Introduction

With the adoption of the Moving Ahead for Progress in the 21st Century Act (MAP-21), the federal government re-affirmed safety and security as independent planning factors for consideration in long-range transportation plans. During the planning process for the *KYOVA 2040 Metropolitan Transportation Plan*, safety and security—for people and freight—of the region's transportation system was consistently cited as a critical area of consideration. The *KYOVA 2040 MTP* includes an evaluation of transportation safety and security for each of the modes of the plan. This chapter of the *KYOVA 2040 MTP* focuses on safety and security as it relates to the critical nodes—intersections, viaducts, and bridges—of the roadway network. It is emphasized that the different modes that complete the region's transportation network typically intersect, and often conflict, at these points. Recommendations identified in this chapter can be considered with those in **Chapter 3** to paint a comprehensive picture of roadway needs in the KYOVA region.

Safety and Transportation Planning

According to the National Highway Traffic Safety Administration, West Virginia ranked fourth in the nation in fatalities per 100 million vehicle miles traveled in 2010 (see **Table 4.1**). And while the rate has decreased 21% since 1994, the improvement is among the lowest in the nation. Ohio fared much better in 2010, with a rate of 0.97 fatalities per 100 million vehicle miles traveled. The geography of West Virginia makes safety on the roadways an ongoing concern. This statement is true in the KYOVA region, where many roads must be designed to account for steep slopes and blind curves. As a result, it is essential to look at potential solutions for mitigating safety issues throughout the region, particularly hotspot locations identified by the stakeholders and the public.

Security and Transportation Planning

Emphasizing security during the transportation planning process helps identify and implement ways to improve security and mitigate imminent threats. The *KYOVA 2040 MTP* is an important part of the region's attempt to deliver secure transportation for people and goods. The MPO has the advantage of considering security at a regional level and across state boundaries, which is a logical first step to ensuring protection at the local level. While general strategies can be formulated at the regional level and the MPO can create multimodal recommendations that enhance security, implementation for many strategies may be the responsibility of local organizations. In the KYOVA area, key security considerations include evacuation routes for communities potentially affected by flooding, failure of sensitive facilities (including many of the industrial sites within the KYOVA area), protection and maintenance of bridges, and the safeguard of highway transit and freight operations. The security element later in this chapter provides added detail to these considerations.

Table 4.1 – Fatalities per 100 Million Vehicle Miles Traveled

Rank	State	2010	% Change (1994-2010)
1	Montana	1.69	-24%
2	Arkansas	1.68	-31%
3	South Carolina	1.65	-27%
4	**West Virginia**	**1.64**	**-21%**
5	Wyoming	1.62	-25%
6	Mississippi	1.61	-42%
7	Kentucky	1.58	-19%
8	South Dakota	1.58	-22%
9	Louisiana	1.56	-31%
10	Tennessee	1.46	-35%
37	**Ohio**	**0.97**	**-31%**

Source: National Highway Traffic Safety Administration

Public Perception

Through the various outreach events held in support of the *KYOVA 2040 MTP*, residents and stakeholders had many opportunities to describe issues and concerns related to safety and security. The project team gathered numerous viewpoints related to corridors and intersections. This feedback helped guide the decision-making process. Specific comments included:

- We need better rail crossings in downtown Huntington;
- Signals are needed where US 52 crosses under Marion Pike in Coal Grove;
- I believe we need to make all the viaducts in Huntington more people (and pedestrian) friendly – especially 8th Street – it's the worst and possibly busiest; and
- Speed enforcement along I-64 near the Kentucky border is lacking.

Several comments touched on the need for better signal coordination throughout the study area. Multiple workshop participants proposed improving access to Prichard, either by improving US 52 or by providing a new connection from Prichard to the east or northeast, possibly connecting directly with Barboursville.

Several intersections were identified as feeling unsafe including the intersection of Midland Trail (US 60) and Washington Boulevard and the intersection of 5th Avenue (US 60) and 31st Street (US 60). There were also many comments regarding the draining of the viaducts during major rain events. Participants noted that pumping and utility systems need to be improved to support draining these during such events. Members of the public also commented on the availability of parking in downtown Huntington. As more urban infill occurs, there is a desire to see an increase in parking supply as well.

Committed Projects

The KYOVA MPO and its communities already have begun to act on many of the issues and concerns expressed during the outreach events. As described in **Chapter 3**, the Transportation Improvement Program (TIP) is a four-year schedule of federally assisted transportation projects for the three-county region that is required under the MAP-21 legislation. The KYOVA Interstate Planning Commission revises and reissues the TIP every other year in coordination with ODOT and WVDOT. The Huntington-Ironton Area Transportation Study (HIATS) 2035 Long-Range Transportation Plan guided the development of the 2012-2015 TIP.

As mentioned in **Chapter 3**, the 2014-2017 TIP is being developed concurrently with the *KYOVA 2040 MTP*. A financial plan based on the financial resources reasonably expected to be available in the KYOVA area over the next four years is used to determine fiscal constraint. The current 2012-2015 total TIP program cost is $220 million including all federal, state, and local sources. Some projects included in the TIP are completely funded using federal money, while others are supplemented with state and local dollars. Approximately 25% of the funds are allocated to Ohio and 75% to West Virginia ($55 and $165 million, respectively). **Table 4.2** lists the relevant TIP projects (e.g. bridge, intersection, and ITS projects) from the 2014-2017 TIP.

Table 4.2 – KYOVA 2014-2017 TIP Projects

Project ID	Route/Section	Length (mile)	Location and Description	Total Cost (000's)
Lawrence County, Ohio				
10379	SR 93	N/A	Replace Bridge over Pine Creek	615.0
83280	CR 144	N/A	Charley Creek/US 52 Intersection – Realign intersection and build access road south of US 52	1,406.8
87326	SR 522	N/A	Lawrence County Bridge Repair	110.0
91413	SR 141	N/A	Replace bridge on SR 141	1,243.0
93350	SR 217	N/A	Replace deficient bridge 2.16 mi E of SR 141	583.0
Cabell County, West Virginia				
U306-60/5-1.60 00 CMAQ-0605(004)D	CR 60/5	0.08	Construct turn lane, drainage, and traffic loop at East Pea Ridge (CR 60/5) and US 60	568.0
U306-60/5-0029100 CMAQ-0605(006)D	CR 60/5	0.08	Construct turn lane, drainage, and traffic loop at East Pea Ridge (CR 60/5) and US 60	450.0
U306-64/-01 091 00	I-64	N/A	Hal Greer Boulevard – 29th Street Interchange	8,600.0
U399/-MTASB1 00 SB-11WV(004)D	US 60	N/A	Midland Trail Corridor Management Plan, various spot locations (statewide)	211,034.0
S306-64/-10.91 00 NH-0641(340)	I-64	0.04	16th Street entrance and exit ramps	6,073.0
S306-527/-2.00 00 BR-0527(007)D	WV 527	0.01	Replace 5th Street Ritter Park Bridge over Fourpole Creek	2,305.0
U306-60/-16.52 00 OCRO-0060(257)D	US 60	0.14	Construct left turn lane on US 60 at MP 16.52	300.0
Wayne County, West Virginia				
S350-152/-23.71.00 STP-0152(047)D STP-0152(048)D	WV 152	0.01	Replace Sidney Beam span	1.300.0
S350-37/-00 329 00 ACBR-0037(030)D	WV 37	1.25	Replace 3 bridges over Hurricane Creek	1,500.0

Safety Element

For safety fully to be integrated into the transportation planning process, it must be a focus at all levels of planning — from the US Department of Transportation to local neighborhoods. At the federal level, MAP-21 has established this focus. Other programs at the state and federal level target work zones, older drivers, bicyclists, and pedestrians. Through the *KYOVA 2040 MTP* process, residents highlighted safety concerns across the different travel modes.

Safety Guidelines

The following guidelines are presented to ensure safety remains a core component of transportation planning in the KYOVA region.

Engineering

The roadway recommendations presented in this plan represent a series of engineering enhancements that should improve traffic flow while increasing safety for all users. The MPO also has emphasized safety planning by incorporating a crash analysis and ranking system into the LRTP to identify high priority crash locations throughout the planning area. General engineering strategies to maximize safety include: improving highway and road design guidelines; implementing corridor-based access management strategies; identifying appropriate intersection improvements to mitigate crashes; constructing a coordinated network of on-street bicycle facilities and off-street trails; designing streets to be pedestrian-friendly; designating appropriately designed streets for truck freight; and maintaining adequate standards for railroad crossings, bridges, and viaducts.

Enforcement

During the outreach events, some attendees expressed concern for the lack of enforcement of traffic laws. Enforcement activities typically include ways to monitor and maintain the appropriate behaviors of road users (motorists, bicyclists, pedestrians, and transit users). These activities usually include law enforcement participation, task forces, and partnerships with organizations dedicated to improving safety. Safety campaigns and initiatives in West Virginia include "Click It or Ticket", "Target Red" (raising awareness of the dangers of red light and stop sign violations), "Drive Sober or Get Pulled Over", and "Over the Limit, Under Arrest". In Ohio, the campaigns include "Click It or Ticket", "Drive Sober or Get Pulled Over", and "Ride SMART/Share the Road". The MPO can partner with state agencies and local governments to support enforcement programs in the planning area.

Education

Education programs can target all age groups and skill levels to encourage the safe use of the transportation system. These programs can be incorporated into activities at schools, churches, task forces, local organizations, and government-sponsored events. Often, education campaigns work in concert with enforcement. Reaching children through education programs is an important way to support lifelong habits of safely using the transportation system. Safe Routes to School programs educate children on the proper use of sidewalks, bicycle facilities, and roadways. Finally, education programs can enhance the attitude toward safety.

Emergency Services

Ensuring safe access to homes and businesses by emergency personnel is a critical element of safety within the transportation system. When the public speaks about safety, they often mention the need for ambulances and fire trucks to respond quickly to incidents. For crashes, timely response is essential to reducing the severity of injuries. The roadway recommendations presented in the *KYOVA 2040 MTP* will have a positive impact on emergency response times. These improvements will encourage an interconnected network of streets that provides route choices and reduced congestion. In addition, improving the signal system and ITS deployment will improve safety.

Traffic Safety and Crash History

Examining traffic patterns and understanding the region's crash history are an important part of identifying where intersection improvements can benefit both motorists and the community as a whole. A high-level analysis of crash trends at the county-level (using data collected by the National Highway Traffic Safety Administration) was combined with discussions with KYOVA staff and local stakeholders to identify locations for safety countermeasures or improvements. This section of the Safety and Security Element reviews in detial some of the worst-performing intersections in the region and presents recommendations for potential countermeasures.

Statewide and Countywide Traffic Fatalities

The National Highway Traffic Safety Administration (NHTSA) directs national highway safety programs and works to help prevent crashes. The NHTSA collects, processes, and distributes a variety of crash data aggregated to the state and county levels. **Table 4.3** summarizes fatality rates based on a series of categories for the three counties in the KYOVA region for a five-year period ending in 2011. The 2011 statewide rank for the three counties is provided for reference. It should be noted that the rate fluctates each year, so the ranking may not reflect the 5-year trend. In general, the fatality rates in Lawrence County are lower than its peer counties in West Virginia. Wayne County typically fares worse than Cabell County.

