

Metro | *Agenda*

Meeting: Metro Council Work Session
Date: Tuesday, May 29, 2012
Time: 2 p.m.
Place: Council Chambers

CALL TO ORDER AND ROLL CALL

**2 PM 1. ADMINISTRATIVE/CHIEF OPERATING OFFICER
 COMMUNICATIONS**

**2:15 PM 2. TUALATIN-VALLEY HIGHWAY CORRIDOR PLANNING –
 INFORMATION / DISCUSSION** **Platman
 Jeannine Rustad,
 City of Hillsboro**

**2:45 PM 3. REGIONAL TRANSPORTATION SAFETY PLAN – FINDINGS
 AND RECOMMENDATIONS** **Butzek
 Naramore**

4 PM 4. COUNCIL BRIEFINGS/COMMUNICATION

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Agenda Item Number 2.0

**Tualatin Valley Corridor
Planning**

Metro Council Work Session
Tuesday, May 29, 2012
Metro Council Chamber

METRO COUNCIL

Work Session Worksheet

Presentation Date: May 29, 2012

Time: 2:15 pm

Length: 30 minutes

Presentation Title: Tualatin Valley Hwy Corridor Refinement Plan (TVCP) – Solutions Concepts

Service, Office, or Center: Planning Department

Presenters (include phone number/extension and alternative contact information):

Deena Platman – x1754 and Jeannine Rustad, City of Hillsboro, Project Manager

ISSUE & BACKGROUND

The City of Hillsboro, in partnership with ODOT, Washington County, the City of Beaverton, TriMet and Metro, is progressing on a multimodal corridor refinement plan for OR8 – Tualatin Valley Hwy between Hillsboro and Beaverton. The planning work occurs in tandem with the Aloha-Reedville Study and Livable Community Plan and follows the South Hillsboro Community Plan and the Beaverton Civic Plan efforts.

At two previous work sessions, Metro Council has provided direction to Councilor Harrington, Metro's TVCP Policy Group member. On October 4, 2011, Council was introduced to the project and weighed in on the Partnering Agreement that defines the project goals and decision making framework. Members directed Councilor Harrington to support the Partnering Agreement and encouraged greater clarity in how the TVCP ties in with land use planning activities in the corridor. The January 3, 2012 work session introduced the pivotal policy decision for the TVCP: the future design and function of Tualatin Valley Hwy. Council asserted Metro's support for designating TV Hwy as a Major Arterial Street to create a solid foundation for identifying supportive transportation investments in the corridor.

At their January meeting, the **TVCP Policy Group reached unanimous consent that TV Hwy should be reclassified from a Throughway to a Major Arterial**, fundamentally changing the future design and operational characteristics of the street. Major arterial streets are envisioned as four travel lanes that balance auto, transit and freight movement with walking and bicycling. This street type accommodates both through movement between places and access to adjacent land uses.

With the policy ground work laid for **designing TV Hwy as a place for people**, the project focus turns to identifying solutions that meet the policy designation and needs of the corridor. On June 18, 2012, the Policy Group will convene to provide feedback on the proposed set of transportation solutions for the corridor and to discuss opportunities for funding these investments. The Policy Group will meet again in the fall to provide final input on a refined solutions package.

Selection of proposed solutions concepts are guided by the implementation goals established in the TVCP Partnering Agreement, including:

- Improve **mobility** and **accessibility** for travel by walking, bicycling, transit, auto, and freight (both truck and rail) for people of all ages and abilities...
- Enhance **safety for all users and modes**...
- Strengthen and support **economic vitality**.
- Improve the **visual appearance** of TV Highway...

- Reduce overall and per capita **vehicle miles travelled...**
- Promote **environmental stewardship ...**
- Be consistent with state and regional comprehensive strategies to **reduce greenhouse gas (GHG) emissions**

The project management team, with involvement from the TVCP technical and citizen advisory committees, used the implementation goals and supporting objectives as evaluation criteria to develop the initial prioritized solutions package. Attachment A lists the potential transportation solutions proposed for the TV Hwy corridor.

Metro is vested in the future of this corridor. Construction Excise Tax (CET) grants have support community planning for South Hillsboro and are currently funding the Aloha Reedville Study and Community Plan. As the TVCP is a transportation component of these broader community planning efforts, solutions generated by this plan will be advanced into updates of both the Washington County and City of Hillsboro transportation system plans, just underway. Ultimately, some of these proposed investments will find their way into the next update of the Regional Transportation Plan, making them eligible to compete for regional flexible funds.

