Mileposting
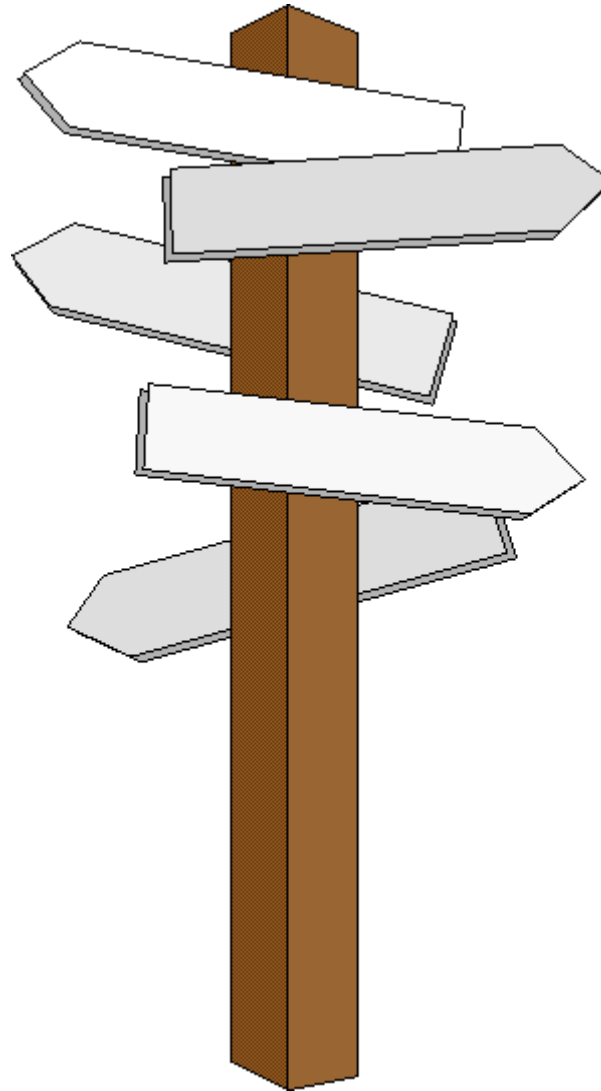
Mileposts

• Allows TEAAS to locate crashes and ordinances on a roadway in relation to the features (intersections, boundaries, etc.) on that roadway

• Allows TEAAS to check for ordinances overlaps (ordinance segments that are not allowed to coincide)

• Location information from crash reports, combined with feature mileposts, are used to calculate milepost values for crashes (high order milepost and/or on road milepost)

• Beginning and ending points from ordinances, combined with feature mileposts, are used to calculate milepost values for ordinances

Mileposts

• Means of specifying a location along a roadway (measured in miles)

• Mileposts are imaginary distance markers that follow the contour of the roadway

• They are specific to each county

• Each route has defined "beginning" and "ending" points

• Beginning milepost is usually 0.000 and ending milepost is usually equal to the total length of the route (added to the beginning milepost)

• Some local routes (i.e. Main Street) that occur several times in the same county will start with different beginning mileposts

• Feature mileposts are usually rounded to the nearest thousandths of a mile (three decimals)

Note that the current alignment of State Highway System roads (I, US, NC, and SR) <u>always</u> starts at 0.000, and any State Highway System road in the system that starts at a milepost *other* than 0.000 is an old alignment!

Milepost Types

Feature Mileposts

• Locates a feature along a route

• Mileposted features are intersections, mile markers, boundaries, at-grade railroad crossings, and structures

• The features report is a listing of all mileposted features along a route

Crash Mileposts
• Locates crashes along a route
• Directly dependant on feature mileposting
• Crashes will not milepost if they reference a feature that is not mileposted
• Crashes may be mileposted if the crash report references a loop feature
• Crashes receive an on road milepost and a high order route milepost

Ordinance Mileposts
• Locates ordinances along a route
• Directly dependant on feature mileposting
• Ordinances will not milepost if they reference a feature that is not mileposted
• Ordinances will not milepost if they reference a loop feature
• Ordinances get a milepost for their "begin" point and, if applicable, their "end" point

Mileposted Features

Features that get assigned a milepost value are:

Intersections	- intersection with another route
Boundaries	- political boundaries
Structures	- structures carrying the route (i.e. culvert)
Mile Markers	- route mileage values (not county specific)
Railroads	- at-grade railroad track crossings
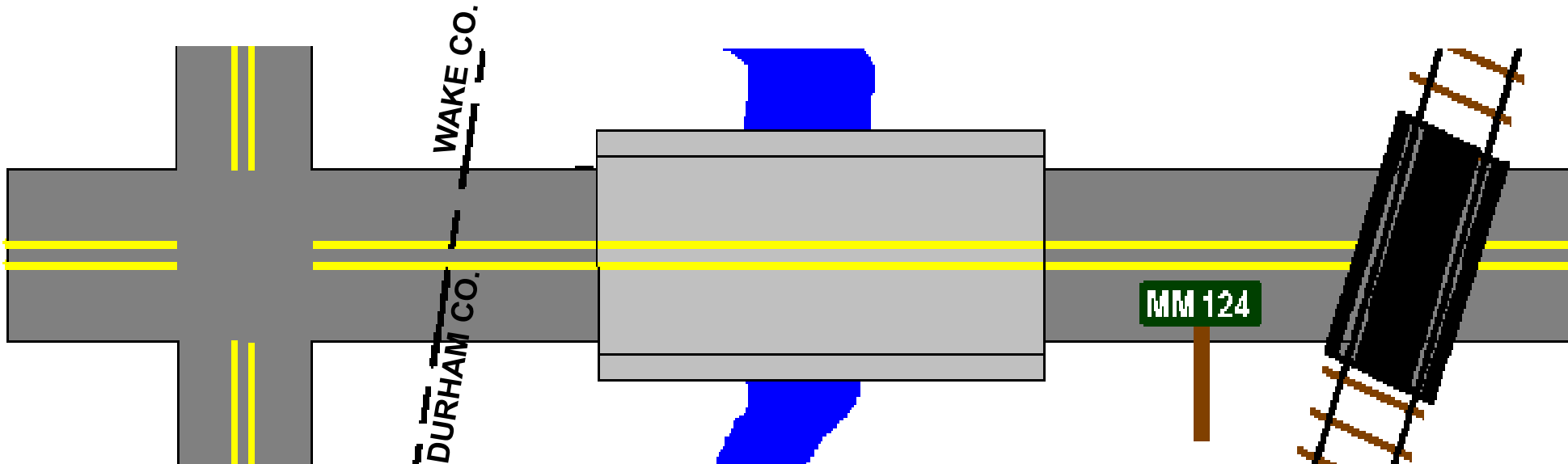
Mileposts vs. Mile Markers

Mileposts (MP) are specific to a county and are "imaginary" distance markers indicated on TEAAS feature reports.

Mile markers (MM) are green/white information signs posted along a road to indicate the mileage from the beginning of the route and are listed as features in TEAAS.