Table 4.3 – Fatalities per 100,000 Population

County	2007	2008	2009	2010	2011	2011 Statewide Ranking	Total Fatalities in 5-year Period
All Crashes							
Cabell County, WV	22.09	8.40	18.74	12.45	12.42	32 out of 55	71
Wayne County, WV	39.79	30.40	28.14	21.22	37.98	4 out of 55	67
Lawrence County, OH	17.53	7.98	11.17	4.81	14.40	18 out of 88	35
Crashes At an Intersection							
Cabell County, WV	5.26	2.10	3.12	1.04	2.07	13 out of 55	13
Wayne County, WV	2.34	2.34	4.69	0.00	2.37	12 out of 55	5
Lawrence County, OH	4.78	3.19	1.60	0.00	1.60	35 out of 88	7
Crashes Involving a Large Truck							
Cabell County, WV	1.05	2.10	0.00	4.15	0.00	24 out of 55	7
Wayne County, WV	4.68	0.00	4.69	4.72	2.37	18 out of 55	7
Lawrence County, OH	0.00	0.00	0.00	0.00	1.60	24 out of 88	1
Pedestrian Fatalities							
Cabell County, WV	5.26	2.10	3.12	1.04	2.07	10 out of 55	3
Wayne County, WV	4.68	0.00	0.00	2.36	2.37	9 out of 55	4
Lawrence County, OH	0.00	1.60	1.60	0.00	0.00	35 out of 88	2
Pedalcyclist Fatalities							
Cabell County, WV	0.00	0.00	0.00	0.00	0.00	N/A	0
Wayne County, WV	0.00	0.00	0.00	0.00	0.00	N/A	0
Lawrence County, OH	1.59	0.00	0.00	0.00	0.00	16 out of 88	1

Source: National Highway Traffic Safety Administration

Priority Locations

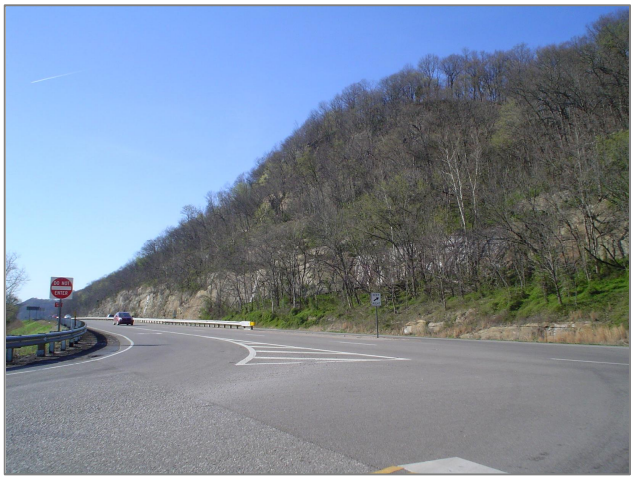
Contributing factors to high crash frequency often include intersection design, access considerations, and traffic congestion. Many locations in the region cited as having high crash frequencies also exhibited higher levels of congestion. Since this relationship exists between traffic congestion and crash frequency, recommended roadway projects in **Chapter 3** that reduce traffic congestion should be recognized as having secondary safety benefits.

A detailed field review was performed for 15 intersections identified by the project team in consultation with KYOVA staff. The field review helped confirm existing conditions and identify possible flaws in the current design of the intersection. Based on this review, a list of potential improvements such as geometric changes or enhancements to traffic control were developed. The priority intersections examined as part of the *KYOVA 2040 MTP* are:

- SR 7 (Chesapeake Bypass) and CR 15 (Buffalo Creek Road)
- US 52 and CR 120S (Burlington-Macedonia Road)
- US 52 and CR 144 (Charley Creek Road)
- US 52 and CR 276
- US 52 and CR 410 (Walmart Way)
- US 52 and CR 1 (Old US 52)
- US 52 and CR 15 (Lick Creek Road)
- 5th Avenue and 1st Street
- 7th Avenue and 1st Street
- 5th Avenue and Hal Greer Boulevard
- US 60 (31st Street) at 5th Avenue
- US 60 at 8th Avenue
- US 60 at 21st Street
- US 60 at East Pea Ridge Road
- WV 152 at WV 75

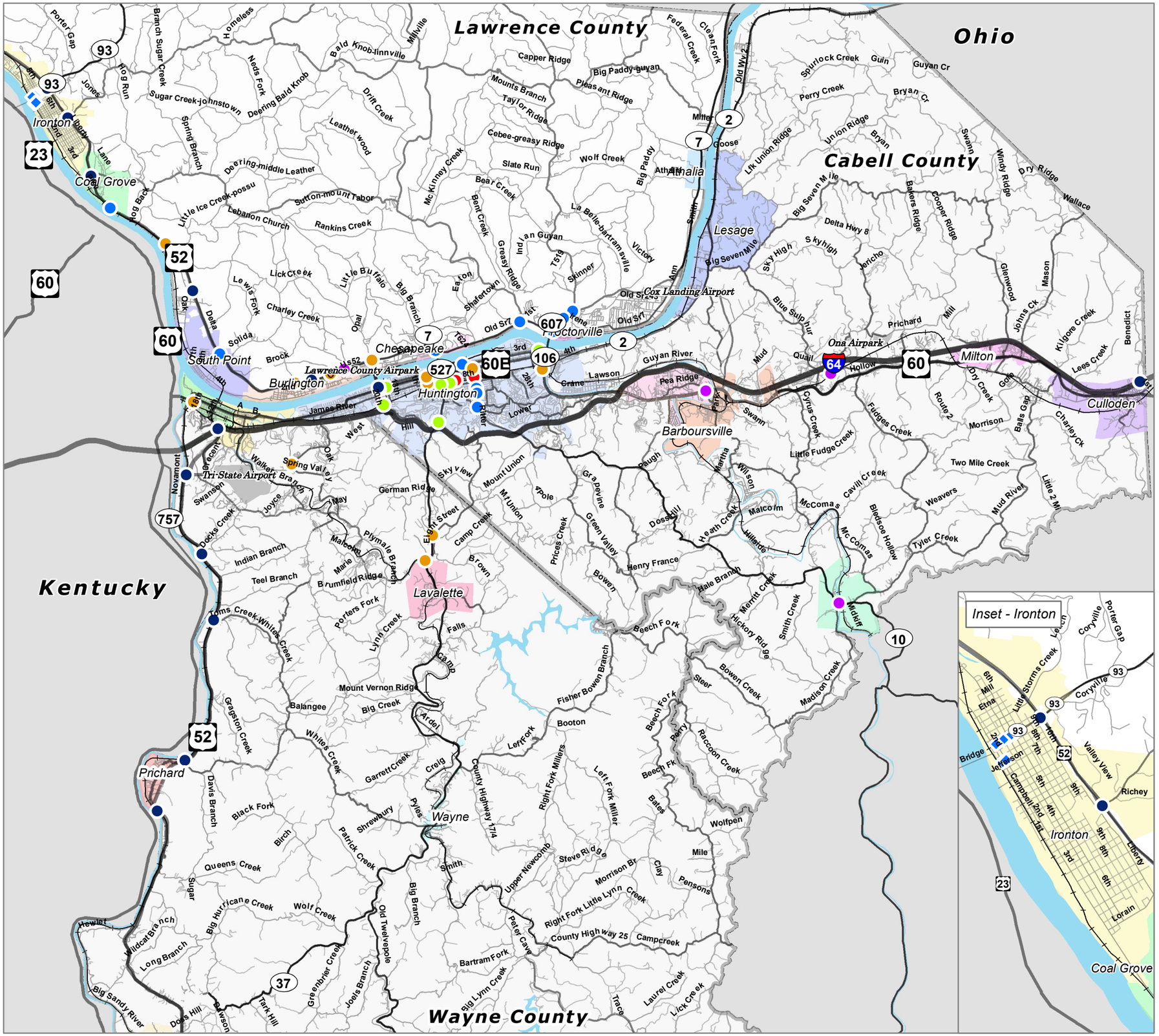
A summary of general observations and recommendations as well as a conceptual exhibit are provided for each location on the pages that follow. It should be noted that the countermeasures recommended for intersections along US 52 are intended to occur in the interim, setting the stage for the more advanced recommendations (interchanges, frontage roads) in the 2007 Traffic and Safety Study for US 52 and SR 7.

Figures 4.1 and **4.1a** show the location of the priority safety intersections as well as other intersections identified for improvement in the Traffic and Safety Study for US 52 and SR 7. The figure also highlights eight intersection beautification improvements, the committed Ironton intersection projects, and new or rehabilitated interchanges along I-64 and US 52. The new interchanges recommended on US 52 would be constructed when the highway is upgraded to a freeway. An improvement at I-64 and US 52 is aimed at improving truck operations. A new interchange is currently under study by WVDOH in cooperation with KYOVA and RIC at I-64 and Benedict Road (CR 60/21) in Culloden.



US 52 and CR 15 (Lick Creek Road)

Figure 4.1



Intersection Recommendations

- Committed Improvements
- Interchange Improvements
- Intersection Safety Improvements
- Intersection Beautification
- Intersection Operation Improvements
- Intersection Operation Improvements
  - Ironton (Committed)
- Viaduct Improvements

0 1.5 3 Miles

KYOVA INTERSTATE PLANNING COMMISSION

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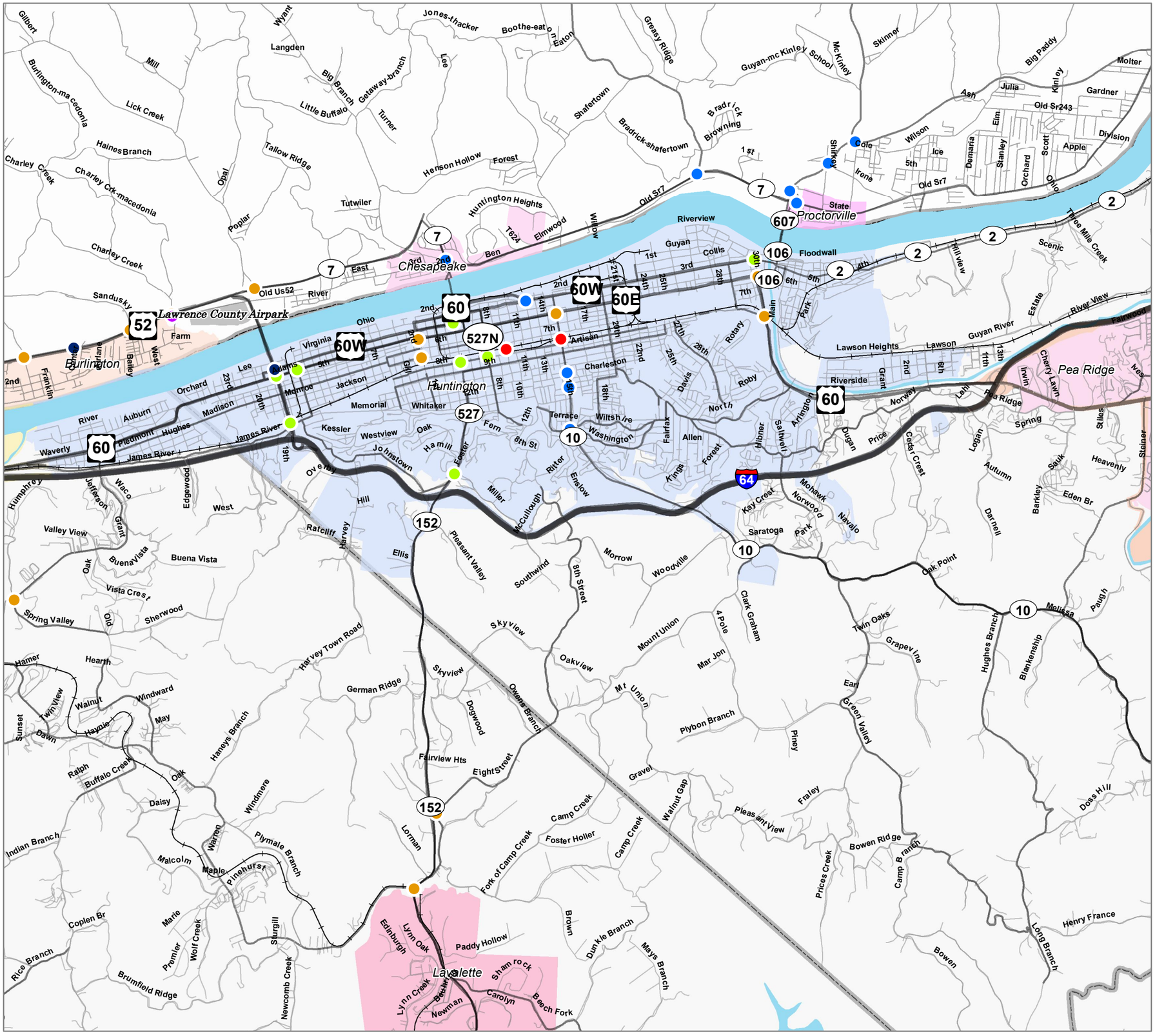
Figure 4.1a