OPTIONS AVAILABLE

This work session is an opportunity for the Council to provide input on the proposed transportation solutions for the TV Hwy corridor and share ideas for future funding partnerships/opportunities which Councilor Harrington will convey at the June 18th Policy Work Group meeting.

IMPLICATIONS AND SUGGESTIONS

In January, the Policy Work Group recommended that the desired design and function of TV Hwy is a major arterial street. The question for the Policy Work Group at its June meeting will be whether the proposed transportation solutions, advanced by the project team with input from the TAC, CAC and open house participants, are consistent with a multimodal arterial street that serves the local community aspirations.

Staff recommends that Council direct Councilor Harrington to:

1. Support the advancement of the proposed solutions package into the solutions refinement phase;
2. Request that intersection grade separation projects be specifically called out as an improvement concept that is inconsistent with the recommended design and function of TV Hwy as a Major Arterial Street and not be advanced for further consideration.

QUESTION(S) PRESENTED FOR CONSIDERATION

- Does Metro Council affirm the list of proposed projects as appropriate to a multimodal, community-serving arterial street?
- Does Metro Council have ideas/suggestions for creating funding partnerships to support implementation of the TVCP?

LEGISLATION WOULD BE REQUIRED FOR COUNCIL ACTION __Yes **X**No
DRAFT IS ATTACHED __Yes **X**No

POTENTIAL TRANSPORTATION SOLUTIONS CONCEPTS

The TV Highway Corridor Plan (TVCP) will identify near-term to longer-term future transportation solutions for the TV Highway Corridor and surrounding communities to make travel around and through the area more safe and convenient for people who use different transportation modes.

This briefing packet provides a summarized description of potential solutions that the TV Highway (Hwy) Corridor Plan Project Management Team (PMT)—the City of Hillsboro, Oregon Department of Transportation (ODOT), Washington County, and consultant staff project managers—is considering for the Draft Solutions Package. This information is provided to increase your understanding of the possible solutions and how they may be applied within the TVCP area. The PMT invites and encourages your input on these potential solutions to help us in our efforts to refine them into a recommended Solutions Package to be incorporated into the TVCP.

The PMT initially prepared draft solution concepts as part of the Needs, Opportunities and Constraints Report development. The PMT drafted a Solutions Package Development matrix to tie each improvement concept back to the project goals and objectives. Each concept was grouped into one of three priorities (based on State and Metro planning policies). Each initial improvement concept was compared to the established project objectives to assess whether the concept best met the objective, partially met the objective, conflicted with criteria, or did not apply.

The PMT presented initial solution concept development matrices and concept descriptions at the third TAC and CAC meetings (held April 5th and 10th respectively). Committee members provided input on each improvement concept, and the outcomes of the small group discussions (yes, no, or discuss further) were recorded as TAC or CAC recommendations. Those concepts given a “yes” or “discuss further” designation, along with technical and policy considerations resulted in a revised set of possible solutions to be considered for inclusion in the draft solutions package, and ultimately to be incorporated into the TVCP

The solutions being considered would serve one or more travel modes, including pedestrians (includes people who use mobility devices), bicyclists, transit riders, motorized vehicles, and freight (truck and rail). Within each of these categories, possible solutions are grouped by future time periods over the TVCP planning period through 2035. The time periods are categorized as “Short Term” (0 to 5 years from the point in time that funding is secured for implementation), “Short Term to Mid Term” (0 to 15 years), “Short Term to Long Term” (0 to 25 years), “Mid Term” (5 to 15 years), “Mid Term to Long Term” (5 to 25 years), and “Long Term” (15 years and beyond).

Possible Solutions to Include in the TV Hwy Corridor Plan (TVCP)

The PMT developed the following possible solutions in coordination with ODOT and consultant staff, and with consideration of input from the TVCP Technical Advisory Committee (TAC), the Community Advisory Committee (CAC) and the public (including input at an Open House held in Aloha on May 8, other events and via an online survey available to the public through May 15, 2012).

