



Road Safety Audit

WV-9

Traver's Country Store to Dollar General
Berkeley County, West Virginia

Conducted on:

December 12, 2018



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Overview

A Road Safety Audit (RSA) was conducted on WV-9 through Johnsontown (between Traver's Country Store and Dollar General) in Berkeley County, West Virginia. An RSA is a formal safety review of a defined section of roadway in which most safety aspects are reviewed and evaluated. Once completed, the group's findings were documented in a report. The RSA team consisted of members representing HEPMPO, WVDOH District 5, WVDOH Traffic Engineering, Berkeley County Planning Department, FHWA-WV Division, Berkeley County Office of Homeland Security and Emergency Management, and Michael Baker International. The attending members are identified in **Table 1**.

The study area is a 0.3-mile-long section of WV-9 that spans from the Traver's Country Store to the Dollar General through Johnsontown. The study area consists of an off-set intersection as well as various vertical and horizontal curves. Many driveways to businesses, churches, and private houses are located throughout the section.

WV-9 has a 2017 Annual Average Daily Traffic (AADT) volume of 8,346 vehicles and a crash rate of 547 crashes per 100 million vehicle-miles of travel (MVMT) within the study area. This is higher than the 2013 Average Statewide Crash Rate of 300 crashes per 100MVMT (see Crash Data section chart). The highest number of intersection-related crashes occur at or near Cherry Run Road. Aggregating crashes at or near the Cherry Run and Baxter Road intersections with 2017 estimates of approach traffic volumes, the resulting intersection crash rate is 1.0 crashes per million entering vehicles (MEV). This value is not significantly high but does warrant consideration of continued monitoring and/or low-cost safety improvements.

Upon completion of the review, suggestions and opportunities for improvement to safety were developed. General observations and corresponding recommendations related to traffic operations and the roadway/roadside features can be found in the Observations and Recommendations Sections. The suggestions were divided into three categories. Those categories were:

- **Short Term** – Improvements that could be accomplished in a relatively short timeframe with existing funds.
- **Intermediate** – Improvements that would require development of plans and identification of funding source. These improvements typically would not require permitting and would be constructed within existing right of way.

- **Long Term** – Improvements that require coordination outside of the Division of Highways in addition to development of plans including permitting and/or right of way and are not currently funded.

Short Term Improvements

1. Conduct speed/sight distance study to reduce speed limit through 'village' area
2. Address vegetation trimming through regular maintenance
3. Work with property owner of Traver's Country Store to provide traffic flow guidance
4. Conduct traffic counts and consider narrowing to a 1-lane exit at Dollar General
5. Add signing and pavement marking improvements (Detailed signing and pavement marking recommendations can be found in the Pavement Markings and Signing Recommendations Section)

