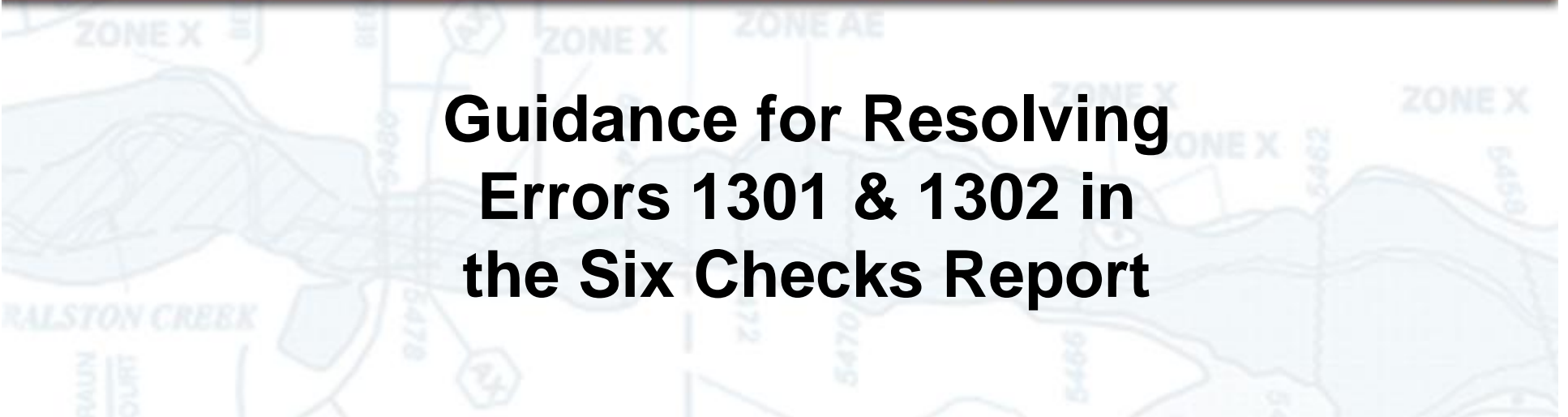


Automation of Six Visual Checks for DFIRM QA/QC



**Guidance for Resolving
Errors 1301 & 1302 in
the Six Checks Report**



Check 1301: Invalid line type

- **Checks that the flood hazard line surrounding Special Flood Hazard Area polygons are coded with a valid line type.**
- **Check 1301 logic:**

If S_FLD_HAZ_AR SFHA_TF attribute is coded to “T” and the bounding S_FLD_HAZ_LN LN_TYP is coded as: “Floodway, Limit of Floodway, Limit of Detailed Study, Limit of Study, 1 PCT Annual Chance Flood Hazard, End of Spatial Extent, Zone Break, Apparent Limit, or Source Boundary”

Then:

Correct – Please move to next check

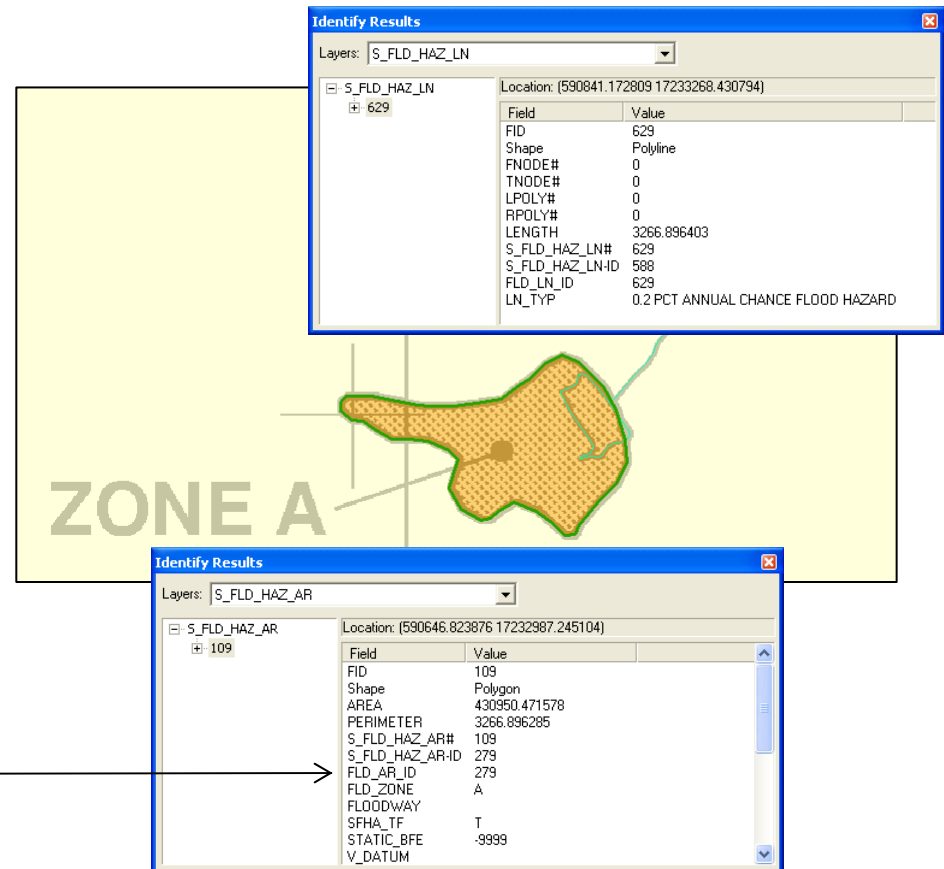
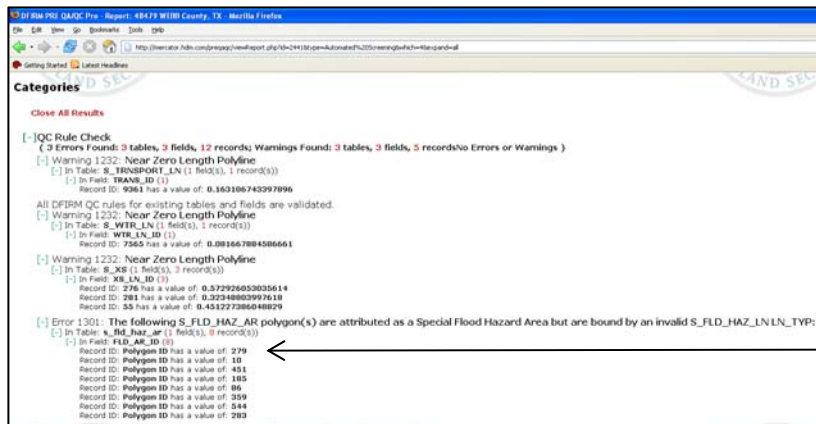
Else:

An error will be returned as:

“Error 1301: The S_FLD_HAZ_AR polygon <ID> attributed as a Special Flood hazard Area is bound by an invalid S_FLD_HAZ_LN LN_TYP”

