## 5.6      Block – Haul Road associations

The same errors can occur as described in section 5.3. One exception is that the first error cannot occur: Because the roads are already imported, they must already satisfy the requirement that all locations are within a particular distance of a modelled location.

When defining a start and end location using automatic routing, both locations must be point sources.

## 5.7 Routing Data

When importing route data, Nexus requires that roads can only meet at vertices co-located in both roads: A road that ends in the middle of a line segment of another road will not make a connection; nor will two line segments that cross each other without vertices present at the crossing. This is the usual cause of multiple distinct road networks, the solution is to fix the routing data then re-import. All major GIS packages have tools necessary to do this.

- Because of how Nexus performs noise calculations, every point on the geometry of the road must be within a predefined distance of existing point source locations in the database. The user can choose to ignore this requirement and import routing data that does not satisfy it, but this will cause error when the road is used in Nexus.

## 5.8 Equipment

Equipment cannot be imported if any of the following are true:

- Equipment that references a location category that does not exist in the database.
- Equipment that references an equipment type that does not exist in the database.
- Equipment that references an icon that does not exist in the database
- Equipment that references a noise category that does not exist in the database

## 5.9 Activities

The following will prevent all contents of a file from being imported:

- The same activity has different op areas specified on different lines.
- A line exists which does not specify a piece of equipment.
- An unparseable number is encountered.

The following will prevent a single activity category from being imported:

- The activity specifies a non-existent op group.
- The activity specifies a non-existent noise category
- No equipment for the activity can be imported due to errors listed below.

The following will prevent particular pieces of equipment associated with an activity from being imported:

- The equipment does not exist in the database
- The source location specified does not exist in the database
- The location category override does not exist in the database
- A piece of equipment in a fixed activity does not specify a location

## 5.10 Public Holidays

A well formatted file should always be able to be imported.

# Appendix A Example Haul Roads Data File

| Pit | Strip | Block | MaterialID | Mining Activity | Block_ID | Haul Route Name | ToID | *Vertex Number | *X-Coordinate | *Y-Coordinate | *Z-Coordinate | Distance | CycleTime |
|-----|-------|-------|------------|-----------------|----------|-----------------|------|----------------|---------------|---------------|---------------|----------|-----------|
| BSC | 13 | 15 | ORE | ORE-No GQ | BSC-13-15 | BSC-13-15-ORE-No GQ | ROM | 1 | 655908 | 8449552 | -2.78415 | 5051.946 | 21.61682 |
| BSC | 13 | 15 | ORE | ORE-No GQ | BSC-13-15 | BSC-13-15-ORE-No GQ | ROM | 2 | 655980.6 | 8449618 | -2.78415 | 0 | 0 |
| BSC | 13 | 15 | ORE | ORE-No GQ | BSC-13-15 | BSC-13-15-ORE-No GQ | ROM | 3 | 656053.8 | 8449684 | 7.077577 | 0 | 0 |
| BSC | 13 | 15 | ORE | ORE-No GQ | BSC-13-15 | BSC-13-15-ORE-No GQ | ROM | 4 | 656015.3 | 8449694 | 11.05773 | 0 | 0 |
| BSC | 13 | 15 | ORE | ORE-No GQ | BSC-13-15 | BSC-13-15-ORE-No GQ | ROM | 5 | 655976.7 | 8449704 | 15.03787 | 0 | 0 |
| BSC | 13 | 15 | ORE | ORE-No GQ | BSC-13-15 | BSC-13-15-ORE-No GQ | ROM | 6 | 655965.8 | 8449707 | 16.17037 | 0 | 0 |
| BSC | 13 | 15 | ORE | ORE-No GQ | BSC-13-15 | BSC-13-15-ORE-No GQ | ROM | 7 | 655940.8 | 8449713 | 18.75266 | 0 | 0 |
| BSC | 13 | 15 | ORE | ORE-No GQ | BSC-13-15 | BSC-13-15-ORE-No GQ | ROM | 8 | 655938.2 | 8449714 | 19.01802 | 0 | 0 |
| BSC | 13 | 15 | ORE | ORE-No GQ | BSC-13-15 | BSC-13-15-ORE-No GQ | ROM | 9 | 655726.8 | 8449712 | 18.45528 | 0 | 0 |