Intermediate Improvements

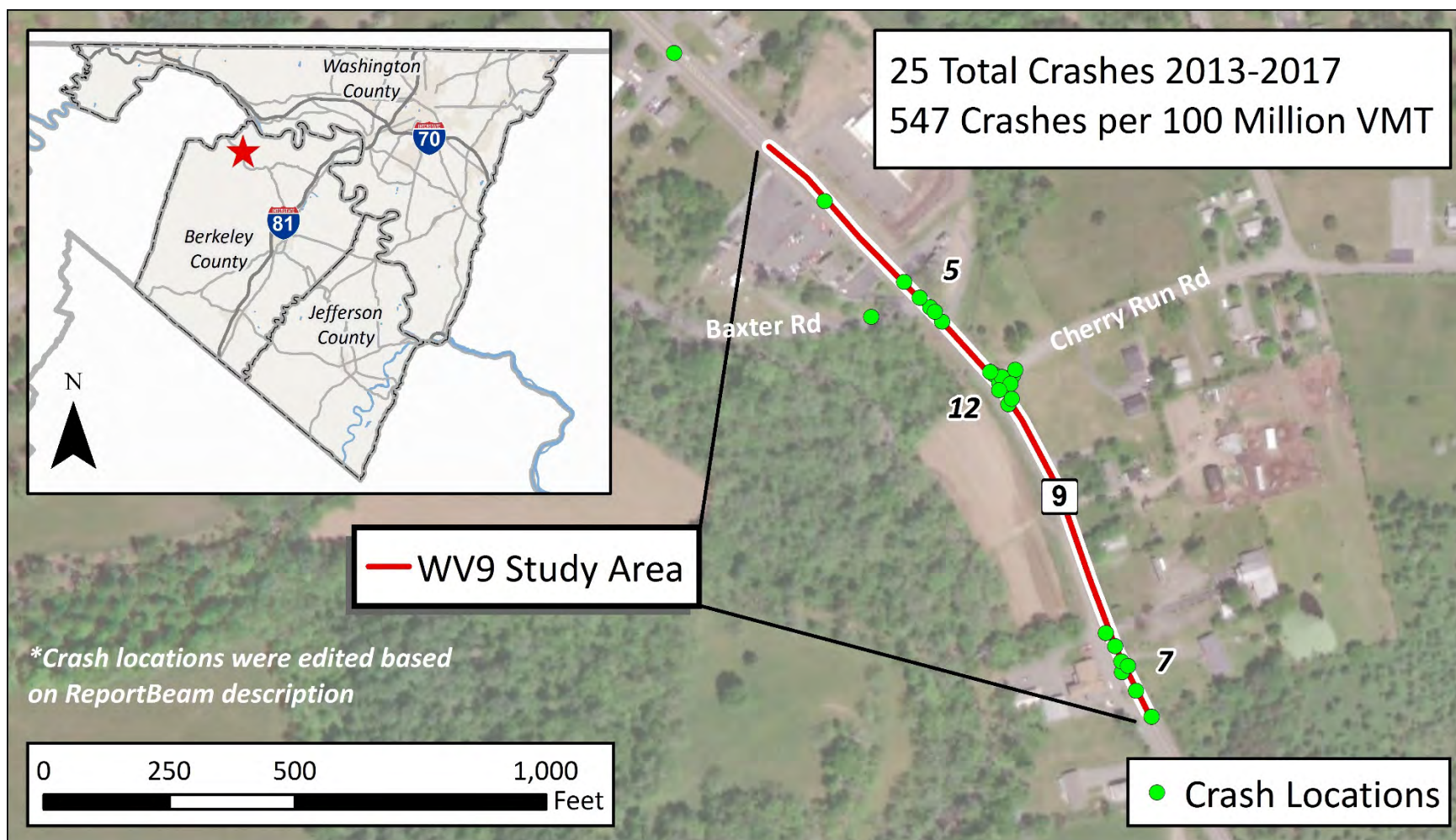
1. Coordinate uniform mailbox placement and add 'shoulder' surface (stone) for mail delivery vehicle
2. Create stone shoulders

Long Term Improvements

1. Improve typical cross section to include paved shoulders
2. Improve drainage/pipe/swale at Baxter Road intersection
3. Extend pipe and drainage ditch configuration at Cherry Run Road intersection
4. Add turn/decel lane (including a RTL heading westbound at the Cherry Run Intersection)
5. Relocate residential driveway at intersection with Baxter Road
6. Realign and reprofile roadway

Crash Data

Figure 1: WV-9 Crash Data



RSA Team

The RSA team was comprised of members representing HEPMPO, WVDOH District 5, WVDOH Traffic Engineering, Berkeley County Planning Department, FHWA-WV Division, Berkeley County Office of Homeland Security and Emergency Management (OHSEM), and Michael Baker International. The RSA team's various experience and safety concerns allowed for adequate discussion throughout the RSA process. **Table 1** lists the attendees and their organizations that were involved in the field study.

Table 1: WV-9 RSA Field Team

Name	Organization
Matt Mullenax	HEPMPO
Steve Thomas	HEPMPO
Shaneka Owens	FHWA-WV Division
Chandra Inglis-Smith	FHWA-WV Division
David Chappell	WVDOH
Ken Clohan	WVDOH District 5
Donna Hardy	WVDOH
Donald Meadows	WVDOH Operations
Ryan Satterfield	WVDOH
Matthew Skiles	WVDOH
Laura Hoffmaster	Berkeley County
Randy Lilly	Berkeley County
Rebecca Christman	Michael Baker International
Jim Frazier	Michael Baker International
Gary Greening	Michael Baker International
Dan Szekeres	Michael Baker International

Observations and Recommendations: Traffic Operations

During the field visit, the Audit team walked the study location while taking photographs and documenting general traffic observations related to operating speeds, traffic volumes, intersections, driveways, and the traffic mix. Recommendations were suggested based upon the general observations and issues. Each issue observed during the field visit is identified with further detail within this section. **Table 2** indicates the observations, the corresponding recommendations, and the link to a photo illustrating the specific issue related to traffic operations.