POTENTIAL SOLUTIONS

	Short Term (0-5 years*)	Mid Term (5-15 years)	Long Term (15+ years)
Multi-Modal	Support and promote employer incentive programs to reduce driving		
	Provide real-time traveler information for TV Hwy and other major routes in the area		
	Improve bus stops along TV Hwy**		
	Add street lighting on TV Hwy**		
	Improve signal timing (all modes)		
	Reduce vehicle turn movements to/from driveways on TV Hwy** → Reduce vehicle turn movements to/from driveways on TV Hwy**		
	Improve existing north-south routes for all modes →	Improve existing north-south routes for all modes →	Improve existing north-south routes for all modes
	Provide new local streets to improve connectivity around TV Hwy →	Provide new local streets to improve connectivity around TV Hwy	
Bicycle & Pedestrian	Add directional wayfinding signs	Develop continuous east-west parallel bike routes north and south of TV Hwy	Add a buffered bicycle lane on TV Hwy or multi-use path adjacent to railroad track
	Improve TV Hwy pedestrian and bicyclist crossings	Complete regional trails in corridor	
	Fill gaps in sidewalks and add landscape buffer along TV Hwy and fill in sidewalks on north-south connecting streets **		
	Provide bicycle facilities on TV Hwy		
Transit	Improve existing bus service within TVCP Area (#57 and other routes)	Add new North-South bus service between South Hillsboro and MAX	
	Moore detailed study to determine long-term transit solutions for TV Hwy		
Motor Vehicles	Add automated speed enforcement cameras**	Improve existing intersections along TV Hwy *** →	Improve existing intersections along TV Hwy***
Freight	Provide community rail safety education		

*0 - 5 years from plan adoption and secured funding

**Specific locations will be identified in the TVCP Solutions Development Report |

***More specific intersection improvement recommendations will be determined for the TVCP

OTHER IMPROVEMENT CONCEPTS NOT RECOMMENDED FOR CONSIDERATION BY THE TAC AND CAC

- Add security cameras at transit stops
- Install secure fencing on south side of railroad track between authorized crossings
- Consolidate number of at-grade rail crossings
- Add new bus service on parallel streets north and south of TV Hwy (e.g., Alexander, Blanton)
- Add a high-occupancy vehicle (HOV) lane
- Create a couplet between Cornelius Pass Road and 170th avenue (makes Alexander one-way westbound and Blanton one-way eastbound)
- Relocate railroad underneath the TV Highway median (cut-and-cover) and use existing railroad land for multimodal use
- Add undercrossing of railroad tracks for pedestrians and bicyclists (between 209th and 160th Avenues)

SHORT TERM (0-5 YEARS¹)

SUPPORT AND PROMOTE EMPLOYER INCENTIVE PROGRAMS TO REDUCE DRIVING

The Regional Transportation System Management and Operations (TSMO) Plan and the Regional Travel Options (RTO) Strategic Plan support marketing and outreach of travel options as a high priority. The Westside Transportation Alliance (WTA), the Transportation Management Association (TMA) serving Washington County, offers workplace services and programs to help employees commute to work by transit, carpool, vanpool, walking, and biking. Currently, there are six WTA Member Businesses within the TV Hwy Corridor. This solution would expand upon current employer-based commute trip reduction programs to reduce travel by motorists (particularly single-occupant vehicles). The program may apply to: purchasing transit passes for riders, vehicles for vanpooling or carpooling, bicycles for commuting, and equipment for transit shelters or bicycle storage.

Recommendation: Yes, as per PMT, TAC, CAC, and community input.

PROVIDE REAL-TIME TRAVELER INFORMATION FOR TV HWY AND OTHER MAJOR ROUTES IN THE AREA

Real-time traveler information may include electronic reader boards, aka. variable message signs (photo at right shows an example) to alert people of temporary lane closures and other nonrecurring events, and direct travelers to alternative routes. Real-time traveler information may also include expanded travel conditions data available to people with handheld electronic devices or on-board navigation systems.



Recommendation: Yes, as per PMT, TAC, and community input.

IMPROVE BUS STOPS ALONG TV HWY*

Amenities such as bicycle parking, shelters, seating, trash cans, lighting, and electronic TransitTracker displays may be provided at some bus stops to improve conditions for people who use transit and to attract more transit riders.

*Specific locations will be identified in a future TVCP Solutions Development Report.



Source: TriMet, <http://trimet.org/projects/pedestrian-network.htm>

Recommendation: Yes, as per PMT, TAC, CAC, and community input.

¹ 0-5 years from plan adoption and secured funding.

ADD STREET LIGHTING ON TV HWY*

A lack of lighting on some sections of TV Hwy makes it difficult to clearly see pedestrians, bicyclists, and vehicles at night. The addition of street lighting along TV Hwy would increase visibility and reduce potential conflicts to enhance safety for all users. Improved safety may increase active transportation and transit use. The greatest benefits are offered at poorly lit, unsignalized intersections, and near pedestrian/bicycle attractors (e.g., bus stops).

*Specific locations will be identified in a future TVCP Solutions Development Report.

Recommendation: Yes, as per PMT, TAC, CAC, and community input.

