Python Add-In 'NJ Road Editor'

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Introduction/Tool Quick Reference

The "NJRoadEditor" (NJRE) Python Add-In is a package of tools for editing the NJ Enhanced Road Centerline Database (NJERCD), which is published by the NJ Office of GIS (OGIS). NJRoadEditor consists of an extension and a toolbar with button tools, and is meant to be used in conjunction with the ESRI "Editor" toolbar. The NJRoadEditor extension and toolbar enables the user to interact and edit the NJERCD within an ArcMap edit session. For example, the user can start an edit session using the Editor toolbar and make a series of edits using the NJRE Add-In along with the Editor tools. Following the edits, the user can save the edits and close the edit session as they would normally do using the Editor tools. The main difference between using the ESRI Editor tools and the NJRE Add-In is that the NJRE tools will make all of the necessary database transactions in the road centerline database.

During all database transactions, the GLOBALID and OBJECTID fields will be automatically populated. The UPDATE_USER and UPDATE_DATE fields will also be automatically populated if "Editor Tracking" is turned on (which is the default). If it is not turned on, the NJ Road Editor Add-In will not function properly. There are a number of different tools that can be accessed via the toolbar, and some tools are launched in response to the user making a certain kind of edit in the map window of ArcMap. The tools that can be accessed using the toolbar will be referred to as "button tools", and the tools that are launched after map actions will be referred to as "map tools". Below is a quick reference for the suite of tools that are available, along with a brief description. The subsequent sections provide full documentation for each of the tools.

NJ Road Editor was developed for Oracle and SQL Server ArcSDE versioned geodatabases, and should only be used in this context. Currently, the NJRE Python Add-In supports editing file geodatabases, but this functionality will be deprecated in the future.

The "type" of field (i.e. required or optional) in the NJRE geoprocessing tool dialog boxes can be determined by the presence of a green dot to the left hand side of the field name. The presence of the green dot or lack of the "(optional)" text both indicate that the parameter is required. Unfortunately, when a field changes from optional to required based on another parameter (e.g. check box), the "(optional)" text does not get removed (and there is currently no way to change this). This can be misleading. The only reliable indicator of required/optional is the presence of the green dot (Figure 0).

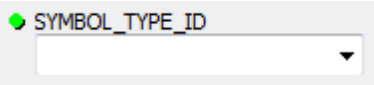

Figure 0. *Green dot indicated required field.*

NewSegment (map tool)

After adding a new segment using the ESRI Editor toolbar, the NJ Road Editor NewSegment tool automatically launches. The tool dialog provides field entries for all relevant tables in the NJERCD including; SEGMENT, SEG_NAME, SEG_SHIELD, LINEAR_REF, and SLD_ROUTE. Full Tool Reference

Split (editor button/map tool)

Splits one segment into two segments. The default field parameters are inherited and the user can modify the fields for each new segment. If the segments have linear referencing the MILEPOST values are automatically interpolated for each new segment in the LINEAR_REF table. All remnants of the original segment are deleted from the database. For each new segment the address ranges are interpolated using the NJ OGIS Roads Geocoder. The split tool is only launched when the user splits a segment using the "Editor" toolbar. Full Tool Reference

Merge (editor button/map tool)

After merging two segments using the ESRI Editor toolbar, the NJ Road Editor Merge tool automatically launches. The tool dialog provides field entries for SEGMENT and will interpolate MILEPOST values for the LINEAR_REF table. The tool can be run in two modes; Standard and Cleanup.

Standard mode deprecates old segments using the SEGMENT_CHANGE and SEGMENT_TRANS tables, and takes care of all the necessary database transactions.

Cleanup mode is for merging small or insignificant segments into a larger significant segment. The tool will delete the remnants of the old insignificant segment, but does not copy the segments to the SEGMENT_CHANGE table or insert records into the SEGMENT_TRANS table, nor does it assign a new SEG_GUID. Full Tool Reference

EditSegment (button) 

Update the attributes of 1 segment in the SEGMENT feature class. Full Tool Reference

EditNames (button) 

Update, insert, or delete SEG_NAME and SEG_SHIELD records. Full Tool Reference

LRS (button) 

Add, update, or delete records in the LINEAR_REF and SLD_ROUTE tables. Select a segment in the SEGMENT feature class and click the LRS button. Full Tool Reference

Identify (button) 

Select a segment in the SEGMENT feature class and click the identify button. A window containing all records in the database will appear (excluding SEGMENT_COMMENTS and SEGMENT_TRANS).

Delete (button) 

Delete a segment and all its associated records in the database. Full Tool Reference

Set Up Desktop Editing Environment

Setting the editing environment in your ArcMap session is a crucial step for ensuring that the NJRoadEditor Add-In functions properly. General best practices with the Add-In include; not editing directly in tables with the NJRoadEditor extension on, and not having tables open during editing while using NJRoadEditor. If you would like to inspect tables after you perform an edit, open a fresh table view after the edit is done. Generally, if the table is open during the edit, it may not refresh to reflect the change (even though the change to the table is real).

Editing Environment Checklist

- NJ Road Editor & ESRI Editor Toolbar are enabled
- NJ Road Editor Extension is enabled
- Current Workspace is set to the .sde connection which contains the features to be edited
- Required feature classes and tables are present in table of contents;
    - SEGMENT
    - SEGMENT_CHANGE
    - SEGMENT_TRANS
    - SEG_NAME
    - SEG_SHIELD
    - LINEAR_REF
    - SLD_ROUTE
    - SEGMENT_COMMENTS

1. Install NJRoadEditor.esriaddin

The NJRoadEditor Add-In has a security certificate embedded to ensure the authenticity and source of the software. This means that the certificate must be installed on the hard drive of the desktop computer where the Add-In is being used in order for the add-in to be trusted. Installing the certificate will ensure that the Add-In is trusted (i.e. the source of the software is trusted and the signature is valid).

Installing the certificate only needs to be performed once every 5 years (the expiration on the certificate is 5 years). As new versions of NJ Road Editor are released, the new Add-In can replace the old Add-In by deleting the current Add-In and replacing it with the new one (if ArcMap is configured to read from a well known folder. Accessing the Add-In from a common repository is advantageous for a distributed system where multiple users can access the Add-In which may be located on a centralized server within a network. For official and detailed instructions on configuring ArcMap to load Add-Ins from a known folder location, see the help pages
http://resources.arcgis.com/en/help/main/10.2/index.html#/Sharing_and_installing_add_ins/014p0000001m000000/.

One-Time Certificate Install & Add-In Install

1. Double click the NJRoadEditor Add-In. This will launch the “Esri ArcGIS Add-In Installation Utility” (Figure 1). Notice that the “Source is trusted” box is unchecked, but the “Signature is valid” box is checked. It is untrusted because the machine does not have the certificate installed yet.
2. Click the “Show Certificate” button.
3. Click the “Install Certificate…” button on the “General” tab. This launches the Windows “Certificate Import Wizard”.
4. Click “Next >”.
5. Select the radio button that says “Place all certificates in the following store” and click “Browse…”
6. Select “Trusted Root Certificate Authorities” folder
7. Click “Next >”.
8. Click “Finish”.

9. Windows will give you a security warning.
10. Click “Yes” if the thumbprint matches.
11. Click “OK” in the Certificate window. Note: in the general tab it will still say that the certificate is not trusted. Also, in the “Esri ArcGIS Add-In Installation Utility”, the “Source is trusted” box will still be unchecked.
12. In the “Esri ArcGIS Add-In Installation Utility” click “Cancel”.
13. To install the Add-In, open the Add-In Manager in ArcMap. Go to the “Options” tab. Click “Add Folder…” button.
14. Browse to the folder where the Add-In is located and click “OK”. The radio button that says “Require Add-Ins to be digitally signed by a trusted publisher” can also be selected, but this is an optional security measure.
15. Close the Add-In Manger and restart ArcMap.
16. Go to the Add-In Manager and the NJ Road Editor Add-In should be present (Figure 2).

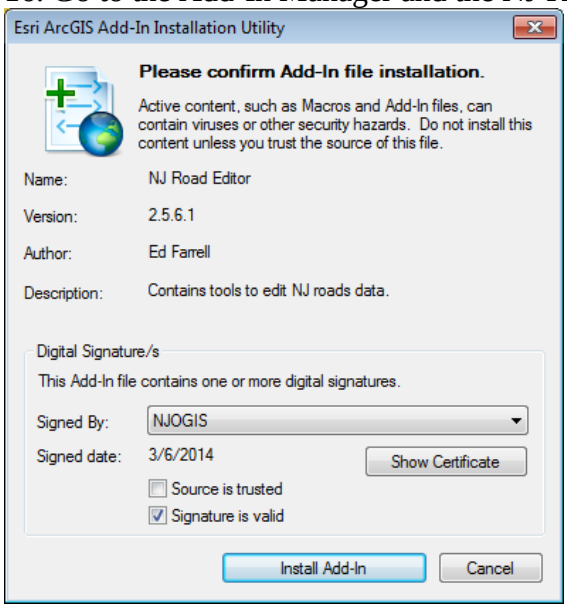

Figure 1. *The Esri ArcGIS Add-In Installation Utility.*

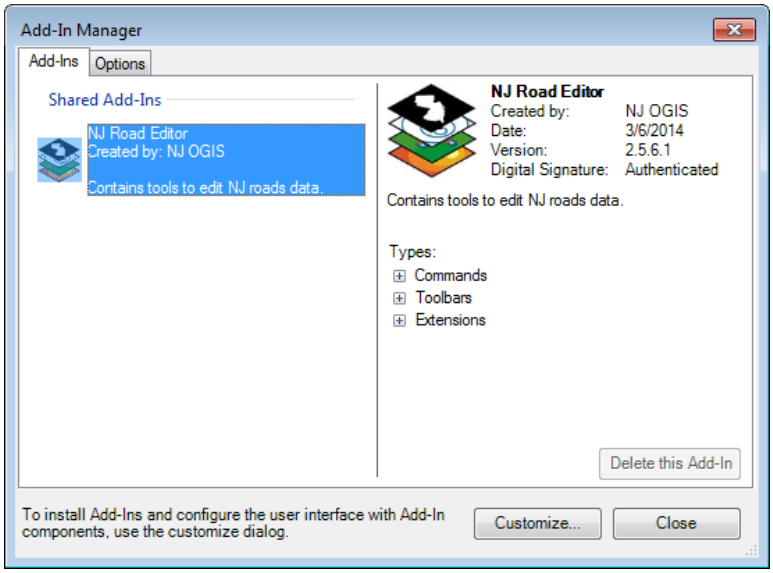

Figure 2. *Add-In Manager in ArcMap showing an installed version of NJ Road Editor with an authenticated digital signature.*