Table 2: Observations and Recommendations Related to Traffic Operations

Traffic Operation	Observations	Recommendations	Link to Issue
Operating Speeds	The general perception is that vehicles cresting hills too fast for available sight distance	<ul style="list-style-type: none"> Conduct speed study to reduce speed limit through 'village' area Advance signing Realign and reprofile roadway Add turn/decel lanes Improve typical cross section to include paved shoulders 	1.1
	Slow vehicles entering and exiting offset intersection of Baxter Road and Cherry Run Road create a safety concern due to sight distance constraints	<ul style="list-style-type: none"> Conduct speed study to reduce speed limit Advance intersection signing Add turn/decel lanes Improve typical cross section to include paved shoulders Realign and reprofile roadway 	1.2
Volumes	Constant/steady flow of traffic through study area. Not notably light and not notably congested	N/A	Not notably congested
Intersections	Sight distance issue at Baxter Road intersection due to signs, vegetation and hedge	<ul style="list-style-type: none"> Relocate private advertising and directional signs Maintain vegetation overgrowth 	2.1
	Evidence of vehicles over-running pavement edges while entering and exiting Cherry Run Road intersection	<ul style="list-style-type: none"> Revise pavement markings Consider geometric improvements 	2.2
	Slow vehicles entering and exiting offset intersection of Baxter Road and Cherry Run Road create a safety concern due to sight distance constraints	<ul style="list-style-type: none"> Advanced intersection signing Add turn/decel lanes Improve typical cross section to include paved shoulders 	2.3



Traffic Operation	Observations	Recommendations	Link to Issue
Driveways	Driveway/parking area for Traver's Country Store is heavily utilized and unchanneled	<ul style="list-style-type: none"> Work with property owner to provide traffic flow guidance Realign and reprofile roadway thereby providing additional circulation/parking area in front of business 	3.1
	Exiting/entering from southern end of unchanneled parking area has sight distance constraints due to vertical curve/hill on WV-9	<ul style="list-style-type: none"> Work with property owner to provide traffic flow guidance 	3.2
	Driveway to 'Open Arms Ministry' has created a gravel/mud decel lane/large turning radius	<ul style="list-style-type: none"> Create stone shoulders Improve typical cross section to include paved shoulders 	3.3
	Residential driveway located in radius of Baxter Road Intersection	<ul style="list-style-type: none"> Relocate residential driveway 	3.4
	Driveway to Dollar General has two exit lanes which may create mutual sight distance obstruction when used concurrently	<ul style="list-style-type: none"> Conduct traffic counts and consider revising pavement markings to a 1-lane exit 	3.5
	Driveway to 'Country Side Auto Sales' has sight distance constraint due to vertical curve/hill	<ul style="list-style-type: none"> Improve typical cross section to include paved shoulders Realign and reprofile roadway 	3.6
	Remainder of driveways are low volume, residential, predominantly gravel, with no specific/unique noted issues	N/A	Remainder of driveways have no noted issues
Traffic Mix	A dirt pedestrian path was worn in from south side of Dollar General parking lot to adjacent property roadside area – No other evidence of pedestrian roadside activity	N/A	No noted pedestrian issues
	No bicycle traffic noted	N/A	No bicycle traffic noted
	Anecdotal evidence of school bus stop at property north of Cherry Run Road/Opposite from Baxter Road intersection with concern for stopped vehicles and sight distance of high-speed approaching vehicles expressed.	<p>N/A</p> <p>(A video of the area indicates that there is no longer a bus stop at that location)</p>	No bus stop noted
	No unusual heavy vehicle percentage noted	N/A	No unusual heavy vehicle traffic

Issue 1: Operating Speeds

1.1 Vehicles Cresting Hills Too Fast

Observations

The general perception is that vehicles are cresting hills too fast for available sight distance.