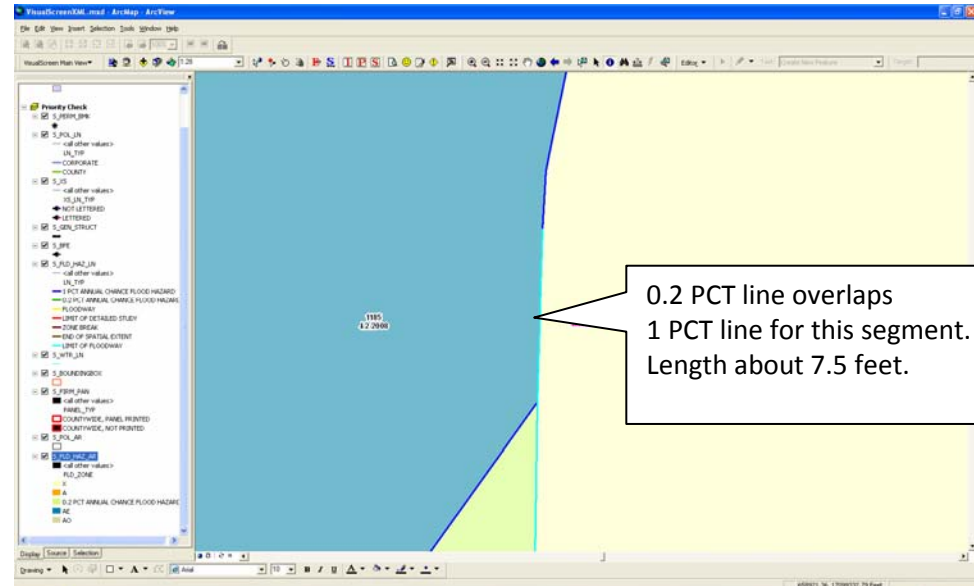
Check 1301: Example 1

- Error is called because SFHA polygon is Zone A but surrounded by a line coded “0.2 PCT ANNUAL CHANCE FLOOD HAZARD”
- Auto Report will list the ID of the affected polygon, in this case FLD_AR_ID = ‘279’
- To correct the error, flood hazard line ID 629 must be coded “1 PCT ANNUAL CHANCE FLOOD HAZARD”



Check 1301: Example 2

- Check 1301 will also find flood hazard lines that overshoot a polygon boundary and overlap the line around the adjacent polygon
- In this example, the 0.2 PCT line around the lower polygon extends upwards past the polygon boundary and touches the 1 PCT polygon
- A 25-foot tolerance was added to Check 1301- lines like this one will be allowed to pass
- Check 1301 will still be called if the overshooting line is longer than 25 feet
- To correct the error, the overshooting line will have to be clipped at the polygon boundary



Finding Check 1301 Errors Step 1

Multi-Hazard Flood
Map Modernization

DFIRM QA/QC Pro - Report: 46029 CODINGTON County, SD - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://mercator.hdm.com/qaqc/viewReport.php?id=31225&type=Automated%20Screening&which=10&expand=all

The following report contains the results of the automated screening of the portion of 46029 CODINGTON County, SD, performed on 06-20-2008. If you have any questions concerning this review, please do not hesitate to contact the NSP at miphelp@mapmodteam.com.

Categories

[Close All Results](#)

- [-] QC Rule Check**
(2 Errors Found: 2 tables, 2 fields, 7 records; Warnings Found: 1 tables, 1 fields, 2 records)
 - [-] Warning 1211: Record in the L_COMM_INFO table has an invalid value for REPOS_ST**
 - [-] In Table: L_COMM_INFO (1 field(s), 2 record(s))**
 - [-] In Field: REPOS_ST (2)**
 - Record ID: 460243 has a value of: NP
 - Record ID: 460304 has a value of: NP
 - [-] Error 1301: The following S_FLD_HAZ_AR polygon(s) are attributed as a Special Flood Hazard Area but are bound by an invalid S_FLD_HAZ_LN LN_TYP:**
 - [-] In Table: s_fld_haz_ar (1 field(s), 5 record(s))**
 - [-] In Field: FLD_AR_ID (5)**
 - Record ID: Polygon ID has a value of: 610
 - Record ID: Polygon ID has a value of: 322
 - Record ID: Polygon ID has a value of: 498
 - Record ID: Polygon ID has a value of: 908
 - Record ID: Polygon ID has a value of: 892



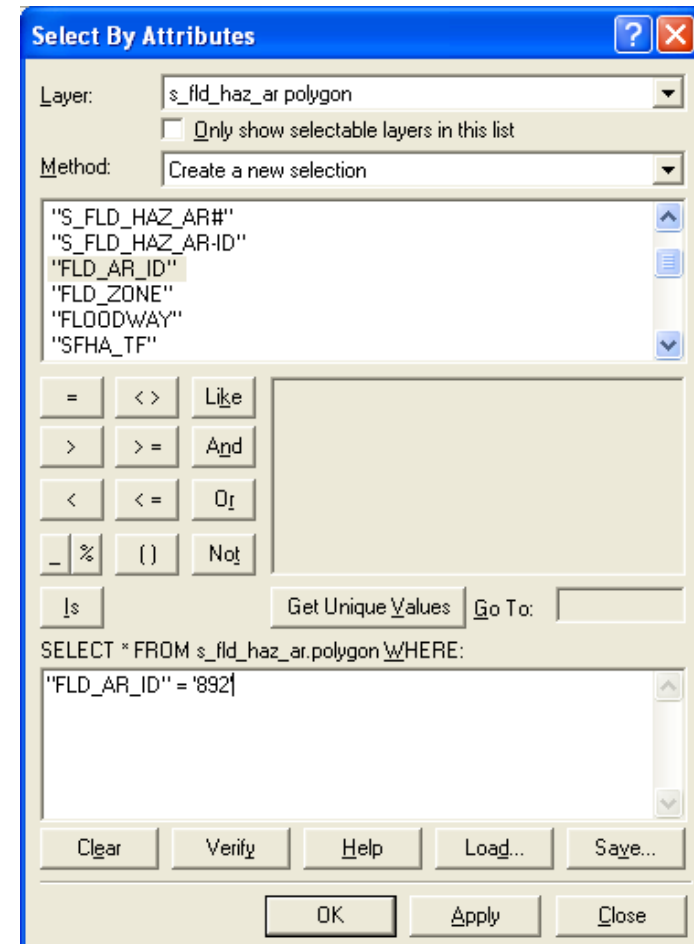
Note the FLD_AR_ID from the Auto Screen Report

Finding Check 1301 Errors

Step 2

For ESRI ArcGIS Users:

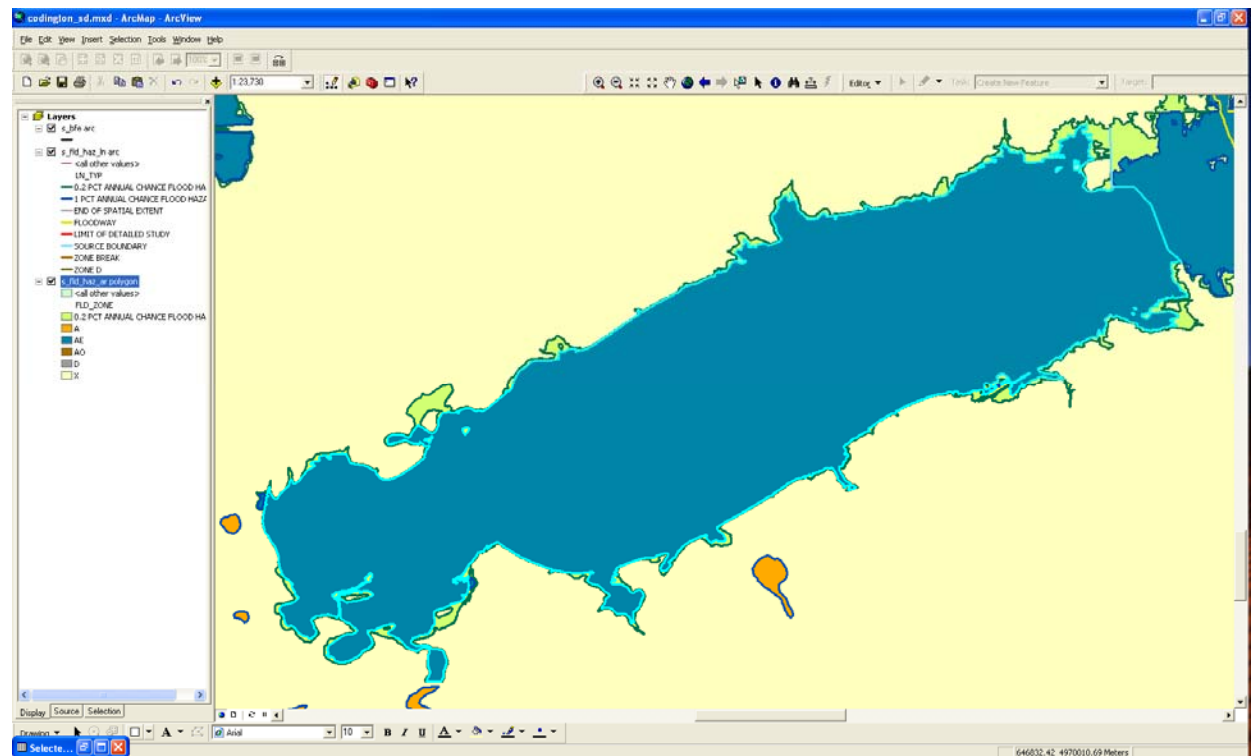
- From the Select menu, Choose “Select by Attributes”
- Double click on “FLD_AR_ID”, equals sign, and enter the ID number in single quotes



Finding Check 1301 Errors Step 3

Multi-Hazard Flood
Map Modernization

- **Zoom to Selected Feature**
- **If the wrong line type can be clearly seen, then you know what line to fix**
- **If the polygon is more complicated, you can query for the lines that bound it in the next step...**

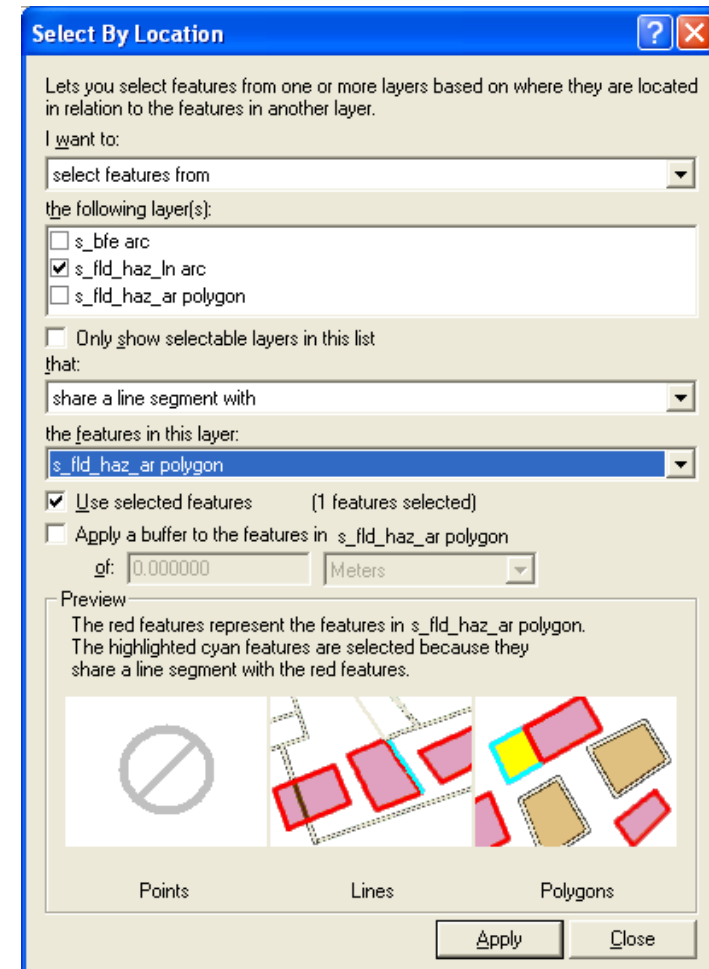


Finding Check 1301 Errors

Step 4

For ESRI ArcGIS Users:

- Go to the Select Menu
- Choose “Select by Location”
- Select features from the S_FLD_HAZ_LN layer that “share a line segment with” the S_FLD_HAZ_AR layer
- Use selected features (default selection)



Finding Check 1301 Errors Step 5

- Open the attribute table for the **S_FLD_HAZ_LN** layer, show selected features
- Look in the **LN_TYP** column for invalid values (like 0.2 PCT ANNUAL CHANCE FLOOD HAZARD)
- If there are many incorrect lines, you can filter out the valid ones in the next step....

