

Probability of Specific Crash Types Exceeding a Threshold Proportion

Version 3.0

5/8/2020

OREGON DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
PLANNING SECTION
TRANSPORTATION PLANNING ANALYSIS UNIT
<http://www.oregon.gov/ODOT/TD/TP/pages/tpau.aspx>

If there are questions or comments concerning this spreadsheet, please contact the Transportation Planning analysis unit.

DISCLAIMER

This calculator is provided to you by the Oregon Department of Transportation (ODOT) "as is" without warranty of any kind. ODOT makes no warranties, either express or implied, including, but not limited to the implied warranties of merchantability, fitness for a particular purpose, and non-infringement. The entire risk as to the quality and performance of this calculator is with you. You are advised to test use of the calculator thoroughly before you rely on it. The author and ODOT disclaim all liability for direct, indirect or consequential damages, arising out of your use of the calculator.

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PRC Crash Data Instructions

Data compatible with this spreadsheet come from ODOT’s Crash Analysis and Reporting (CAR) Unit’s Motor Vehicle Traffic Crash Database. For information on the database, go to the CAR Unit’s website at: <https://www.oregon.gov/ODOT/Data/Pages/Crash.aspx>.

1. Get Data in PRC format

Crash data should be in the PRC style report from the CAR crash database. You can get PRC data from one of the following locations:

1.1. TDS

Crash data System

Crash Statistics & Reports

The Crash Analysis & Reporting Unit provides motor vehicle crash data through database creation, maintenance and quality assurance, information and reports, and limited database access. Ten years of crash data is maintained at all times. Vehicle crashes include those coded for city streets, county roads and state highways.

- Quick Facts** (+)
 - Summaries of the most commonly requested crash data by year
- Annual Crash Summary Books** (+)
 - Five-Year Crash Tables, Driver Error Tables, Fatal and Injury Crash Summaries by location
- 10-Year Crash Summary Reports** (+)
 - Crash summaries by severity, road type, location, time of day, collision type, etc.

Contact
 ✉ Robin Ness
 Crash Analysis and Reporting Unit Manager
 ☎ 503-986-4236

Additional Links

- Crash Data System** (highlighted with a red box)
- [Routes to Highway Cross Reference Table](#)
- [Crash Data System Code Manual](#)
- [Crash Data Disclaimers](#)
- [Driver and Motor Vehicle Services](#)
- [Safety Corridors on Oregon Highways](#)

Oregon Department of Transportation

Home

Crash Data System
 Click here for access to CDS
 Please note, this application does not work with Firefox

Pay attention to system maintenance messages or warnings about what data are final (fully QC'd) or not.

Choose either the Highways tab or the local roads tab.
Select Hwy, MP.

Oregon Department of Transportation

Home ODOT Search

Intranet Application Links

System Maintenance Message! 2017 crash data is final. 2018 crash data is preliminary. Recommend not using it for final analysis, as it will change daily. NOTE: For PDO crashes, data collection for Vehicles & Participants is reduced effective 2016. [Dismiss](#)

[TransViewer](#)

[Annual Reports](#)

[Crash Data System Code Manual](#)

[Code Definitions for CDS380](#)

[Code Definitions for CDS390](#)

TDS - Crash Reports [HELP](#) (Opens a PDF)

WARNING: Large reports may take an extended amount of time to run without visual indication.

[Highways](#) [Local Roads](#) [All Jurisdictions](#)

State Highway Crash Reports

Reports will display crash data on the selected highway segment only. Resulting output excludes side streets, city streets and county roads.

Select a Highway Segment

Highway Name: 001: PACIFIC

Beginning Mile Point: 0.00

Ending Mile Point: 308.63

[Cross-Reference of Route Numbers to State Highways](#)

Select date extent. Note warning about what data are preliminary.

Select a Date Range

Enter a date range by using the calendar icons, or by typing the desired "start" and "end" date in mm/dd/yyyy format.

Start Date:

End Date:

Data is available from 01/01/1985 to 12/31/2018 .
Current year data is preliminary and subject to change.

Select Excel report format, Report "Comprehensive:

Select a Report Format

Print Format Excel Format

Start Report at Record Number:

For detail reports, shows the next 5000 records using the value in the field above as the starting point.

Excel format will open an Excel (XLS) format file suitable for use in a spreadsheet.

Display instructions on opening Location, Direction, PRC or RRR reports.

Report format selection does not apply to Data Extracts.

Select a Report

Summary by Year
CDS150

Crash Location
CDS390

Vehicle
Direction

Comprehensive
PRC-11x17 CDS380

Characteristics
RRR

1.2. [OTSDE](#) (Oregon Transportation Safety Data Explorer)

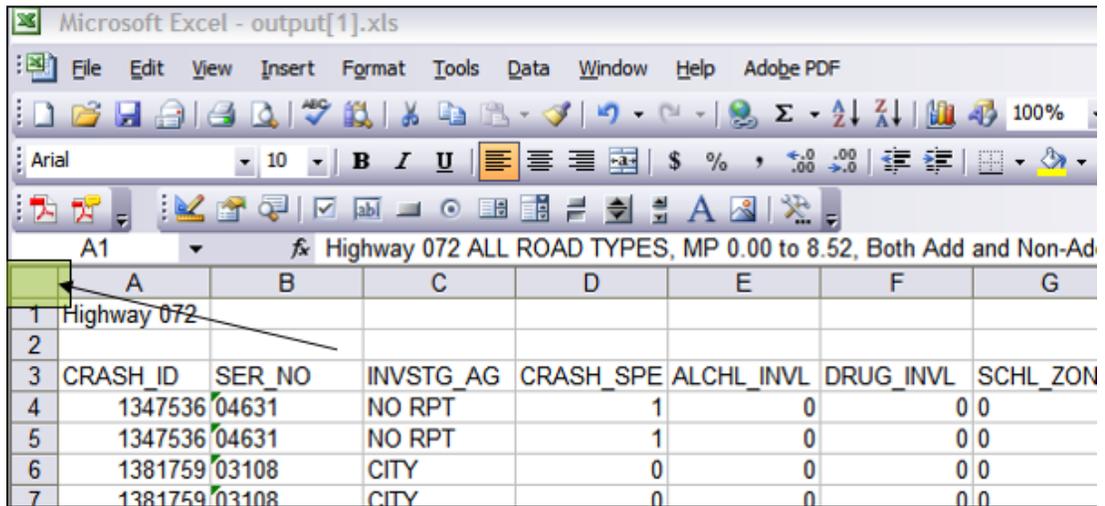
OTSDE can be used to pull data from the last five years of fully QC'd crash data, selecting by area and with filters applied.

Data downloaded from OTSDE can be run through the crash decoder, which will create the PRC format in tab "Comprehensive Raw Data", which can then be used as input for the excess proportion calculator. See instructions from the widget in OTSDE, and in the Crash decoder Instructions tab.