2. Set up ArcMap Editing Environment

2.1 Connect to your instance/version of the NJRCD .sde in ArcCatalog (Figure 3).

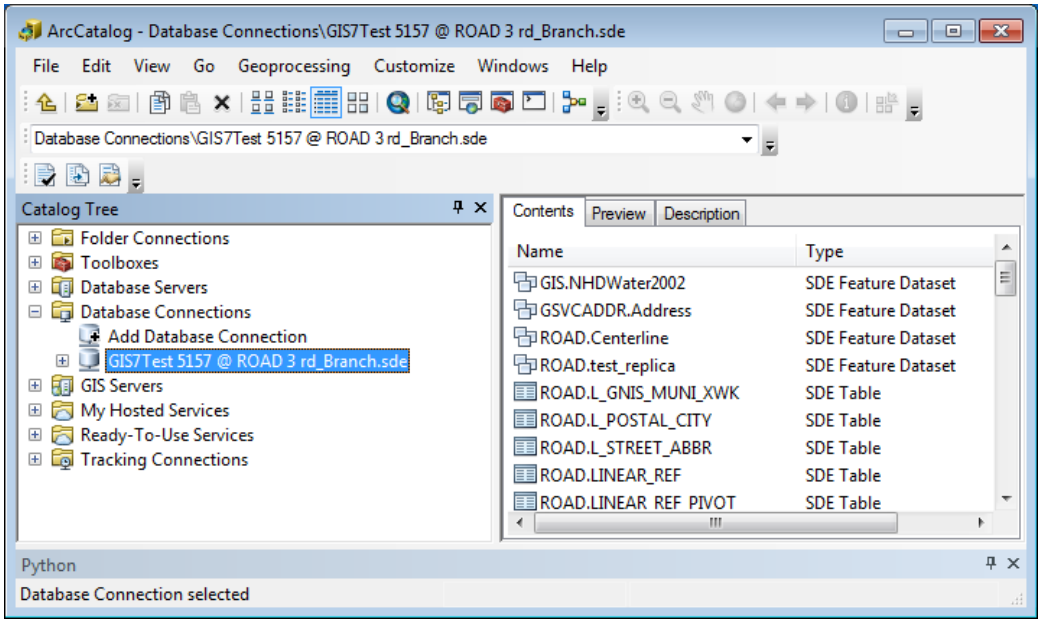

Figure 3*. Connect to road centerline .sde in ArcCatolog*

2.2 Add the feature classes and tables that you will be working on in ArcMap.Then add the Editor toolbar and NJ Road Editor toolbar (Figure 4). **Important: the tables to be edited using the NJRoadEditor Add-In must be in the Table of Contents**.

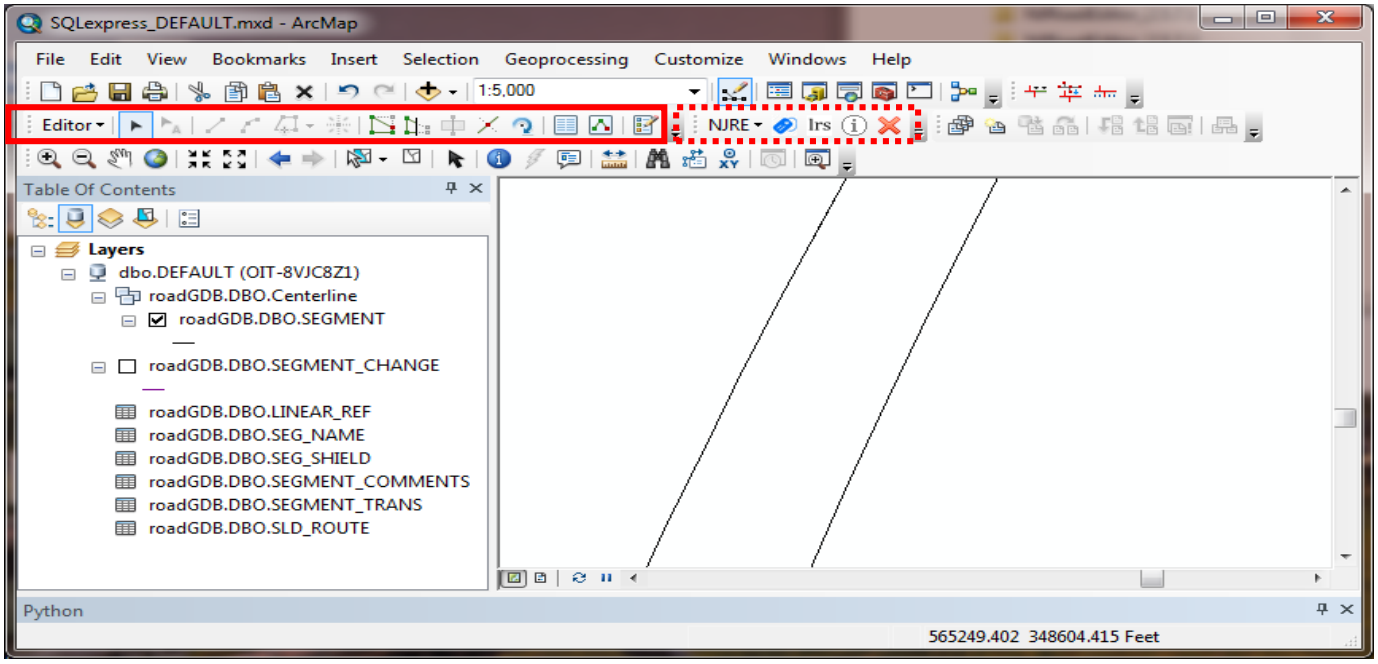

Figure 4. *Add the feature classes and tables to be edited. It is ok to add multiple versions of the database, and to change the names (i.e. aliases), as long as the "Current Workspace" is set to the correct .sde instance. The Editor toolbar (solid red box) and NJ Road Editor toolbar (dashed red box) should be added to ArcMap.*

2.3 Add the NJ Road Editor Extension (Figure 5). **Note:** don't forget to turn this extension off if you don't plan on using it during your edit session.

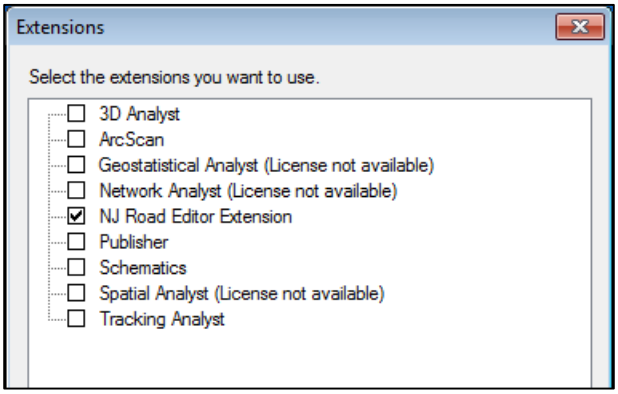

***Figure 5**. Select the NJ Road Editor Extension (Customize > Extensions...)*

2.4 Set the "Current Workspace" in ArcMap. To set the "Current Workspace" go to Geoprocessing > Environments…> Workspace Category (Figure 6). The "Current Workspace" should be set to the .sde version/instance that will be edited. **Important: If this is not set, or not set correctly, the Add-In will not work properly**. The "Scratch Workspace" can be set to any folder the user desires.

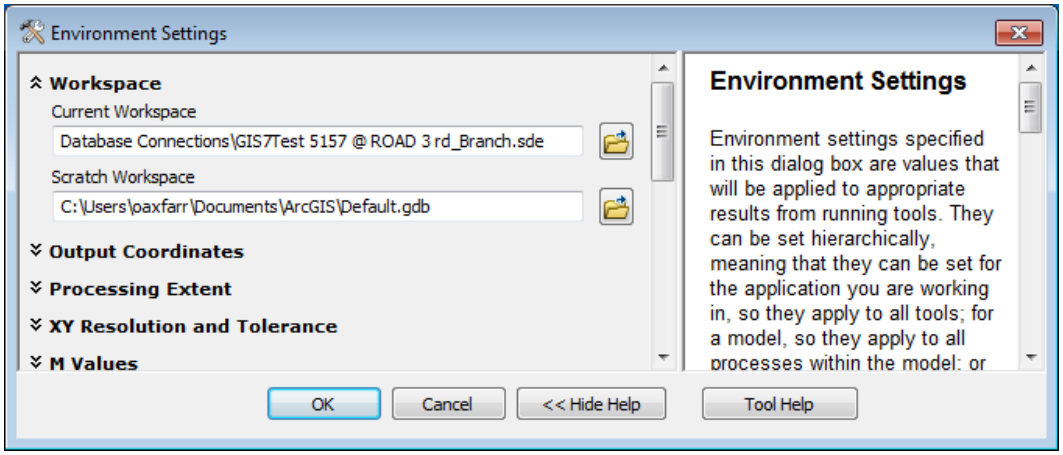

***Figure 6**. Set the "Current Workspace" to the .sde to be edited*

3. Feature Class and Table Naming

Feature class and table names at the database level should remain consistent with NJ OGIS naming. The NJ Road Editor Add-In accesses this list of feature classes; SEGMENT, SEGMENT_CHANGE. The add-in accesses this list of tables; SEGMENT_TRANS, SEG_NAME, SEG_SHIELD, LINEAR_REF, SLD_ROUTE, SEGMENT_COMMENTS. If these names are changed at the database level, the tool will not work because these names are hardcoded. Furthermore, the SEGMENT feature class should remain as part of the centerline feature dataset.

4. Table of Contents

The table of contents (TOC) must have all of the tables mentioned in Section 3. However, naming does not have to be consistent with the database names for feature classes and tables. New and different alias names can be assigned. This allows the user to have mulitple versions of the same feature class or table visible in the table of contents, but only edit one version. As long as the "Current Workspace" is set to the correct database (i.e. the database to be edited), the user can use any alias names they please.

5. Save your ArcMap document

The editing environment is now set. Save the .mxd so that the settings are preserved.