FID	Shape	FHODE#	THODE#	LPOLY#	RPOLY#	LENGTH	S_FLD_HAZ_LIN#	S_FLD_HAZ_LIN_ID	FLD_LIN_ID	LN_TYP
12	Polyline	0	0	0	0	116.934703	12	12	92	0.2 PCT ANNUAL CHANCE FLOOD HAZARD
20	Polyline	0	0	0	0	668.589477	20	20	100	1 PCT ANNUAL CHANCE FLOOD HAZARD
21	Polyline	0	0	0	0	118.370576	21	21	101	1 PCT ANNUAL CHANCE FLOOD HAZARD
362	Polyline	0	0	0	0	761.125057	362	335	415	1 PCT ANNUAL CHANCE FLOOD HAZARD
363	Polyline	0	0	0	0	782.929159	363	335	415	1 PCT ANNUAL CHANCE FLOOD HAZARD
364	Polyline	0	0	0	0	803.149763	364	335	415	1 PCT ANNUAL CHANCE FLOOD HAZARD
365	Polyline	0	0	0	0	785.760414	365	335	415	1 PCT ANNUAL CHANCE FLOOD HAZARD
366	Polyline	0	0	0	0	738.642113	366	335	415	1 PCT ANNUAL CHANCE FLOOD HAZARD
367	Polyline	0	0	0	0	714.580549	367	335	415	1 PCT ANNUAL CHANCE FLOOD HAZARD
368	Polyline	0	0	0	0	703.786808	368	335	415	1 PCT ANNUAL CHANCE FLOOD HAZARD
369	Polyline	0	0	0	0	712.279115	369	335	415	1 PCT ANNUAL CHANCE FLOOD HAZARD
370	Polyline	0	0	0	0	745.495142	370	335	415	1 PCT ANNUAL CHANCE FLOOD HAZARD
371	Polyline	0	0	0	0	718.075406	371	335	415	1 PCT ANNUAL CHANCE FLOOD HAZARD
372	Polyline	0	0	0	0	543.418617	372	335	415	1 PCT ANNUAL CHANCE FLOOD HAZARD
722	Polyline	0	0	0	0	936.621059	722	633	713	ZONE BREAK
846	Polyline	0	0	0	0	50.769992	846	755	835	1 PCT ANNUAL CHANCE FLOOD HAZARD
847	Polyline	0	0	0	0	161.876980	847	756	836	1 PCT ANNUAL CHANCE FLOOD HAZARD
848	Polyline	0	0	0	0	292.340867	848	757	837	1 PCT ANNUAL CHANCE FLOOD HAZARD
853	Polyline	0	0	0	0	695.940924	853	762	842	1 PCT ANNUAL CHANCE FLOOD HAZARD
854	Polyline	0	0	0	0	701.476659	854	762	842	1 PCT ANNUAL CHANCE FLOOD HAZARD
855	Polyline	0	0	0	0	778.302120	855	762	842	1 PCT ANNUAL CHANCE FLOOD HAZARD
856	Polyline	0	0	0	0	444.294664	856	762	842	1 PCT ANNUAL CHANCE FLOOD HAZARD
858	Polyline	0	0	0	0	668.018256	858	764	844	1 PCT ANNUAL CHANCE FLOOD HAZARD
859	Polyline	0	0	0	0	473.562395	859	764	844	1 PCT ANNUAL CHANCE FLOOD HAZARD
1121	Polyline	0	0	0	0	62.812881	1121	985	1065	1 PCT ANNUAL CHANCE FLOOD HAZARD
1122	Polyline	0	0	0	0	8.261673	1122	986	1066	1 PCT ANNUAL CHANCE FLOOD HAZARD
1123	Polyline	0	0	0	0	791.444097	1123	987	1067	1 PCT ANNUAL CHANCE FLOOD HAZARD
1124	Polyline	0	0	0	0	729.882831	1124	987	1067	1 PCT ANNUAL CHANCE FLOOD HAZARD
1125	Polyline	0	0	0	0	689.291883	1125	987	1067	1 PCT ANNUAL CHANCE FLOOD HAZARD
1126	Polyline	0	0	0	0	747.330459	1126	987	1067	1 PCT ANNUAL CHANCE FLOOD HAZARD
1127	Polyline	0	0	0	0	704.932846	1127	987	1067	1 PCT ANNUAL CHANCE FLOOD HAZARD
1128	Polyline	0	0	0	0	650.594917	1128	987	1067	1 PCT ANNUAL CHANCE FLOOD HAZARD
1129	Polyline	0	0	0	0	639.946217	1129	987	1067	1 PCT ANNUAL CHANCE FLOOD HAZARD
1130	Polyline	0	0	0	0	758.121986	1130	987	1067	1 PCT ANNUAL CHANCE FLOOD HAZARD
1131	Polyline	0	0	0	0	675.443684	1131	987	1067	1 PCT ANNUAL CHANCE FLOOD HAZARD
1132	Polyline	0	0	0	0	680.816655	1132	987	1067	1 PCT ANNUAL CHANCE FLOOD HAZARD
1133	Polyline	0	0	0	0	672.156424	1133	987	1067	1 PCT ANNUAL CHANCE FLOOD HAZARD
1134	Polyline	0	0	0	0	716.271485	1134	987	1067	1 PCT ANNUAL CHANCE FLOOD HAZARD
1135	Polyline	0	0	0	0	732.377963	1135	987	1067	1 PCT ANNUAL CHANCE FLOOD HAZARD
1136	Polyline	0	0	0	0	738.370966	1136	987	1067	1 PCT ANNUAL CHANCE FLOOD HAZARD
1137	Polyline	0	0	0	0	712.829502	1137	987	1067	1 PCT ANNUAL CHANCE FLOOD HAZARD
1138	Polyline	0	0	0	0	791.482011	1138	987	1067	1 PCT ANNUAL CHANCE FLOOD HAZARD
1139	Polyline	0	0	0	0	824.519440	1139	987	1067	1 PCT ANNUAL CHANCE FLOOD HAZARD
1140	Polyline	0	0	0	0	731.412458	1140	987	1067	1 PCT ANNUAL CHANCE FLOOD HAZARD
1141	Polyline	0	0	0	0	731.388323	1141	987	1067	1 PCT ANNUAL CHANCE FLOOD HAZARD

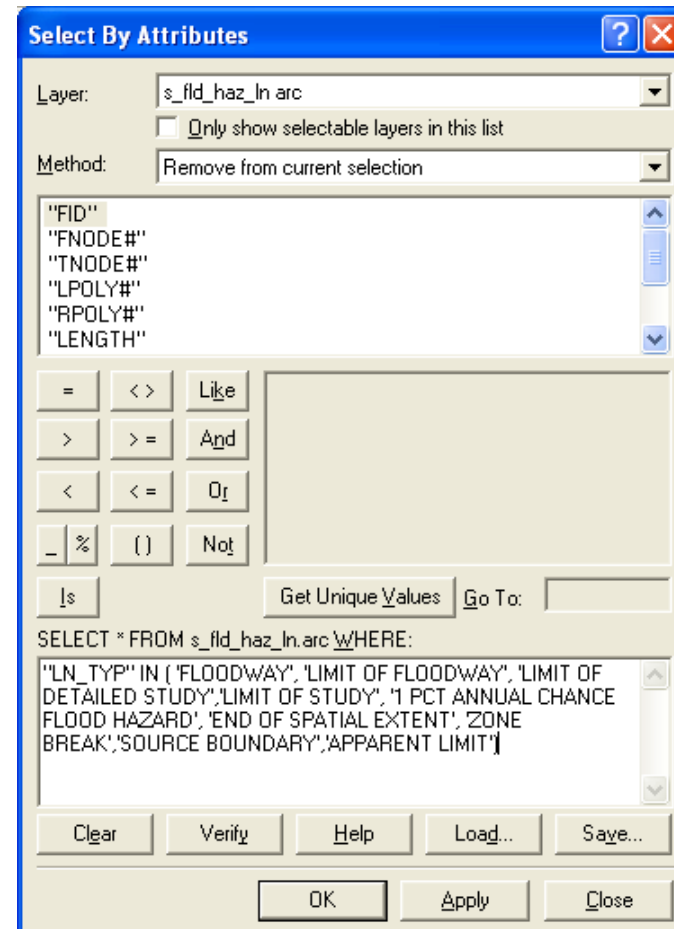
Finding Check 1301 Errors

Step 6

For ESRI ArcGIS Users:

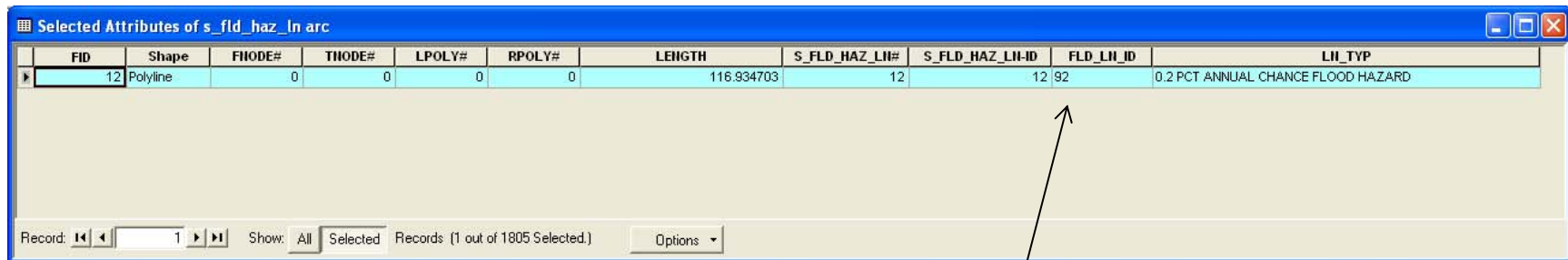
- Go to the Select Menu
- Choose Select by Attributes
- Select Layer, S_FLD_HAZ_LN
- Select Method, “Remove from current selection”
- Copy and paste the list of valid line types to remove:

"LN_TYP" IN ('FLOODWAY', 'LIMIT OF FLOODWAY', 'LIMIT OF DETAILED STUDY', 'LIMIT OF STUDY', '1 PCT ANNUAL CHANCE FLOOD HAZARD', 'END OF SPATIAL EXTENT', 'ZONE BREAK', 'SOURCE BOUNDARY', 'APPARENT LIMIT')



Finding Check 1301 Errors

Step 7



FID	Shape	FIODE#	THODE#	LPOLY#	RPOLY#	LENGTH	S_FLD_HAZ_LII#	S_FLD_HAZ_LII-ID	FLD_LII_ID	LII_TYP
12	Polyline	0	0	0	0	116.934703	12	12	92	0.2 PCT ANNUAL CHANCE FLOOD HAZARD

Record: 1 Show: All Selected Records: [1 out of 1805 Selected.] Options

Open the attribute table to see the remaining lines

Finding Check 1301 Errors

Step 8

- The 0.2 PCT line extends all the way across the AE zone.
- The line type needs to be recoded for this segment

The screenshot shows a GIS application window with a map of a flood hazard area. The map displays a blue water body, a yellow AE zone, and an orange 0.2 PCT Annual Chance Flood Hazard zone. An orange line segment is highlighted on the map, extending across the AE zone. An arrow points from this line segment to the Identify Results dialog box.

Identify Results

Layers: s_fld_haz_ln arc

Location: (641344.521075 4967574.151180)

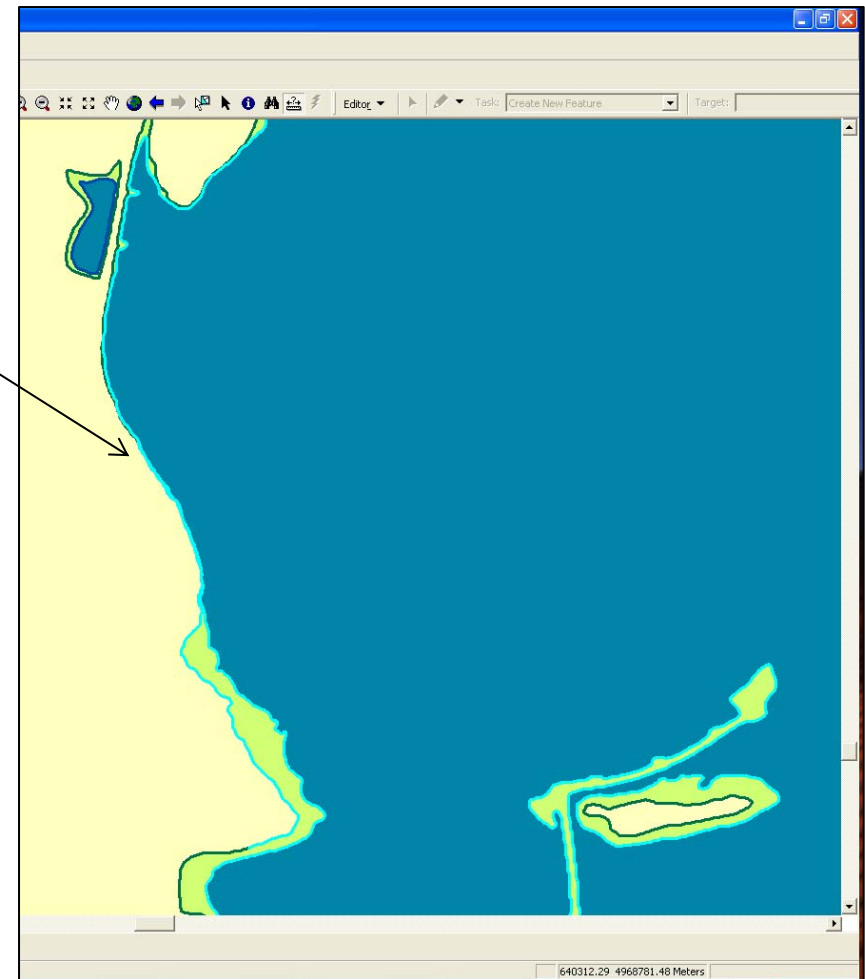
Field	Value
FID	12
Shape	Polyline
FNODE#	0
TNODE#	0
LPOLY#	0
RPOLY#	0
LENGTH	116.934703
S_FLD_HAZ_LN#	12
S_FLD_HAZ_LN-ID	12
FLD_LN_ID	92
LN_TYP	0.2 PCT ANNUAL CHANCE FLOOD HAZARD

Finding Check 1301 Errors

Step 9

- Sometimes Check 1301 can be caused by sliver polygons adjacent to the SFHA polygon.
- In this example, the 0.2 PCT polygon is less than 0.1 map units wide.
- You can find these lines by following the next step...

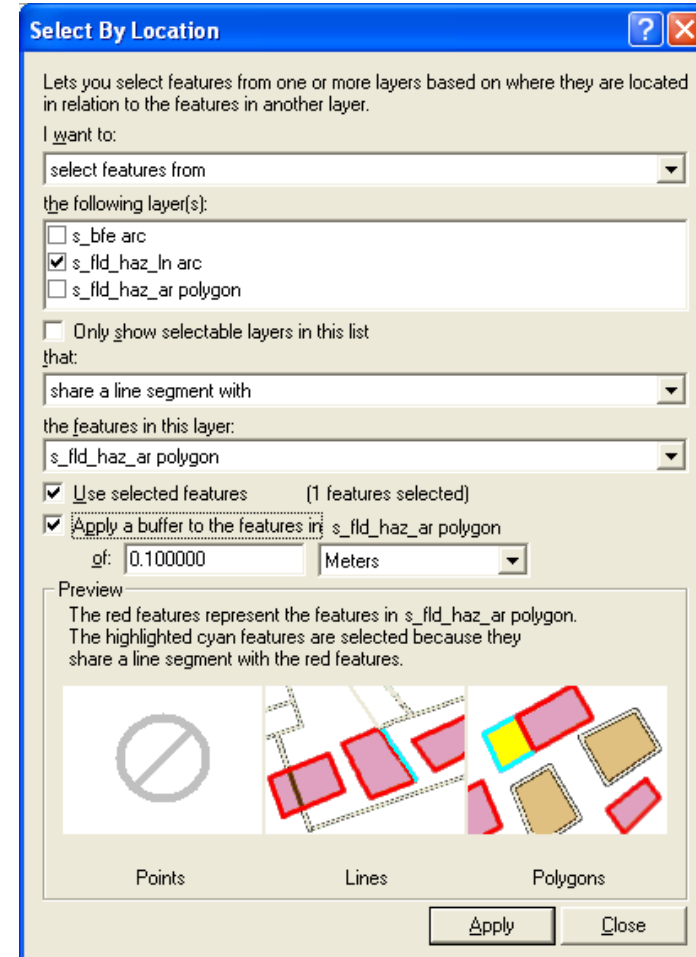
The 0.2 PCT line is within 0.1 meters of the 1 PCT line bounding the polygon in this area