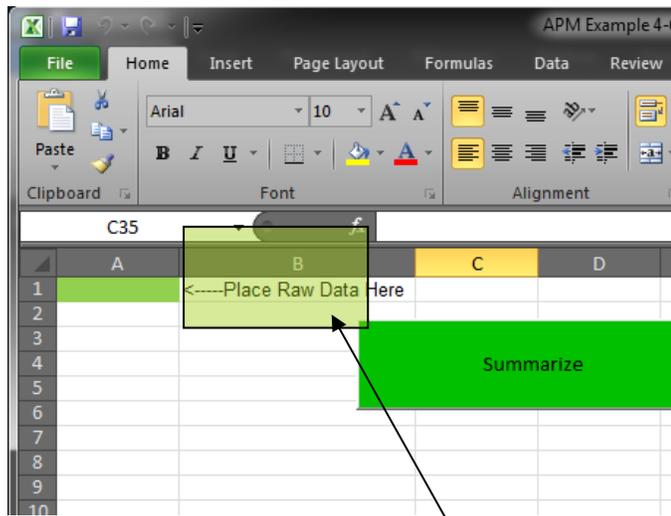


2. Copy PRC Data into the Spreadsheet

2.1. The PRC report opens in an Excel window. Click the top button between column A and Row 1 to select all data in the sheet.



2.2. Copy the selected data and paste it into the top left corner (Cell A1) of the "Comprehensive Raw Data" tab in the spreadsheet.



3. Summarize PRC Crash Data

3.1. Once the PRC Crash data are pasted into Cell A1; click the green summarize button.

	A	B	C	D	E	F	G	H	I	J	K
1	Highway 001 ALL ROAD TYPES, MP 295 to 295.1, Both Add and Non-Add mileage, 01/01/2015 to 12/31/2017										
2	CRASH_ID	SER_NO	INVEST_Y_SH ESC	Summarize		Reset Spreadsheet		Hand Enter Data			
3	1705951	06230	NONE	0	0	0	0	0	N	FALSE	5/30/2016
4											

3.2. A project information popup appears.

Entering in the project information here populates these fields throughout the rest of the calculations. Fill in the information and click on “OKAY”.

Project Information

General and Site Information

Analyst:

Agency/Company:

Date:

Project Name:

Highway No. & Name:

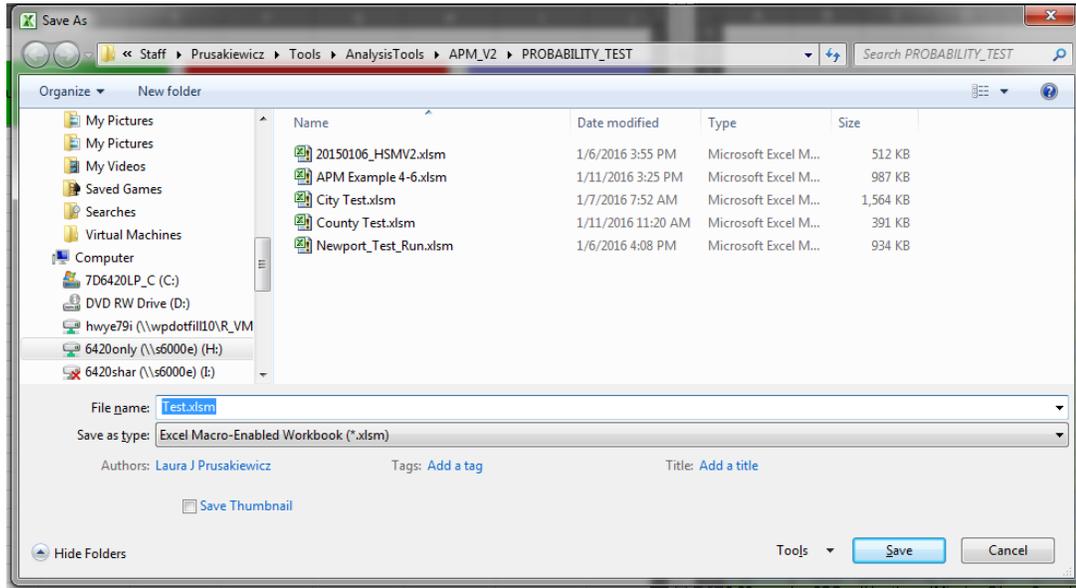
Mile Points:

Crash Years:

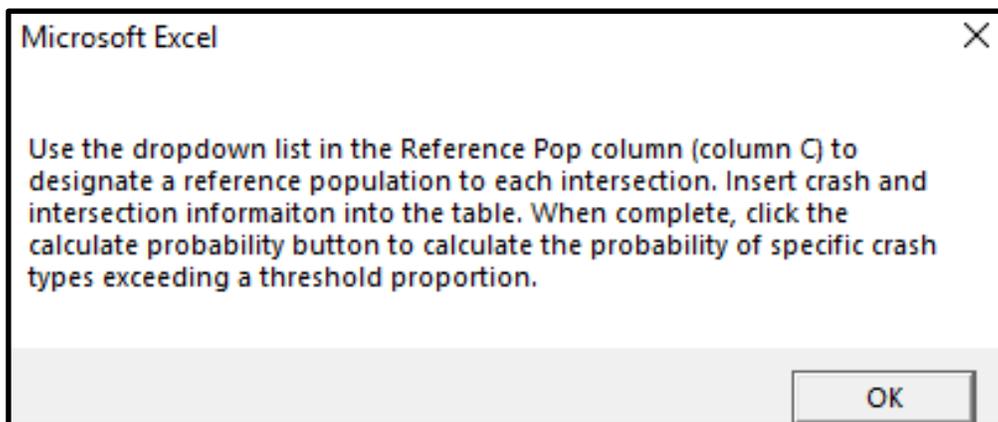
3.3. Next there will be a “Reference Population” popup, where you can define up to four reference population groups.

<div style="border: 1px solid gray; padding: 5px;"> <p>Reference Populations</p> <p>Please enter the name of your four reference populations. You can type over defaults</p> <p>Reference Pop 1: <input type="text" value="3ST"/></p> <p>Reference Pop 2: <input type="text" value="3SG"/></p> <p>Reference Pop 3: <input type="text" value="4ST"/></p> <p>Reference Pop 4: <input type="text" value="4SG"/></p> <p style="text-align: center;"><input type="button" value="OKAY"/></p> </div>	<p>The most common reference population groups would be 3SG, 3ST, 4SG, 4ST (3 legged and 4 legged, signalized or stop controlled).</p> <p>These will be auto-filled; or they can be typed over.</p>
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- 3.4. You will then be prompted to save the spreadsheet using the project name, rather than saving in the original spreadsheet. This helps you keep a clean copy of the starting file.