IMPROVE SIGNAL TIMING (ALL MODES)

Adjusting the timing at signalized intersections in the TVCP area to optimize traffic operations under current traffic volumes may reduce delay and improve travel times. Signal timing improvements may include:

- **Signal prioritization for transit** - The addition of transit signal priority at signalized intersections on TV Hwy would improve transit travel times along TV Hwy by detecting when a transit vehicle is approaching a signalized intersection and altering the intersection signal timing to provide additional green time to the transit vehicle movement. Signal priority allows busses to minimize delay at traffic signals and decrease the overall travel time for riders. The Regional Transportation System Management and Operations (TSMO) Plan identifies transit signal prioritization as a near-term priority for TV Hwy.
- **Adaptive signal control (“smart signals” that adjust timing to congestion levels)** is an advanced form of signal optimization that allows traffic signals to adjust signal timing in real time as traffic volumes change. Adaptive systems also communicate traffic volume and signal timing information between signals to improve overall corridor traffic flow. TV Hwy and other arterial corridors such as 185th Avenue are good candidates for adaptive signal control.

Recommendation: Yes, as per PMT, TAC, CAC, and community input.

SHORT TERM TO MID TERM (0-15 YEARS)

REDUCE VEHICLE TURN MOVEMENTS TO/FROM DRIVEWAYS ON TV HWY*

The safety of a roadway is closely related to the location, orientation, and distance between vehicle access points (e.g., streets and driveways). Research has clearly shown a direct correlation between the number of access points and collision rates. Typically, as the number of access points increases, so do collision rates. Managing the number, spacing, and available turning movements at driveway and side streets protects those traveling on a major street from conflicts with those turning onto or off of the street. The purpose of reducing vehicle turn movements (aka, access management) is to improve safety and mobility for through travel along TV Hwy by pedestrians, bicyclists, and motorists. Possible solutions to target for specific areas along TV Hwy include:

- Reducing the number of driveways as redevelopment of properties occurs along TV Hwy
- Reducing access to right-in, right-out only turn movements
- Restricting turns at certain intersections
- Using nontraversable medians to manage left-turn and U-turn movements

Turn restrictions would need to be focused at areas where alternative access is provided. Limiting driveway access on TV Hwy is a strategy that may be useful in protecting bicyclists riding in the right-hand travel lanes and pedestrians along the north side of the highway. Medians can also provide a refuge area for pedestrians crossing TV Hwy.

*Specific locations will be identified in a future TVCP Solutions Development Report.

Recommendation: Yes, as per PMT, TAC, CAC, and community input.

PROVIDE NEW LOCAL STREETS TO IMPROVE CONNECTIVITY AROUND TV HWY

Dedicating areas for new connected streets could be implemented with redevelopment of certain areas adjacent to TV Hwy. A connected local street network would provide a more safe, balanced, and integrated transportation network, including reducing the need for people making short local trips to use TV Hwy.

Recommendation: Yes, as per PMT, TAC, CAC, and community input.

SHORT TERM TO LONG TERM (0-25 YEARS)

IMPROVE EXISTING NORTH-SOUTH ROUTES FOR ALL MODES*

Some of the congestion on TV Hwy is a result of TV Hwy being used for a portion of north-south travel. Enhancing north-south roadways could reduce travel demand on TV Hwy. Multiple segments of north-south arterials and collectors do not safely accommodate pedestrians and bicyclists, and would benefit from enhancements including addition of on-street bike lanes and sidewalks. However, improvements to roadways such as 209th Avenue, 198th Avenue, 185th Avenue, and 170th Avenue, which are key routes between jobs north of TV Hwy and housing south of TV Hwy, may provide the most benefit to the overall transportation system. Further exploration and development of these enhancements may also be considered in concert with intersection improvements, such as possible strategies identified in Table 1 on page 9.



*Specific locations will be identified in a future TVCP Solutions Development Report.

Recommendation: Yes, as per PMT, TAC, CAC, and community input.