Finding Check 1301 Errors

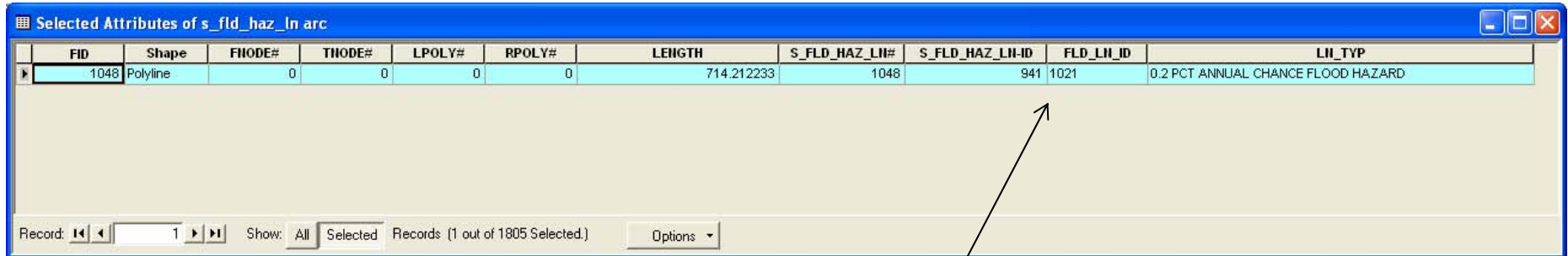
Step 10

- Clear all selected features
- Re-select the polygon ID you wish to examine
- Go to the Select Menu and choose Select by Location
- Select from S_FLD_HAZ_LN features that “share a line segment with” the S_FLD_HAZ_AR polygon
- Use selected features (default selection)
- Apply a buffer to the features in S_FLD_HAZ_AR
- Set buffer to 0.1 units



Finding Check 1301 Errors

Step 11



FID	Shape	FNODE#	TNODE#	LPOLY#	RPOLY#	LENGTH	S_FLD_HAZ_LII#	S_FLD_HAZ_LII-ID	FLD_LII_ID	LII_TYP
1048	Polyline	0	0	0	0	714.212233	1048	941	1021	0.2 PCT ANNUAL CHANCE FLOOD HAZARD

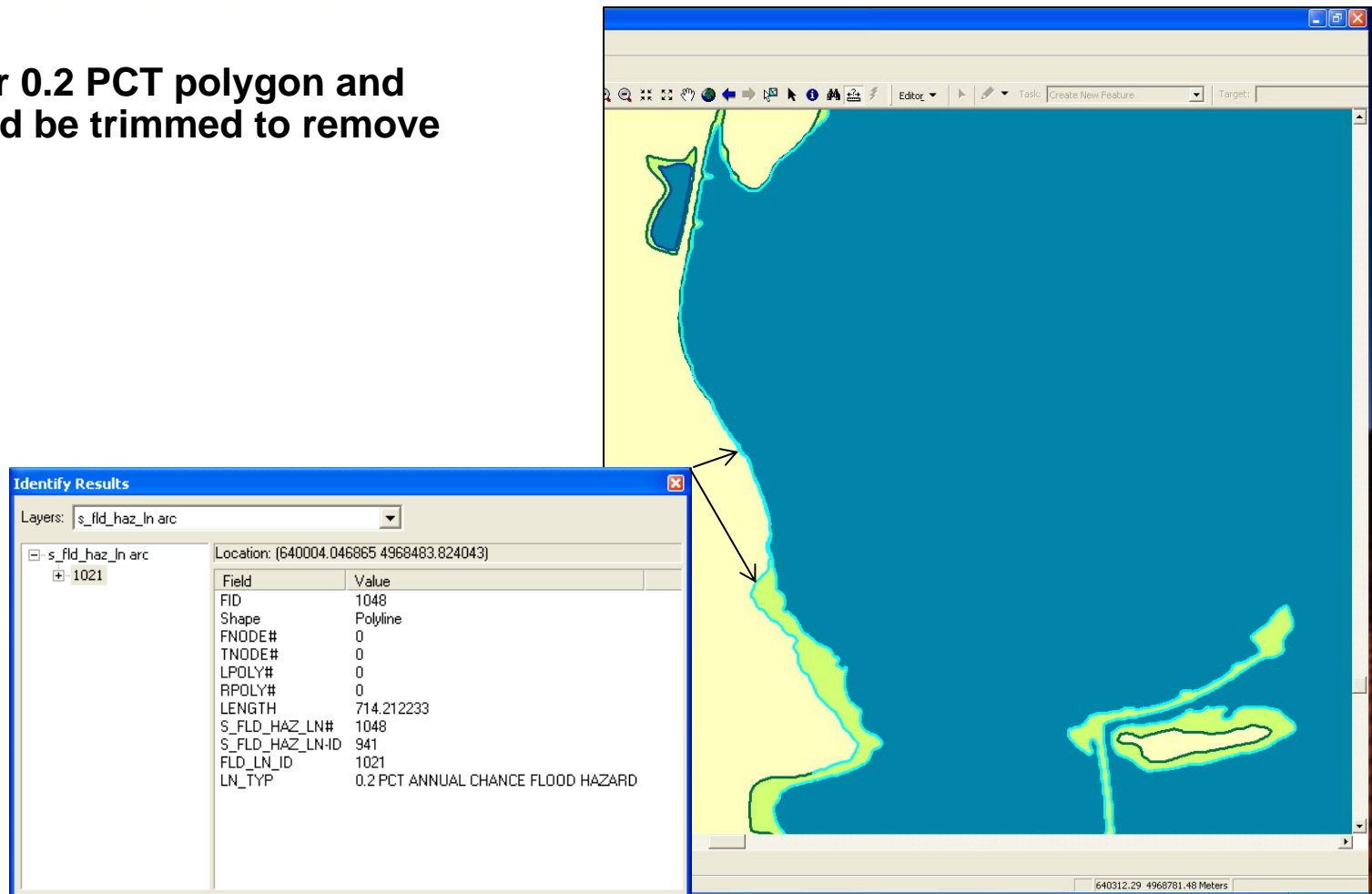
Record: 1 Show: All Selected Records: (1 out of 1805 Selected.) Options

Open the attribute table to see the remaining lines

Finding Check 1301 Errors

Step 12

- This sliver 0.2 PCT polygon and line should be trimmed to remove the error



The screenshot displays a GIS application interface. The main map area shows a coastal region with a yellow landmass and a blue water body. A small, irregular sliver of yellow is visible on the coast, highlighted with a red outline. An 'Identify Results' window is open, showing the following data for the selected feature:

Field	Value
FID	1048
Shape	Polyline
FNODE#	0
TNODE#	0
LPOLY#	0
RPOLY#	0
LENGTH	714.212233
S_FLD_HAZ_LN#	1048
S_FLD_HAZ_LN-ID	941
FLD_LN_ID	1021
LN_TYP	0.2 PCT ANNUAL CHANCE FLOOD HAZARD

The 'Identify Results' window also shows the location coordinates: (640004.046865 4968483.824043). The map interface includes a toolbar with various tools and a status bar at the bottom right showing coordinates: 640312.29 4968781.48 Meters.