"NewSegment" Tool

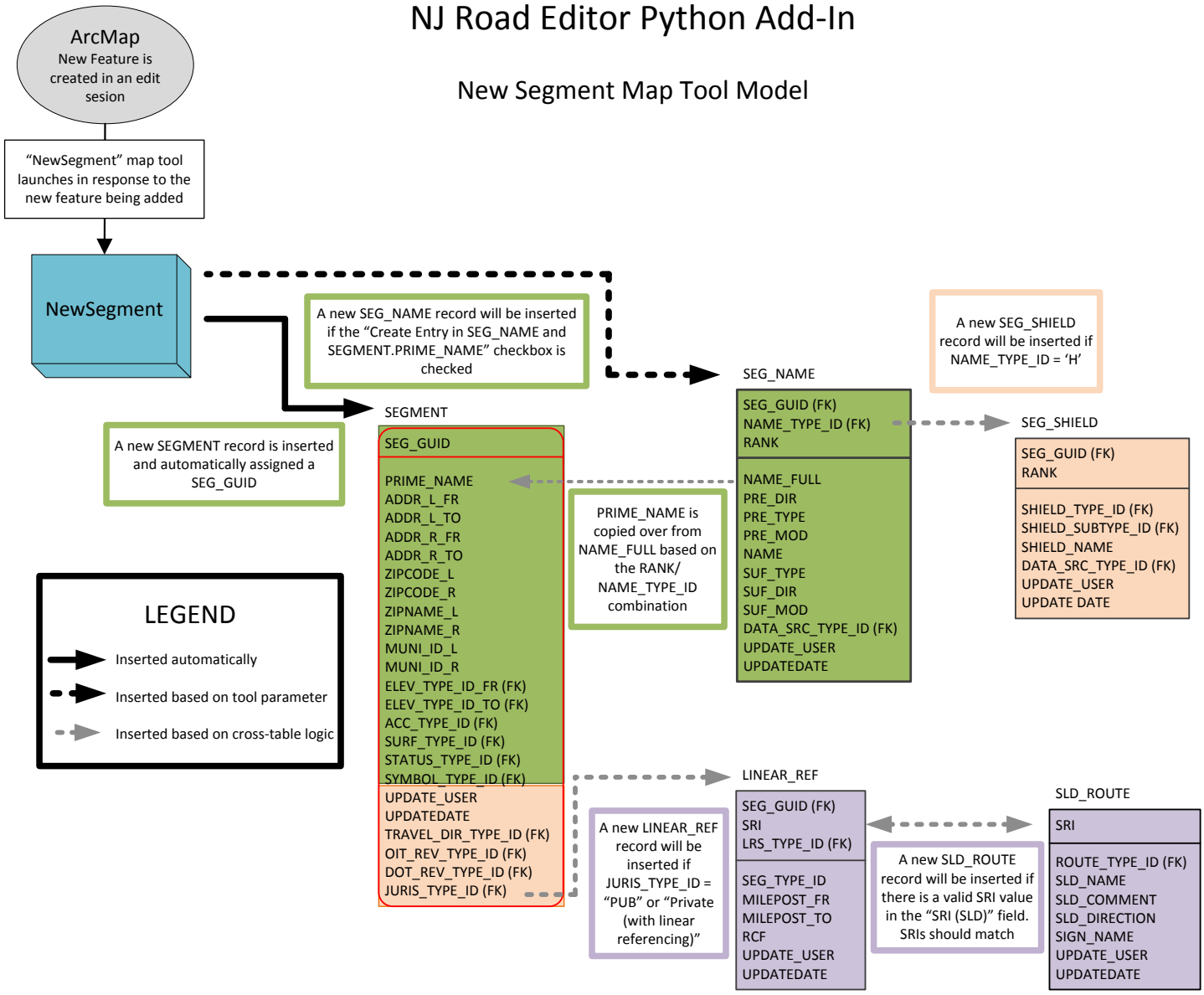

Figure 7. *Conceptual model for the NJRE NewSegment tool. Starting with the user creating a new road segment in the SEGMENT feature class, the NewSegment tool will respond and launch. The model demonstrates how andwhen a new record is inserted into various tables in the NJ Road Centerlines database.*

The "NewSegment" tool is launched when the user creates a new segment (in the SEGMENT feature class) in an edit session (there is no button for this tool). The NewSegment tool is a geoprocessing dialog box where the user can input a variety of fields that are applied to the various tables. The tables that can receive new records using the NewSegment tool are; SEGMENT, SEG_NAME, SEG_SHIELD, LINEAR_REF, and SLD_ROUTE (see Figure 7). There are numerous switches within the tool that turn certain categories on and off, also make certain fields required or optional, as well as provide multiple levels of parameter validation. A comprehensive list of tool validation can be found in the Global Validation NJRE Tools.xlsx spreadsheet. See Figure 7 above for the logic on how records are inserted into the various tables in the data model.

One new record will be inserted in the LINEAR_REF table regardless of JURIS_TYPE. Also, if the LRS_TYPE is “1”, then the milepost values are used to create the M-values in the SEGMENT feature class. If more than one LRS record needs to be inserted (which is common), the LRS tool can be used to edit/add/delete the LRS records that are associated with the segment (after the NewSegment tool is complete).

Split

The ESRI Editor split tool and the NJRE Split tool are two separate tools that are used by the Add-In to properly handle changes to the database feature classes and tables. Splitting a segment should be performed using the ESRI Editor split tool. After the segment is split (in the SEGMENT feature class), the NJRE Add-In Split tool will launch as a series of dialog boxes that will allow fields to be populated for each of the two newly split segments. By default, all of the field values in the original segment are inherited by the two newly split segments, but new SEG_GUID values are created for each new segment. The user will also have to provide ELEV_TYPE values for one end of each segment (since elevation is unknown where the split took place). If the original segment had linear referencing the MILEPOST values are automatically interpolated (for each new segment) in the LINEAR_REF table. For each new segment the address ranges are interpolated using the NJ OGIS Roads Geocoder ('http://geodata.state.nj.us/arcgis/rest/services/Tasks/Addr_NJ_road/GeocodeServer'). If the geocoder fails to interpolate, the field values will be inherited from the original segment. Once the field values are updated using the dialog boxes, all remnants of the original segment are deleted from the database and the field values for the two new segments are updated.

The general process shown in Figure 8 shows the split process, where the original segment (SEG_GUID 0) gets deleted along with any associated SEGMENT_COMMENTS records. Also, the original segment is added to the SEG_CHANGE feature class, and 2 new records are inserted into the SEGMENT_TRANS table with SEG_GUID_NEW values that match SEG_GUID 1 and SEG_GUID 2. The field values from SEG_GUID 0 are inherited to SEG_GUID 1 and SEG_GUID 2, and any changes that were made using the tool dialog boxes are applied for each of the segments. Milepost values are updated based on the new M-values for each of the newly split segments (this is only for LRS_TYPE 1, 2, and 3). If the user is on the OIT domain, OIT_REV_TYPE will default to ‘Final’ and DOT_REV_TYPE will default to ‘Draft’. Conversely, if the user is DOT, then OIT_REV_TYPE will default to ‘Draft’ and DOT_REV_TYPE will default to ‘Final’.

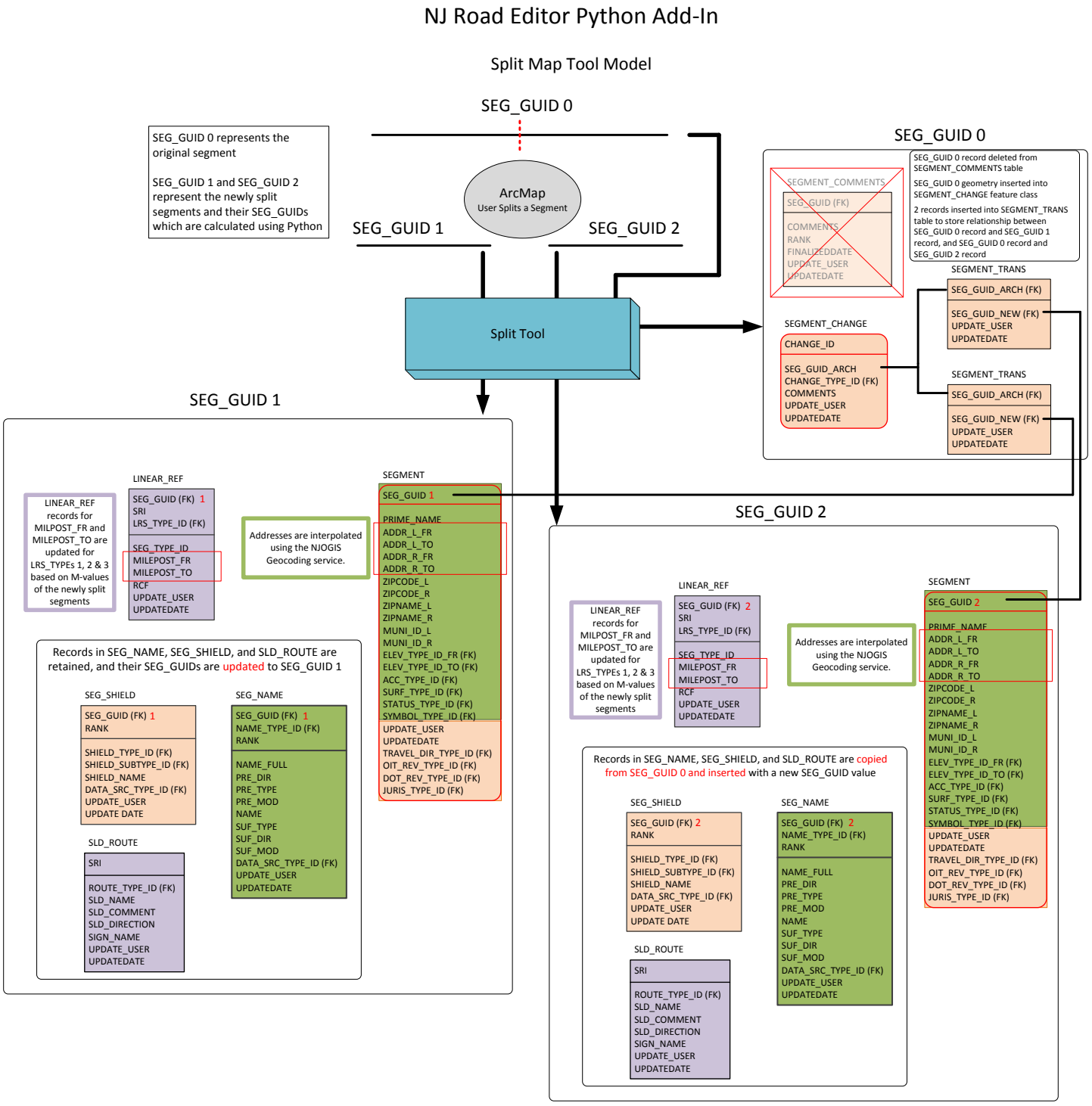

Figure 8. *Conceptual diagram of the NJRE Python Add-In Split map tool. The red dashed line shows the initial split in ArcMap on SEG_GUID 0. The two new segments are then assigned new SEG_GUIDs as well as GLOBALID values. After the split takes place, the Split map tool responds by launching a series of dialog boxes that handle each new segment individually. The result is a deprecated SEG_GUID 0 segment, and 2 new segments with all the appropriate database updates throughout the data model.*

Step 1: Split segment & enter values for first new segment (SEG_GUID 1)

Start an edit session using the ESRI Editor toolbar(hereafter, Editor toolbar). Select the segment to be split (note: only one segment can be selected at a time). Select the split button on the Editor toolbar and split the segment at the desired location. At this point, the segment will be split. The NJ Road Editor (NJRE) Split tool will launch automatically (Figure A6). Simultaneously, the segment the user is currently entering values for will be selected (i.e. highlighted in bright blue) so the user knows which of the new segments is being edited. Figure A6 shows a typical split on a segment where the address range values are ascending on both sides of the road. In this case, the values have been interpolated by the geocoder, rather than inheriting the original segment's values (original address values were L_FR: 3431, L_TO: 3499, R_FR: 3444, R_TO: 3498). All other attribute values have been automatically populated from the original segment, and can be manually edited (except for SEG_GUID and PRIME_NAME). Once the user is satisfied with the input, click "OK". If not, click "Cancel".