Based on crash data from 2013 to 2017, 30% of the reported crashes within the study area occurred while cresting the hill near Traver's Country Store. 75% of which occurred during dry conditions

Suggestions

Short-term

- Conduct speed study to reduce speed limit through 'village' area
- Advanced signing

Long-term

- Realign and reprofile roadway
- Add turn/decel lanes
- Improve typical cross section to include paved shoulders



1.2 Slow Vehicles Entering and Exiting

Observations

Slow vehicles entering and exiting offset intersection of Baxter Road and Cherry Run Road create a safety concern due to sight distance constraints

Based on crash data from 2013 to 2017, 65% of the reported crashes along the corridor occurred in the vicinity of the offset intersection

Suggestions

Short-term

- Conduct speed study to reduce speed limit through 'village' area
- Advanced intersection signing

Long-term

- Add turn/decel lanes
- Improve typical cross section to include paved shoulders
- Realign and reprofile roadway



Issue 2: Intersections

2.1 Baxter Road Intersection

Observations

Sight distance issue at Baxter Road intersection due to signs, vegetation and hedge

Based on crash data from 2013 to 2017, 23% of the crashes along the corridor were angle crashes, 86% of which occurred in dry conditions.

Suggestions

Short-term

- Relocate private advertising and directional signs
- Maintain vegetation overgrowth



2.2 Cherry Run Road Intersection

Observations

Evidence of vehicles over-running pavement edges while entering and exiting Cherry Run Road intersections

Picture shows the NW corner of the Cherry Run Road/WV-9 intersection

Suggestions

Short-term

- Revise pavement markings

Long-term

- Consider geometric improvements



2.3 Offset Intersection of Baxter Road and Cherry Run Road

Observations

Slow vehicles entering and exiting offset intersection of Baxter Road and Cherry Run Road create a safety concern due to sight distance constraints.

Based on crash data from 2013 to 2017, 65% of the reported crashes along the corridor occurred in the vicinity of the offset intersection

Suggestions

Short-term

- Advance intersection signing

Long-term

- Add turn/decel lanes
- Improve typical cross section to include paved shoulders



Issue 3: Driveways

3.1 Driveway/Parking Area for Traver's Country Store

Observations

Driveway/parking area for Traver's Country Store is heavily utilized and unchanneled

Photo of Traver's Country Store parking lot, facing westbound WV-9

Suggestions

Short-term

- Work with property owner to provide traffic flow guidance

Long-term

- Realign and reprofile roadway thereby providing additional circulation/parking area in front of business



3.2 Exiting/Entering from Unchanneled Parking Area

Observations

Exiting/entering from southern end of unchanneled parking area has sight distance constraints due to vertical curve/hill on WV-9

Photo of Traver's Country Store parking lot, facing eastbound WV-9

Suggestions

Short-term

- Work with property owner to provide traffic flow guidance



3.3 Open Arms Ministry Driveway

Observations

Driveway near 'Open Arms Ministry' has created a gravel/mud decel lane/large turning radius

Picture facing westbound WV-9 at 'Open Arms Ministry' driveway prior to the Cherry Run Road intersection

Suggestions

Intermediate-term

- Create stone shoulders

Long-term

- Improve typical cross section to include paved shoulders



3.4 Residential Driveway in Radius of Baxter Road Intersection

Observations

Residential driveway located in radius of Baxter Road intersection

Suggestions

Long-term

- Relocate residential driveway



3.5 Driveway to Dollar General

Observations

Driveway to Dollar General has two exit lanes which may create mutual sight distance obstruction when used concurrently

Suggestions

Short-term

- Conduct traffic counts and consider revising pavement markings to a 1-lane exit



3.6 Country Side Auto Sales Driveway

Observations

Driveway to 'Country Side Auto Sales' has sight distance constraint due to vertical curve/hill

Suggestions

Long-term

- Improve typical cross section to include paved shoulders
- Realign and reprofile roadway



Observations and Recommendations: Roadway/ Roadside Features

During the field visit, the Audit team walked the study location while taking photographs and documenting the general roadway and roadside features. Recommendations are suggested based upon the general observations and issues. Each issue observed during the field visit is identified with further detail within this section. **Table 3** indicates the observations, the corresponding recommendations, and the link to a photo illustrating the specific issue related to the roadway and roadside features.