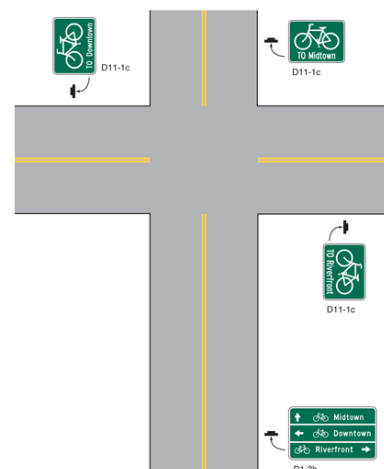
POTENTIAL BICYCLE & PEDESTRIAN SOLUTIONS

SHORT TERM (0-5 YEARS²)

ADD DIRECTIONAL WAYFINDING SIGNS

Wayfinding signs inform people who walk, use mobility devices, or ride bicycles about available pathways, streets, and other routes to safely and conveniently navigate throughout an area. Wayfinding signs will typically show destination, direction, distance (sometimes measured in time to walk or bike to a destination), a mode symbol (pedestrian, bicycle, etc.), and a route number or identification (if applicable). Wayfinding signage is an important element of the TSMO Plan and Regional Travel Options (RTO) Strategic Plan. Wayfinding signage along TV Hwy and connecting streets would direct pedestrians and bicyclists to transit facilities, schools, parks, and other community attractions to strengthen connectivity and increase bicycle, pedestrian, and transit use within the TVCP area. Application of this concept would be refined as the TVCP develops.

Recommendation: Yes, as per PMT, TAC, CAC, and community input.



² 0-5 years from plan adoption and secured funding.

IMPROVE TV HWY PEDESTRIAN AND BICYCLIST CROSSINGS*

Adding safe, new or enhanced pedestrian and bicyclist crossings at targeted locations may reduce potential conflicts with motorists. Possible crossing improvements include:

- Updated crossings at signalized intersections that meet Americans with Disabilities Act (ADA) requirements, and increase visibility and drivers' awareness of pedestrians and bicyclists
- New crossings with possible treatments including signals, striped crosswalks, and raised pedestrian refuge islands (such as the new signalized crossing at 178th Avenue)



*The locations of pedestrian crossing improvements will be evaluated based on the need for access management, transit stop locations, property access, and safety, and will be identified in a future TVCP Solutions Development Report.

Recommendation: Yes, as per PMT, TAC, CAC, and community input.

FILL GAPS IN SIDEWALKS AND ADD LANDSCAPE BUFFER ALONG TV HWY AND FILL GAPS IN SIDEWALK ON NORTH-SOUTH CONNECTING STREETS*

Existing sidewalk facility gaps along TV Hwy and on north-south arterials and collectors would be filled, and existing sidewalks would be widened to a minimum of 6 feet, consistent with the Metro Regional Street and Pedestrian Corridor designations. Sidewalks will connect schools, parks, and commerce areas to TV Hwy while improving safety and access to transit.

Consistent with the Regional street designation, a 5-foot to 8-foot planter strip would be provided between the bike lanes and sidewalk along TV Hwy. This landscape buffer will be designed with transit accessibility in mind (e.g., having concrete between the sidewalk and the curb at bus stops). This buffer between vehicular traffic and pedestrians improves safety and increases the attractiveness for pedestrians along the corridor.



*Specific locations will be identified in a future TVCP Solutions Development Report.

Recommendation: Yes, as per PMT, TAC, CAC, and community input.

PROVIDE BICYCLE FACILITIES ON TV HWY

While bike lanes are provided along most of the length of TV Hwy, there are missing in some locations and are narrow in other places. This solution would result in bike lanes being widened to a minimum of 6 feet (where feasible). Bike lanes must be wide enough to allow a bicyclist to ride far enough from the edge of pavement to avoid debris and avoid conflicts with passing vehicles. Existing bike lanes are narrow, especially considering the relatively high number of motorized vehicles and speeds on TV Hwy. These constrained bike lanes limit the use of bicycles as a safe and viable travel mode on TV Hwy, and force bicyclists to ride on or near the edge of the outside vehicle travel lane. Improved bike lanes would clearly designate a usable lane for bicyclists on the roadway, and possible locations of these improved facilities are shown on the four segment maps.

Recommendation: Yes, as per PMT, TAC, CAC, and community input.

MID TERM (5-15 YEARS)

DEVELOP CONTINUOUS EAST-WEST PARALLEL BIKE ROUTES NORTH AND SOUTH OF TV HWY

To complement Regional Transportation Plan (RTP) and Major Streets Transportation Improvement Program (MSTIP) projects, continuous east-to-west bike routes that parallel TV Hwy will be provided. There are opportunities to advance this concept in the Washington County Transportation System Plan and Regional Active Transportation Plan. The following are some of the streets that will potentially have bike facilities:

North of TV Hwy:

- Alexander Street from 170th Avenue to 214th Avenue
- Johnson Street from 209th Avenue to 234th Avenue
- Drake Street from 67th Avenue to Brookwood Avenue
- Frewing Road from Brookwood Avenue to 45th Avenue

South of TV Hwy:

- River Road from TV Hwy to Witch Hazel Road
- Witch Hazel Road from River Road to Brookwood Avenue
- Construct Shaw Road from Brookwood Avenue to 198th Avenue
- Shaw Road from 198th Avenue to 160th Avenue
- Alexander from Davis Road to 229th [and eventually through South Hillsboro]
- Davis Road from River Road to 234th

This improvement concept would serve both advanced and casual riders (including children). Advanced riders are typically willing to use bicycle facilities along main streets and will avoid out-of-direction travel whenever possible. The more casual riders typically desire a separated facility, or a roadway with lower-speed, lower-volume traffic, and are willing to include a small amount of out-of-direction travel.