Intersection Recommendations

- Committed Improvements
- Interchange Improvements
- Intersection Safety Improvements
- Intersection Beautification
- Intersection Operation Improvements
- Intersection Operation Improvements
  - Ironton (Committed)
- Viaduct Improvements

0 0.5 1 Miles

KYOVA INTERSTATE PLANNING COMMISSION

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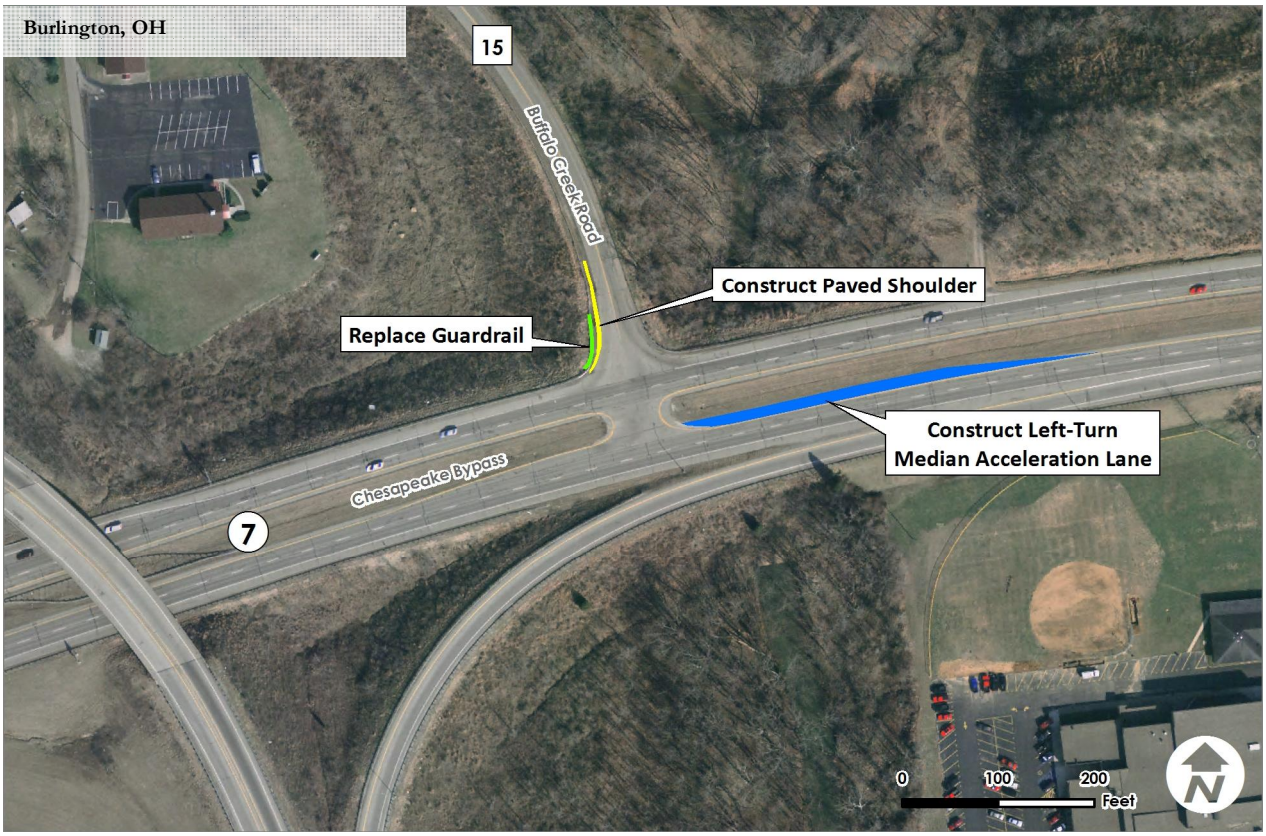
SR 7 (Chesapeake Bypass) and CR 15 (Buffalo Creek Road)

General Observations

- Guardrail in northwest quadrant is in poor condition.
- Dirt shoulder along west side of Buffalo Creek Road is in poor condition.
- Crash data reveals a high frequency of angle crashes involving left-turning vehicles struck by through vehicles on eastbound US 52.

Recommendations

- Replace guardrail in northwest quadrant
- Construct paved shoulder along west side of Buffalo Creek Road
- Improve safety:
  - **Option 1**: Construct a merge lane on eastbound US 52 for vehicles turning left from Buffalo Creek Road
  - **Option 2**: Construct a continuous green T-intersection



US 52 and CR 120S (Burlington-Macedonia Road)

General Observations

- Gap exists in paved shoulder along east side of northbound Burlington-Macedonia Road.
- Crash data reveals a high frequency of rear-end crashes along eastbound US 52 before intersection.

Recommendations

- Construct paved shoulder along east side of northbound Burlington-Macedonia Road
- Replace "Prepare to Stop When Flashing" sign with Signal Ahead sign and continuous flashers
- Improve signal visibility:
  - Install signal head retroflective backplates
  - Install red light strobes

US 52 and CR 144 (Charley Creek Road)

General Observations

- Dirt shoulder along east side of northbound Charley Creek Road is in poor condition.
- Crash data reveals a high frequency of rear-end crashes along eastbound and westbound US 52 before the intersection and a high frequency of angle crashes at intersection.

Recommendations

- Construct paved shoulder along east side of northbound Charley Creek Road
- Replace "Prepare to Stop When Flashing" signs with Signal Ahead signs and continuous flashers
- Improve signal visibility:
  - Install signal head retroflective backplates
  - Install red light strobes
- Split northbound and southbound phases on Charley Creek Road
- Install "Side-street Traffic Does Not Stop" signs on Sandusky Road

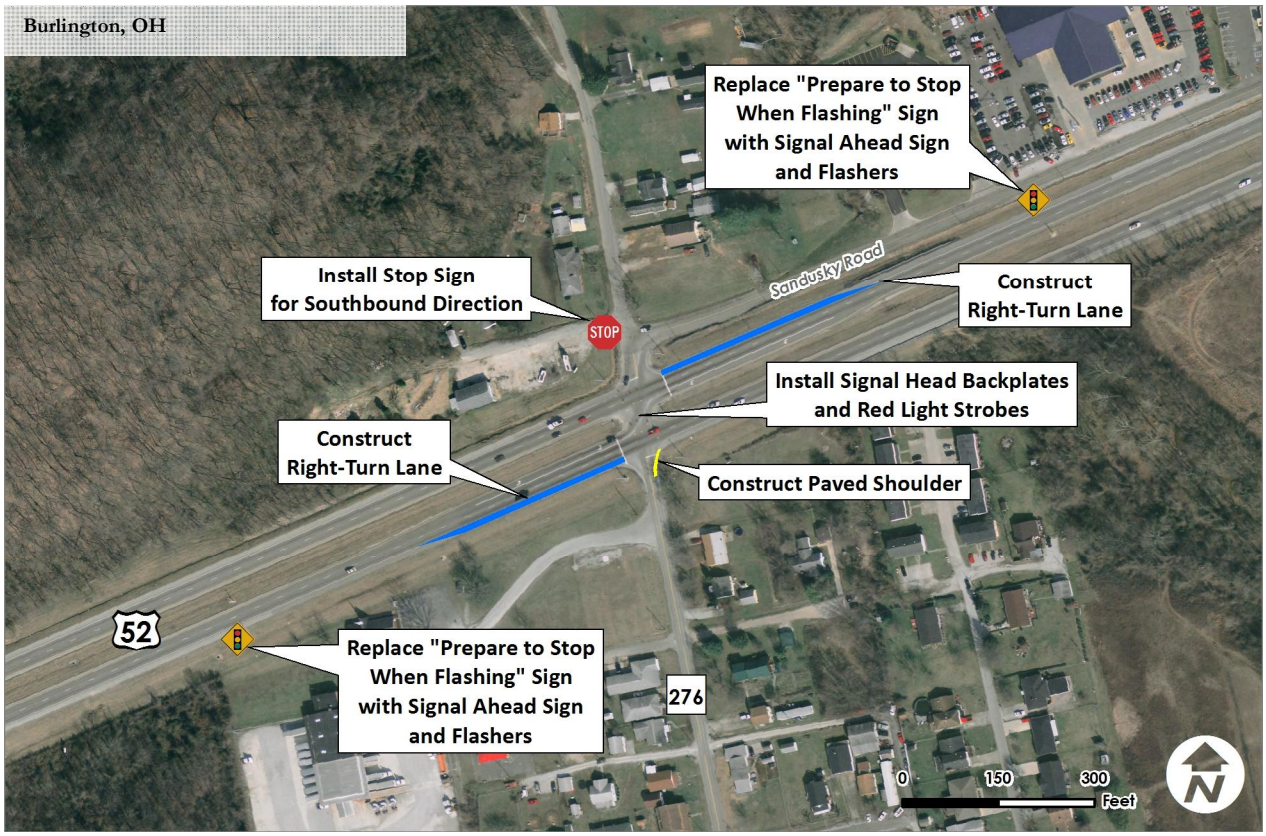
US 52 and CR 276

General Observations

- Dirt shoulder along east side of northbound County Road 276 is in poor condition.
- Right-of-way is available for exclusive right-turn lanes on US 52.
- Crash data reveals a high frequency of rear-end crashes along eastbound and westbound US 52 before intersection.

Recommendations

- Construct paved shoulder along east side of northbound CR 276
- Construct exclusive right-turn lanes on US 52
- Replace "Prepare to Stop When Flashing" signs with Signal Ahead signs and continuous flashers
- Improve signal visibility:
  - Install signal head retroflective backplates
  - Install red light strobes
- Install Stop Sign for southbound CR 276 at Sandusky Road



US 52 and CR 410 (Walmart Way)

General Observations

- Northbound Walmart Way may accommodate the extension of the exclusive right-turn lane.
- Crash data reveals a high frequency of rear-end crashes on westbound US 52 and northbound Walmart Way before intersection.
- Crash data also reveals a high frequency of angle crashes at Walmart Way and 6th Avenue, likely the result of a large business sign obstructing the view of drivers on 6th Avenue waiting to turn right.

Recommendations

- Restripe northbound Walmart Way with two lanes from 6th Avenue to US 52
- Replace "Prepare to Stop When Flashing" sign with Signal Ahead sign and continuous flashers
- Improve signal visibility:
  - Install signal head retroflective backplates
  - Install red light strobes
- Install intersection striping for dual left-turn on westbound US 52
- Relocate business sign at Walmart Way and 6th Avenue

US 52 and CR 1 (Old US 52)

General Observations

- No traffic control is present for right-turns from eastbound US 52.
- Crash data reveals a high frequency of angle crashes involving left-turning vehicles struck by through vehicles on westbound US 52.
- A left-turn median acceleration lane exists.

Recommendations

- Install yield sign for right-turn lane on eastbound US 52
- Monitor intersection and signalize intersection when Manual on Uniform Control Devices Warrant 7 (Crash Experience) is met:
  - Consider a continuous green T-intersection
- Install intersection striping for left-turn on westbound US 52

US 52 and CR 15 (Lick Creek Road)

General Observations

- Crash data reveals a high frequency of angle crashes involving right-turning vehicles struck by through vehicles on westbound US 52.

Recommendations

- Construct right-turn acceleration lane on westbound US 52

5th Avenue and 1st Street

General Observations

- Crosswalk markings exist only on north leg.
- Several full-movement driveway access points are in proximity of intersection.
- Stop bar for left-turn lane on southbound 1st Street is set back approximately 100' from intersection.
- 1st Street and its corresponding right-of-way are very narrow.