Check 1302: BFE line Undershoot/Overshoot

- Checks that BFE lines extend to the Special Flood Hazard Area boundary
- Checks BFE lines in AE and AH zone polygons with no static BFEs
- Small overshoots and undershoots of less than 25 feet will be allowed to pass
- Check 1302 logic:

If: S_BFE line is within +/- 25 feet of the SFHA boundary

Then:

Correct – Please move to next check

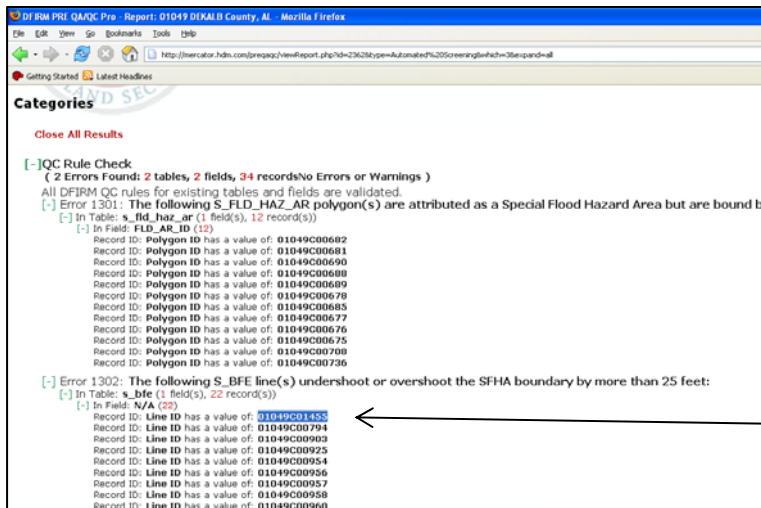
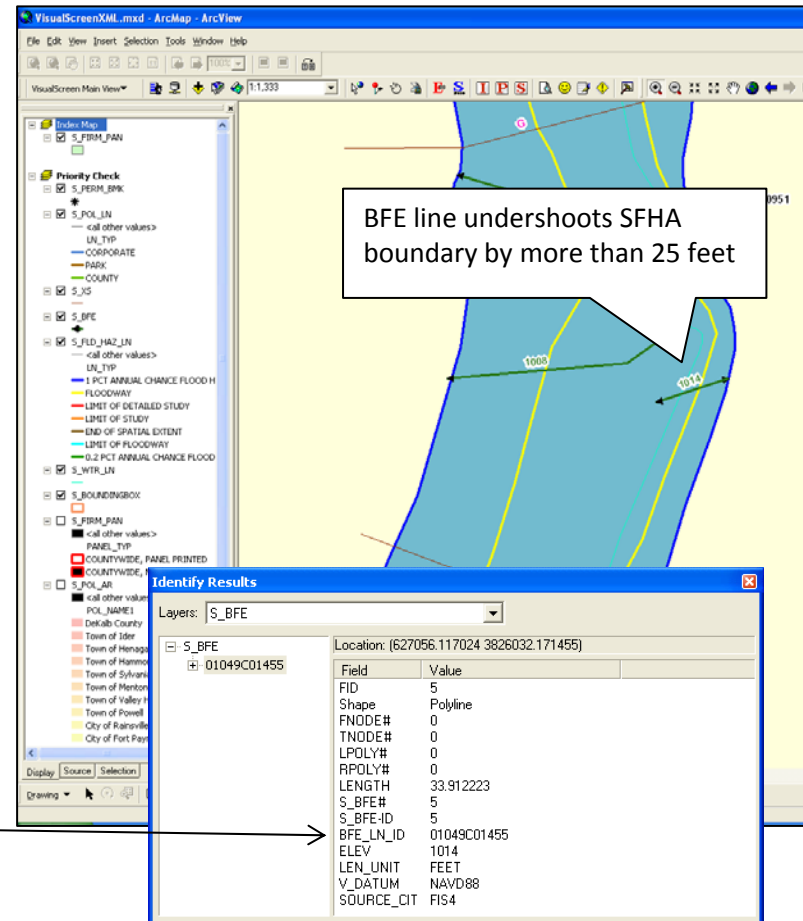
Else:

An error will be returned as:

“Error 1302: The following S_BFE line (s) undershoot or overshoot the SFHA boundary by more than 25 feet”

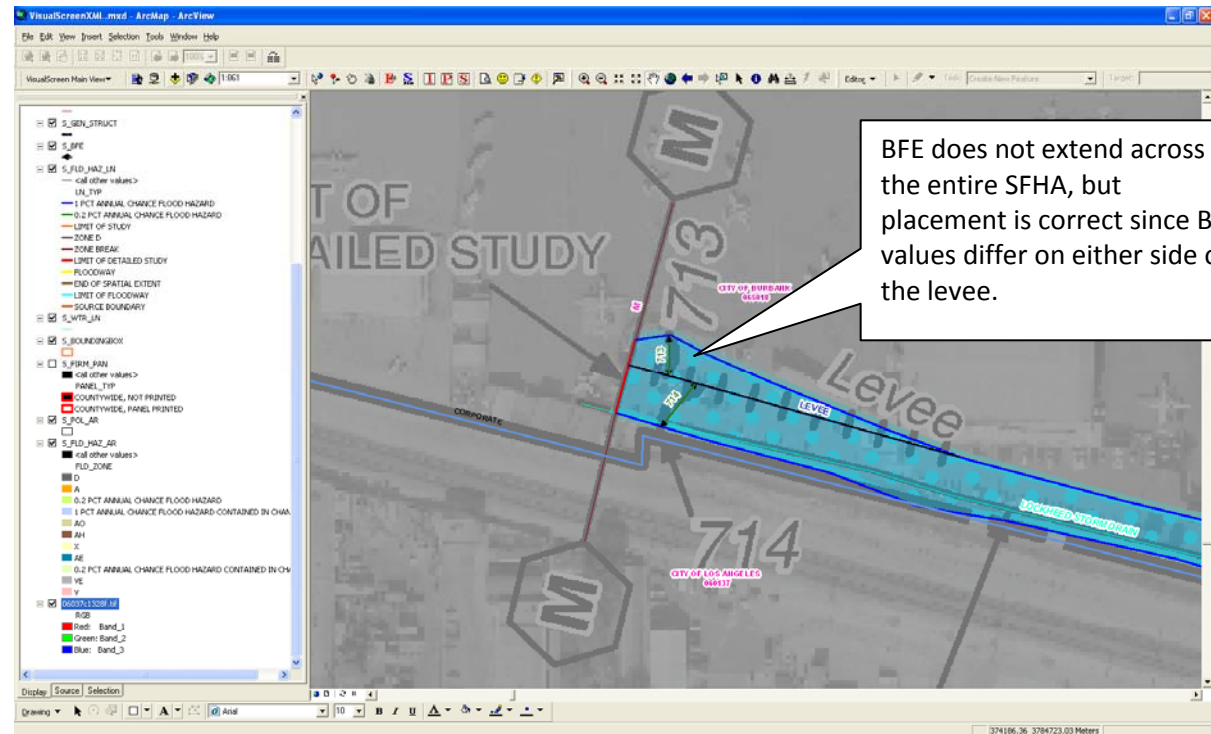
Check 1302: BFE line Under/Overshoot Example 1