- 3.5. Once the spreadsheet has been saved, after you click “Okay”, the summarize process will start. The more crashes, the longer it will take to run. The data will be filtering down to intersection crashes only, one record per crash. The code will try to group crashes into intersections by highway and MP or matching street and cross street names. There will be a circle indicating that code is running.
- 3.6. The next message box instructs you to use the drop down options in setting the reference population. If you choose to hand enter data, there is a chance that if you mis-type and the reference type is not an exact match there will be errors in the spreadsheet calculations.



Hand Entering Crash Data Instructions

Crash data can be hand entered into the spreadsheet when necessary¹. Rather than using the spreadsheet to summarize the data the user can simply jump to the calculation summary process.

1. Click the purple button called “Hand Enter Data”



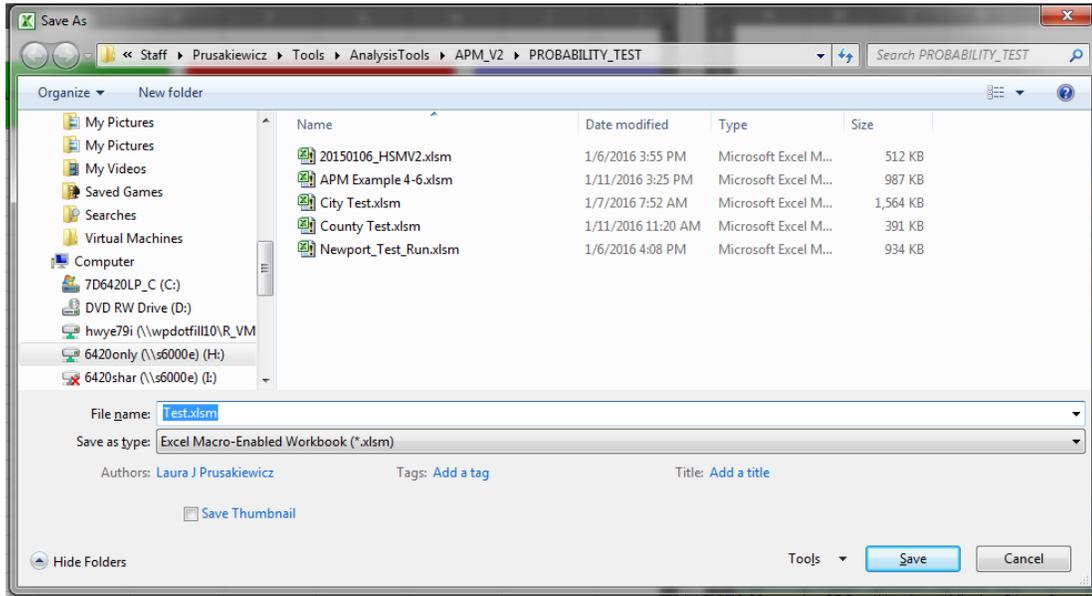
A project information popup appears. Entering in the project information here populates these fields throughout the rest of the calculations. Fill in the information and click on “OKAY”.

Next there will be a “Reference Population” popup, where you can define up to four reference population groups.

	<p>The most common reference population groups would be 3SG, 3ST, 4SG, 4ST (3 legged and 4 legged, signalized or stop controlled).</p> <p>These will be auto-filled; or they can be typed over.</p>
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¹ Sometimes crash data are not available in PRC format or in some cases it may be easier to enter data into the spreadsheet by hand.

You will then be prompted to save the spreadsheet using the project name, rather than saving in the original spreadsheet. This helps you keep a clean copy of the starting file.



Use the crash data you have available to fill in the Calculation Summary spreadsheet. Make sure that each intersection is on its own row and each intersection contains a reference population.

MP	Reference Pop	Street 1	Street 2	Angle	Back
1.54	4SG	Salem Parkway	Verda Ln NE	5	0
3.16	4SG	Broadway St NE	Salem Parkway	13	1
3.55	3ST	Hickory St NE	Liberty St NE	1	0
3.56	3ST	Commercial St NE	Hickory St NE	4	0
3.57	3SG	Commercial St NE	Pine St NE	3	0
3.62	3SG	Liberty St NE	Pine St NE	18	0
3.73	3ST	ove St NE	Liberty St NE	2	1
4.24	3ST	Commercial St NE	Hood St NE	7	0
4.3	3ST	Commercial St NE	Gaines St NE	2	0
4.36	3SG	Commercial St NE	Market St NE	5	1
4.79	3SG	Commercial St NE	Union St NE	14	0
4.84	3ST	Front St Parkway NE	Union St NE	5	1

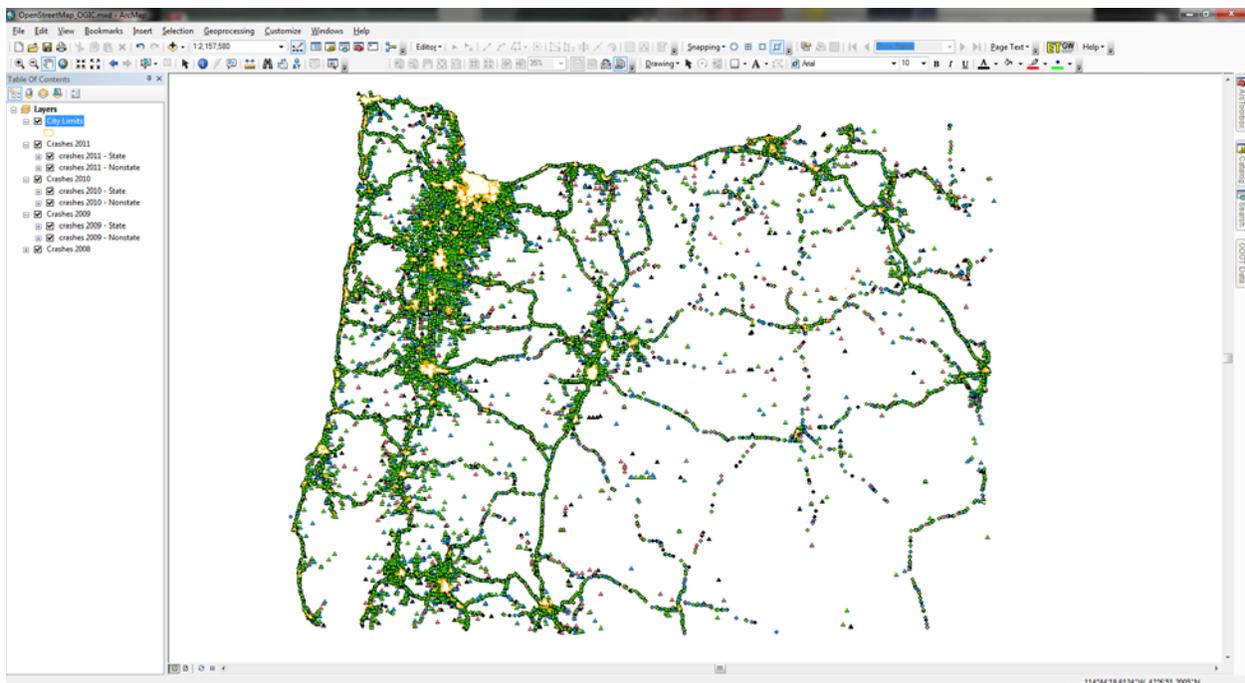
DBF Crash Data Instructions

Crash data are also available on the GIS servers in a shapefile format. These files are created for the state on a yearly basis and are never updated once they are created. It is the user's responsibility to understand their project area and if there have been any major updates to the crash dataset.