Recommendations

- Install crosswalk markings on east and south legs
- Install pedestrian buttons and countdown signals
- Install "Yield to Pedestrians" sign for right-turns on northbound 1st Street
- Construct concrete island in driveway in southwest quadrant to restrict left-turns
- Adjust signal phasing to allow left-turns on southbound 1st Street as protected only
- Long term, consider widening 1st Street between 4th Avenue and 5th Avenue

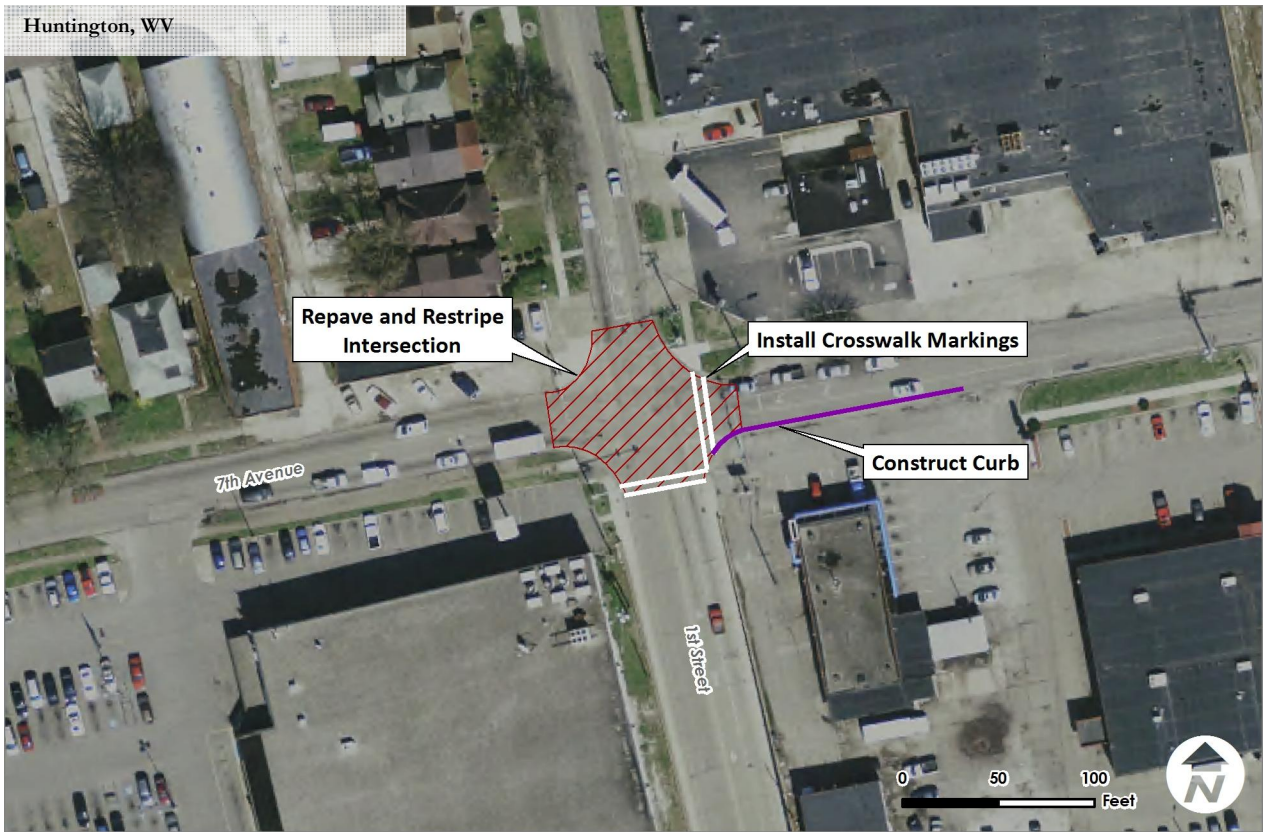
7th Avenue and 1st Street

General Observations

- Intersection pavement is in poor condition.
- No crosswalk markings are present.
- No clear delineation of driveway access exists.

Recommendations

- Repave and restripe intersection
- Install crosswalk markings on east and south legs
- Construct a curb along 5th Avenue adjacent to Fantastic Sam's to restrict access but maintain parking



5th Avenue and Hal Greer Boulevard

General Observations

- Intersection pavement is in poor condition.
- Left-turn on eastbound 5th Avenue is difficult for large trucks.

Recommendations

- Repave and restripe intersection
- Move stop bar for left-turn lane on southbound Hal Greer Boulevard further north to provide larger turn radius for heavy trucks turning left from eastbound 5th Avenue

US 60 (31st Street) at 5th Avenue

General Observations

- Unmarked on-street parking exists on west side of US 60.
- Signage is insufficient for drivers on eastbound 5th Avenue and left-turning drivers on southbound US 60.

Recommendations

- Install on-street parking pavement markings
- Install directional signage and thermoplastic shield markings for SR 7 and US 60 on eastbound 5th Avenue
- Install directional signage to SR 7 / Proctorville and 5th Avenue / Guyandotte for left-turning vehicles on southbound US 60
- Install ADA ramp in northwest quadrant
- Install "Yield to Pedestrians" sign at crosswalk at ramp to SR 7

US 60 at 8th Avenue

General Observations

- Channelized right-turn lane on eastbound 8th Avenue is stop-controlled.
- Drivers must look back over their left shoulder when turning right onto US 60.
- Topography prohibits the addition of a right-turn acceleration lane on southbound US 60.

Recommendations

- Install signal for right-turn on eastbound 8th Avenue with an overlap phase coinciding with the northbound left-turn phase and the westbound left-turn phase

US 60 at 21st Street

General Observations

- "Except When Turning Right" sign under stop sign on northbound 21st Street is confusing.
- Limited sight distance is available for vehicles turning left or traveling through on northbound 21st Street.
- A similar intersection exists to the south at Chestnut Street and 21st Street.

Recommendations

- Signalize intersection with northbound right-turns and westbound left-turns as main movements:
  - May also be implemented at Chestnut Street and 21st Street intersection to the south

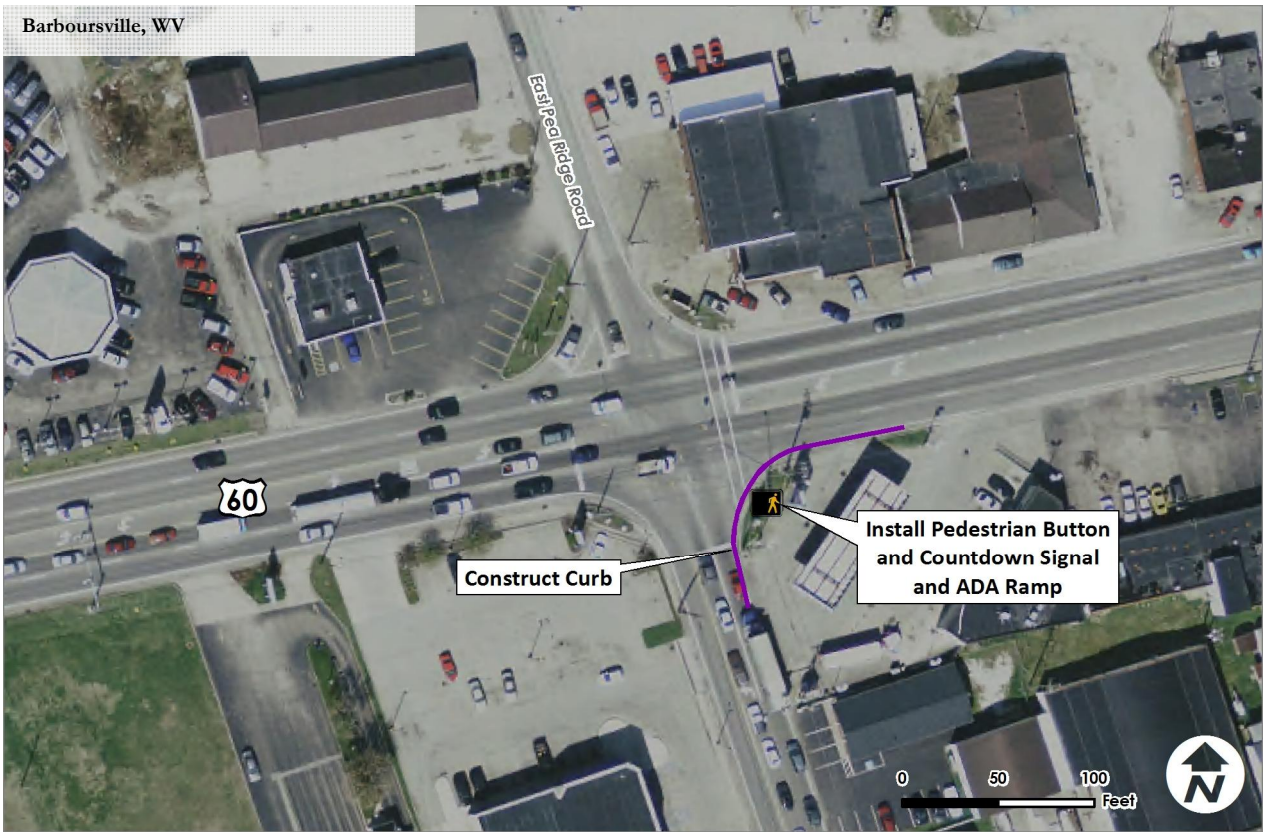
US 60 at East Pea Ridge Road

General Observations

- Several driveways are in proximity of intersection.
- Southern terminus of eastern crosswalk is obstructed by a curb and utility poles.

Recommendations

- Construct curb to delineate driveway access
- Construct ADA ramp in southeast quadrant
- Install pedestrian button and countdown signal



WV 152 at WV 75

General Observations

- No gates exist at at-grade railroad crossing.

Recommendations

- Consider installing railroad crossing gates if train volumes increase
- Replace three-section signal head with five-section signal head for right-turn lane on southbound WV 152 to allow right-turn overlap with eastbound phase
- Consider adding a preempted right turn prohibition for southbound traffic
- Construct right-turn lane on eastbound WV 75

Security Element

Through the adoption of SAFETEA-LU and subsequently MAP-21, the federal government established security as an independent planning factor for consideration in long-range transportation plans. The section that follows provides an overview of existing transportation security while making recommendations for future improvements.

The KYOVA MPO is tasked with considering security at a regional level, which is a logical first step to ensuring protection at the local level. The multimodal recommendations established by the MPO address the key security considerations mentioned in the introduction to this chapter: evacuation routes for communities potentially affected by flooding, failure of sensitive facilities, protection and maintenance of bridges, and the safeguard of highway transit and freight operations. A selection of these considerations is described in more detail below. Each of the considerations should continue to be a focus of the KYOVA Policy Committee.

It is also important to note that at the national level, the U.S. Department of Homeland Security (USDHS) is the overarching agency whose responsibilities include security planning for the transportation system. Its mission is to protect the United States from attacks through border and transportation security; emergency preparedness and response; chemical, biological, radiological, and nuclear countermeasures; information analysis; and infrastructure protection. The USDHS provides guidance and support for transportation security through the National Response Plan, which establishes protocols for the federal government's coordination with state, local, and tribal governments, and with the private sector, for security events.

At the statewide level, the West Virginia Emergency Operations Plan developed by the West Virginia Department of Homeland Security and Emergency Management and the State of Ohio Emergency Operations Plan provide for state-level emergency operations in response to any type of disaster or large-scale incident affecting Ohio and West Virginia. These assign duties and responsibilities to departments, agencies and support organizations for disaster preparedness, response and recovery, and mitigation. They also provide the needed framework within which more detailed emergency plans and procedures can be developed and maintained by both state agencies and local governments.

Four Categories of Security

Security measures typically fall into one of four categories: prevention, protection, redundancy, and recovery.