After clicking, the tool will show the geoprocessing dialog for this part of the tool. This can be closed. Then a dialog box will ask if the user wants to continue or not. If yes, click "OK". If not, click "Cancel". If the user clicks Cancel, the tool will stop, however the split will have still happened. To get rid of the split, click "Undo" or stop editing without saving.

Step 2: Enter values for second new segment (SEG_GUID 2)

Once the user has entered the values for the first new segment (SEG_GUID 1), the second new segment (SEG_GUID 2) will be selected in the map document and the same dialog box will launch (see Figure A6) enabling the user to input values for SEG_GUID 2. The same address interpolation will be performed. Click "OK" to continue or "Cancel" to cancel.

After clicking, the tool will show the geoprocessing dialog for this part of the tool. This can be closed. Then a dialog box will ask if you want to continue or not. If yes, click "OK". If not, clock "Cancel". If the user clicks Cancel, the tool will stop. However, the split will have still happened. To get rid of the split, click "Undo" or stop editing without saving.

Step 3: Geoprocessing

At this point, all that the tool has done is collect user input for fields in the two new segments. Now, the database transactions need to happen. Here is a list of geoprocessing events that happen after the user clicks "OK";

- New SEG_GUID assigned to first new segment (i.e. SEG_GUID 1)
- New SEG_GUID assigned to second new segment (i.e. SEG_GUID 2)
- SEG_NAME table – insert rows for new segments (road name(s) copied from original segment, with new SEG_GUIDs)
- SEG_NAME table – delete row(s) for SEG_GUID 0
- SEG_SHIELD table – insert rows for new segments (shield type(s) copied from original segment, with new SEG_GUIDs)
- SEG_SHIELD table – delete row(s) for SEG_GUID 0
- LINEAR_REF table – insert rows for new segments (SRI(s) copied from original segment, with new SEG_GUIDs)
- LINEAR_REF table – delete row(s) for SEG_GUID 0

- LINEAR_REF table - MILEPOST values are interpolated for SEG_GUID 1 and SEG_GUID 2 based on M-values from newly split segments.
- SEGMENT_CHANGE – original segment (SEG_GUID 0) is copied over from SEGMENT feature class
- SEGMENT_TRANS – insert 1 row for each new segment
- SEGMENT_COMMENTS – delete SEG_GUID 0 record
- SEGMENT – delete SEG_GUID 0 record
- SEGMENT – insert SEG_GUID 1 and SEG_GUID 2 records with user input
- SLD_ROUTE – no action taken

Merge

Like the NewSegment and Split tools, Merge operates in conjunction with the Editor tools and is launched after features are merged. The tool can be run in two modes; Standard and Cleanup. Standard mode treats the merge as a standard database transaction where the old segments go to SEGMENT_CHANGE and SEGMENT_TRANS and a new SEG_GUID is assigned. Cleanup mode does not assigning a new SEG_GUID value for the new segment (the new segment retains the SEG_GUID of the segment that was "merged to"), or create records in SEGMENT_CHANGE and SEGMENT_TRANS. In each mode, only 2 segments can be merged at a time.

If the user is on the OIT domain, OIT_REV_TYPE will default to 'Final' and DOT_REV_TYPE will default to 'Draft'. Conversely, if the user is DOT, then OIT_REV_TYPE will default to 'Draft' and DOT_REV_TYPE will default to 'Final'.

Standard Mode

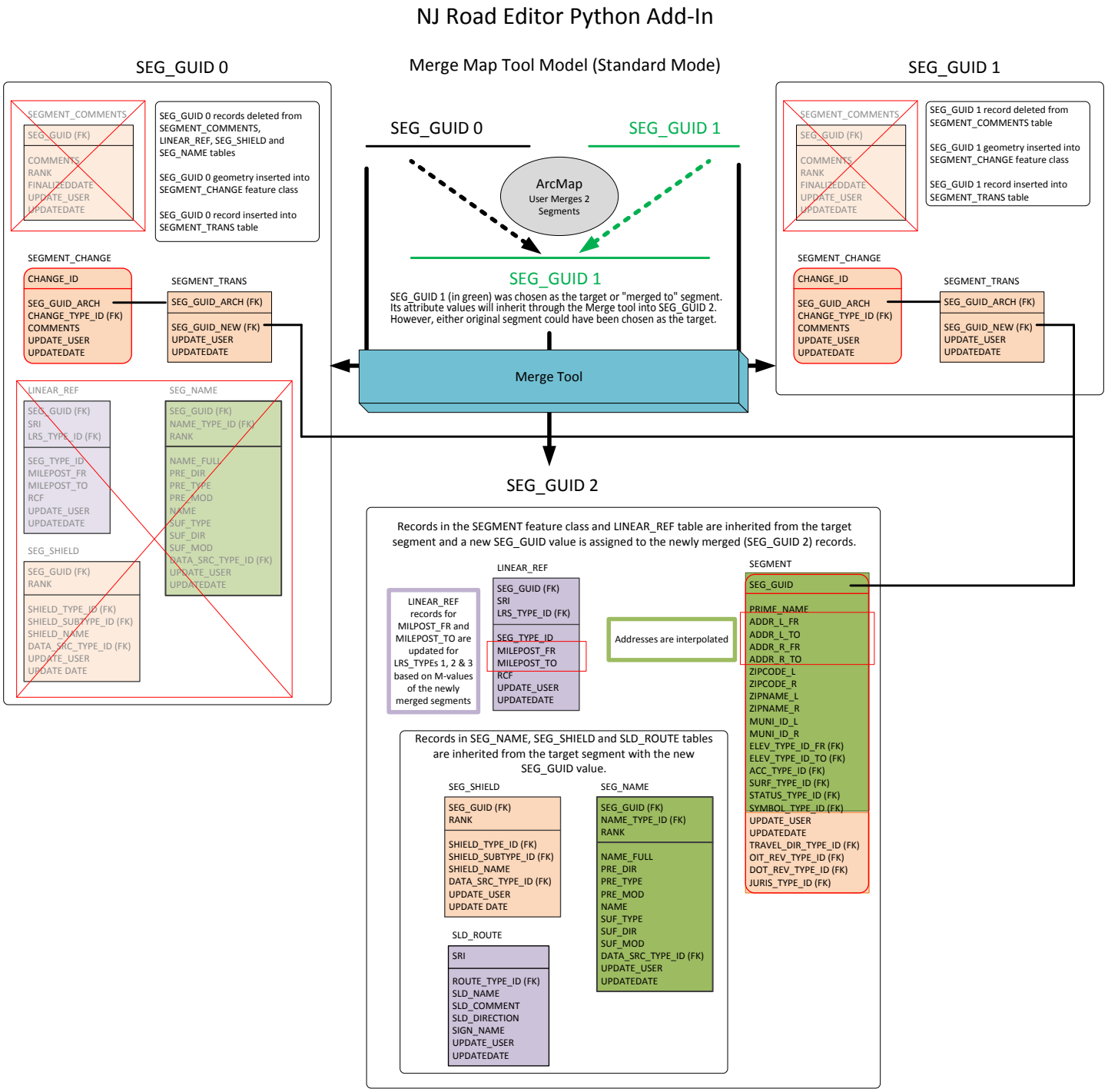

Figure 9. *Conceptual diagram for a Merge operation using the NJ Road Editor Add-In in Standard Mode.*

Performing a Merge operation in standard mode triggers all relevant database transactions that need to take place. Standard mode is designed for merging two segments which need to be retained in the SEGMENT_CHANGE feature class. This is typical if the two segments are established roads that need to be accounted for in the database.

To perform a Merge using the NJ Road Editor Add-In, simply perform a Merge operation using the ESRI Editor toolbar. After the merge, a message box will ask what mode you would like to run the tool in (Figure A7). After selecting the mode (click "Yes" for Standard), a geoprocessing dialog will appear (Figure A8). The values that appear in the fields are inherited from the target segment which is SEG_GUID 1 in the conceptual diagram (Figure 9). If the target segment has LINEAR_REF records, the user can choose to automatically update the MILEPOST values using the new M-values of the merged segment.

A summary of events for the Merge tool in standard mode:

- SEG_NAME table – delete all SEG_GUID 0 records
- SEG_NAME table – delete all SEG_GUID 1 records
- SEG_SHIELD table – delete all SEG_GUID 0 records
- SEG_SHIELD table – delete all SEG_GUID 1 records
- LINEAR_REF table – delete all SEG_GUID 0 records
- LINEAR_REF table – delete all SEG_GUID 1 records
- SEGMENT_COMMENTS table – delete all SEG_GUID 0 records
- SEGMENT_COMMENTS table – delete all SEG_GUID 1 records
- SEGMENT_CHANGE feature class – insert record for SEG_GUID 0
- SEGMENT_CHANGE feature class – insert record for SEG_GUID 1
- SEGMENT_TRANS table – insert record for SEG_GUID 0 to SEG_GUID 2
- SEGMENT_TRANS table – insert record for SEG_GUID 1 to SEG_GUID 2
- SEG_NAME table – insert rows for SEG_GUID 2 (copies of the old names, with new SEG_GUID)
- SEG_SHIELD table – insert rows for SEG_GUID 2 (copies of the old names, with new SEG_GUID)
- LINEAR_REF table – insert rows for SEG_GUID 2 (copies of the old names, with new SEG_GUID)
- LINEAR_REF table – update the MILEPOST vales (if selected) using the M-values of SEG_GUID 2
- SEGMENT feature class – delete SEG_GUID 0
- SEGMENT feature class – delete SEG_GUID 1
- SEGMENT feature class – insert SEG_GUID 2 with user input
- SLD_ROUTE table – no action taken