Iredell County
MP 8.546

Catawba County
MP 3.812

Catawba County
MP 12.133
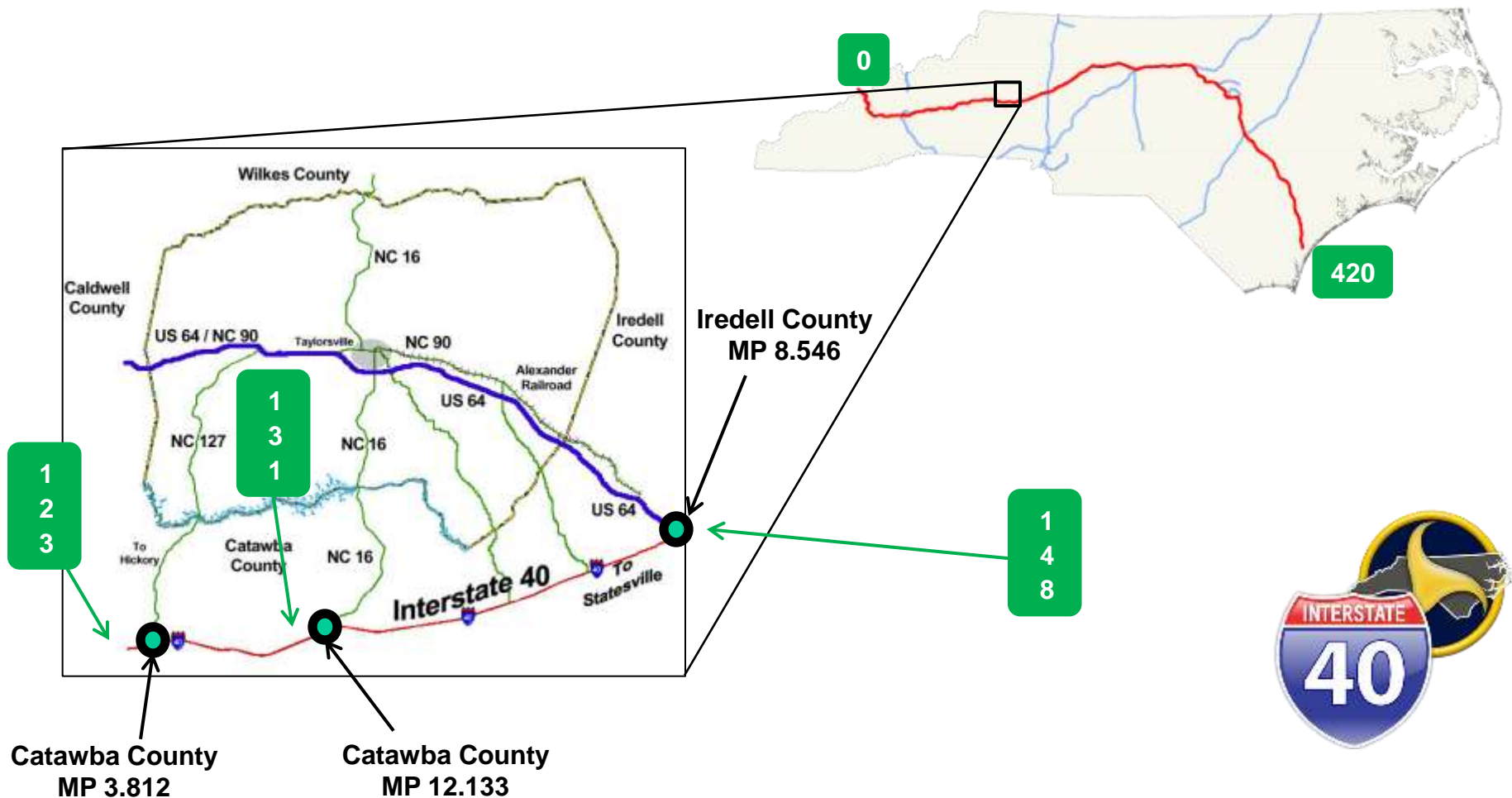
Mileposting Rules

- Based on NCDOT's Linear Referencing System (LRS)

- $MP_{n+1} = MP_n + ($distance between feature$_n$ and feature$_{n+1})$

- Assign mileposts to all standard features

- Use all possible maps to identify features and distances

- If there are coinciding routes, they must also be checked and/or mileposted

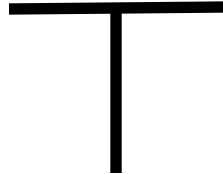- Provide ample documentation as needed

The terms "legs" and "approaches" mean the same thing and are used to identify types of at-grade (same level) intersections:
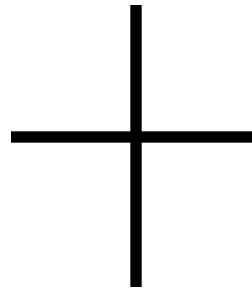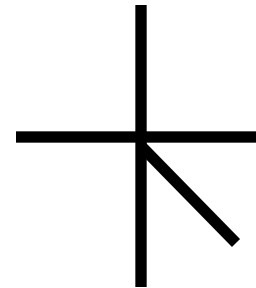
Examples:

2-leg	3-leg	4-leg	5-leg
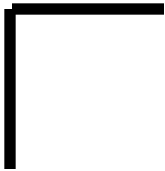
Compass directions versus Engineering directions:

Compass

N

NW   NE

W   E

SW   SE

S
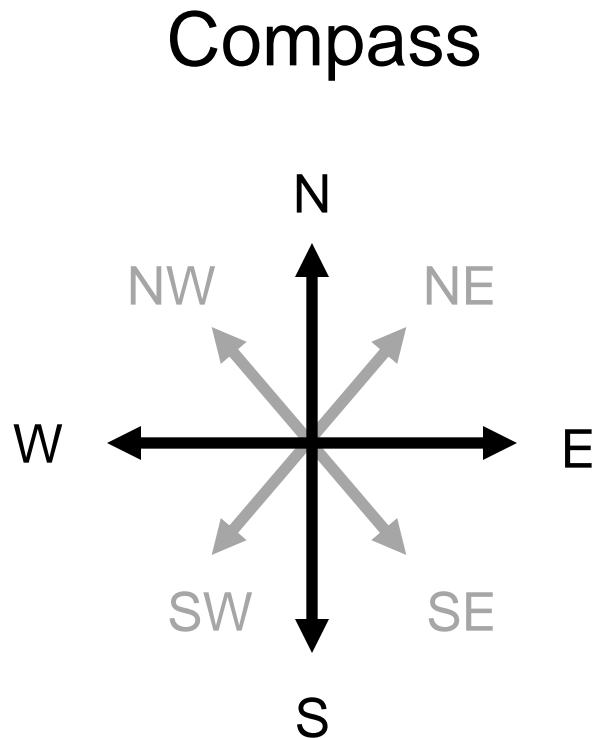
Engineering

West to East

South to North

The term "direction to next" is the compass direction from one feature to the next, along the direction of the route, and NOT the general direction of the route itself:

E

North
and
East

North
and
East

D

North
and
West

C

North
and
West

A

South
and
East

B

NCDOT Linear Referencing System (LRS)