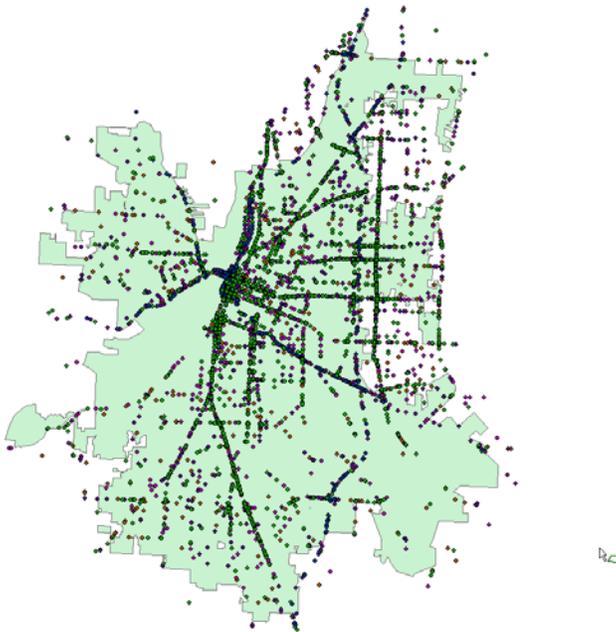
In this process the user should have a working knowledge of ArcGIS as well as understand the data they are working with.

1. Clipping Crash Datasets

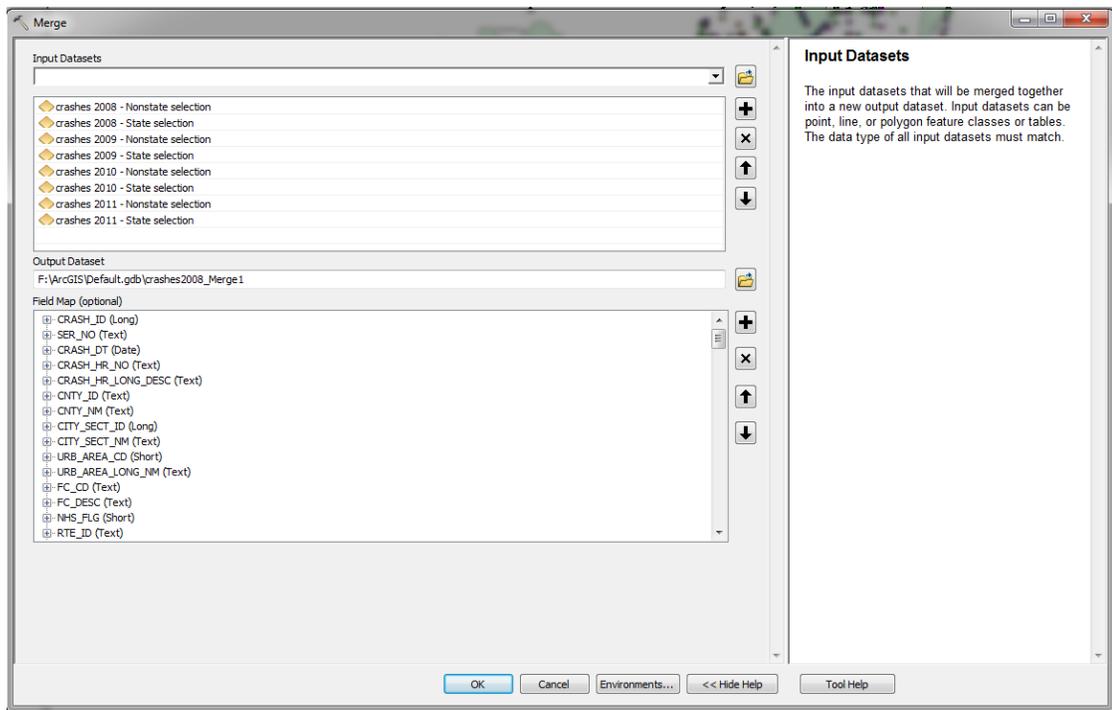
1.1. Open ArcGIS and import a boundary file or some sort of background image that represents your project area. Using the GIS server import the years of crashes you are interested in. In this example 2008-2011 were pulled.



- 1.2. Using your knowledge of the project area clip the statewide crash data to your project area to make it more manageable.



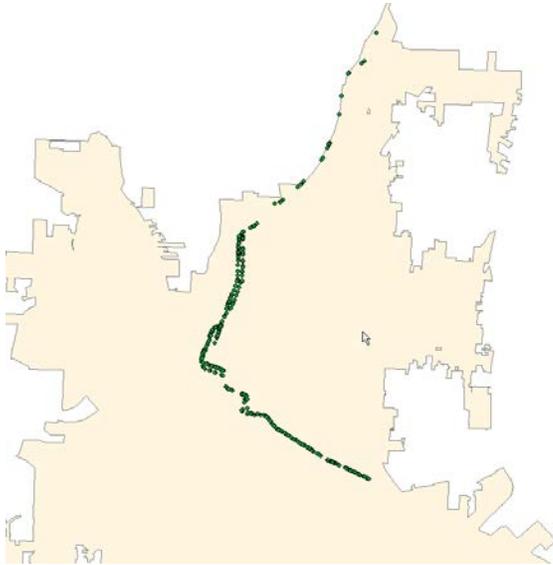
- 1.3. Using the Merge feature merge all years and both state and non-state data into one shapefile. Keeping all attributes.



- 1.4. Using your knowledge of the project area select the location of the crashes you are interested in. In most cases you could do the whole city when looking at a TSP. For this example we only wanted to look at Highway #072. Clip the file again to represent your study intersection.