Cleanup Mode

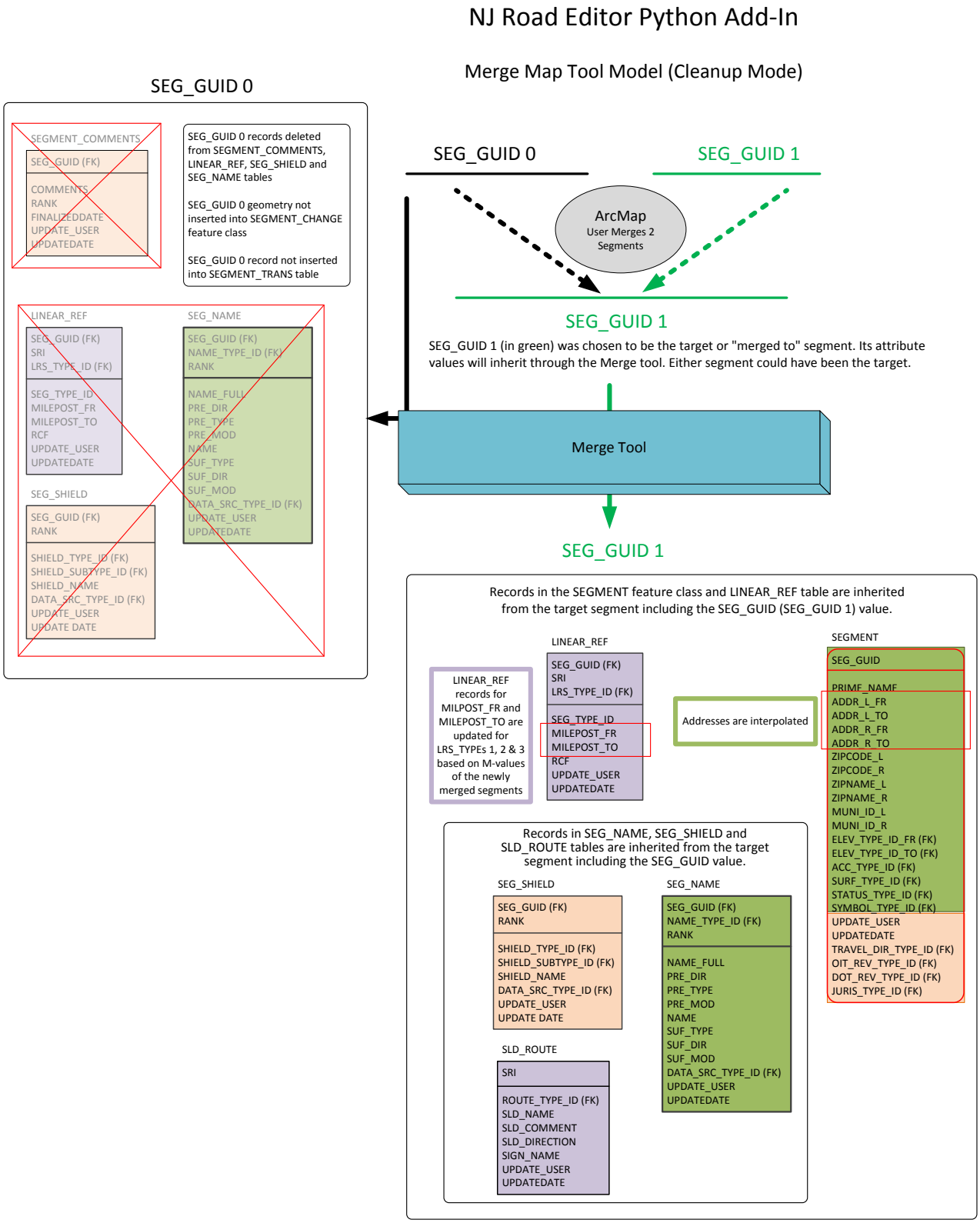

Figure 10. *Conceptual diagram of the NJ Road Editor Merge tool in Cleanup mode.*

The NJ Road Editor Merge tool in cleanup mode is launched in the same way as in standard mode, accept the user should choose “No” on the dialog box shown in Figure A7. After choosing “No” the tool dialog box will launch (Figure A8) and the fields should be filled out in the same way as in Standard mode.

All of the fields will be automatically populated with the values from SEG_GUID 1 (Figure 10). Cleanup mode was designed to merge small insignificant or erroneous segments into a larger segment without adding geometry to the SEGMENT_CHANGE feature class, a record to the SEGMENT_TRANS table and assigning a new SEG_GUID value. Instead, SEG_GUID 0 geometry is added to SEG GUID 1 and all remnant of SEG_GUID 0 are deleted from the database. If there are M-values from SEG_GUID 0 that were added to SEG_GUID 1, the LINEAR_REF MILEPOST values will be updated. Like standard mode, MMS Milepost Markers are not handled because they are not linked to M-values, so the user must manually update the values in this field if necessary . The summary of events that takes place in cleanup mode:

- SEG_NAME – delete all SEG_GUID 0 records
- SEG_SHIELD – delete all SEG_GUID 0 records
- LINEAR_REF – delete all SEG_GUID 0 records
- LINEAR_REF – update all SEG_GUID 1 records
- SEGMENT_COMMENTS – delete all SEG_GUID 0 records
- SEGMENT_CHANGE – no action taken
- SEGMENT_TRANS – no action taken
- SEG_NAME – delete all SEG_GUID 0 records
- SEG_SHIELD – delete all SEG_GUID 0 records
- SEGMENT – delete SEG_GUID 0
- SEGMENT – update SEG_GUID 1 with user input
- SLD_ROUTE – no action taken

EditSegment

The EditSegment button tool enables the user to update the attributes of 1 segment of the SEGMENT feature class. The use the tool, the user should select 1 segment and click the  button. The user will be presented with an interface that will allow them to modify existing attributes or add new ones to the segment. Clicking the “Ok” button will change the values in the data model and provide the user with a summary of changes and results in a “geoprocessing results” interface.

EditNames

The EditNames button tool enables the user to update, insert, or delete records in the SEG_NAME and SEG_SHIELD tables associated with a segment in the SEGMENT feature class. The user must be in an edit session to use the tool.

Insert Record

Once in an edit session, select the segment (only 1 segment) and click the EditNames button. A tool dialog will launch with a "value table" (Figure A9) where current records are listed in the rows of the table. Using the value table controls, the user can add or delete records. To insert a new record, use the "Add and Delete Records" text box and type "Record 1" and hit the + button. If "Record 1" already exists, enter "Record 2" or the next number in the sequence of existing records. This will populate the "Record ID" field, which must be in the format "Record 1, Record 2, Record 3, etc.". Once the new record is in the table, edit the fields by selecting the record in the "Current Record" dropdown, and the user can edit all of the fields of the record. At minimum, a new record will be inserted into the SEG_NAME table. If the NAME_TYPE_ID is "H", then a SEG_SHIELD record will also be inserted.

Update Record

To update existing records, use the "Current Record" dropdown to select which record to update. Once the record is selected, all current values for the record will populate the fields below "Current Record". As the fields are updated, they automatically update in the value table.

Delete Record

To delete a record, select the record in the value table and click the X button.

Tool Validation

SEG_NAME Validation

1. NAME_TYPE_ID is required
2. NAME is required
3. DATA_SRC_TYPE_ID is required.
4. NAME_FULL is automatically concatenated from the seven parsed name element fields

SEG_SHIELD Validation

1. If NAME_TYPE_ID = 'H', then SHIELD_TYPE_ID, and SHIELD_SUBTYPE_ID are required
2. If NAME_TYPE_ID = 'H', and SHIELD_TYPE_ID = Highway Authority Route, then SHIELD_NAME is nulled
3. If NAME_TYPE_ID = 'H', and. If SHIELD_TYPE_ID <> Highway Authority Route, then SHIELD_NAME is required
4. The seven parsed name element fields will automatically populate based on SHIELD_TYPE_ID

LRS

The LRS button tool on the NJ Road Editor Toolbar allows the user to insert, update, and delete records from the LINEAR_REF and SLD_ROUTE tables independently from one another. The tool has two "value tables" (Figure A10) where the current records in both tables are displayed. To use this tool, select a segment from the SEGMENT feature class and click the button.

Insert Record

Once in an edit session, select the segment (only 1 segment) and click the LRS button. A tool dialog will launch with a "value table" for current LINEAR_REF and SLD_ROUTE (Figure A10) records listed in the rows of the table. Using the value table controls, the user can add or delete records. To insert a new record, use the "Add and Delete LINEAR_REF Records" text box and type "Record 1" and hit the + button. If "Record 1" already exists, enter "Record 2" or the next number in the sequence of existing records. This will populate the "Record ID" field, which must be in the format "Record 1, Record 2, Record 3, etc.". Once the new record is in the table, edit the fields by selecting the record in the "Current LINEAR_REF Record" dropdown, and the user can edit all of the fields of the record. If the user enters a new LRS record and the LRS_TYPE = 1, then the MILEPOST_FR and MILEPOST_TO values will be used to populate the M-Values of the segment (geometry change).

Use the same method for inserting records into the SLD_ROUTE value table.

Update Record

To update existing records, use the "Current LINEAR_REF Record" dropdown to select which record to update. Once the record is selected, all current values for the record will populate the fields below "Current Record". As the fields are updated, they automatically update in the value table. If the user alters the LRS record and the LRS_TYPE = 1, then the MILEPOST_FR and MILEPOST_TO values will be used to update the M-Values of the segment (geometry change).

Delete Record

To delete a record, select the record in the value table and click the X button.

Tool Validation (i.e. field validation within the tool before it runs)

LINEAR_REF Validation:

1. Must contain a valid LRS_TYPE, and cannot be null
2. Must have a valid MILEPOST_FR and MILEPOST_TO
3. If LRS_TYPE = 1, then milepost values must be increasing
4. Required fields for each record: SEG_GUID, LRS_TYPE, SEG_TYPE, MILEPOST_FR, MILEPOST_TO
5. Should contain "__" in the 9th and 10th characters if the LRS_TYPE_ID = 2

SLD_ROUTE Validation:

1. If SRI has a value, ROUTE_TYPE_ID, SLD_NAME and SLD_DIRECTION are required
2. If ROUTE_TYPE_ID >= 7, then SLD_DIRECTION will be set to null (i.e. database null)
3. If ROUTE_TYPE_ID < 7, then SLD_DIRECTION is required

Delete

The Delete button tool on the NJ Road Editor Toolbar can only be used during an edit session. To use the tool, select a segment in the SEGMENT feature class (note: not for use on the SEGMENT_CHANGE feature class) and press the Delete button. This will launch the Delete tool dialog with options for how to make the delete in the database (Figure A11). The user will have options to add the deleted segment to the SEGMENT_CHANGE feature class, create a new record or delete an existing record in the SEGMENT_COMMENTS table. If the user selects to create a new record in the SEGMENT_COMMENTS table, the COMMENTS and RANK fields will be enabled. Also, a value of "Y" will be automatically added to the COMMENTS field of the SEGMENT_CHANGE feature class (to indicate a SEGMENT_COMMENTS record).