- **Prevention** mainly limits access to ensure the safety of the transportation system.
- **Protection**—in coordination with prevention elements—focuses on vulnerable components of the roadway system such as bridges and major corridors.
- **Redundancy** within the transportation network creates identifiable alternative routes in the event of an incident. Redundancy most often refers to an interconnected street network, though similar methods should be extended to the bicycle and pedestrian network, transit system, and rail corridors.
- **Recovery** refers to both the initial response during an emergency and long-term activities that aid in the return of normal operations.

Emergency Response and Fire Protection

Natural or man-made community emergencies can occur at any time. The Emergency Management Departments of Lawrence County, Ohio and Wayne County and Cabell County, West Virginia are primarily responsible for overall coordination of county, state, and volunteer agencies before, during, and after an emergency. In addition to the county EMS departments, elements of emergency response and fire protection in the KYOVA area include municipal and county fire departments, county sheriff offices, county commissions, public works departments, health departments, county Red Cross organizations, and police departments for local cities and major universities (such as Marshall University).

Evacuation Routes

Natural emergencies such as earthquakes, floods, fire, and major storms potentially could affect the KYOVA MPO area. Although no evacuation routes have been formally designated, all freeways, expressways, and arterials within the study area are critical for area access.

Bridges

The major bridges and viaducts within the study area also serve as critical access points. Bridges crossing the Ohio, Big Sandy, and Guyandotte Rivers are particularly critical elements of the regional roadway network. Some of the largest roadway bridges include:

- Ironton Bridge Road across the Ohio River (Ironton-Russell Bridge)
- 12th Street across the Ohio River (Ben Williamson Memorial Bridge / 12th Street Bridge)
- US 60 across the Ohio River (Simeon Willis Memorial Bridge)
- US 52 across the Ohio River (West Huntington Bridge / West End Bridge / West 17th Street Bridge / Nick Joe Rahall II Bridge)
- 2nd Street (SR 527) across the Ohio River (Robert C. Byrd Bridge)
- SR 775/SR 106 across the Ohio River (East Huntington Bridge / East End Bridge / Frank Gatski Memorial Bridge / 31st Street Bridge)
- Chestnut Street / 35th Street (US 60) across the Big Sandy River
- I-64 Eastbound across the Big Sandy River
- I-64 Westbound across the Big Sandy River
- Madison Street across the Big Sandy river between Louisa, KY and Fort Gay, WV

Viaducts

Numerous low-lying viaducts (roadways that temporarily drop in grade usually to go underneath a rail line) throughout the region also could become blocked during times of severe flooding. These include:

- West 14th Street near Memorial Boulevard
- 1st Street between 7th Avenue and 8th Avenue
- 8th Street between 7th Avenue and 8th Avenue
- 10th Street between 7th Avenue and 8th Avenue
- 16th Street Road between 7th Avenue and 8th Avenue
- 20th Street between 7th Avenue and 8th Avenue
- Old Guyan River Road between Price Industrial Road and Altizer Avenue
- Central Avenue in downtown Barboursville
- Main Street between Midland Trail (US 60) and Woodland Drive
- Goose Creek Road near Midland Trail (US 60)
- Dry Creek Road in Milton, WV (3 locations)

Maintaining operations of these important roadway facilities and having designated alternative routes should be a top priority during cases of natural disaster and regional emergency.

Bridge Conditions

A September 2003 Federal Highway Administration (FHWA) report on bridge and tunnel security (titled Recommendations for Bridge and Tunnel Security) notes that after considering the bridges and tunnels in the national highway system, the loss of a critical bridge or tunnel at one of the numerous "choke points" in the highway system could result in casualties, direct reconstruction costs, and socioeconomic costs. While the report focuses on the deliberate act of sabotaging a bridge, it shows the importance of preserving and maintaining bridges in the face of normal wear and tear.

Sufficiency Ratings

Bridges inspected by WVDOT and ODOT are checked for sufficiency every two years as required by the FHWA. These reviews produce a sufficiency rating for each bridge. Per FHWA's Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges, a bridge's sufficiency rating calculates four separate factors to obtain a numeric value indicative of bridge sufficiency to remain in service. Bridges with a sufficiency rating of 50.0 or below qualify for federal replacement funds while bridges with a sufficiency rating of 80.0 or below qualify for federal rehabilitation funding. A summary of the bridges in the KYOVA study area with bridge sufficiency ratings of below 80.0 is provided on this page.

Sufficiency Ratings of 80 and Below

Cabell County, WV

- 202 bridges countywide
  - 33 bridges with ratings below 50
  - 54 bridges with ratings between 50 and 80

Wayne County, WV

- 157 bridges countywide
  - 29 bridges with ratings below 50
  - 54 bridges with ratings between 50 and 80

Lawrence County, OH

- 348 bridges countywide
  - 32 bridges with ratings below 50
  - 94 bridges with ratings between 50 and 80

Structurally Deficient/Functionally Obsolete

Structurally deficient bridges refer to structures at least 10 years old in relatively poor condition or that cannot carry sufficient loads due to its design or deterioration. Functionally obsolete bridges refer to structures that can no longer adequately serve existing traffic due to design limitations such as being too narrow, poorly aligned, or unable to carry proper loads. **Tables 4.4** and **4.5** summarize the bridges with sufficiency ratings of 50.0 or less for West Virginia and Ohio, respectively.

Table 4.4 – Bridges with Sufficiency Ratings of 50.0 or Below (West Virginia)

Route	Feature Intersected	Length	Year Built	Sufficiency Rating	Category
CR 31 (McComas Road)	Trace Creek	100.7	1923	2.0	Structurally Deficient
8th Street Viaduct	CSX Railroad	58.5	1920	2.0	Structurally Deficient
CR 25/11 (Girl Scout Camp Road)	Mud River	121.7	1965	17.0	Structurally Deficient
CR 31 (McComas Road)	Tom Creek	101.2	1923	17.0	Structurally Deficient
CR 43 (Long Branch Road)	Long Branch	25.5	1940	17.0	Structurally Deficient
Wilson Court	Fourpole Creek	44.7	1920	19.0	Structurally Deficient
Whitaker Boulevard West	Fourpole Creek	43.6	1921	21.0	Structurally Deficient
CR 31 (McComas Road)	Cavill Creek	100.2	1923	22.0	Structurally Deficient
Cedar Drive	Mud River	191.0	1977	23.5	Structurally Deficient
WV 10	Heath Creek	42.8	1936	26.5	Structurally Deficient
5th Avenue	Guyandotte River	485.8	1926	27.0	Structurally Deficient
Madison Avenue/Piedmont Road	Fourpole Creek	97.7	1928	27.6	Structurally Deficient
Howell Mill-Union Ridge Road	Spurlock Creek	36.2	1979	28.0	Structurally Deficient
5th Street	Fourpole Creek	80.9	1921	29.5	Structurally Deficient
CR 10/11 (Melissa Drive)	Left Fork Davis Creek	30.3	1930	31.4	Structurally Deficient
16th Street Entrance Ramp	Fourpole Creek	148.9	1965	31.8	Structurally Deficient
16th Street Exit Ramp	Fourpole Creek	159.0	1965	32.0	Structurally Deficient
CR 1 (Edmonds Branch Road)	Big Cabell Creek	37.7	1982	35.9	Structurally Deficient
CR 17 (Blue Sulphur Road)	Sevenmile Creek	30.0	1979	36.0	Structurally Deficient
CR 25 (East Mud River Road)	Charley Creek	32.0	1929	38.5	Structurally Deficient
WV 10	Smith Creek	28.2	1950	39.5	Structurally Deficient
Green Valley Road	Fourpole Creek	39.8	1940	39.5	Structurally Deficient
CR 9 (Newmans Branch Road)	Mill Creek	31.9	1931	40.5	Structurally Deficient
US 60 (Midland Trail)	CSX Railroad	1300	1932	41.2	Structurally Deficient
CR 15 (Glendwood Road)	Right Fork Lower Creek	32.3	1922	41.5	Structurally Deficient
I-64	US-52	146.0	1964	41.6	Structurally Deficient
CR 25 (East Mud River Road)	Big Twomile Creek	33.7	1943	42.9	Structurally Deficient
CR 68 (Merritts Creek Road)	Merritt Creek	30.1	1950	45.5	Structurally Deficient
CR 7 (Nine Mile Road)	Ninemile Creek	30.6	1945	46.5	Structurally Deficient
WV 10	Left Fork of Heath Creek	23.1	1940	47.8	Structurally Deficient
12th Street	Fourpole Creek	45.8	1927	49.1	Functionally Obsolete
CR 29 (Fudges Creek Road)	Fudges Creek	34.2	1929	49.2	Functionally Obsolete
5th Street	I-64	350.7	1963	49.9	Structurally Deficient

Table 4.5 – Bridges with Sufficiency Ratings of 50.0 or Below (Ohio)

Route	Feature Intersected	Length	Year Built	Sufficiency Rating	Category
93	Ohio River and N&W RR	731.8	1922	6.9	Structurally Deficient
5th Street	Storms Creek	-	-	9.3	Structurally Deficient
C0004	Cannons Creek	42.0	-	16.2	Structurally Deficient
C0004	Cannons Creek	23.0	-	24.8	Structurally Deficient
C0022	Little Storms Creek	39.0	-	25.5	Structurally Deficient
T0225	Little Guyan Creek	-	-	25.9	Structurally Deficient
C0052	Turkey Fork Creek	26.0	1940	26.3	Structurally Deficient
C0013	Long Creek	23.0	-	27.9	Structurally Deficient
C0002	Bent Creek	16.0	-	33.1	Structurally Deficient
C007B	Blackfork	32.0	-	33.9	Structurally Deficient
C0010	Pine Creek	93.0	1934	34.5	Structurally Deficient
C0056	Branch of Lick Creek	21.0	1941	34.6	Structurally Deficient
C0029	Storms Creek	53.0	1940	35.8	Functionally Obsolete
C0144	Charley Creek	21.0	1941	37.0	Structurally Deficient
52	Solida Creek	35.0	1959	38.8	Structurally Deficient
775	Trib of Wolf Creek	-	1984	39.3	Functionally Obsolete
C0051	Slab Fork	31.0	1939	40.1	Structurally Deficient
C0005	Elkins Creek	23.0	-	43.8	Structurally Deficient
C0056	Ice Creek	23.0	1941	45.3	Structurally Deficient
TOWIN	Solida Creek	33.0	1900	45.5	Structurally Deficient
C0017	Symmes Creek	-	-	46.4	Functionally Obsolete
141	Long Creek	42.0	1915	46.7	Structurally Deficient
T0110	Long Creek	-	-	47.0	-
243	Leatherwood Creek	19.0	1948	47.2	Functionally Obsolete
C0005	Branch of Elkins Creek	21.0	-	47.3	-
C0033	Hales Creek	37.0	-	47.5	Functionally Obsolete
7	Buffalo Creek	31.5	1959	47.6	Structurally Deficient
217	Stream	-	1965	47.9	Structurally Deficient
T0113	Branch of Cannons Creek	-	-	48.3	Structurally Deficient
T0113	Branch of Cannons Creek	-	-	48.6	Functionally Obsolete
C0022	Storms Creek	-	1959	48.8	Structurally Deficient
Lawrence Hill Road	Cannons Creek	31	1908	49.9	Structurally Deficient

Additional Considerations

Two additional considerations relevant to the safety and security of the KYOVA region's transportation network include congestion management/incident management and the results of a 2007 safety study for US 52 and SR 7 in Lawrence County.

Systems Management

Transportation systems management (TSM) and intelligent transportation systems (ITS) are additional tools available to alleviate traffic congestion and improve safety. The *KYOVA 2040 MTP* refers to these tools as systems management approached. These techniques have been deployed throughout the world, including the KYOVA region. Additional techniques are scheduled to go live in the region in the years to come. A description of the existing systems as well as programmed and planned systems follows.