Recommendation: Yes, as per PMT, TAC, CAC, and community input.

COMPLETE REGIONAL TRAILS IN CORRIDOR

TV Hwy Corridor is identified by Tualatin Hills Parks and Recreation District (THPRD) as part of the Surf to Turf Rail-with-Trail. Other regional trails in the TVCP area are identified in the Metro RTP Financially Constrained project list. Completion of these regional trails would improve the multimodal transportation system and enhance livability.

Recommendation: Yes, as per PMT, TAC, and community input.



LONG TERM (15+ YEARS)

ADD A BUFFERED BICYCLE LANE ON TV HWY OR A MULTI-USE PATH ADJACENT TO THE RAILROAD TRACK

Buffered bicycle lanes are separated from automobile traffic by a physical barrier such as a landscaped buffer or a mountable curb to provide cyclists with a higher level of comfort and safety. Buffered bicycle lanes may be one-way or two-way on the same side of the road. This buffer between vehicular traffic and bicyclists improves safety and increases the attractiveness for bicyclists along the corridor. Special attention must be given to points where the bicycle lanes or separated pathway would interact with



roadways and driveways. Coordination and agreement plus potential property acquisition would be needed to construct a path adjacent to the railroad. Additional study is needed to determine the most appropriate and cost-effective long-term treatment.

Recommendation: Discuss further, as per PMT, TAC, and community input.

POTENTIAL TRANSIT SOLUTIONS

SHORT TERM (0-5 YEARS³)

IMPROVE EXISTING BUS SERVICE WITHIN TVCP AREA (#57 AND OTHER ROUTES)

More extensive and frequent bus service may attract additional riders and allow for the movement of more people through the corridor. Additionally, stop locations will be assessed for safety, access to resources such as schools and health facilities, and ease of connections to the MAX. Bus service will also be enhanced by signal priority for transit vehicles. Signal priority allows busses to minimize delay at traffic signals and decrease the overall travel time for riders.



Recommendation: Yes, as per PMT, TAC, CAC, and community input.

MORE DETAILED STUDY TO DETERMINE LONG-TERM TRANSIT SOLUTIONS FOR TV HWY

The Regional Transportation Plan identifies TV Hwy as a high capacity transit corridor. A thorough and detailed transit alternatives analysis study would determine the preferred location (e.g., on or adjacent to TV Hwy) and most viable transit mode that could be developed further and eventually implemented (e.g., express bus service, light rail, streetcar, bus rapid transit, or commuter rail) to serve future growth and potential transit users.

Recommendation: Yes, as per PMT input.

MID TERM (5-15 YEARS)

ADD NEW NORTH-SOUTH BUS SERVICE BETWEEN SOUTH HILLSBORO AND MAX

New north-south bus service would connect the communities of South Hillsboro and Aloha-Reedville to the MAX line north of TV Hwy. New bus service will help with connectivity and access throughout the TVCP area. The City of Hillsboro and TriMet are currently working on a Westside Transit Enhancement Study that is evaluating the benefits of providing north-south bus service. Both the TriMet study and the TVCP are evaluating a north-south transit line in the vicinity of Century Boulevard to connect jobs north of TV Hwy with housing south of TV Hwy. To provide the additional benefit, the north-south transit lines should jog east-west off of arterials into residential neighborhoods, coordinate arrival times with the MAX line, and reduce or eliminate the need for transfers by bringing users as close to the front doors of large area businesses as possible.

Recommendation: Yes, as per PMT, TAC, CAC, and community input.

POTENTIAL MOTOR VEHICLE SOLUTIONS

SHORT TERM (0-5 YEARS⁴)

³ 0-5 years from plan adoption and secured funding.

⁴ 0-5 years from plan adoption and secured funding.

ADD AUTOMATED SPEED ENFORCEMENT CAMERAS*

Long delays and extensive traffic queues may cause drivers to engage in riskier actions, such as exceeding reasonable speeds, which could result in more turning- and angle-related collisions. Speed cameras provide law enforcement officials with a tool to improve safety for all modes by targeting aggressive and reckless driving behaviors.