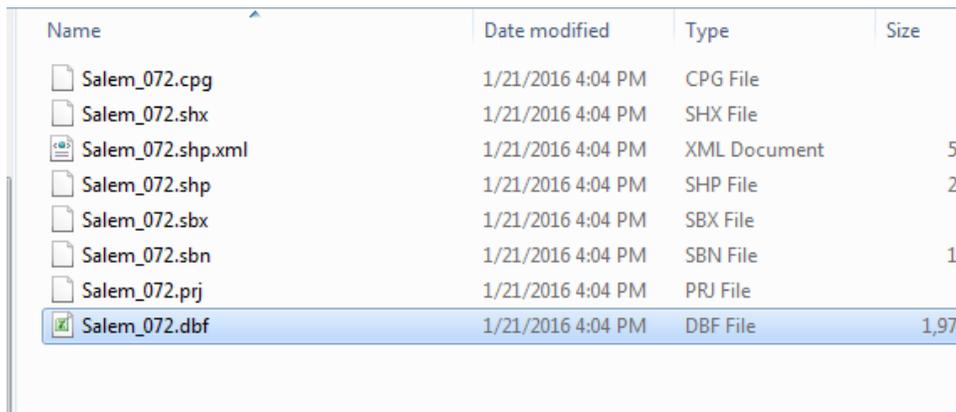


- 1.5. Either create a new shapefile of your selected crashes or clip the current shapefile so these crashes are the only ones left.



2. Opening DBF Crash Data in Excel

- 2.1. Once you are sure that you have the crash data that you need. Save the shapefile, close ArcGIS, open the DBF probability spreadsheet, and the raw dbf file. (You can open DBF files in Excel. If your computer is not set up to automatically open them in excel, simply right click and choose open with. Then navigate to excel and choose the excel program to open these types of files.)



Name	Date modified	Type	Size
Salem_072.cpg	1/21/2016 4:04 PM	CPG File	
Salem_072.shx	1/21/2016 4:04 PM	SHX File	
Salem_072.shp.xml	1/21/2016 4:04 PM	XML Document	5
Salem_072.shp	1/21/2016 4:04 PM	SHP File	2
Salem_072.sbx	1/21/2016 4:04 PM	SBX File	
Salem_072.sbn	1/21/2016 4:04 PM	SBN File	1
Salem_072.prj	1/21/2016 4:04 PM	PRJ File	
Salem_072.dbf	1/21/2016 4:04 PM	DBF File	1,97

3. Import DBF Data into the Probability Spreadsheet

3.1. The DBF probability spreadsheet is designed to deal with the entire file including headings. Select all of the data in the DBF output and copy it.

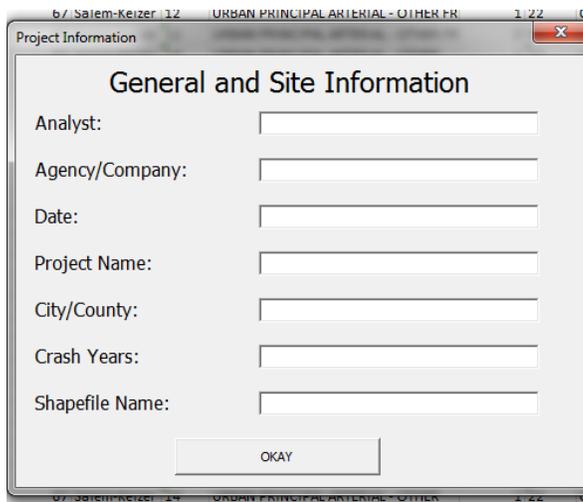
#	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	CRASH_ID	SER_NO	CRASH_DT	CRASH_HR_N	CRASH_HR_L	CNTY_ID	CNTY_NM	CITY_SECT	CITY_SECT1	URB_URB_AREA_L	FC_FC_DESC	NHS_P	RTI_H	RTI	
2	1275216	00207	1/14/2008	14	02:00 PM to 02:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	12 URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP	0	99EB	OR	
3	1275277	00237	1/16/2008	17	05:00 PM to 05:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	0	99EB	OR	
4	1275282	00206	1/14/2008	10	05:00 AM to 05:59 AM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	1	52	OR	
5	1275284	00071	1/4/2008	18	06:00 PM to 06:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	12 URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP	1	52	OR	
6	1276951	00350	1/24/2008	08	08:00 AM to 08:59 AM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	1	52	OR	
7	1277014	00033	1/2/2008	12	12:00 PM (Noon) to 12:59	24	Marion	184	Salem	67 Salem-Keizer UA	12 URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP	1	52	OR	
8	1277015	80075	1/2/2008	13	01:00 PM to 01:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	12 URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP	1	52	OR	
9	1277017	00109	1/7/2008	09	09:00 AM to 09:59 AM	24	Marion	184	Salem	67 Salem-Keizer UA	12 URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP	0	99EB	OR	
10	1277020	00040	1/2/2008	12	12:00 PM (Noon) to 12:59	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	1	52	OR	
11	1277021	00268	1/18/2008	10	10:00 AM to 10:59 AM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	0	99EB	OR	
12	1277023	00255	1/18/2008	18	06:00 PM to 06:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	0	99EB	OR	
13	1277024	00039	1/2/2008	15	03:00 PM to 03:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	1	52	OR	
14	1277059	00467	2/5/2008	15	03:00 PM to 03:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	1	52	OR	
15	1277536	00475	2/5/2008	09	09:00 AM to 09:59 AM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	1	52	OR	
16	1277644	00487	2/4/2008	12	12:00 PM (Noon) to 12:59	24	Marion	184	Salem	67 Salem-Keizer UA	12 URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP	0	99EB	OR	
17	1277621	00527	2/1/2008	15	03:00 PM to 03:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	1	52	OR	
18	1277622	00478	2/4/2008	14	02:00 PM to 02:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	12 URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP	1	52	OR	
19	1277626	00566	2/9/2008	18	06:00 PM to 06:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	12 URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP	1	52	OR	
20	1277642	00512	2/4/2008	17	05:00 PM to 05:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	1	52	OR	
21	1277644	00524	2/1/2008	18	06:00 PM to 06:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	0	99EB	OR	
22	1277701	00486	2/4/2008	12	10:00 PM to 10:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	1	52	OR	
23	1278000	00640	1/11/2008	11	11:00 AM to 11:59 AM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	0	99EB	OR	
24	1278144	00618	02/02/2008	02	02:00 AM to 02:59 AM	24	Marion	184	Salem	67 Salem-Keizer UA	12 URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP	0	99EB	OR	
25	1278478	00696	1/13/2008	13	01:00 PM to 01:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	0	99EB	OR	
26	1279047	00726	1/11/2008	11	11:00 AM to 11:59 AM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	1	52	OR	
27	1279048	00760	1/11/2008	11	09:00 PM to 09:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	1	52	OR	
28	1279049	00723	1/11/2008	11	11:00 AM to 11:59 AM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	1	52	OR	
29	1279059	00694	1/17/2008	17	05:00 PM to 05:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	1	52	OR	
30	1279094	00773	1/15/2008	15	03:00 PM to 03:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	1	52	OR	
31	1279102	00788	1/15/2008	15	03:00 PM to 03:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	1	52	OR	
32	1279476	00889	09/09/2008	09	09:00 AM to 09:59 AM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	0	99EB	OR	
33	1279685	00801	1/3/2008	14	02:00 PM to 02:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	12 URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP	0	99EB	OR	
34	1280393	00940	1/13/2008	13	01:00 PM to 01:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	12 URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP	1	52	OR	
35	1280415	00955	1/16/2008	16	04:00 PM to 04:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	12 URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP	1	52	OR	
36	1280419	00919	1/16/2008	16	04:00 PM to 04:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	1	52	OR	
37	1280422	00902	1/6/2008	07	07:00 AM to 07:59 AM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	1	52	OR	
38	1280425	00919	1/14/2008	14	02:00 PM to 02:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	0	99EB	OR	
39	1281019	01074	1/14/2008	14	02:00 PM to 02:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	1	52	OR	
40	1281022	01019	1/14/2008	14	08:00 PM to 08:59 PM	24	Marion	184	Salem	67 Salem-Keizer UA	14 URBAN PRINCIPAL ARTERIAL - OTHER	0	99EB	OR	
41	1281026	01015	1/14/2008	14	03:00 AM to 03:59 AM	24	Marion	184	Salem	67 Salem-Keizer UA	12 URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP	0	99EB	OR	