Table 3: Observations and Recommendations Related to Roadway/Roadside Features

Roadway/ Roadside Features	Observations	Recommendations	Link to Issue
General Roadway Features	Study area located between two vertical curves (hills) with sight distance constraints	<ul style="list-style-type: none"> Add advance signing Speed and sight distance study to reduce speed limit Realign and reprofile roadway 	1.1
	Two 12' lanes with no/minimal (1'-4') shoulders	<ul style="list-style-type: none"> Improve typical cross section to include paved shoulders 	1.2
Roadside Features	Drainage issues at Baxter Run Road intersection	<ul style="list-style-type: none"> Drainage/pipe/swale improvements Relocate residential driveway 	2.1
	A few mailboxes close to roadway edge – causing mail delivery vehicle to stop in roadway for mail deliveries. Other mailboxes with evidence of dirt/mud mail truck tire tracks off pavement edge	<ul style="list-style-type: none"> Coordinate uniform mailbox placement and add 'shoulder' surface (stone) for mail delivery vehicle Improve typical cross section to include paved shoulders 	2.2
	Evidence of many crashes (vehicle parts/crash debris along roadside) throughout the study section	<ul style="list-style-type: none"> Implement various safety improvement recommendations as noted here-in 	2.3
	Guiderail along roadway at Cherry Run Road intersection is missing object markers at all ends except one. It also has no delineators	<ul style="list-style-type: none"> Install object markers Install delineators 	2.4
	Guiderail end facing Cherry Run Road approach detached from supports (evidence of crash or over-running)	<ul style="list-style-type: none"> Install delineators Revise pavement markings Geometric improvements at intersection 	2.5
	Vegetation in close proximity to roadway along creek (tributary) is not maintained. Anecdotal evidence suggests this makes a sight distance obstruction in growing season.	<ul style="list-style-type: none"> Address vegetation trimming through regular maintenance 	2.6

Roadway/ Roadside Features	Observations	Recommendations	Link to Issue
	Drainage pipe and swale at Cherry Run Road intersection at very edge of pavement. Unprotected pavement edge shows evidence of vehicle scraping	<ul style="list-style-type: none"> • Add maintenance markers/delineators • Revise pavement markings • Extend pipe and drainage ditch configuration and install shoulder 	2.7

Issue 1: General Roadway Features

1.1	Sight Distance Constraints
Observations	
Study area located between two vertical curves (hills) with sight distance constraints	
The picture shows eastbound WV-9 as it approaches the study area	
Suggestions	
<p><i>Short-term</i></p> <ul style="list-style-type: none"> • Add advanced intersection signing • Speed and sight distance study to reduce speed limit <p><i>Long-term</i></p> <ul style="list-style-type: none"> • Realign and reprofile roadway 	



1.2 No/Minimal (1'-4') Shoulders

Observations

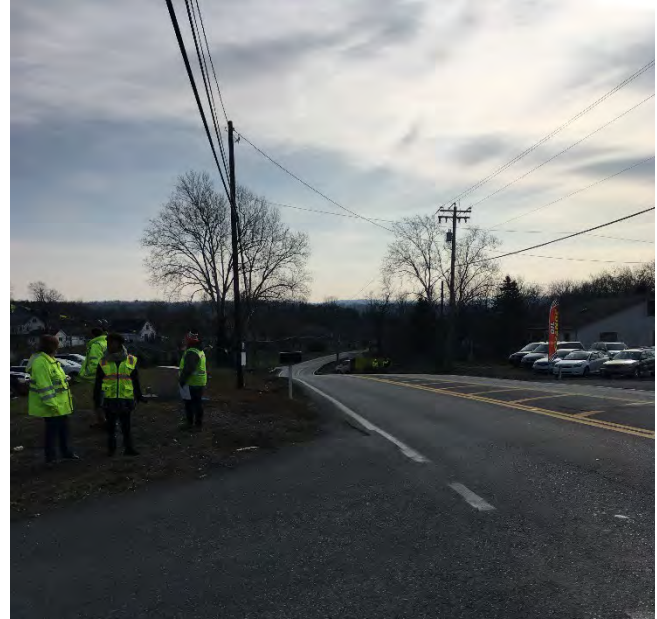
Two 12' lanes with no/minimal (1'-4') shoulders

Based on crash data from 2013 to 2017, 30% of the reported crashes within the study section were single vehicle, sideswipe, or head on crashes. 75% of the single vehicle crashes hit a fixed object (pole, tree, guardrail, embankment)