KYOVA relies on the West Virginia, Ohio, and Kentucky Statewide ITS Architectures and coordinates with WVDOT, ODOT, and KYTC and other stakeholders to help ensure that information for ITS elements within the MPO is kept up-to-date with the corresponding Statewide ITS Architecture. KYOVA facilitates cooperation among local ITS stakeholders in determining the roles and responsibilities of each stakeholder and informs the state DOTs whenever it becomes aware of any changes to stakeholder information including changes in roles and responsibilities and the establishment, amendment, or abolishment of agreements between stakeholders that would affect the Statewide ITS Architecture. The MPO also keeps the state DOTs informed of potential new ITS projects so that these projects can be incorporated into the Statewide ITS Architecture. During the project selection process, KYOVA considers ITS technologies as potential solutions to transportation needs in the MPO area.

Existing Systems Management Approaches

In the KYOVA study area, three primary systems management approaches are in use:

- WVDOH intelligent transportation system (ITS) deployment along I-64 throughout the study area
- Phase I of the City of Huntington Computerized Signal System Upgrade
- Closed loop signal system in the Burlington area of Lawrence County

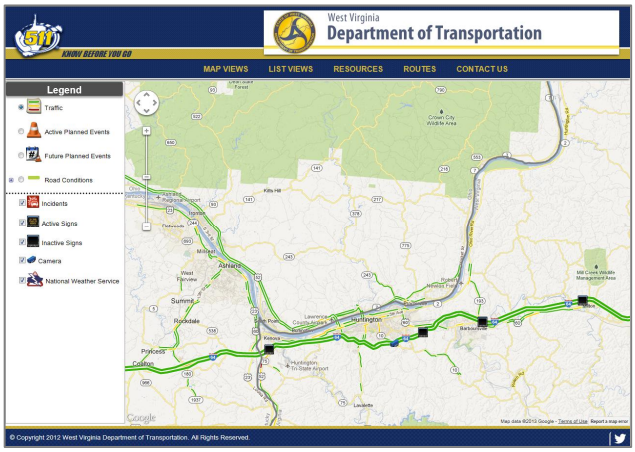
These approaches are detailed on the pages that follow.

West Virginia DOH ITS Deployment

The WVDOH commenced operations in fall 2008 of its Statewide Smart Traffic Center, which was identified in the 2006 Statewide ITS Architecture and Strategic Deployment Plan. This center, located in the DOH headquarters in the Capitol Complex, provides monitoring, situational awareness, traffic management, incident management and coordination, and traveler information capabilities for major roadways throughout the state. The ITS functionality includes:

- Closed Circuit Television (CCTV) monitoring of roadway facilities
- Road weather information (RWIS) data collection stations
- Real time travel speeds
- En-route traveler information via dynamic message signs
- Voice response 511
- Incident management coordination

In the fall of 2012, the system introduced the West Virginia 511 website and voice activated traveler information system. The image below is screen shot from the website version of the traveler information porthole (www.wv511.org). In addition to the main traffic management center (TMC) located in the Capitol Complex, satellite TMCs are located at the WV Turnpike Authority and the Rahall Transportation Institute in Huntington. ODOT has a similar system called Buckeye Traffic, with traveler information accessible at www.ohgo.com.



In the KYOVA study area, the primary WVDOH ITS deployment is along the I-64 corridor from the Cabell County/Putnam County border to the West Virginia/Kentucky state line. This deployment includes the following dynamic message signs (DMS), closed circuit television units (CCTV), and road weather information system monitoring locations (RWIS).

- I-64 DMS
  - MP 0.4 (EB)
  - MP 13.3 (EB)
  - MP 13.3 (WB)
  - MP 27.5 (EB)
  - MP 27.5 (WB)
- I-64 CCTV
  - Milton (MP 28)
  - Hal Greer Boulevard (MP 11)
- I-64 RWIS
  - Twelve Poole Bridge (MP 2.3)
  - Edgewood Overpass (MP 5.32)
  - Hal Greer Boulevard (MP 22)
  - Milton (MP 28)

City of Huntington Computerized Signal System.

Incorporating the recommendations of the City of Huntington Signal Optimization study, the City of Huntington designed and implemented an upgrade of its computerized signal system, which was brought on-line in the first quarter of 2012. The system upgrade included:

- New, more functional local traffic signal controller equipment;
- Revised local intersection phasing (including left turn treatments, right turn overlaps, and pedestrian signals);
- Emergency signal preemption;
- Enhanced, higher throughput communications; and
- New central software.

The first phase encompasses approximately 50 intersections in the Huntington core from 1st Street to 29th Street and from the floodwall to the railroad tracks. This system is operated by the Rahall Transportation Institute, and its operations center is collocated with the WVDOH satellite TMC. The system improves intersection safety for turning vehicles and pedestrians and signal coordination resulting in reduced travel times. It permits safer passage of emergency vehicles through intersections resulting in more timely emergency response. The system can adjust signal timing in real time to respond to unexpected changes in traffic and can improve the ability to prepare for planned activities such as construction events and special events.

Burlington Closed-Loop Signal System.

In the Burlington area of Lawrence County, US 52 serves both as a major mobility route for the county as well as a major access point for several regional commercial and industrial sites. This confluence of roles has created safety and mobility issues with high truck volumes and high speed interregional trips conflicting with traffic seeking to access local commercial, industrial, and retail destinations. In response, ODOT installed a closed loop traffic

signal system to improve signal coordination in the segment and to permit the remote monitoring and management of the segment.

Programmed Deployments

Several systems management improvements have been identified in the West Virginia and Ohio STIPs for the next 4 to 6 years.

2014-2017 KYOVA TIP

The KYOVA TIP includes improvements in various stages of completion (programmed, under construction, or recently implemented). These include:

- WVDOH Statewide ITS
  - CCTV: I-64 east of Milton (MP 18.4)
  - CCTV: I-64 at exit 20B (East Mall Road) – westbound off-ramp, southeast quadrant
- City of Huntington Computerized Signal System

Ironton Traffic Flow Study

The City of Ironton recently completed an operations study and consequent design and is about to commence construction of a computerized signal system and to enhance signing and turn radii in the City. The locations included in the project include:

- Signal, poles, and light upgrades (6 locations)
  - Park Avenue (SR 93) and 6th Street
  - Park Avenue (SR 93) and 5th Street
  - Park Avenue (SR 93) and 4th Street
  - Park Avenue (SR 93) and 3rd Street
  - 2nd Street and Adams Street
  - 3rd Street and Adams Street
- Turning radii enhancements (7 locations)
  - Liberty Street at Pine Street (NW quadrant)
  - 9th Street at Spruce Street (SW quadrant)
  - 3rd Street at Lorain Street (NE and SE quadrants)
  - 3rd Street at Jefferson Street (SW quadrant)
  - 2nd Street at Jefferson Street (NE quadrant)
  - 2nd Street at Park Avenue (SE quadrant)
  - 2nd Street at Adams Street (SW quadrant)
- Centralized Computerized Signal System

Planned Projects

Systems management approaches are in place throughout the region with a focus on I-64, the City of Huntington, the City of Ironton, and the Burlington area. Given the multi-state study area, a coordinated regional system will need to be deployed to truly provide regional traveler information, regional incident management, and regional arterial and freeway management. This system would:

- Improve monitoring of the region's workhorse east-west corridors (I-64, US 60, and US 52) and permit the improved management of and traveler information to detouring traffic due to incidents, construction, and/or special events
- Improve arterial flow in urbanized areas
- Improve monitoring of heavy vehicles
- Improve safety at queuing locations

The recommended deployments are shown in **Figure 4.2** and summarized below.

I-64/US 60 Integrated Corridor Management (ICM)

- **I-64**: increased DMS, increased CCTV, vehicle detection
- **US 60**: CCTV, responsive/adaptive signal control, trailblazing DMS, vehicle detection
- Static "I64 Alternate" signage on US 60

I-64/US 60/US 52/US 23 Incident Management Corridor

- US 60 CCTV and detection (Kentucky/West Virginia line to I-64)
- I-64 CCTV and detection (Kentucky line to US 60/exit 181)
- I-64 DMS at US 23 and KY 180
- US 23 CCTV and detection I-64 (Kentucky to Ironton/Russell Bridge)

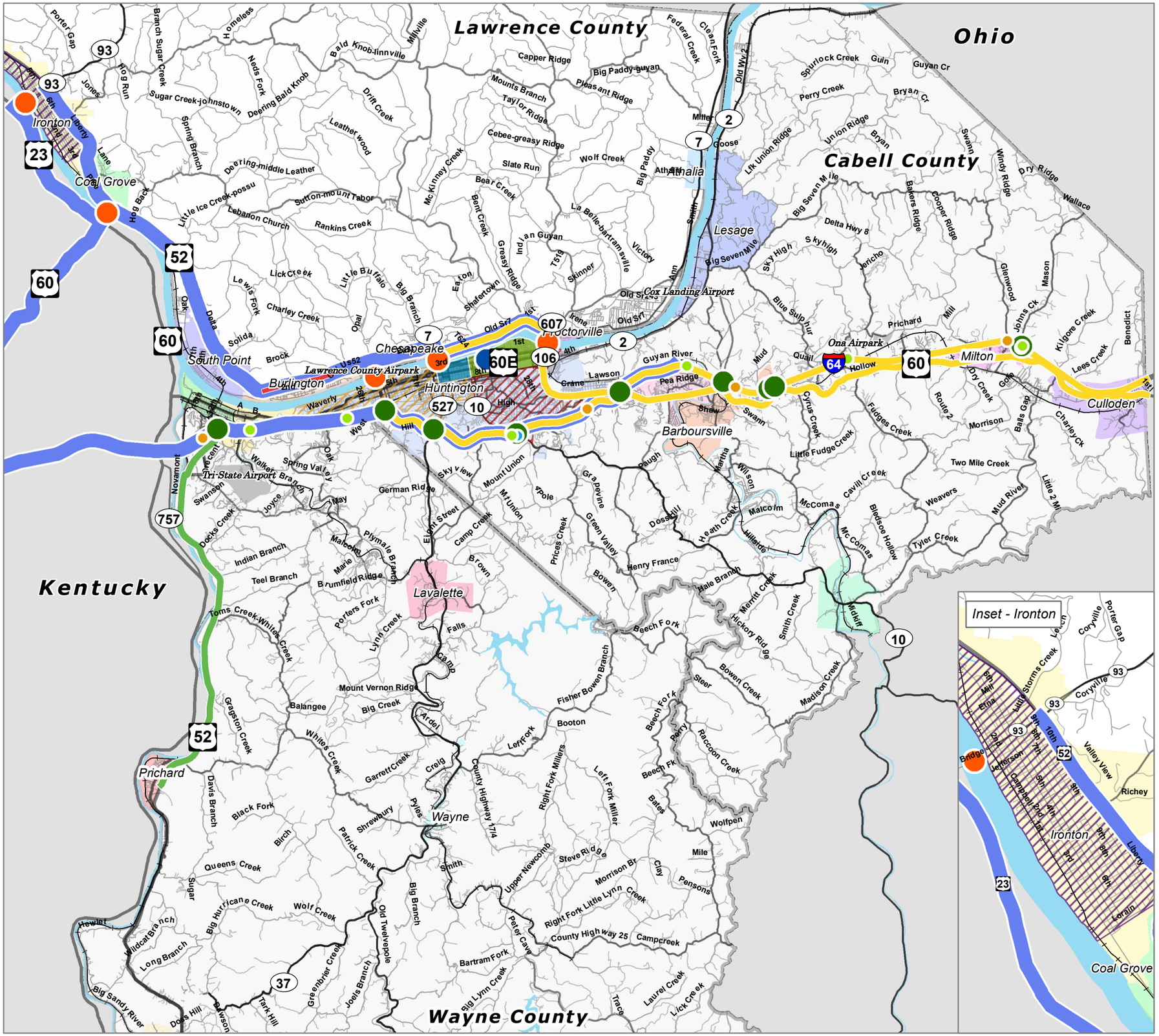
US 52 Freight Management/Incident Management Corridor (Prichard to I-64)