Upon running the tool, all records that have a matching SEG_GUID values will be deleted (note: no action is taken on the SLD_ROUTE table). The delete geoprocessing result dialog box will report where deletes were made.

Appendix

Figure A1. New Feature tool default dialog

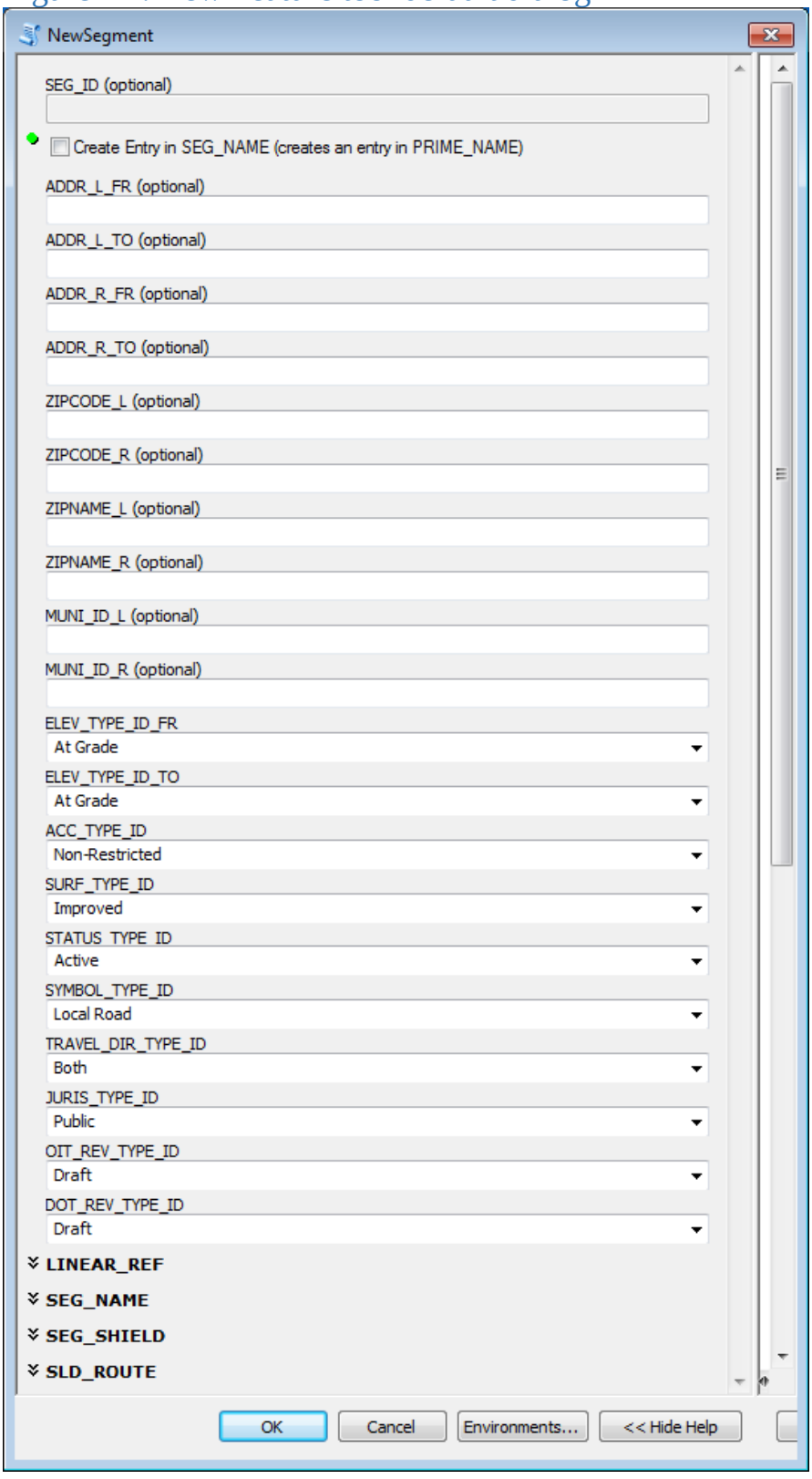

Figure A2. New Feature tool: SEG_NAME Category