*Specific locations will be identified in a future TVCP Solutions Development Report.

Recommendation: Yes, as per PMT, TAC, CAC, and community input.

MID TERM TO LONG TERM (5-25 YEARS)

IMPROVE SPECIFIC INTERSECTIONS ALONG TV HWY

Improvements will be needed at 10 intersections along TV Hwy to maintain mobility through the future planning year (2035). Table 1 below provides a list of possible improvements for each intersection that would maintain adequate operating conditions for motorists based on a traffic operational analysis of future conditions along TV Hwy using the Metro 2035 travel demand model. Additional coordination will be needed with ODOT, Washington County, and the Cities of Hillsboro and Beaverton to determine the most appropriate and cost-effective improvements. Additional study would be needed to determine the benefits and impacts of potential urban interchange or other grade separated treatments.

Table 1. Possible Intersection Improvements to Maintain Mobility

Intersection	Possible Examples to Maintain Mobility
SE Brookwood Ave & TV Hwy	Second left-turn lane
SW 234th Ave/Century Blvd & TV Hwy	Dual left-turn lane on one approach, dedicated right-turn lane on one approach
SW 229th Ave & TV Hwy	Left-turn lane
TV Hwy & Cornelius Pass Rd/SW 219th Ave	Dual left-turn lanes on three approaches, dedicated right-turn lane on one approach, two north-south through lanes, protected left turns (traffic signal improvement)
SW 209th Ave & TV Hwy	Dedicated right-turn lanes on two approaches, additional north-south through lane, protected left turns (traffic signal improvement)
SW 198th Ave & TV Hwy	Dual left-turn lanes on one approach, dedicated right-turn lane on one approach
SW 185th Ave & TV Hwy	Dual left-turn lanes on all approaches, dedicated right-turn lanes on two approaches
SW 170th Ave & TV Hwy	Dedicated right-turn lanes on three approaches, dual left-turn lanes on all approaches, additional through lanes (or grade separation)
SW 160th Av/SW Millikan Way & TV Hwy	Dual left-turn lanes on one approach, protected left turns (traffic signal improvement)
SW Murray Blvd & TV Hwy	Dual left-turn lane on one approach, dedicated right-turn lane

Note: The listed improvements are included to provide an order of magnitude understanding of effort and cost. Other improvement scenarios may also provide adequate operations. The adoption of alternative mobility standards may allow for fewer improvements.

Recommendation: Yes, as per PMT, TAC, CAC, and community input.

FREIGHT

PUBLIC COMMUNITY RAIL SAFETY EDUCATION

Promoting and integrating public rail safety education (“Operation Lifesaver”), particularly targeted at school-aged children within the TVCP vicinity is an effective way of increasing community awareness of safety issues. The primary immediate and sustained benefit of implementing this program through schools in the TVCP area will be reduced exposure to freight trains by people who may otherwise trespass across the Portland and Western Rail track, or stop their vehicle within a marked rail crossing. Metro supports this solution concept and notes that there is an opportunity to incorporate rail safety education into the Regional Freight and Passenger Rail Study scope of work.



Recommendation: Yes, as per PMT, TAC, CAC, and community input.

OTHER IMPROVEMENT CONCEPTS NOT RECOMMENDED FOR TVCP SOLUTIONS PACKAGE

The following improvement concepts were presented to and considered by the TAC and CAC. Based on their input and the professional recommendation of the consultant staff, these improvement concepts are not recommended to be included in the Draft Solutions Package. However, the PMT encourages your input on these concepts, including whether or not you agree with this recommendation. All public comments will be made part of the project record and considered in future recommendations.

ADD SECURITY CAMERAS AT TRANSIT STOPS

Security cameras can assist transit agencies in monitoring and responding to situations at transit facilities and can be used in incident response. Cameras can be used to monitor the safety of passengers while ensuring that the station equipment remains intact. Security cameras at transit stops can warn officials of possible intentional acts of crime or violence.

- This improvement concept met very few of the project objectives and was not supported by the TAC or CAC. Therefore, it is not recommended for the Draft Solutions Package.

INSTALL SECURE FENCING ON SOUTH SIDE OF RAILROAD TRACK BETWEEN AUTHORIZED CROSSINGS

A fence separating the railroad track and the residential and commercial developments on the south side of TV Hwy would funnel pedestrians and bicyclists through authorized crossings, thereby improving freight travel time reliability. This fencing would reduce the number of unauthorized crossings of the Portland and Western Rail (PNWR) track, thus increasing safety within the corridor.