Suggestions

Long-term

- Improve typical cross section to include paved shoulders



Issue 2: Roadside Features

2.1 Drainage Issues at Baxter Run Road Intersection

Observations

Drainage issues at Baxter Run Road intersection

Picture shows drainage along WV-9, west of the Baxter Run Road intersection

Suggestions

Long-term

- Drainage/pipe/swale improvements
- Relocate residential driveway



2.2 Mailboxes Close to Roadway Edge

Observations

A few mailboxes are close to the roadway edge – causing mail delivery vehicle to stop in the roadway for mail deliveries. Other mailboxes have evidence of dirt/mud mail truck tire tracks off of the pavement edge.

Suggestions

Intermediate-term

- Coordinate uniform mailbox placement and add 'shoulder' surface (stone) for mail delivery vehicle

Long-term

- Improve typical cross section to include paved shoulders



2.3 Evidence of Crashes

Observations

Evidence of many crashes (vehicle parts/crash debris along roadside) throughout the study section

The corridor crash rate for this section of roadway is 547 crashes per 100 million VMT. Picture shows eastbound WV-9 just prior to Traver's Country Store parking lot

Suggestions

Various-term

Implement various safety improvements recommendations as noted here-in



2.4 Missing Guardrail Object Markers

Observations

Guardrail along roadway at Cherry Run Road intersection is missing object markers at all ends except one. It also has no delineators

Guardrail pictured is at the Cherry Run Road intersection. Additional evidence of cars scraping against guardrail

Suggestions

Short-term

- Install object markers
- Install delineators



2.5 Guardrail at Cherry Run Road

Observations

Guardrail end facing Cherry Run Road approach detached from supports

Evidence of crash or over-running. Picture shows guardrail along NW corner of the Cherry Run Road/WV-9 intersection.

Suggestions

Short-term

- Install delineators
- Revise pavement markings

Long-term

- Geometric improvements at intersection



2.6 Vegetation in Close Proximity to

Observations

Vegetation in close proximity to roadway along creek (tributary) is not maintained. Anecdotal evidence suggests this makes a sight distance obstruction for Baxter Rd in growing season.

Suggestions

Short-term

Address vegetation trimming through regular maintenance



2.7 Drainage Pipe and Swale at Cherry Run Road Intersection

Observations

Drainage pipe and swale at Cherry Run Road intersection at very edge of pavement. Unprotected pavement edge shows evidence of vehicle scraping

Picture shows pavement edge of NE corner of the Cherry Run Road/WV-9 intersection.

Suggestions

Short-term

- Add maintenance markers/delineators
- Revise pavement markings

Long-term

- Extend pipe and drainage ditch configuration and install shoulders



Pavement Markings and Signing Recommendations

Signing and pavement marking improvements were recommended following the field visit and analysis of crash history. Generally, signing and pavement markings are suggested to be added throughout the WV-9 study area to lower the speed of drivers by creating a 'village' atmosphere. Additional delineation and warning signs are recommended to advise drivers of various, unique, elements of the section. **Table 4** and the following figures indicate the specific recommended signing and pavement markings for the WV-9 study section.

Table 4: WV-9 Signing and Pavement Marking Recommendations

Signing and Pavement Marking Recommendations	Figure Reference
<ul style="list-style-type: none"> Conduct speed study to reduce speed limit through study section due to sight distance constraints approaching offset intersection and village-like nature of study area 	A.
<ul style="list-style-type: none"> Add 'Advanced Speed Limit Reduction' signs (W3-5) 	B.
<ul style="list-style-type: none"> Add 'Speed Limit' signs (R2-1) 	C.
<ul style="list-style-type: none"> Add 'Offset Side Roads' signs (W2-7R) with advisory special caution plaque and distance plaque (W15-2aP) 	D.
<ul style="list-style-type: none"> Add 'Johnsontown Unincorporated' signs (I-2) to contribute to 'village' atmosphere of section/area 	E.
<ul style="list-style-type: none"> Add object markers (OM3-L/R) at guiderail ends 	F.
<ul style="list-style-type: none"> Add 'Large Double Arrow' sign (W1-7) at Cherry Run Road T-intersection 	G.
<ul style="list-style-type: none"> Add maintenance markers (flexible delineator posts) at drainage ditch drop-off at Cherry Run Road 	H.
<ul style="list-style-type: none"> Add guiderail web delineators and top delineators along all guiderail sections 	I.
<ul style="list-style-type: none"> Revise pavement markings and lane widths at Cherry Run Road approach to WV-9 	J.
<ul style="list-style-type: none"> Add speed reduction markings in advance of curves 	K.