3.2. Next paste it onto the comprehensive raw data tab of the DBF probability spreadsheet.

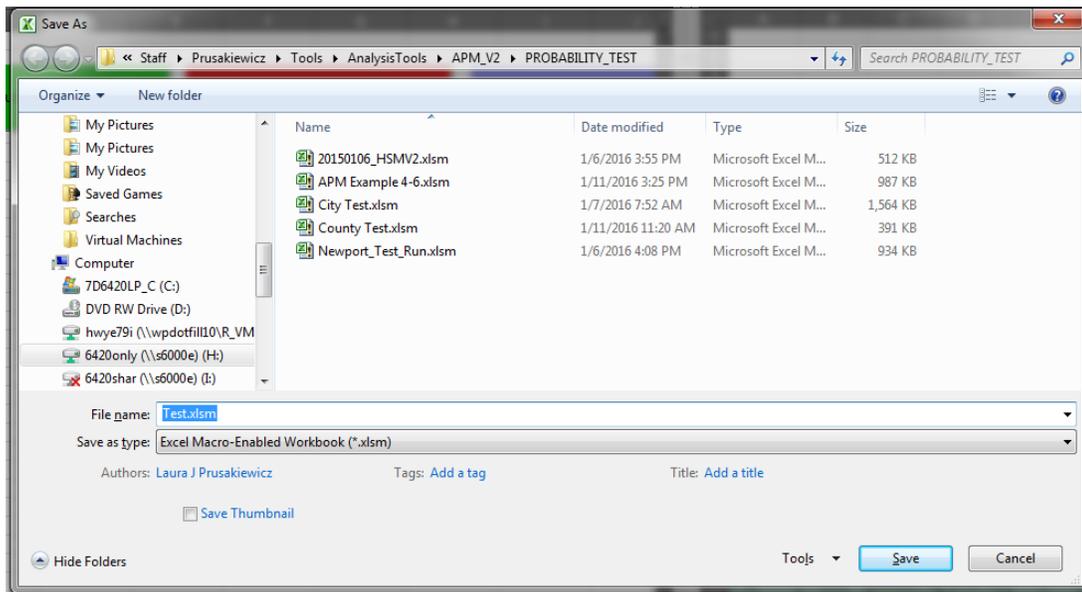
#	A	B	C	D	E	F	G
1	CRASH_ID	SER_NO	CRASH_DT	CRASH_HR_N	CRASH_HR_L	CNTY_ID	CNTY_NM
2	1275216	00207	1/14/2008	14	02:00 PM to 02:59 PM	24	Marion
3	1275277	00237	1/16/2008	17	05:00 PM to 05:59 PM	24	Marion
4	1275282	00206	1/14/2008	10	05:00 AM to 05:59 AM	24	Marion
5	1275284	00071	1/4/2008	18	06:00 PM to 06:59 PM	24	Marion
6	1276951	00350	1/24/2008	08	08:00 AM to 08:59 AM	24	Marion
7	1277014	00033	1/2/2008	12	12:00 PM (Noon) to 12:59	24	Marion
8	1277015	80075	1/2/2008	13	01:00 PM to 01:59 PM	24	Marion
9	1277017	00109	1/7/2008	09	09:00 AM to 09:59 AM	24	Marion
10	1277020	00040	1/2/2008	12	12:00 PM (Noon) to 12:59	24	Marion
11	1277021	00268	1/18/2008	10	10:00 AM to 10:59 AM	24	Marion
12	1277023	00255	1/18/2008	18	06:00 PM to 06:59 PM	24	Marion

4. Summarize DBF Crash Data

4.1. Once the DBF Crash data are pasted into Cell A1 you are ready to begin the spreadsheet processing; click the green summarize button. A project information popup appears. Entering in the project information here populates these fields throughout the rest of the calculations.

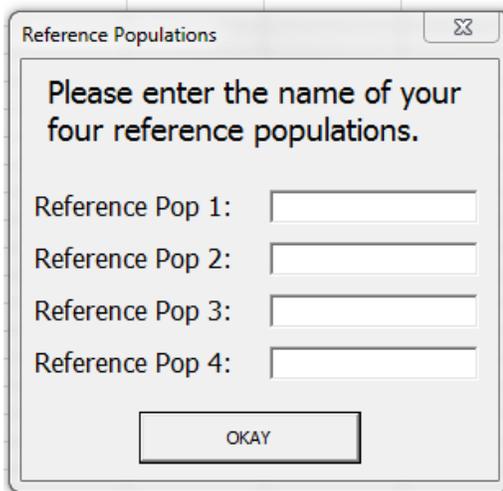


4.2. After clicking “OKAY” on the project information popup, the spreadsheet will then prompt you to save the spreadsheet using the project name. This is to encourage you save the integrity of the original spreadsheet.



5. Define Reference Populations

- 5.1. Once the spreadsheet has been saved, there will be a “Reference Population” popup. In this popup the reference populations for the spreadsheet will need to be defined. These populations do not need to be numerical or text, they can be called any variable of names. The most common reference population group would be 3SG, 3ST, 4SG, 4ST (3 legged and 4 legged, signalized and stop controlled).

A screenshot of a dialog box titled "Reference Populations". The dialog box has a close button in the top right corner. The main text inside the dialog box reads: "Please enter the name of your four reference populations." Below this text are four input fields, each preceded by a label: "Reference Pop 1:", "Reference Pop 2:", "Reference Pop 3:", and "Reference Pop 4:". At the bottom of the dialog box is an "OKAY" button.

- 5.2. After reference populations are set, the next message box is simply directions on what to do in the next step. It instructs you to use the drop down options in setting the reference population. If you choose to hand type in there is a chance that if you miss-type and the reference type is off a little bit it will cause errors in the spreadsheet calculations.