- This BFE line undershoots the SFHA boundary by more than 25 feet
- To fix the error, the line must be extended to the SFHA boundary
- Small undershoots or overshoots will be allowed to pass if they are less than 25 feet



Check 1302: BFE line Under/Overshoot Example 3

- Check 1302 allows special cases to pass
- BFE lines that do not extend across the SFHA will still pass if they are interrupted by a general structure such as a levee
- The lines will pass as long as they are within 25 feet of the general structure



Check 1302: BFE line Under/Overshoot Example 4

Multi-Hazard Flood Map Modernization

- Check 1302 can also be caused by BFE lines in a polygon that is not supposed to contain BFE lines
- BFE lines are only allowed in Zone AE or Zone AH with no STATIC_BFE value (not populated or -9999)
- BFE lines outside these areas will be called in Check 1302....

```
DFIRM QA/QC Pro - Report: 51067 FRANKLIN County, VA - Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://mercator.hdm.com/qaqc/viewReport.php?id=35810&type=Automated%20Screening&which=3&expand=all

Record ID: 3470 has a value of: 0.539073278963001
All DFIRM QC rules for existing tables and fields are validated.
[-] Warning 1232: Near Zero Length Polyline
[-] In Table: S_WTR_LN (1 field(s), 3 record(s))
[-] In Field: WTR_LN_ID (3)
Record ID: 101 has a value of: 0.890954544548589
Record ID: 24 has a value of: 0.339558536903817
Record ID: 26 has a value of: 0.494772675083154
[-] Warning 1232: Near Zero Length Polyline
[-] In Table: S_FLD_HAZ_LN (1 field(s), 1 record(s))
[-] In Field: FLD_LN_ID (1)
Record ID: 704 has a value of: 0.642012464332756
[-] Error 1301: The following S_FLD_HAZ_AR polygon(s) are attributed as a Special Flood Hazard Area but are bo
[-] In Table: s_fld_haz_ar (1 field(s), 1 record(s))
[-] In Field: FLD_AR_ID (1)
Record ID: Polygon ID has a value of: 269
[-] Error 1302: The following S_BFE line(s) undershoot or overshoot the SFHA boundary by more than 25 feet:
[-] In Table: s_bfe (1 field(s), 1 record(s))
[-] In Field: N/A (1)
Record ID: Line ID has a value of: 355
```

Check 1302: BFE line Under/Overshoot Example 4

Multi-Hazard Flood Map Modernization

The screenshot shows the ArcMap interface with a flood hazard map. The map displays various flood hazard zones in different colors: light green for 0.2 PCT ANNUAL CHANCE FLOOD HAZARD, dark green for 1 PCT ANNUAL CHANCE FLOOD HAZARD, and blue for FLOODWAY. A cyan line representing the BFE (Base Flood Elevation) is overlaid on the map. A text box highlights a specific issue: "BFE_LN_ID 355 is in a polygon coded 0.2 PCT ANNUAL CHANCE FLOOD HAZARD. (FLD_AR_ID = 33). The BFE line must be deleted, or the coding of the polygon and the line bounding it are incorrect." Two Identify Results windows are open. The top window shows the properties for a polygon (FLD_AR_ID = 33) which is coded as 0.2 PCT ANNUAL CHANCE FLOOD HAZARD. The bottom window shows the properties for the BFE line (BFE_LN_ID = 355) which is also coded as 0.2 PCT ANNUAL CHANCE FLOOD HAZARD. The bottom window also shows the length of the line (55.734048) and its source (STUDY3).

Layers

- s_bfe arc
- s_fid_haz_in arc
 - <all other values>
 - LN_TYP
 - 0.2 PCT ANNUAL CHANCE FLOOD HAZARD
 - 1 PCT ANNUAL CHANCE FLOOD HAZARD
 - END OF SPATIAL EX
 - FLOODWAY
 - LIMIT OF DETAILED EX
 - LIMIT OF STUDY
 - ZONE BREAK
 - ZONE D
- s_fid_haz_ar polygon
 - <all other values>
 - FLD_ZONE
 - 0.2 PCT ANNUAL CH
 - A
 - AE
 - D
 - X

Identify Results

Layers: s_fid_haz_ar polygon

Location: [591181.999808 4110452.966037]

Field	Value
FID	34
Shape	Polygon
AREA	42310.930400
PERIMETER	1879.152490
S_FL_D_HAZ_AR#	34
S_FL_D_HAZ_ARID	33
POLY#	34
SUBCLASS	POLYGON
SUBCLASS#	33
RINGS_OK	1
RINGS_NOK	0
FLD_AR_ID	33
FLD_ZONE	0.2 PCT ANNUAL CHANCE FLOOD HAZARD
FLOODWAY	
SFHA_TF	F
STATIC_BFE	-9999
V_DATUM	
DEPTH	-9999
LEN_UNIT	
VELOCITY	-9999
VEL_UNIT	
AR_REVERT	
BFE_REVERT	-9999
DEP_REVERT	-9999
SOURCE_CIT	BASE6
HYDRO_ID	
CST_MDL_ID	

Identify Results

Layers: s_bfe arc

Location: [591165.331024]

Field	Value
FID	355
Shape	Polyline
FNODE#	0
TNODE#	0
LPOLY#	0
RPOLY#	0
LENGTH	55.734048
S_BFE#	355
S_BFE-ID	355
BFE_LN_ID	355
ELEV	1202
LEN_UNIT	FEET
V_DATUM	NAVD88
SOURCE_CIT	STUDY3

Check 1302: BFE line Under/Overshoot Example 5

- Since Check 1302 allows a 25-foot tolerance for BFE placement, it must examine the polygons around the end points to find the SFHA boundary.
- The check creates a 25-foot buffer around the BFE end points. If the BFE is placed correctly, the buffer will touch the polygon containing the BFE, and the non-SFHA polygon just beyond the end point.
- If it only touches the SFHA polygon containing the BFE, it is an undershoot.
- This data set is missing the Zone X area. Since the check cannot find the boundary, it interprets it as a BFE undershoot.
- To fix this error, the flood hazard area layer must cover the whole study, including the Zone X beyond the BFE end points.