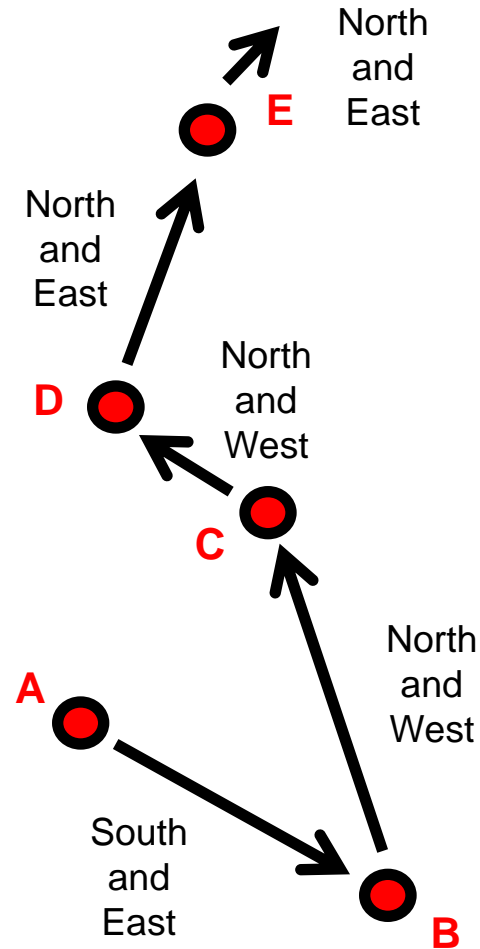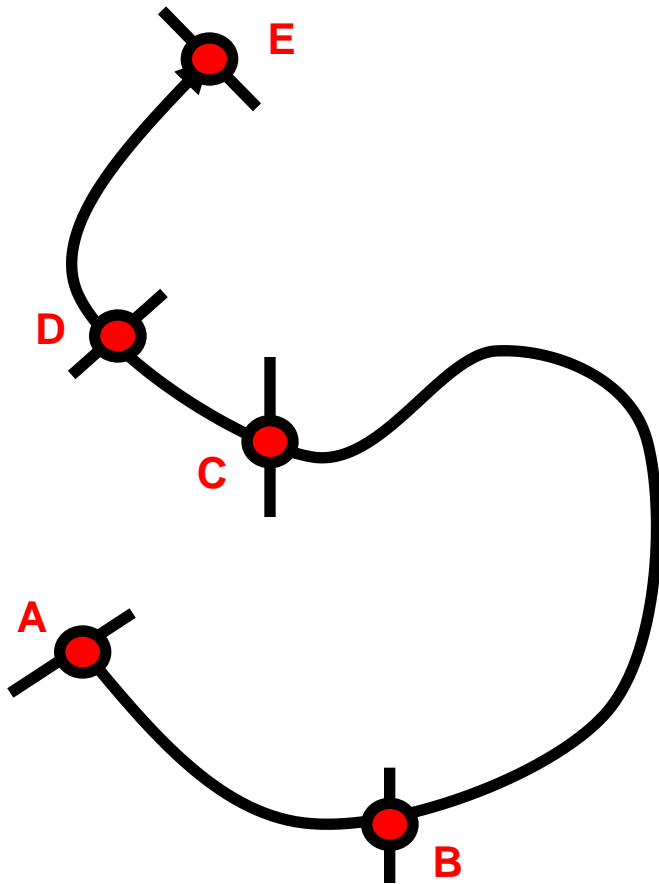| County	Route_Na	Route_Length	Segment_	Segment_Begin_MP	Segment_	Segment_End_MP
91	SR-1010	18.041	C0000050	.000	40001013	.211
91	SR-1010	18.041	40001013	.211	30000050	.945
91	SR-1010	18.041	30000050	2.329	40002731	2.479
91	SR-1010	18.041	40002731	2.479	40002730	3.569
91	SR-1010	18.041	40002730	3.569	40005339	3.679
91	SR-1010	18.041	40005339	3.679	40002727	3.912
91	SR-1010	18.041	40002727	3.912	40005398	4.260
91	SR-1010	18.041	40005398	4.260	40005332	4.510
91	SR-1010	18.041	40005332	4.510	40002728	4.740
91	SR-1010	18.041	40002728	4.740	40002725	5.350
91	SR-1010	18.041	40002725	5.350	40001006	5.730
91	SR-1010	18.041	40001006	5.730	40003851	6.570
91	SR-1010	18.041	40003851	6.570	40002723	6.960
91	SR-1010	18.041	40002723	6.960	40005353	7.000
91	SR-1010	18.041	40005353	7.000	40002722	7.481
91	SR-1010	18.041	40002722	7.481	20000401	7.881
91	SR-1010	18.041	20000401	7.881	20400401	7.891
91	SR-1010	18.041	20400401	7.891	40001375	8.451
91	SR-1010	18.041	40001375	8.451	40001377	9.371
91	SR-1010	18.041	40001377	9.371	40001404	9.431
91	SR-1010	18.041	40001404	9.431	40004096	9.941
91	SR-1010	18.041	40004096	9.941	40001578	10.051
91	SR-1010	18.041	40001578	10.051	40001405	10.291
91	SR-1010	18.041	40001405	10.291	40001386	10.781
91	SR-1010	18.041	40001386	10.781	40004013	11.131
91	SR-1010	18.041	40004013	11.131	40001557	11.211
91	SR-1010	18.041	40001557	11.211	40001387	11.551
91	SR-1010	18.041	40001387	11.551	40003982	11.841
91	SR-1010	18.041	40003982	11.841	40001583	11.881
91	SR-1010	18.041	40001583	11.881	40001530	12.031
91	SR-1010	18.041	40001530	12.031	40001544	12.061
91	SR-1010	18.041	40001544	12.061	40001520	12.181
91	SR-1010	18.041	40001520	12.181	40001388	12.191
91	SR-1010	18.041	40001388	12.191	40001580	12.581
91	SR-1010	18.041	40001580	12.581	40001152	12.721
91	SR-1010	18.041	40001152	12.721	40001594	12.971
91	SR-1010	18.041	40001594	12.971	40001300	14.111
91	SR-1010	18.041	40001300	14.111	40001303	14.731
91	SR-1010	18.041	40001303	14.731	40004023	14.831

Intersection Features

• Used to search for and view location information for intersections on an inventoried route.

• Access the "Features - Intersections" screen by selecting the following:

 $\Longrightarrow$ **Intersections**

Intersection Features (Cont.)

To search for Intersections
- Click the **"Search"** icon
- Enter search criteria
- Leave any criteria blank if they are not part of the search
- Click the **"GO"** icon

Search Icon

GO Icon

County name

8-digit inventoried route code (wildcard characters may be used to search for one or more feature)

Inventoried route beginning milepost

Intersection milepost value

Intersecting route ID (8-digit code)

Intersection type

Next feature direction

TEAAS - Features - Intersections
Edit Help

Inventoried Route
County
Inventoried Rte ID
Begin Milepost
End Milepost

Intersection
Intersection Milepost
Intersecting Rte ID
Intersecting Rte Name
Intersecting Rte Milepost
Intersection Type
Next Feature Direction
Beyond Route Limits
Loop Condition

Reports
Features Report

Last Update
User ID
Date/Time

0 of 0

Fields Not Allowed as search criteria:
- End Milepost
- Intersecting Route Name
- Intersecting Route Milepost
- Beyond Route Limits
- Loop Condition

• Click the **"OK"** button on the records retrieved dialog box to view the records retrieved.

• If no records are returned, verify that the search criteria are correct.

• A new search may be executed by adjusting the search criteria and clicking the **"GO"** icon.

• TEAAS will display a maximum of 500 records for any given search, although more than 500 records may actually meet the search criteria.

Intersection Features Example

Suppose you wanted to search the intersections on NC 39 in Wake county

      Step A: Click on the **"Search"** icon
      Step B: Enter the county (Wake)
      Step C: Enter the inventoried route ID (30000039)
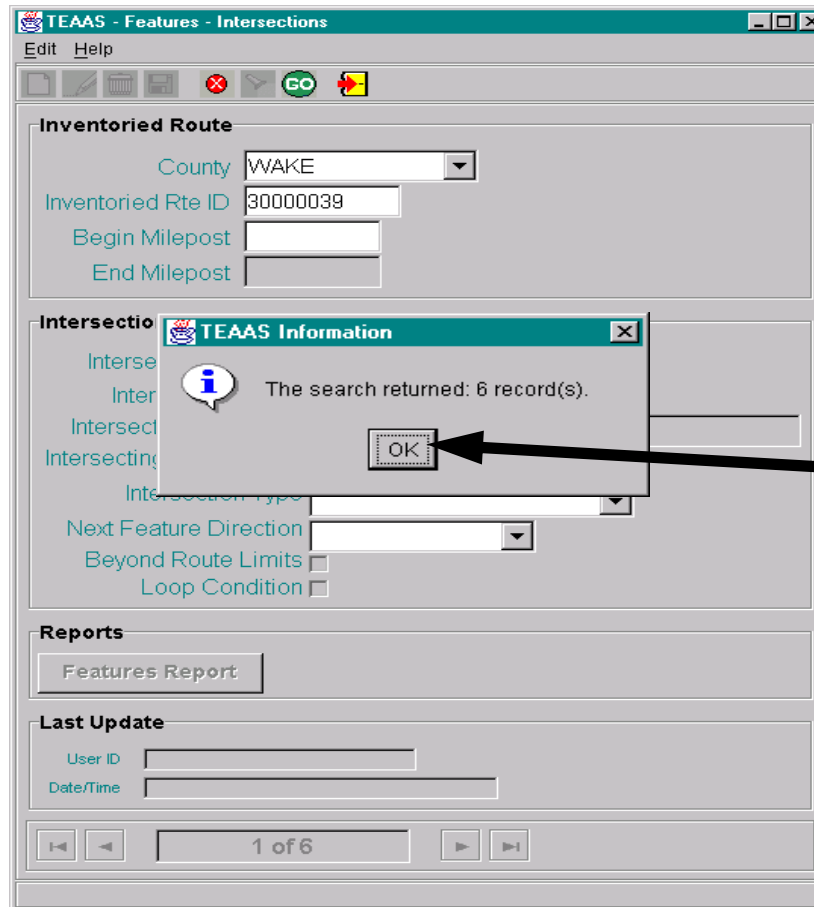   Step D: Click the **"GO"** icon.

Step A

Step D

Step B

Step C

Intersection Features Example (Cont.)

• If matches are found, a dialog box will indicate the number of matched records (note - wildcards and other criteria can return more than one record).

• If no matches are found, try using other criteria, wildcards, etc.

Step E: Click on the **"OK"** button and view the records.