- CCTV, vehicle detection, RWIS, weigh in motion sensors

Back of Queue Detection and CCTV Surveillance

- 31st Street Bridge (Huntington/Proctorville)
- 5th Street Bridge (Huntington/Chesapeake)
- West 17th Street Bridge (Huntington/Lawrence County)
- Ashland Bridge – 12th /13th Streets (Ashland/Coal Grove)
- Ironton/Russell Bridge

Figure 4.2



Incident Management Improvements

- Existing CCTV
- Existing DMS
- Existing RWIS
- I-64 Interchange
- Existing Huntington TOC
- Video Surveillance / Queue Detection
- Closed Loop Signal System
- US 60/I-64/US 52/US 23 Incident Management Corridor
- US 60/I-64 Integrated Corridor Management
- Freight Management Corridor
- Ironton ATMS
- Huntington ATMS - Eastern Phase (Future)
- Huntington ATMS - Western Phase (Future)
- Huntington ATMS - Arterial Project (Existing)
- Huntington ATMS - Downtown Project (Existing)

0 1.5 3 Miles

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Traffic and Safety Study for US 52 and SR 7

The Traffic and Safety Study for US 52 and SR 7 in Lawrence County, Ohio (completed in July 2007) focused on mobility and safety by examining current conditions, reasonably forecasting future conditions, and evaluating recommendations for both corridors in the study area. Several steps informed the understanding of existing conditions and existing and forecasted deficiencies:

- Obtaining data for the corridor including cross-sections, median types, posted speeds, and intersection geometrics, as well as existing link count and state crash data.
- Identifying deficiencies along the corridor, at specific locations (both safety and congestion related), and at points of interest/concern. Deficiencies included safety, congestion, access, and mobility constraints.
- Analyzing high crash locations along the US 52/SR 7 corridor and then prioritizing locations to help with selecting potential highway safety projects.
- Examining expected capacity deficiencies along the corridor using the KYOVA travel demand model.
- Conducting an operational deficiency analysis for intersections along the US 52/SR 7 corridor.

Based on the deficiency analysis, locations along the corridor needing traffic and safety improvements to mitigate existing and projected shortcomings were identified. The alternatives ranged in complexity from intersection level signalization improvements to the construction of new Ohio River crossings, and ranged in estimated construction price from $65,000 to $122,000,000. The study grouped proposed alternatives geographically along the corridor and chronologically through the planning horizon. The geographic regions included three sections: Western, Central, and Eastern. The chronological groupings included near term (zero to five years), short term (five to ten years), medium term (ten to twenty years), and long term (greater than twenty years). The detailed schematics of the improvements were shown in a series of figures (Figures 14, 15, and 16). These figures are reprinted on the pages that follow.

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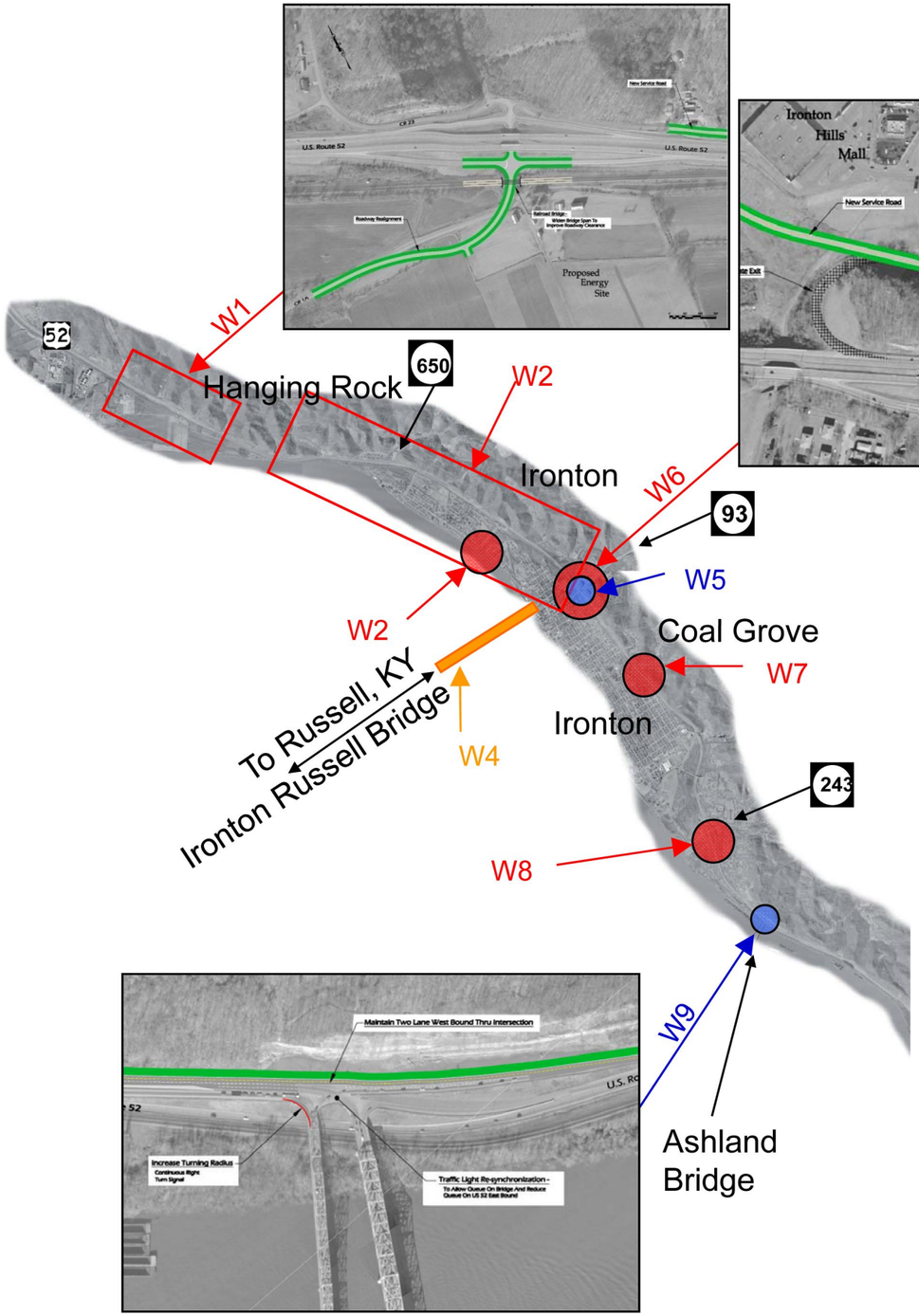

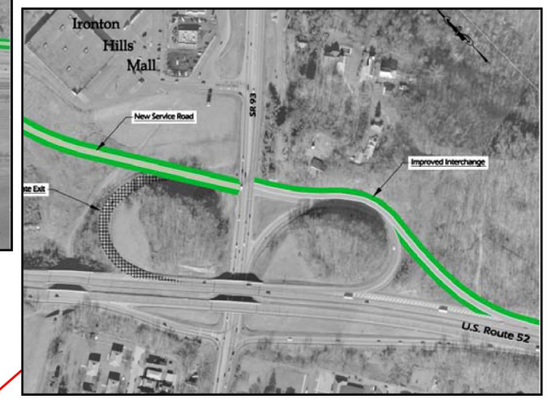

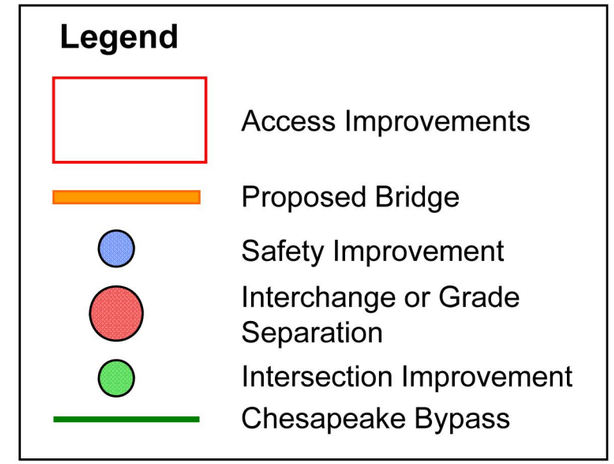

Western Corridor	W1	CR 1A/CR 23 Interchange and US 52 Access	This improvement includes widening the bridge span over Old US 52 (CR 1A) to improve roadway clearance, realigning the Old US 52 (CR 1A) approach to the interchange to improve sight distance, creating a new service road north of US 52 (connects to Patrick Street T-117), and eliminating one highway access point. The consolidation of access to US 52 is anticipated to enhance US 52 mobility
	W2	US 52 Access Improvements Location 1	This improvement includes managing access to US 52 between Rock Hollow Rd (CR 128) and Park Dr (SR 93) by: **1.** Creating a new service road between Happy Hollow Dr (T-330) and Scioto Ave, eliminating two highway access points **2.** Eliminating highway access at Township Rd 277 **3.** Improving an existing service road between Orchard Rd (T 142) and Little Storms Creek Rd (CR 22), eliminating one highway access point **4.** Creating a new service road between Little Storms Creek Rd (CR 22) and Park Dr (SR 93)
	W3	2nd Street Bridge Replacement	This improvement includes replacing the 2nd Street Bridge that spans an inlet of the Ohio River between Orchard Street and Sycamore Street. This location is prone to flooding from the Ohio River, and the existing bridge is routinely closed when water levels rise.
	W4	Ironton-Russell Bridge	This improvement includes reconstructing the Ironton-Russell Bridge over the Ohio River. The bridge will maintain and enhance the connection between Ironton, OH with Russell, KY.
	W5	Park Drive (SR 93)	The predominant crash pattern at this location is rear-end crashes primarily at the ramp termini. The proposed improvements include upgrading the existing traffic signals to a three-phase Texas diamond configuration and adding warning signage.
	W6	SR 93 Interchange	This improvement includes converting the existing partial cloverleaf interchange to a diamond configuration.
	W7	Campbell Drive (SR 141) Interchange	This improvement includes the complete signalization of the interchange and intersection as well as the addition of two turning lanes.
	W8	SR 243 Interchange	This improvement includes signalizing the interchange at Marion Pike (SR 243).
	W9	Ashland Bridge (US 60) Ramp Termini	The predominant crash pattern at this location is a combination of rear-end and loss-of-control collisions due to heavy queuing at the signalized intersection. The proposed improvements include signal retiming and optimization and construction of an additional westbound thru lane.