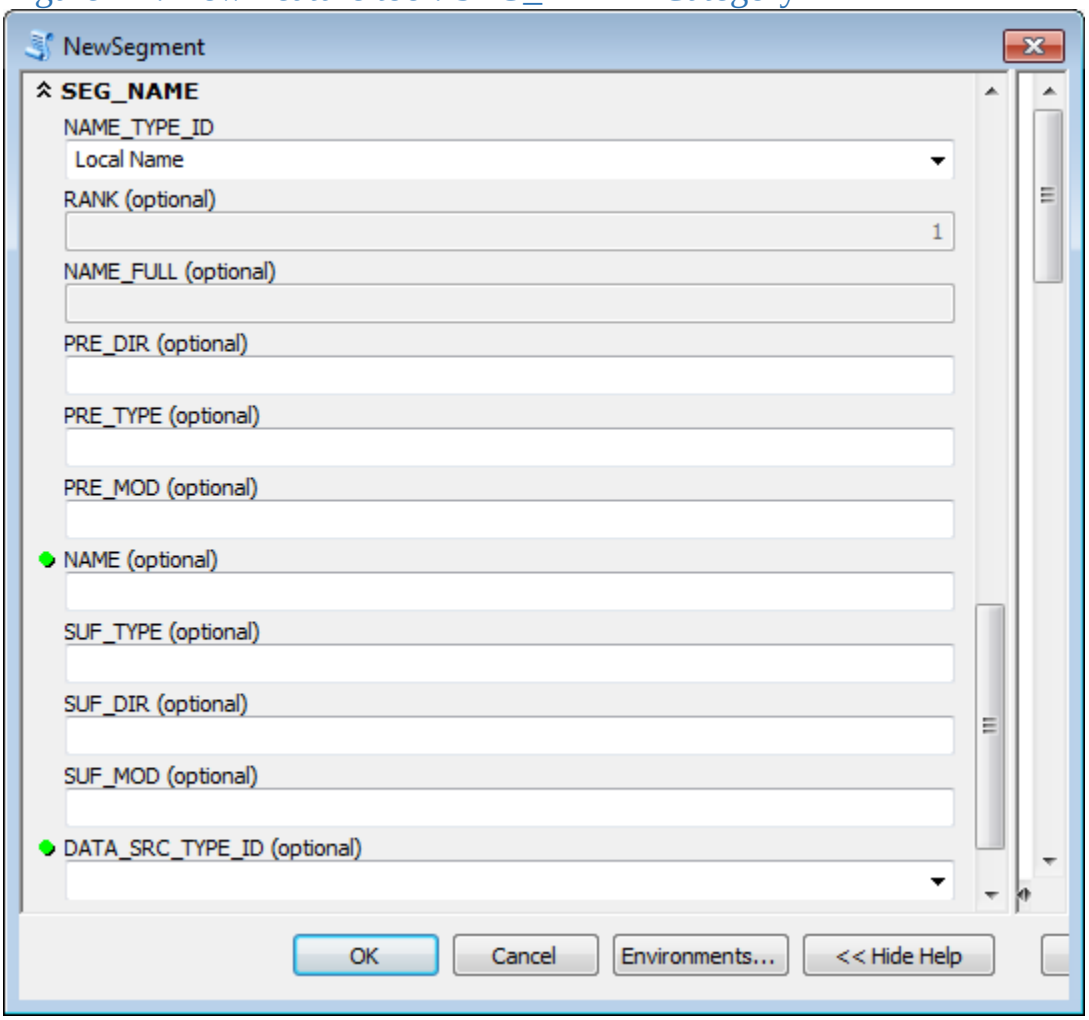

Figure A3. New Feature tool: SEG_SHIELD Category

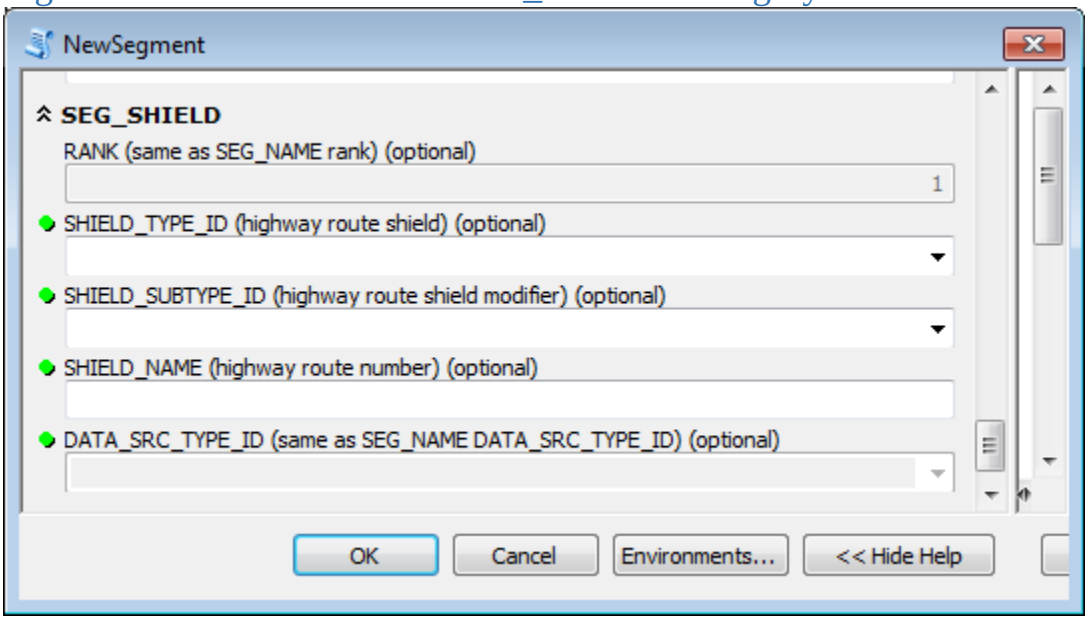

Figure A4. New Feature tool: LINEAR_REF Category

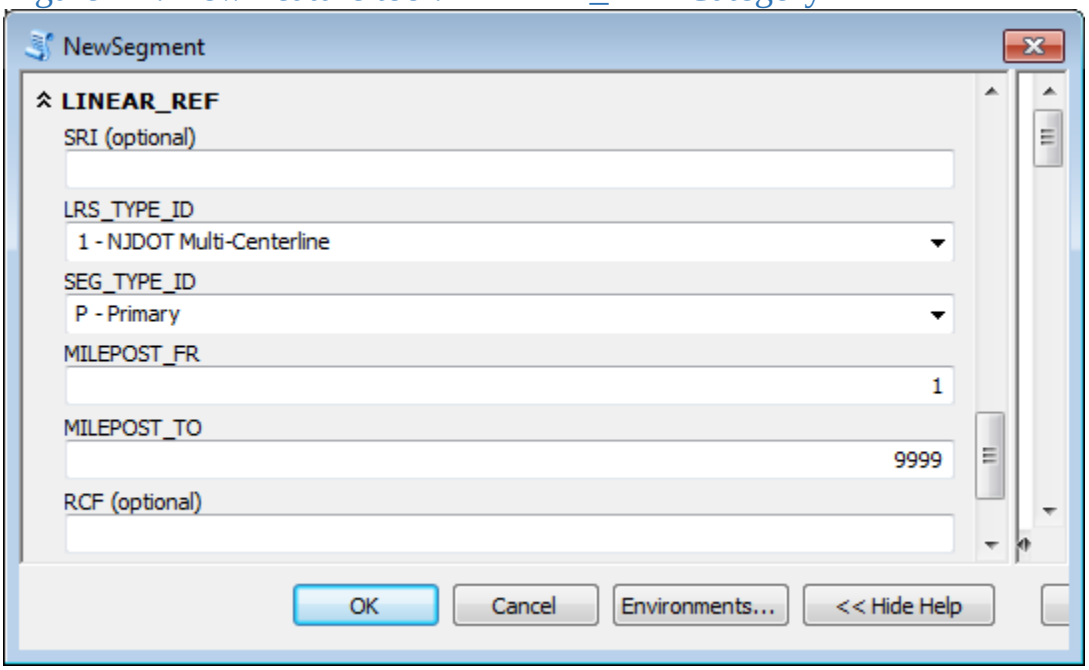

Figure A5. New Feature tool: SLD_ROUTE Category

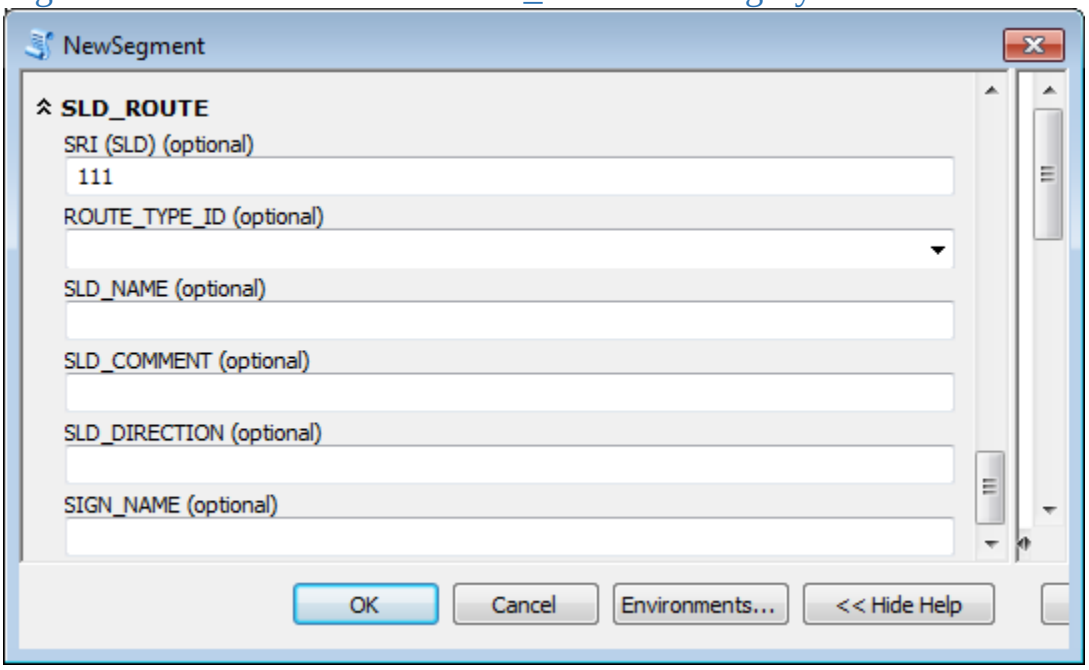

Figure A6. Split tool dialog box