Step E

Reading the Intersection Features Screen

8-digit code of intersecting route

Name attached to the 8-digit code of the intersecting route

If the intersecting route is mileposted, the intersecting route's milepost would be shown here

County searched

Route searched

Beginning milepost of the route searched

Ending milepost of the route searched

Milepost on the inventoried route where the intersecting route intersects NC 39

See Appendix C for a description of the last four items shown here

*Click here to launch the **Features Report***

TEAAS - Features - Intersections

Edit   Help

Inventoried Route

County WAKE
Inventoried Rte ID 30000039
Begin Milepost 0.0
End Milepost 2.86

Intersection

Intersection Milepost 0.560
Intersecting Rte ID 21000264
Intersecting Rte Name US 264A
Intersecting Rte Milepost
Intersection Type At grade intersection, 4 legs
Next Feature Direction North and West
Beyond Route Limits ☐
Loop Condition ☐

Reports

Features Report

Last Update

User ID TEAAS CONVERSION
Date/Time 28 September 1999 12:35 PM

1 of 6

Other Roadway Feature Screens

Boundaries Screen ⟹ Boundaries

Used to search for and view location information for political boundaries that cross an inventoried route

Structures Screen ⟹ Structures

Used to search for and view location information for structures (bridges, culverts, tunnels, ferry landings, etc.)

Mile Markers Screen ⟹ Mile Markers

Used to search for and view location information for mile markers.

Railroad Crossing Screen ⟹ Railroad Crossing

Used to search for and view location information for at-grade railroad crossings

Milepost, Mileage, Mile Marker

Milepost - the distance, in miles, from the beginning of an inventoried route to a feature on that route (i.e. SR 1002 on I 40 in Wake County is 2.21 miles from the beginning of I 40 in Wake County and, therefore, has a milepost of 2.21)

Mileage (1) - the distance, in miles, from one feature to another on an inventoried route (i.e. the distance on I 40 in Wake County between the Durham County Line and SR 1002 is 2.21 miles)

Mileage (2) - the total length of an inventoried route in a specific county (i.e. the total length of I 40 in Wake County is approximately 29.18 miles)

Mileage (3) - the total length of a route within the state (i.e. interstate 40 is approximately 420 miles long)

Mile Marker - sign indicating the distance, in miles, from the beginning of a route within the state to the sign (i.e. mile marker 145 on I 40 is approximately 145 miles from the Tennessee State Line)

Features Report

- Feature records are county specific

- The features report shows all mileposted features on an inventoried route

- Used in crash analyses to determine the location of a crash in relation to mileposted roadway features

- Used by ordinances to determine the location of the ordinanced segment in relation to mileposted roadway features

- There are several ways to run a features report within TEAAS

Features Report Example

North Carolina Department of Transportation
Traffic Engineering Accident Analysis System
Features Report

County	Inventoried Route ID	Begin Milepost	End Milepost
WAKE	20000064	0.0	44.340

MP No	FeatureID	Feature Name/Type	Special Type		Distance to Next	Direction to Next	Loop	Beyond Rte Limits
0.000	70000018	CL-CHATHAM			0.230	North and East		
0.230	50034086	TWO POND	At grade intersection,	3 leg	0.420	North and East		
0.650	50013376	HATTIE	At grade intersection,	3 leg	0.110	North and East		
0.760	50017261	LAWSON	At grade intersection,	3 leg	0.150	North and East		
0.910	50034087	FLYING HAWK	At grade intersection,	3 leg	0.210	North and East		
1.120	910002	Structure	Bridge		0.200			
1.320	40001602	SR 1602	At grade intersection,	3 leg	0.000	North and East		
1.320	50012145	GOODWIN	At grade intersection,	3 leg	0.080	North and East		
1.400	50000278	AIRPARK	At grade intersection,	3 leg	0.330	North and East		
1.730	40001601	SR 1601	At grade intersection,	3 leg	0.000	North and East		
1.730	50015388	JENKS	At grade intersection,	3 leg	1.240	North and East		
2.970	40001163	SR 1163	At grade intersection,	4 leg	0.000	North and East		
2.970	50016074	KELLY	At grade intersection,	4 leg	0.720	North and East		

North Carolina Department of Transportation
Traffic Engineering Accident Analysis System
Features Report

County	Inventoried Route ID	Begin Milepost	End Milepost
WAKE	20000064	0.0	44.340

MP No	FeatureID	Feature Name/Type	Special Type		Distance to Next	Direction to Next	Loop	Beyond Rte Limits
0.000	70000018	CL-CHATHAM			0.230	North and East		
0.230	50034086	TWO POND	At grade intersection,	3 leg	0.420	North and East		
0.650	50013376	HATTIE	At grade intersection,	3 leg	0.110	North and East		
0.760	50017261	LAWSON	At grade intersection,	3 leg	0.150	North and East		
0.910	50034087	FLYING HAWK	At grade intersection,	3 leg	0.210	North and East		
1.120	910002	Structure	Bridge		0.200			
1.320	40001602	SR 1602	At grade intersection,	3 leg	0.000	North and East		
1.320	50012145	GOODWIN	At grade intersection,	3 leg	0.080	North and East		
1.400	50000278	AIRPARK						
1.730	40001601	SR 1601						
1.730	50015388	JENKS						
2.970	40001163	SR 1163	At grade intersection,	4 leg	0.000	North and East		
2.970	50016074	KELLY	At grade intersection,	4 leg	0.720	North and East		

Coinciding routes (same milepost number, but different 8-digit codes)

Features Report Example (cont.)

- County - county where mileposted route exists
- Inventoried Route ID - 8-digit route code
- Begin Milepost - beginning milepost of the route
- End Milepost - ending milepost of the route
- MP No - milepost value for the given feature
- FeatureID
  - 8-digit code for roads, boundaries, and mile markers
  - 6-digit code for structures
  - 7-digit code for at-grade railroad crossings

- Feature Name/Type - preferred name of the feature

- Special Type - intersection or structure type

- Distance to Next - distance from one feature to the next feature following the route's direction

- Direction to Next - direction from one feature to the next feature

- Loop - flag to indicate if a feature intersects the route more than once ("Y" or blank)

- Beyond Rte Limits - flag to indicate if the feature is outside of the inventoried route limits ("Y" or blank)

Route Mileposting Exercise

Milepost the example route (SR 9999 in Wake County) shown below:
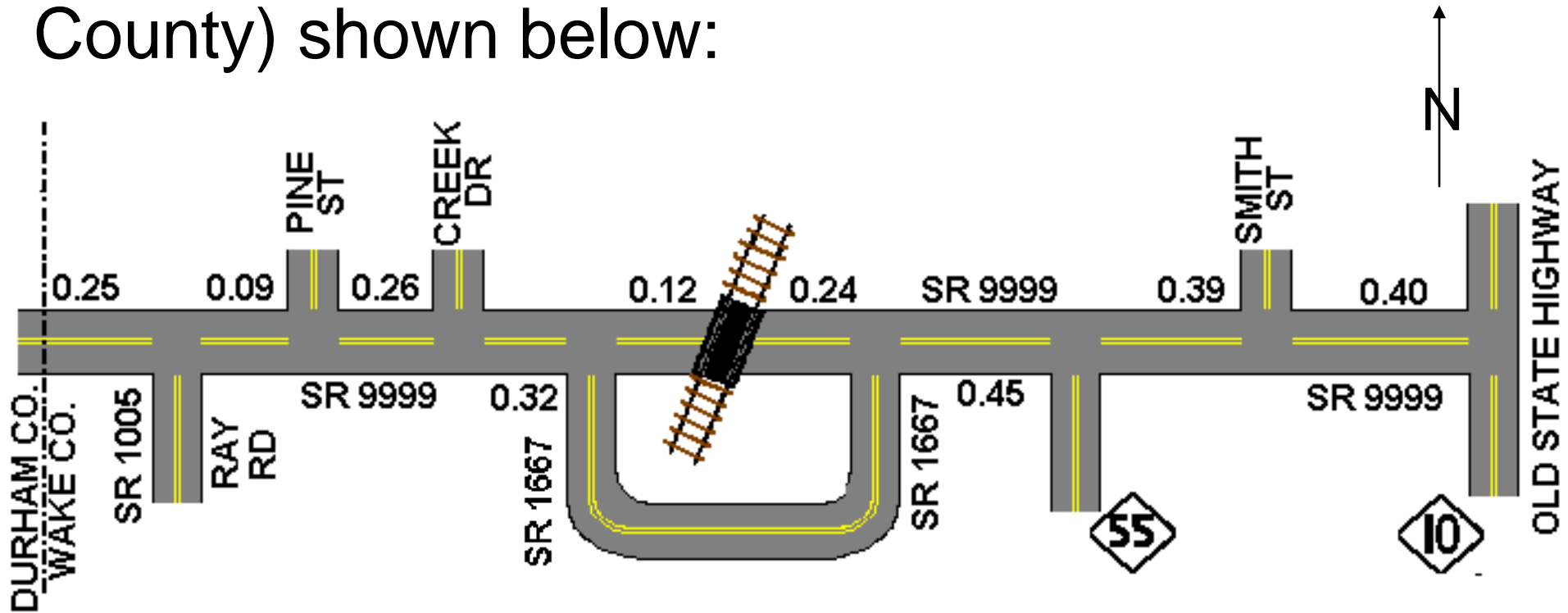
Note:

- Distance between the features is given in miles.
- Start at the Durham County line with Milepost 0.00
- Calculate rest of mileposting from west to east

Non-Mileposted Routes

If a given route is not already mileposted there are two options:

1. Determine mileposts for route features and manually calculate the milepost for each crash or ordinance

2. Determine mileposts for route features and submit them to a Secondary Data Maintainer (SDM) to permanently enter into TEAAS. After the route mileposting is entered into TEAAS, mileposting for crashes along that route are automatically calculated within 24 hours (mileposting for ordinances must be manually initiated).

Crash Mileposting Information

- Crashes are mileposted (located) using location information on DMV-349 crash reports

- Location Information used:

  Road On - Road name or route where the crash occurred

  From Road - road name or route of an intersecting road near the crash

  Distance From - Distance between crash and From Road

  Direction From - Direction of crash from the From Road

  Towards Road - Next intersecting road in the Direction From from the From Road

  NOTE – Crashes are usually between the From Road and Towards Road

Example below could also be described as:

Road On - **Capital Blvd**

From Road - **Green Rd**

Distance From - **600 ft**

Direction From - **West**
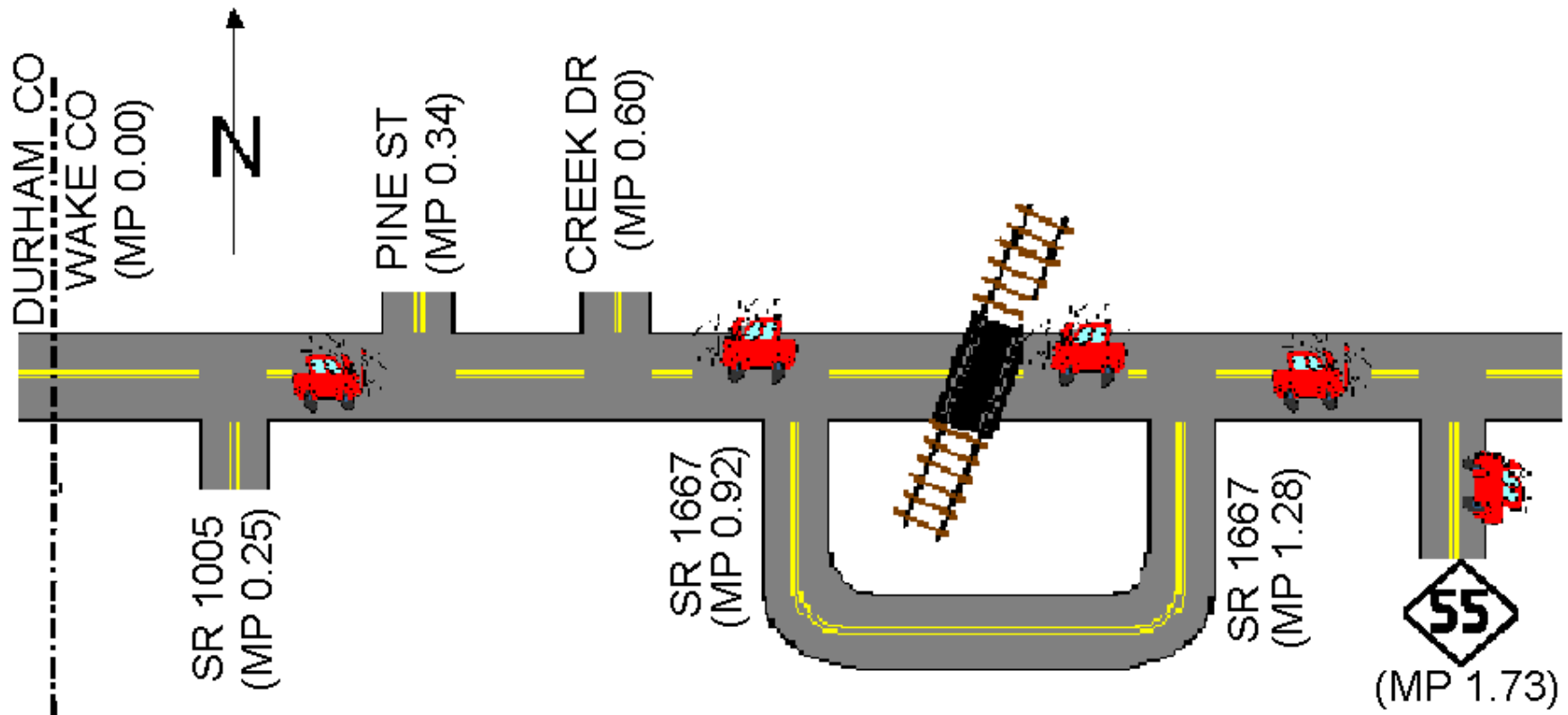
Towards Road - **Best St**
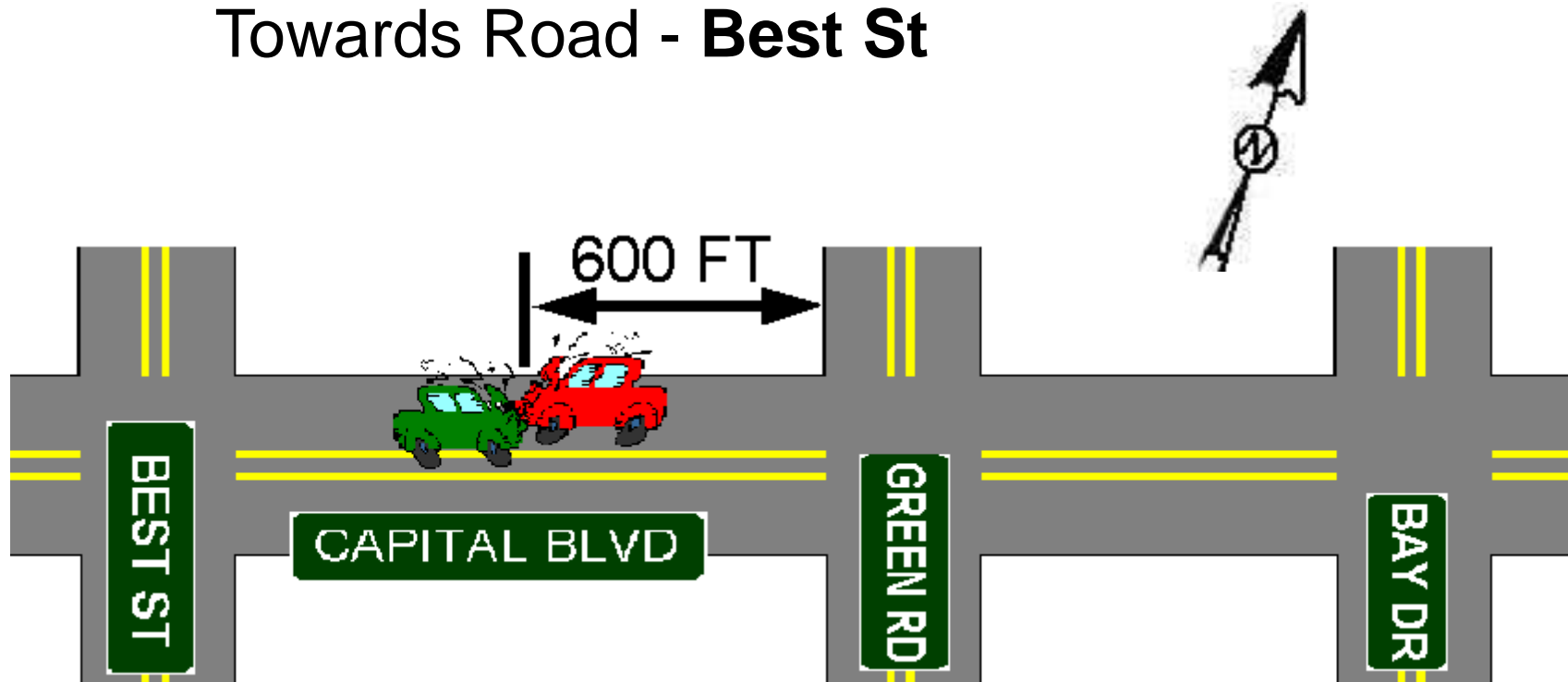
Crash Mileposting Example