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Traffic and Safety Study For US 52 and SR 7

Figure 14 – Western Corridor Alternatives

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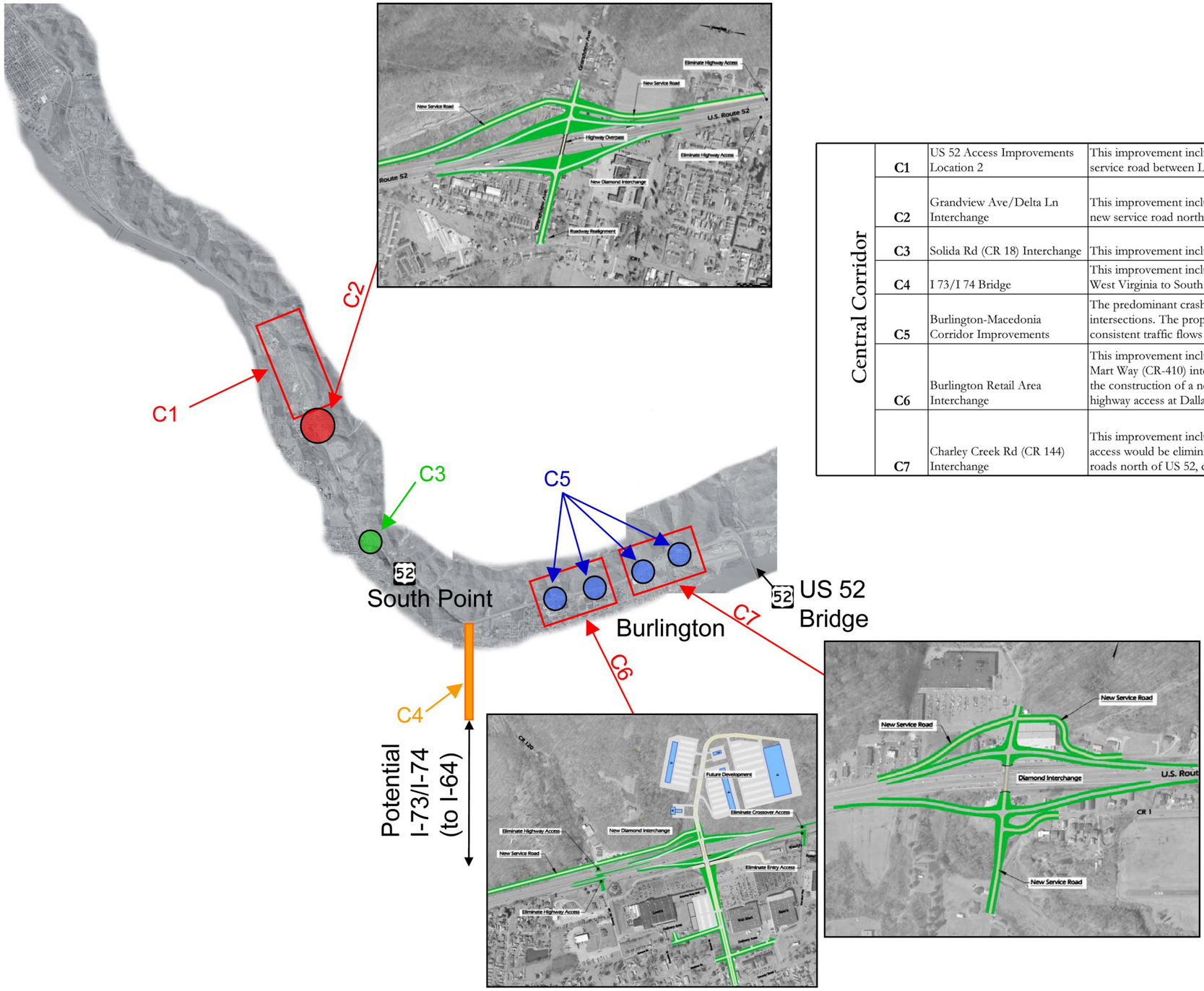

Central Corridor	**C1**	US 52 Access Improvements Location 2	This improvement includes closing highway access at Hog Back Road (T-268) and CR 56, as well as constructing a new service road between Lick Creek Rd (CR 15) and Grandview Ave.
	C2	Grandview Ave/Delta Ln Interchange	This improvement includes constructing a diamond interchange at the existing Grandview Ave intersection, constructing a new service road north of US 52 connecting Grandview Ave and Delta Ln, and eliminating highway access at Delta Ln.
	C3	Solida Rd (CR 18) Interchange	This improvement includes signalizing the eastbound ramp at the existing Solida Rd (CR 18) interchange.
	C4	I 73/I 74 Bridge	This improvement includes the construction of a new bridge over the Ohio River. The bridge would span from I-64 in West Virginia to South Point, Ohio. Exact location under consideration.
	C5	Burlington-Macedonia Corridor Improvements	The predominant crash pattern at this location is rear-end collisions between the signals and angle collisions at the intersections. The proposed improvements include creating a progression-controlled signal system that would create more consistent traffic flows along the corridor.
	C6	Burlington Retail Area Interchange	This improvement includes constructing a diamond interchange between the Burlington-Macedonia Rd (CR 120) and Wal-Mart Way (CR-410) intersections. Highway access would be eliminated at these locations. This improvement would require the construction of a new service road between Dallas-Matthew Pike and Burlington-Macedonia Rd (CR 120), eliminating highway access at Dallas-Matthew Pike.
	C7	Charley Creek Rd (CR 144) Interchange	This improvement includes constructing a diamond interchange at the existing Charley Creek Rd intersection. Highway access would be eliminated at Sandusky Rd (CR 276). This improvement would require the construction of new service roads north of US 52, connecting to CR 406 on either side, as well as realigning Old US 52 (CR 1) south of US 52.

Legend

- Access Improvements
- Proposed Bridge
- Safety Improvement
- Interchange or Grade Separation
- Intersection Improvement
- Chesapeake Bypass

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Traffic and Safety Study For US 52 and SR 7

Figure 15 – Central Corridor Alternatives

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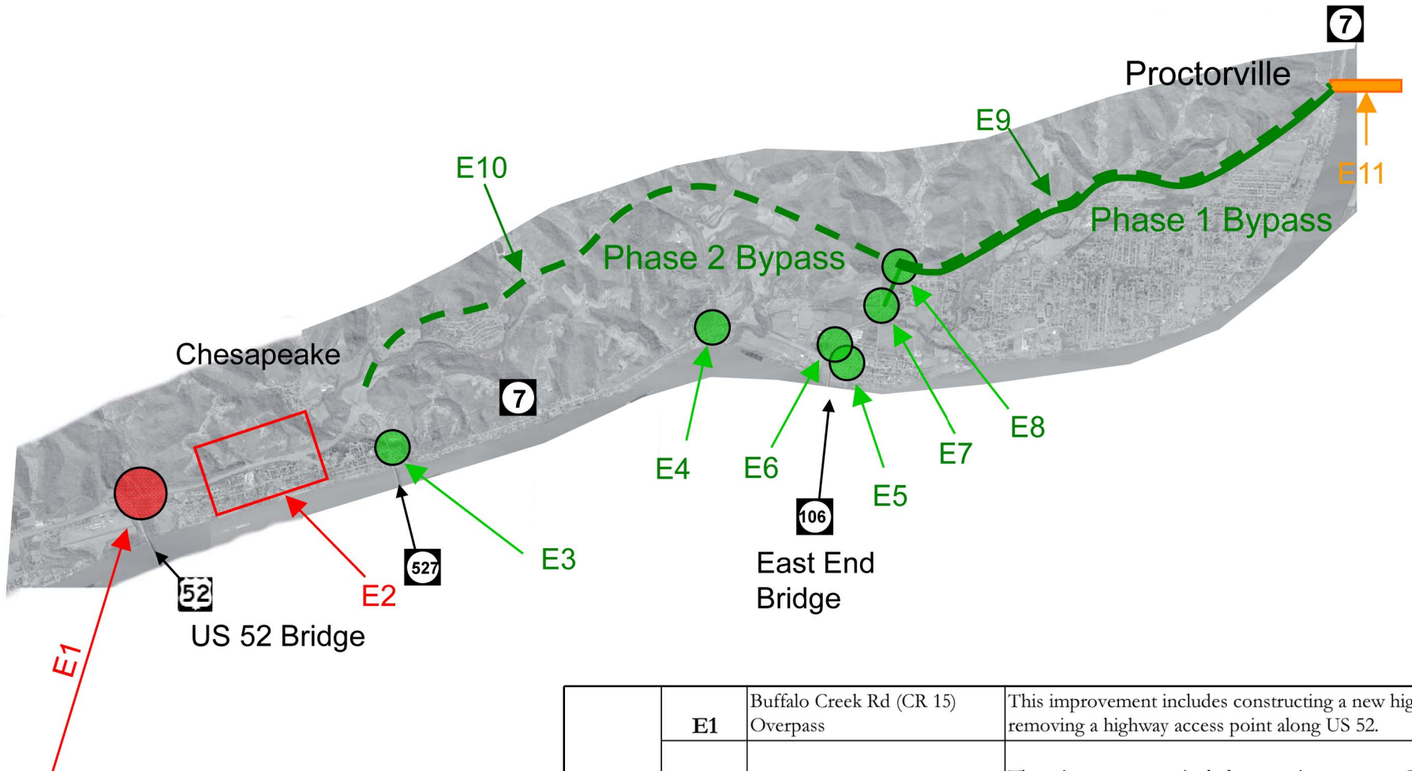

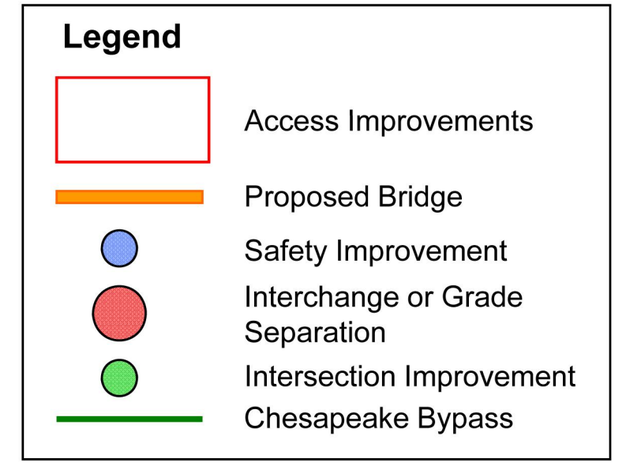

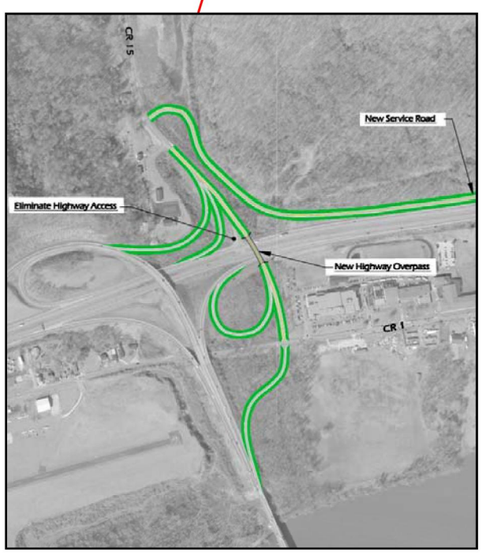

Eastern Corridor	**E1**	Buffalo Creek Rd (CR 15) Overpass	This improvement includes constructing a new highway overpass from Buffalo Creek Rd (CR 15) to Old US 52 (CR 1), removing a highway access point along US 52.
	E2	SR 7 Access Improvements Location 1	These improvements include managing access to SR 7 by constructing two new service roads: 1. Between Kimball Ln (T-287) and Tallow Ridge Rd (CR 124), eliminating two highway access points 2. Between Tallow Ridge Rd (CR 124) and Big Branch Rd (CR 31), creating alternate access between these two routes
	E3	3rd Avenue and SR 7 (6th Street Bridge)	This improvement includes constructing free flow right-turn lanes in the eastbound and westbound approaches. Modify signal cycle length.
	E4	SR 7 and SR 243 (Bradrick)	This improvement includes constructing a free flow right-turn lane on southbound SR 243.
	E5	SR 775 and Old SR 7	This improvement includes constructing free flow right-turn lanes on the southbound and westbound approaches. Protected phasing should be given to northbound and southbound left-turn movements.
	E6	East End Bridge and SR 775 Ramp	This improvement includes widening SR 775 to provide a second southbound thru lane and a second westbound left turn lane to accommodate heavy volumes of traffic using the East End Bridge to cross the Ohio River.
	E7	SR 775 and Irene Road	This improvement includes modifying the signal timing to improve vehicle progression.
	E8	SR 775 and Chesapeake Bypass	This improvement includes constructing dual left-turn lanes on the westbound approach, as well as free flow right-turn lanes on the northbound and eastbound approaches.
	E9	Chesapeake Bypass Phase 1C	This improvement includes the construction of additional thru lanes and grade separated interchanges at SR 775 and Kinley Avenue along the Chesapeake Bypass between SR 775 and SR 7 (existing Phase 1A alignment).
	E10	Chesapeake Bypass Phase 2	This improvement includes completion of the full alignment of the Chesapeake Bypass from the SR 775 interchange to an interchange at SR 152N. The alignment will be built as four lanes divided with grade separated intersections.
	E11	Merrick Creek Bridge	This improvement includes the construction of a new bridge over the Ohio River. The bridge would span from the Merrick Creek Connector in West Virginia to the eastern terminus of the Chesapeake Bypass in Ohio.

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