The remaining steps in this process are completed whether you started with PRC data, hand entered data, or DBF data.

Designate Reference Population for each intersection

Set the reference population of each intersection using the dropdown menu.

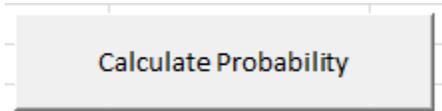
Check that each intersection is only shown once; there may be difference in how crashes are coded. If the street number, intersecting street number or the Hwy (Highway) and MP (milepoint) are different (only MP with DBF data), the spreadsheet will think it's a different intersection when in fact it could be the same one. If this is the case, combine the crash information and counts into one row.

MP	Reference Pop	Street 1	Street 2	Angle
1.54		Salem Parkway	Verda Ln NE	5
3.16	3ST	Salem Parkway St NE	Salem Parkway	13
3.55	3SG	Hickory St NE	Liberty St NE	1
3.56	4ST	Commercial St NE	Hickory St NE	4
3.57	4SG	Commercial St NE	Pine St NE	3
3.62		Liberty St NE	Pine St NE	18
3.73		Grove St NE	Liberty St NE	2
4.24		Commercial St NE	Hood St NE	7
4.3		Commercial St NE	Gaines St NE	2

Calculate Probability

1. Run the Probability Macro

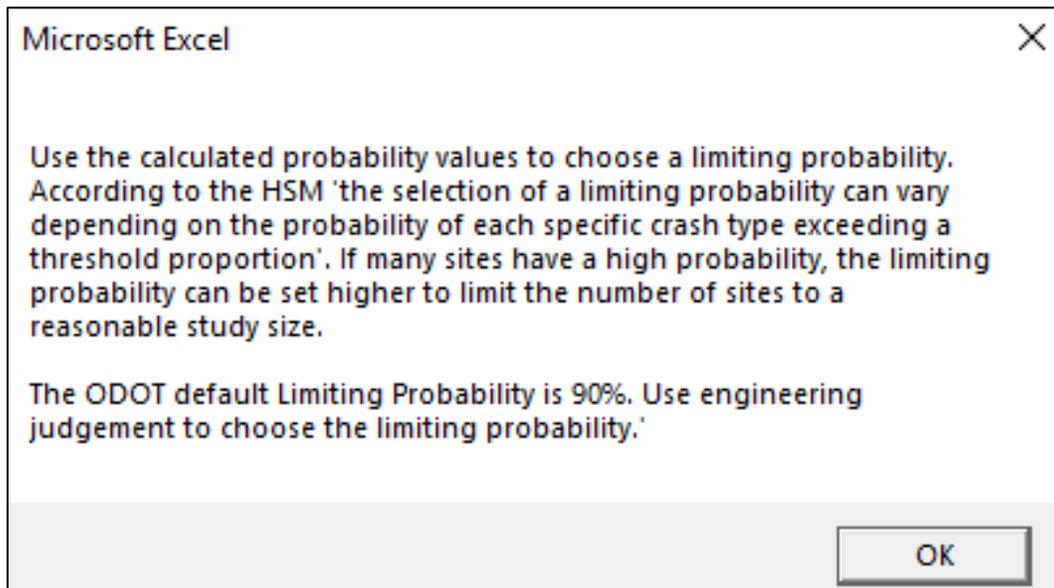
- 1.1. Once you have confirmed that each intersection is only contained in one row and that all intersections now contain a reference population click the calculated probability button.



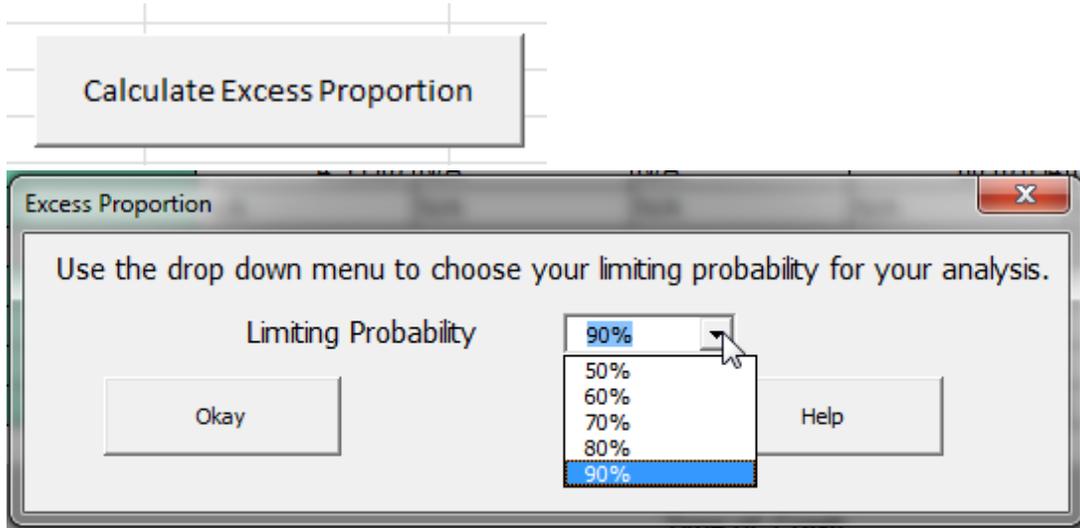
Click 'Calculate Probability' to begin calculations on the crash data. The following calculations are run:

Observed proportion of crashes	For each crash type at each intersection
Threshold proportions	For each crash type
Sample variance	For each reference population
Alpha and Beta parameters	For each reference population
Probability of crashes exceeding threshold proportions	For each intersection and each crash type

- 1.2. After the macro is done running, a message box appears to explain limiting probability.



- 1.3. Click the “Calculate Excess Proportion” button. This will bring up a pop-up window with a dropdown box for the analyst to choose limiting probability. The default is 90%, but other choices are provided within the range of 50% to 90%.



Probability that crash type for each intersection is greater than the limiting probability is checked; if so, excess proportion is calculated and placed above the probability matrix in tab “Probability”.

		Excess Proportion with a probability of greater than 0.9						
		Type of Crash						
	Street 2	Angle	Back	Bike	Fix	Head	NonCol	
way	Verda Ln NE							
t NE	Salem Parkway	0.211			0.021			
NE	Liberty St NE							

- 1.4. After the excess proportion has been calculated, a new button named ‘Create Report’ is shown. This button creates a summary of each crash type at the intersections which meet the limiting probability. It then creates a printable version of the summary.