- Assume Mileposted features on Capital Blvd are:
  - Best St = 1.05
  - Green Rd = 1.25
  - Bay Dr = 1.32

- The example crash would be mileposted as follows:
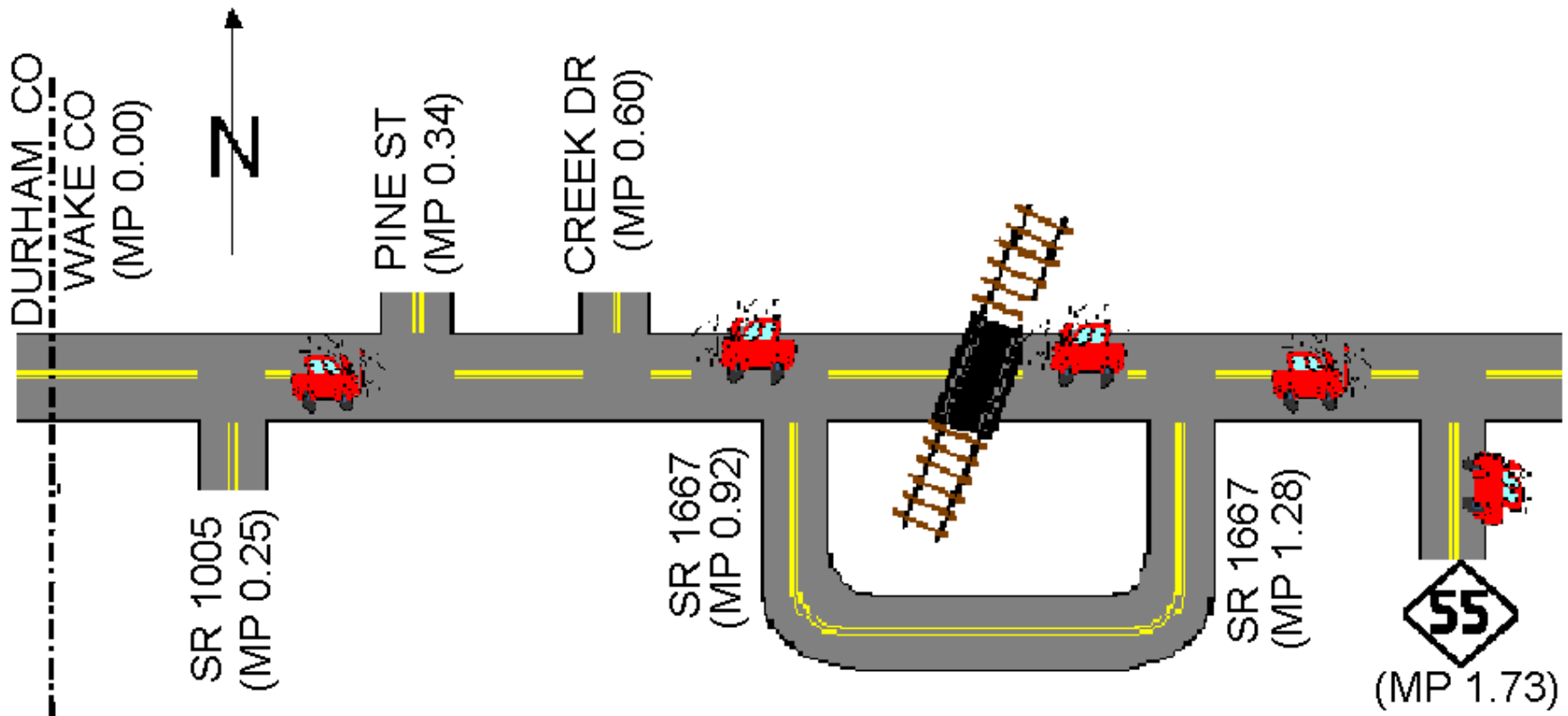 - The crash occurred 400 feet (or 0.08 miles) east of Best Street (MP 1.05), so the milepost is calculated to be 1.05 + 0.08 = 1.13
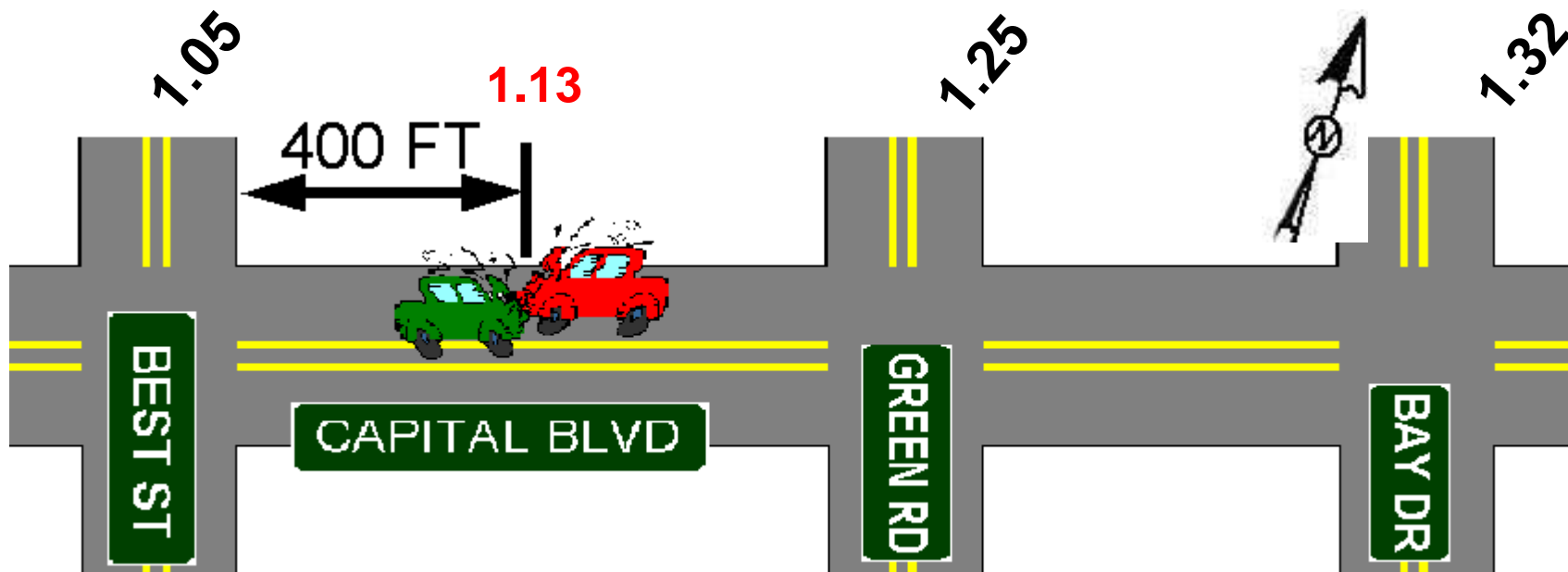
Crash Mileposting Exercise

Given the following route mileposts for SR 9999:

MP	Road	Dir to Next
0.00	Durham Co/Wake Co Line	North and East
0.25	SR 1005	North and East
0.34	Pine St	North and East
0.60	Creek Drive	North and East
0.92	SR 1667	North and East
1.28	SR 1667	North and East
1.73	NC 55	North and East

Crash Mileposting Exercise

What are the mileposts for the following crashes?