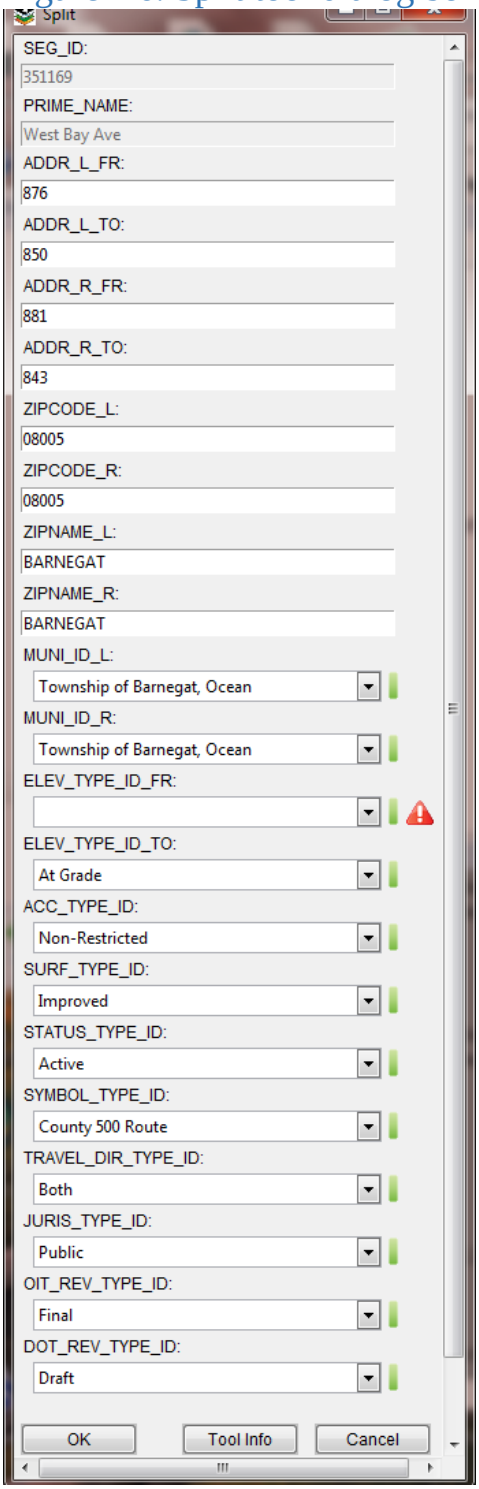

Figure A7. Merge mode dialog box

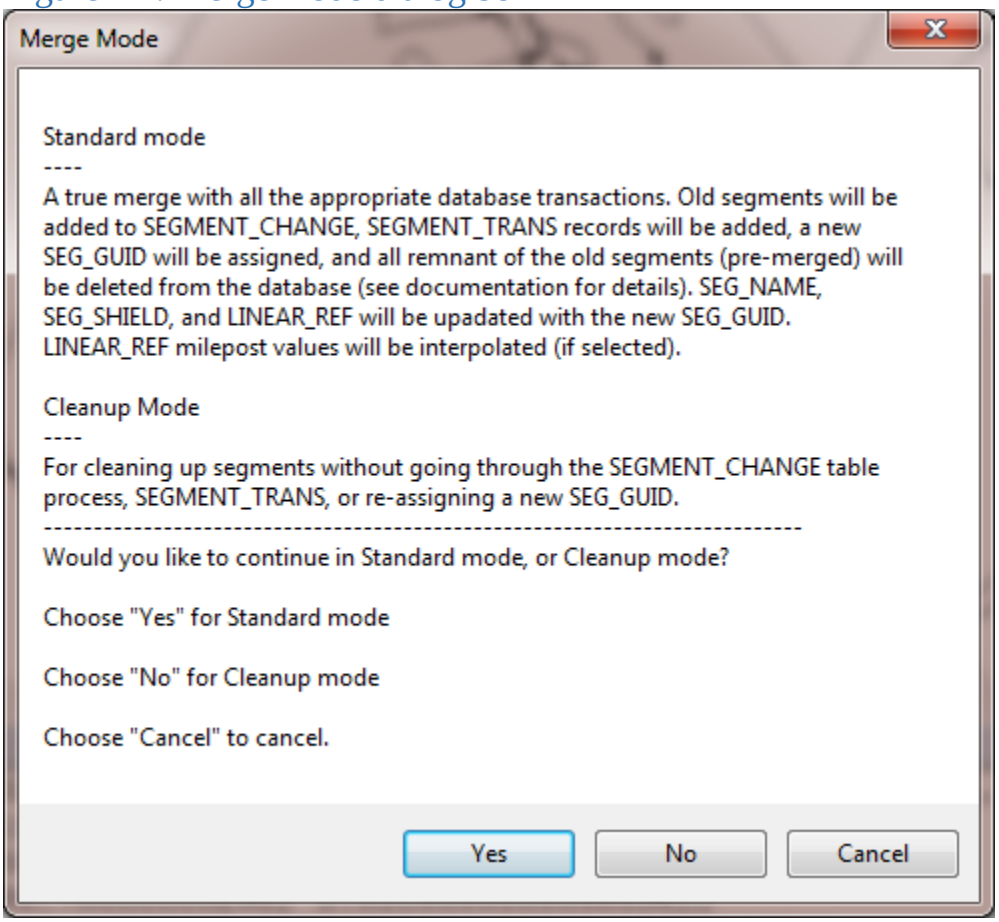

Figure A8. Standard Merge tool dialog

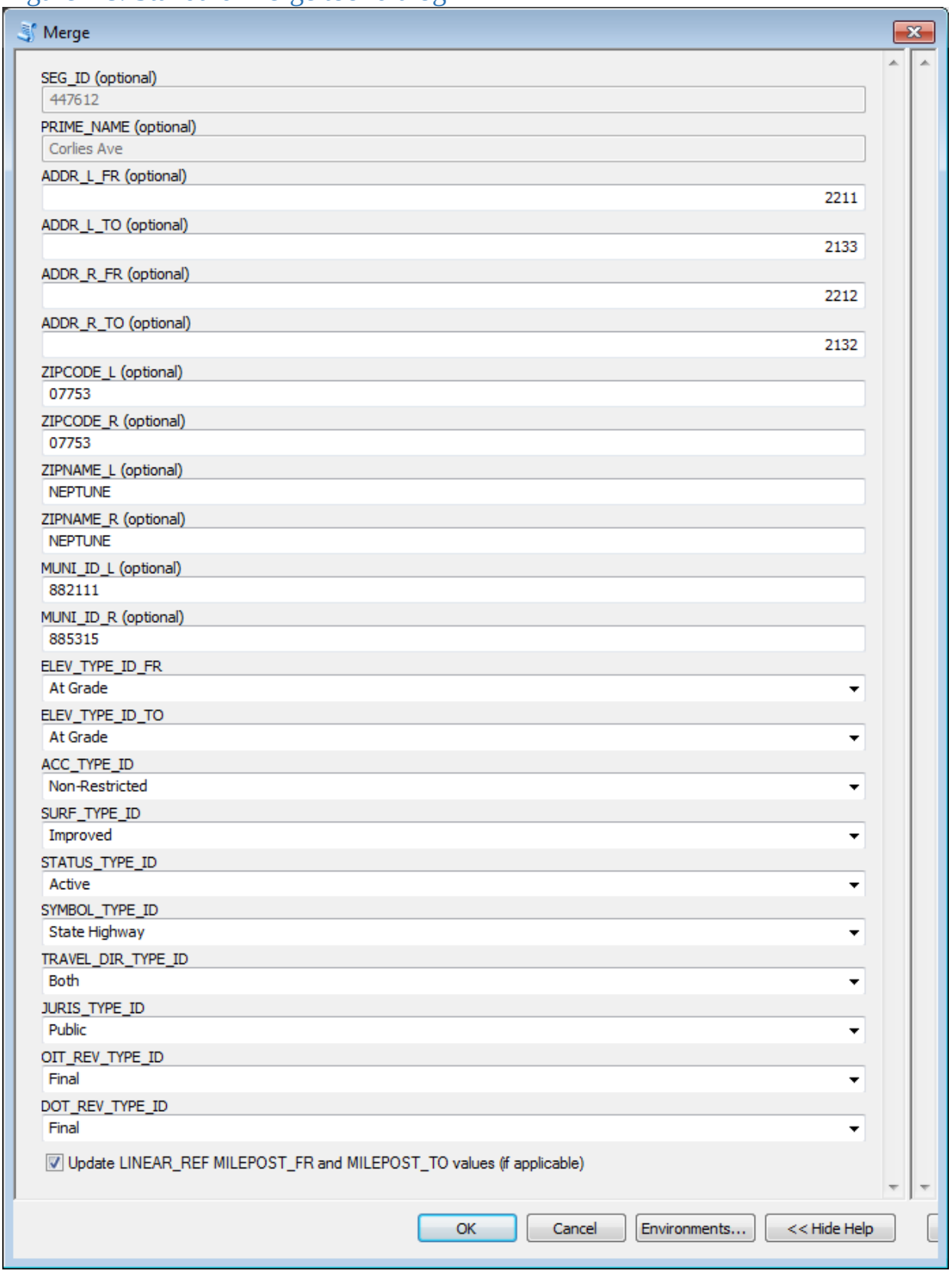

Figure A9. EditNames tool dialog

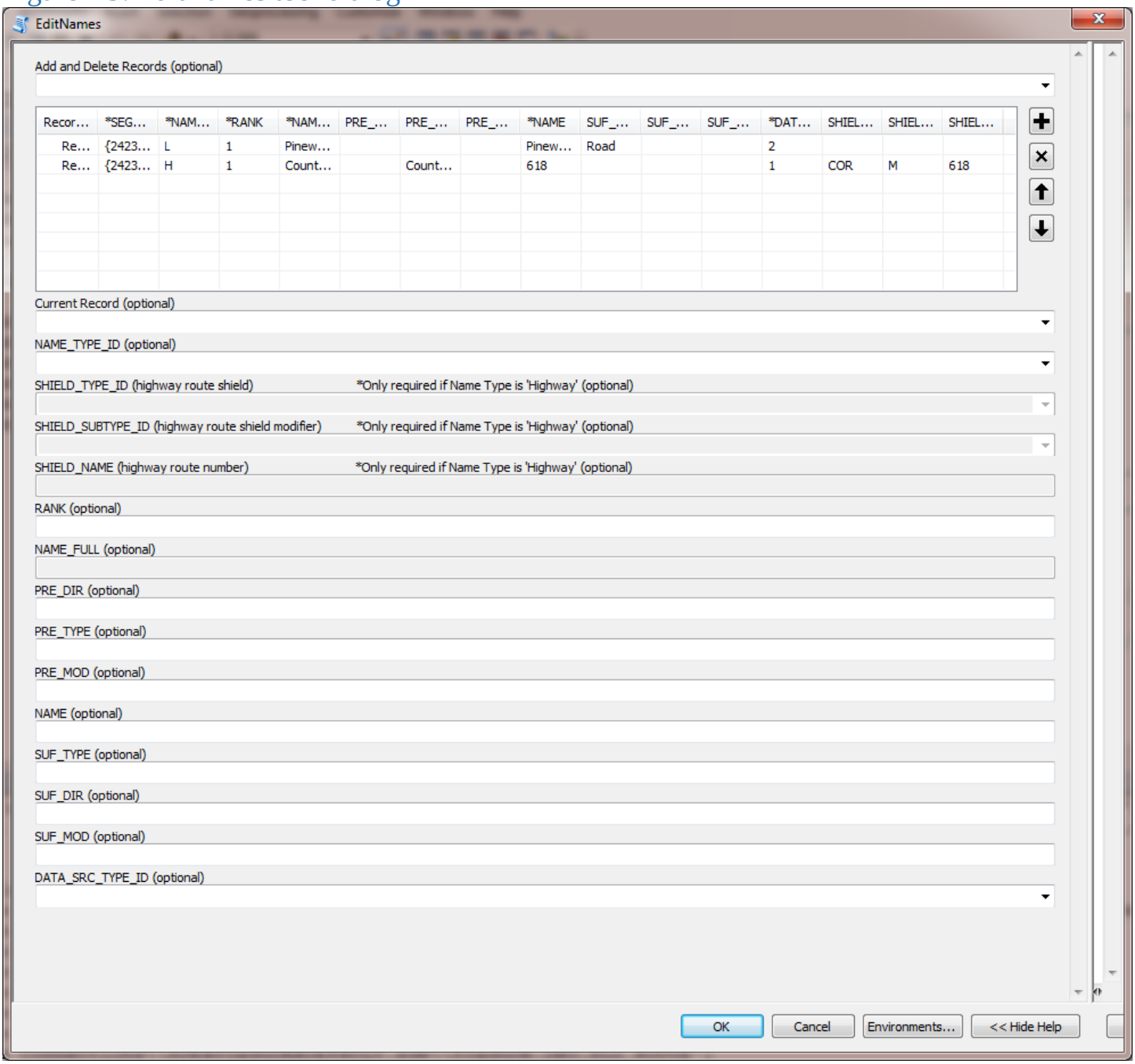

Figure A10. LRS tool dialog

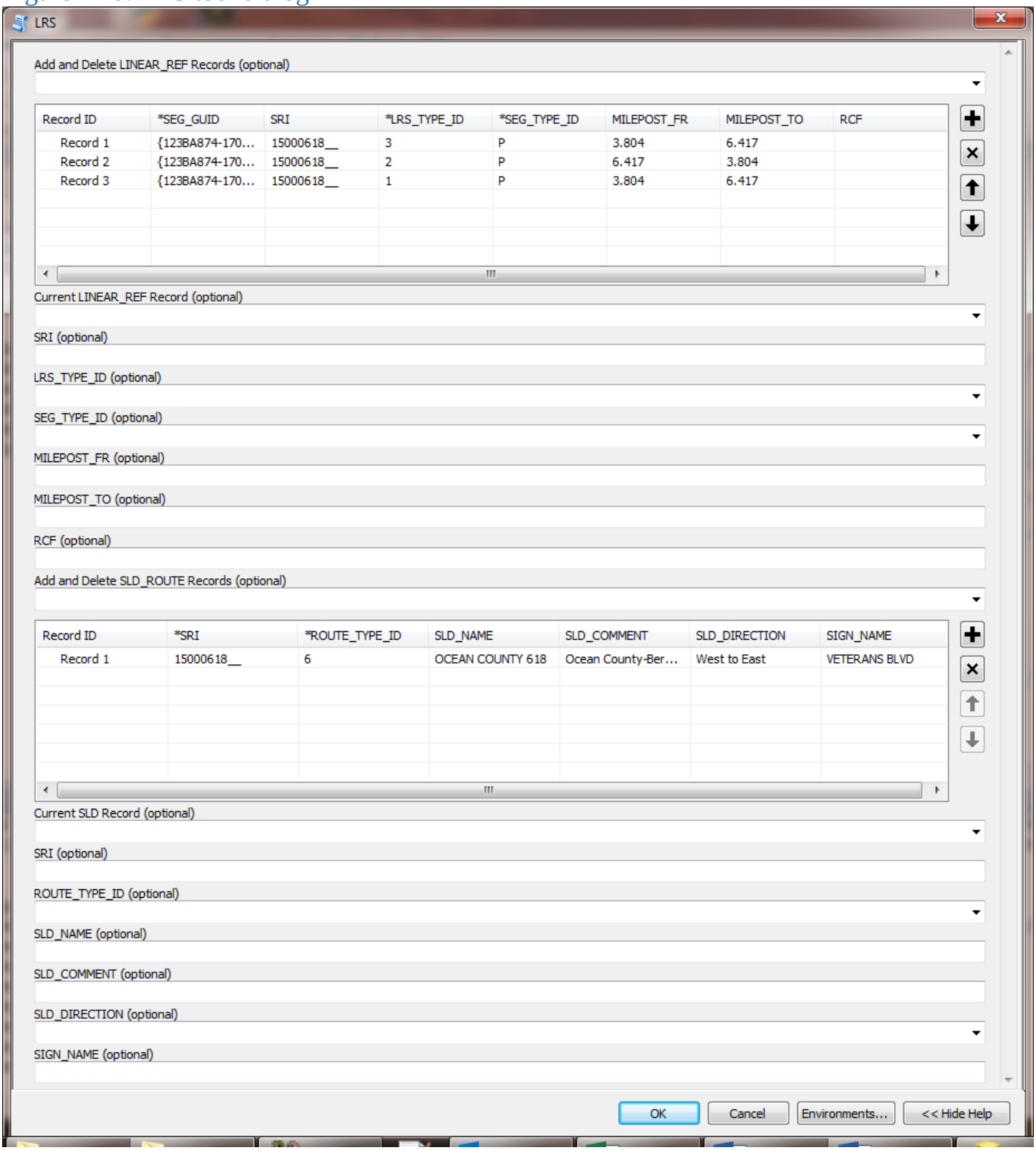

Figure A11. Delete tool dialog