Analyst:		KG				
Agency/Company:		ODOT				
Date:		5/6/2020				
Project Name:		testing				
Angle Crashes						
Hwy	MP	RefPop	Street 1	Street 2	Probability	Excess Proportion
29	2.94	4SG	SW TUALATIN VALL	SB EX BEAV-HLLSD	0.87	0.04
29	2.75	4SG	SW CANYON RD	SW 110TH AVE	0.85	0.10
26	2.47	4SG	SE POWELL BLVD	SE 33RD AVE	0.70	0.02
26	2.07	4SG	SE POWELL BLVD	SE 26TH AVE	0.69	0.01
Bike Crashes						
Hwy	MP	RefPop	Street1	Street2	Probability	Excess Proportion
26	2.47	4SG	SE POWELL BLVD	SE 33RD AVE	1.00	0.07
26	2.07	4SG	SE POWELL BLVD	SE 26TH AVE	1.00	0.03

2. Interpreting Results

This section gives some basic instructions on how to interpret the output from the spreadsheet and the HSM calculation. In looking below at the clip of the report page we will look at the intersection of Liberty Street SE at Trade Street SE.

Angle Crashes					
MP	RefPop	Street 1	Street 2	Probability	Excess Proportion
3.62	3SG	Liberty St NE	Pine St NE	1.000	0.619
4.79	3SG	Commercial St NE	Union St NE	1.000	0.355
5.39	3SG	Commercial St NE	Ferry St SE	1.000	0.325
5.52	3SG	Liberty St SE	Trade St SE	0.992	0.274
3.16	4SG	Broadway St NE	Salem Parkway	0.998	0.211
5.47	3SG	Ferry St SE	Liberty St SE	0.901	0.140

In looking at the probability of 0.992, this means that there’s a 99.2% chance that the long term expected proportion of angle crashes at Liberty St SE and Trade St SE will be greater than the long term expected proportion of angle crashes at 3-legged Signal-Controlled intersections when compared to the rest of this population of intersections. The 0.274 in the excess proportion column implies the “the likelihood that the site will benefit from a countermeasure targeted at the collision type under consideration.” (HSM 4-58) The greater the excess proportion the greater the likelihood.

Intersections with a probability greater than the limiting probability (default of 90%) and an excess proportion of at least 0.10 or a probability greater than the limiting probability and flagged by either the Critical Rate or the SPIS top 10% need to be further investigated.

The spreadsheet will automatically grey out intersections with an excess proportion of less than 0.10. Unless these intersections are flagged by either the Critical Rate calculation or the SPIS top 10% they may dropped from further investigation. Use engineering judgement to determine if there are other factors at the greyed out intersections to determine if they need to be further investigated.

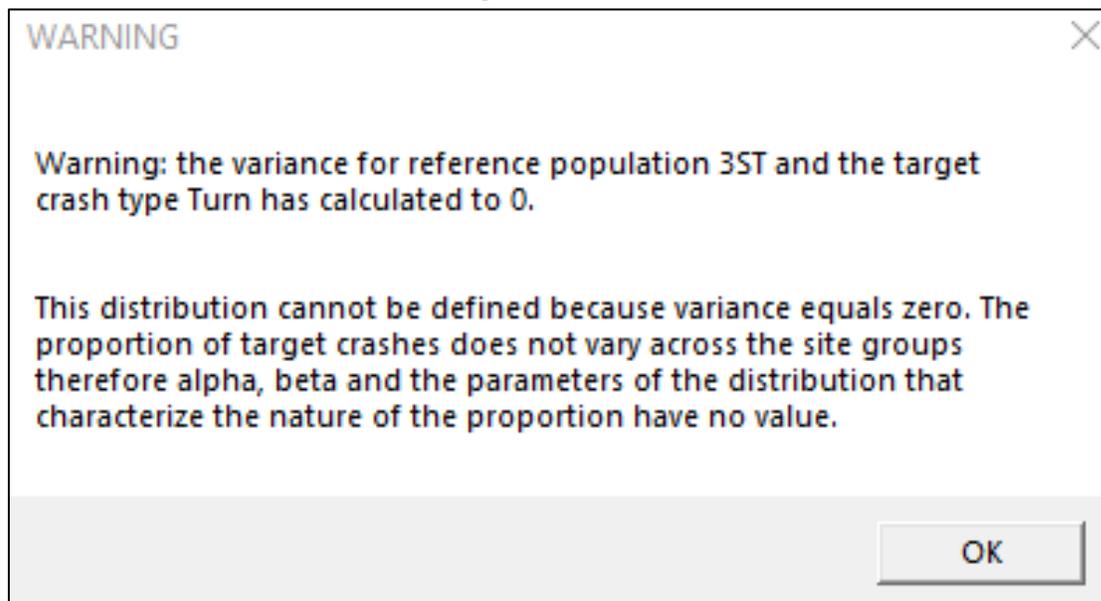
Turn Crashes					
MP	RefPop	Street1	Street2	Probability	Excess Proportion
3.57	3SG	Commercial St NE	Pine St NE	0.92	0.17
5.93	4SG	Pringle Creek Park	Winter St NE	0.94	0.11
4.85	3SG	Commercial St NE	Marion St NE	0.91	0.04

Basic Troubleshooting

1. Zero Variance

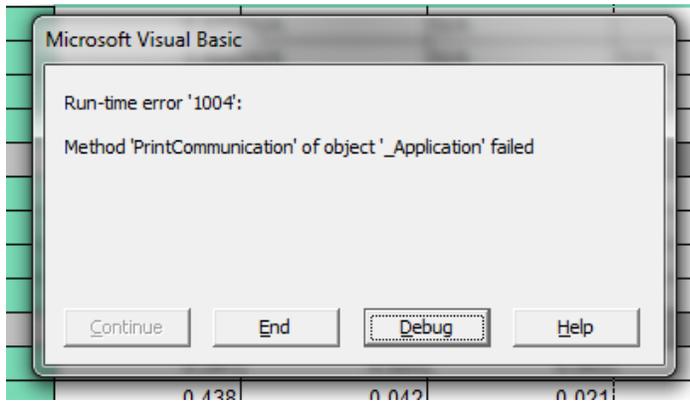
The variance equation in the HSM had an error that allowed negative variances to be calculated. This is statistically impossible and therefore caused ODOT to investigate an update to the variance equation. An updated equation was calculated and after testing the equation it was discovered that in rare circumstances it is possible to calculate a zero variance. The variance is used as the denominator in the alpha calculation it will cause a divide by zero error. In this instance it was decided that the variance would then be ignored, and the probability would not be calculated for that particular reference population and target crash.

This will not cause the spreadsheet to fail but will give a warning shown below. The two boxes represent the two pieces of the message box that will change depending on which type of intersection and crash is calculating a zero variance.



2. Default Printer

If after pressing the Create Report button you get a run-time error similar to the one shown, it means that the spreadsheet is trying to connect to a printer that isn't available or is a PDF creator. Check to make sure that you have a default printer set and that it is working and online. Then click end, and delete the empty Report tab. Then you should be able to click the Create Report again and it should create a printer friendly report for you.



3. Negative Alpha

In rare circumstances the alpha calculate can be a negative number. This will cause the beta to also be negative and will not allow the beta distribution to calculate. The spreadsheet will give the warning shown below alert the user,