Crash	On Road	From Road	Dist/Dir From	Toward Road
A	SR 9999	SR 1005	0.02 mi. East	Pine Street
B	SR 9999	NC 55	0.08 mi. West	SR 1667
C	NC 55	SR 9999	0.01 mi. South	Jones Street
D	SR 9999	SR 1667	0.04 mi. West	SR 1667
E	SR 9999	SR 1667	0.01 mi. West	Creek Drive

What are the mileposts for the following crashes?

| Crash	On Road	From Road	Dist/Dir From	Toward Road
A	SR 9999	SR 1005	0.02 mi. East	Pine Street
B	SR 9999	NC 55	0.08 mi. West	SR 1667
C	NC 55	SR 9999	0.01 mi. South	Jones Street
D	SR 9999	SR 1667	0.04 mi. West	SR 1667
E	SR 9999	SR 1667	0.01 mi. West	Creek Drive

Ordinance Mileposting Example

Example below could be described as:

Speed Limit – **45 MPH**

On Road – **SR 9999**

Begin Reference Point – **SR 1005 (Ray Road)**

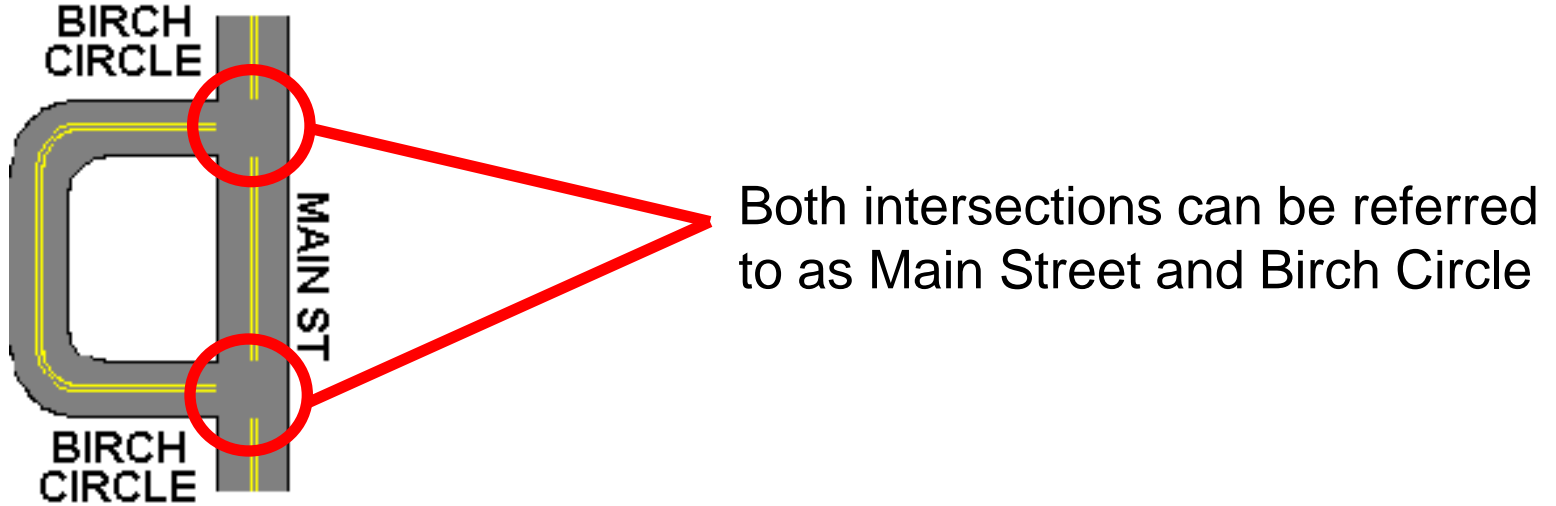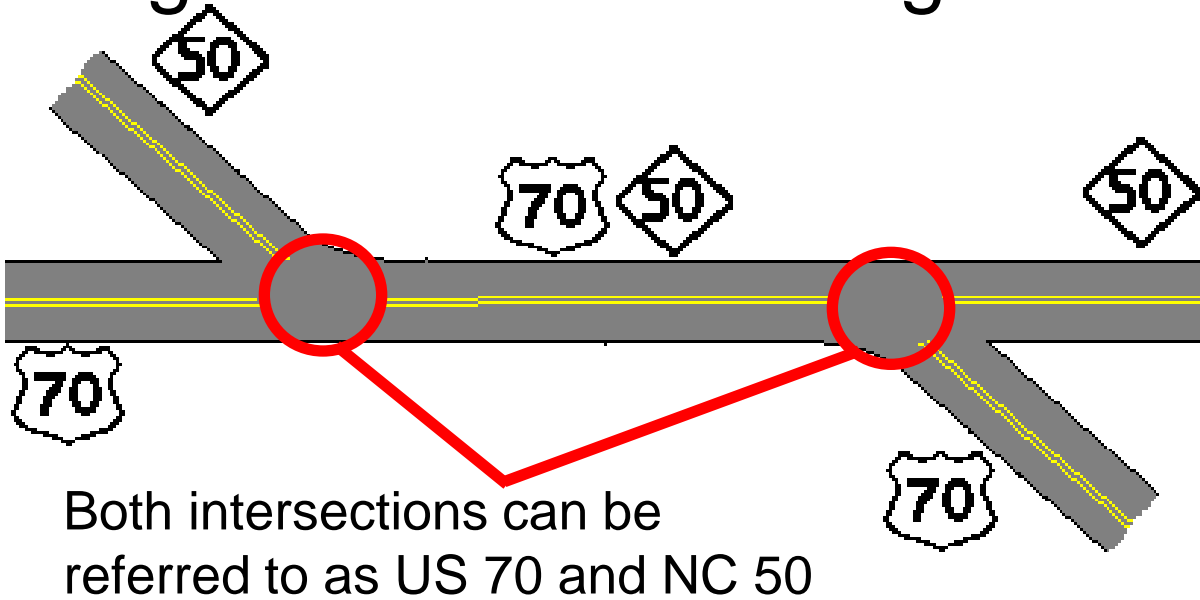End Reference Point – **0.2 mile west of Smith Street**
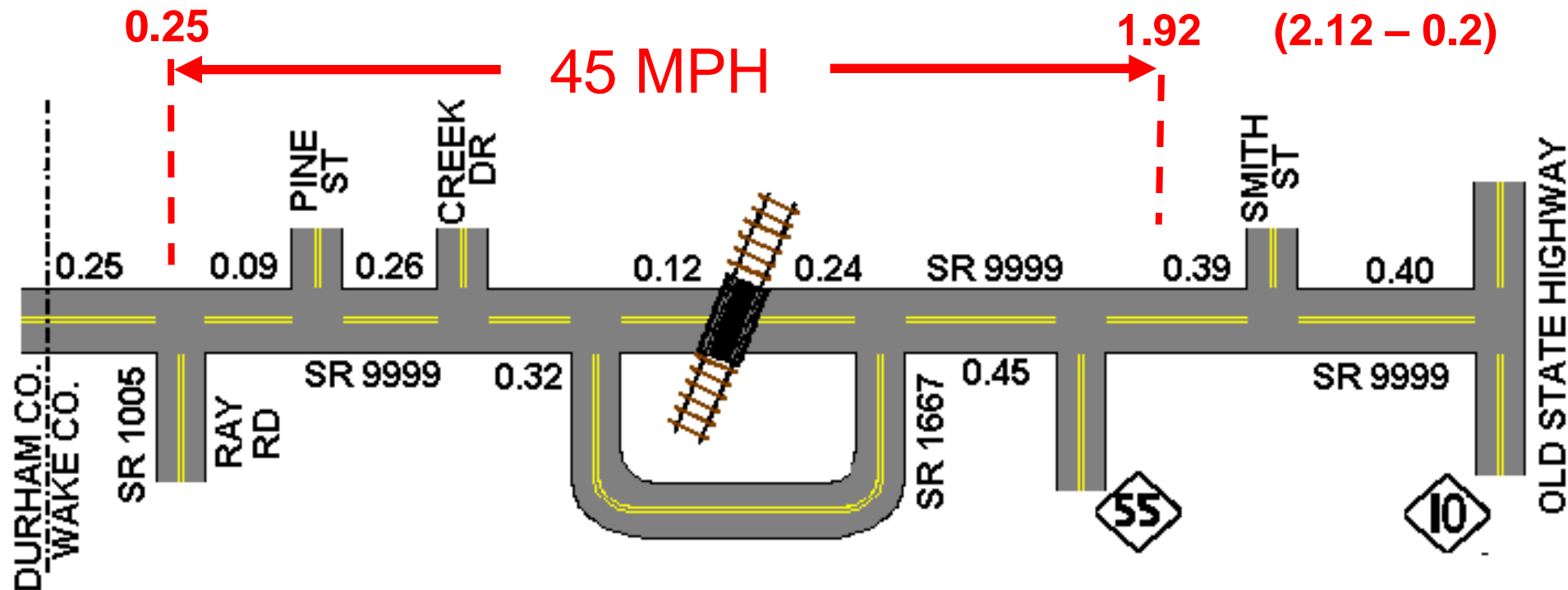
Loops