Figure 2: Signing and Pavement Marking Recommendations through Johnsontown (Entire Study Area)



Figure 3: Signing and Pavement Marking Recommendations at WV-9 and Cherry Run Road intersection



Figure 4: Signing and Pavement Marking Recommendations at WV-9 and Cherry Run Road

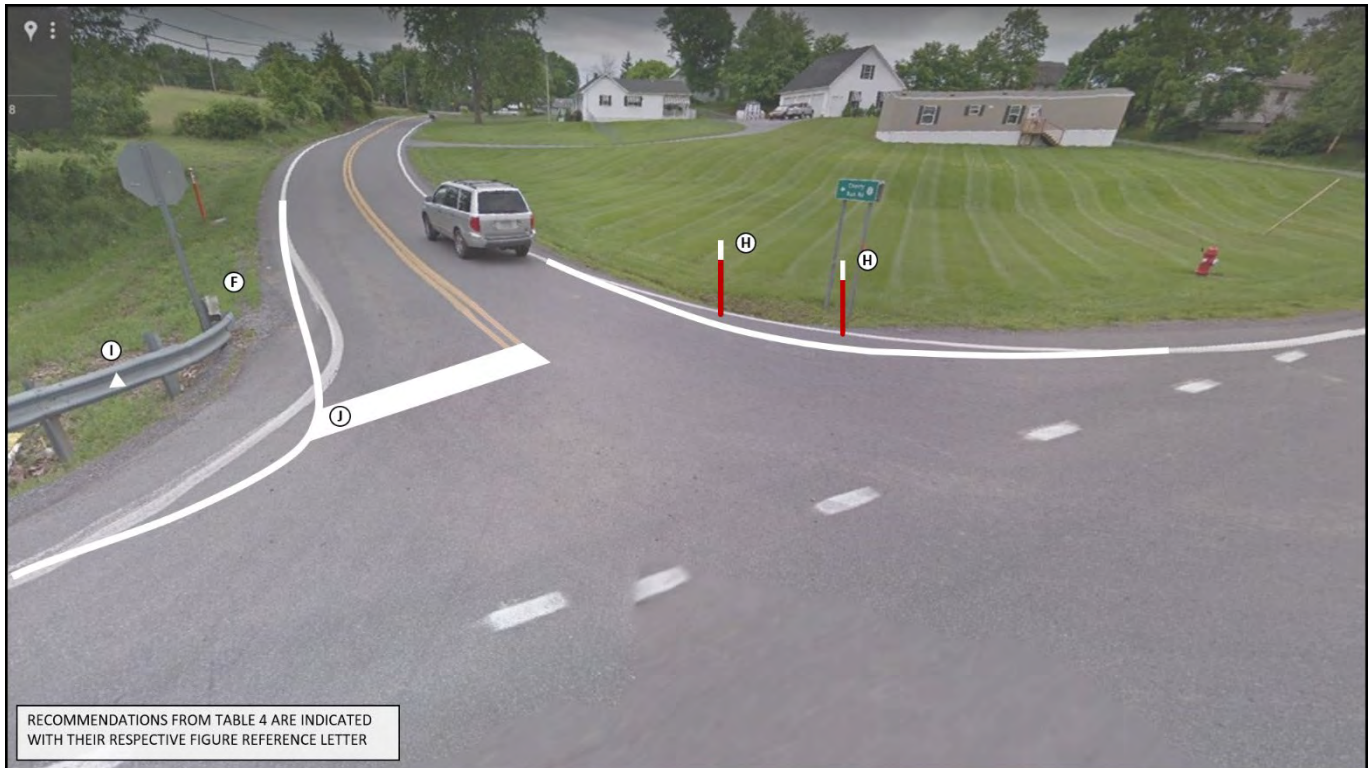


Figure 5: Signing and Pavement Marking Recommendations for Eastbound WV-9



Figure 6: Signing and Pavement Marking Recommendations for Westbound WV-9