- Occur when a feature intersects a route more than once

- Create problems for locating crashes and ordinances properly, since two different locations can be specified with the same intersection combinations

- For crashes, towards roads are usually helpful in determining at which end of the loop the crash occurred

- If a crash study location includes loops, some crashes will have to be manually reviewed to determine where they actually occurred

- Ordinances will NOT milepost if referenced to loops

Loop Examples

Road that actually loops back onto another road

BIRCH CIRCLE

MAIN ST

BIRCH CIRCLE

Both intersections can be referred to as Main Street and Birch Circle

Coinciding routes that converge and diverge

50

70 50

50

70

70

Both intersections can be referred to as US 70 and NC 50
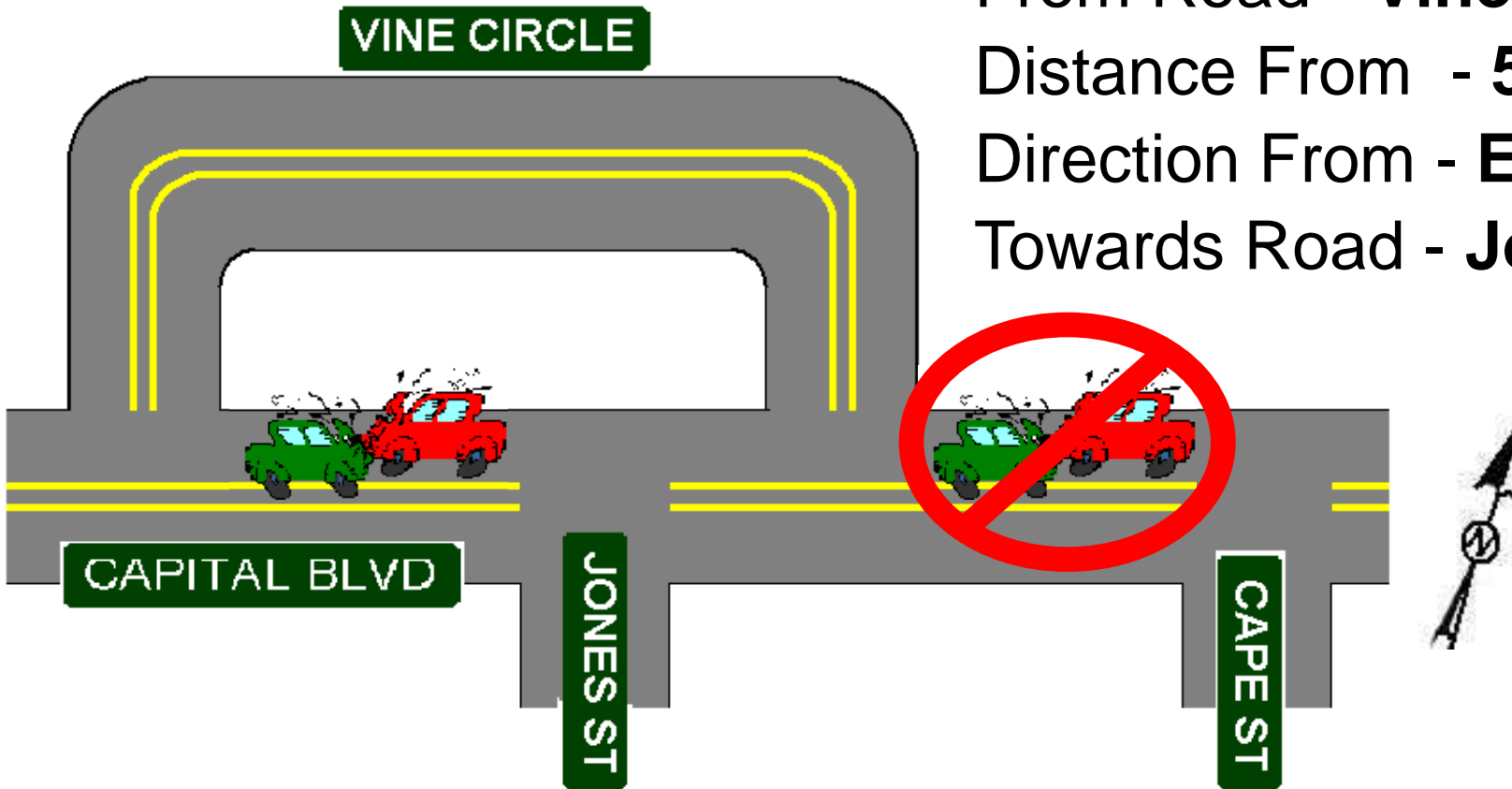
Unmileposted Crashes

Some crashes in TEAAS do not milepost because:

• The Road On is not an inventoried route

• The Road On is not mileposted

• The From Road is not a mileposted feature

- Roads being built faster than records can be updated
- Police officers reference features that are not mileposted
(i.e. McDonald's, Wal-Mart parking lot, PVA, etc.)

• The From Road is a loop

• The crash has not gone through the mileposting update program

Unmileposted Ordinances

Some ordinances in TEAAS do not milepost because:

- The On Road is not mileposted

- The Begin Reference Road and/or the End Reference Road is not a mileposted feature

- The Begin Reference Road and/or the End Reference Road is a loop

- The ordinance has not gone through the mileposting update program

Incorrect Mileposts - Crashes

Some crashes in TEAAS have incorrect mileposts because:

• Some (or all) of the features on the Road On are mileposted in the wrong direction

• The distance and direction of the crash put it outside of the Road On mileposting limits

• The crash has not gone through the mileposting update program

Incorrect Mileposts - Ordinances

Some ordinances in TEAAS have incorrect mileposts because:

• Some (or all) of the features on the On Road are mileposted in the wrong direction

• The Begin Reference Distance and/or the Begin Reference Direction are incorrect

• The End Reference Distance and/or the End Reference Direction are incorrect

• The distance and direction of the ordinance reference point (Begin and/or End) put it outside of the On Road mileposting limits

• The ordinance has not gone through the mileposting update program

Mileposting Resources

TEAAS Resources and Information
Mileposting, TEAAS Links

TEAAS Mileposting

Mileposting is the process of determining the location of features on a road, in miles, from the beginning of the road, and is a fundamental requirement of the Traffic Engineering and Accident Analysis System (TEAAS) necessary for crash studies and analyses, crash rates, and ordinance overlap checks. Mileposts are based on information in NCDOT's Linear Referencing System (LRS) maintained by the Geographic Information Systems (GIS) Unit, and are used to determine where crashes occurred, or where ordinances are located, in relation to roadway features. Features requiring mileposts are intersections and interchanges, at-grade railroad crossings, mile markers, structures (that carry the road), and political boundaries (municipal, county, and state lines).

Mileposting Links

Exclusion List (LRS sycnchronization)

Guidelines.pdf

High Order Routes Sheet.zip

List of County Information.zip

Old Secondary Road Names (SECI).pdf

Oracle Script (Non-Inventoried Route Names).txt

Oracle Script (Unmileposted Crashes and Ordinances).txt

Policies and Procedures.pdf

Route Change Mileposting Guidelines.pdf

Secondary Data Maintainer Certification.pdf

Secondary Data Maintainer Requirements.pdf

Employee Directory
Staff contacts for *Transportation Safety and Mobility*.

Local City Crash Reports

Charlotte Crash Reports

Greensboro Police Reports

Raleigh Crash Reports

Wilminton Police Reports

Winston-Salem Crash Reports

Links and Information

Bridge Document Management System (BridgeDocs)

County GIS Maps

Crash Rates

DMV CrashWeb

DMV CrashWeb Access North Carolina Identity Management Service (NCID)

DMV CrashWeb NCID New Account Instructions

https://connect.ncdot.gov/resources/safety/Pages/TEAAS%20Information.aspx