- This improvement concept met very few of the project objectives, could potentially decrease pedestrian and transit mode share, and was not supported by the TAC or CAC. The fencing conflicted with the objectives for a well-connected street system and an increase in pedestrian mode share. Because this is an expensive solution that would not be paid for by the railroad company, the TAC found that this would offer only limited benefits for a high cost. It is therefore not recommended for the Draft Solutions Package.

CONSOLIDATE NUMBER OF AT-GRADE RAIL CROSSINGS

At-grade rail crossings pose a safety risk, and reducing the number of crossings may improve rail-related safety.

⁵ 0-5 years from plan adoption and secured funding.

- This improvement concept met very few of the project objectives and was not supported by the TAC or CAC. Consolidating the number of at-grade rail crossings would not minimize travel times, provide a well-connected street system, provide a more complete bicycle or pedestrian system, enhance conditions for reliable emergency response, or develop solutions that support economic vitality. Furthermore, closing an at-grade crossing would divert traffic to adjacent intersections that are already capacity-constrained. Therefore this improvement concept is not a recommended solution.

ADD NEW BUS SERVICE ON PARALLEL STREETS NORTH AND SOUTH OF TV HWY (E.G., ALEXANDER, BLANTON)

New bus service on parallel streets would improve connectivity within the TVCP area while increasing transit, pedestrian, and bicycle mode share.

- This is not a recommended improvement concept because it would require infrastructure improvements (e.g., for bus stops) and would detract ridership from the TV Hwy Route #57. The PMT, TAC, and CAC unanimously did not recommend this improvement concept for inclusion in the Draft Solutions Package.

ADD A HIGH-OCCUPANCY VEHICLE (HOV) LANE

HOV lanes are also known as carpool or diamond lanes. HOV lanes can connect major population and employment centers. They are generally inside (left) lanes that are identified by signs and diamond symbols painted on the pavement, and are typically separated from the other lanes on the freeway by a solid white line.

- Adding a HOV lane on TV Hwy is not recommended for the Draft Solutions Package because of the negative feedback received from the TAC and CAC. The principal concerns were with giving up a lane of traffic or needing to add another lane and that an HOV lane is most effective with pricing preferences that would not work on TV Hwy. Although the HOV lane meets the project objectives for greater travel time reliability and a reduction in travel share by single-occupancy vehicles, it is a high cost-solution that does not fit the arterial designation of TV Hwy. For these reasons it is not a recommended improvement concept for the Draft Solutions Package.

CREATE A COUPLET BETWEEN CORNELIUS PASS ROAD AND 170TH AVENUE (MAKES ALEXANDER ONE-WAY WESTBOUND AND BLANTON ONE-WAY EASTBOUND)

A couplet between Cornelius Pass Road and 170th Avenue would function as more of a circulatory system south and parallel to TV Hwy.

- This improvement concept was universally not recommended by the PMT, TAC, or CAC and is therefore not included in the Draft Solutions Package. Members found this option to be too disruptive to travel patterns and neighborhood streets, with minimal benefits. Although this improvement would meet the project objectives for mobility and safety, it conflicts with the objectives for providing a well-connected street network and worker access to industrial/employment areas.

RELOCATE RAILROAD UNDERNEATH THE TV HWY MEDIAN (CUT-AND-COVER) AND USE EXISTING RAILROAD LAND FOR MULTIMODAL USE

This would be a major reconstruction project to relocate a portion of the PNWR track alignment and to depress the track elevation so that other modes could cross it via structures. The existing PNWR right-of-way would be available for use as a dedicated high-capacity transit and multi-use trail.

- Because the high cost of this improvement concept would preclude other low-cost, high-impact solutions, this is not recommended for the Draft Solutions Package. PMT, TAC, and CAC members agreed that, although relocating the railroad and using the land for multimodal use meets a high number of objectives, it is cost prohibitive.

ADD UNDERCROSSING OF RAILROAD TRACKS FOR PEDESTRIANS AND BICYCLISTS (BETWEEN 209TH AND 160TH AVENUES)

An undercrossing will allow safe access to and from TV Hwy for pedestrians and bicyclists from the south without creating an additional crossing of the railroad tracks.

- Multiple technical and community representatives have expressed concern that this would be extremely costly and may not be safe for users. The general consensus among TAC and CAC members was that personal safety may be compromised in creating undercrossings. Additionally, there are different low-cost solutions that meet more project objectives. For these reasons, this is not a recommended improvement concept for the Draft Solutions Package.

NEXT STEPS

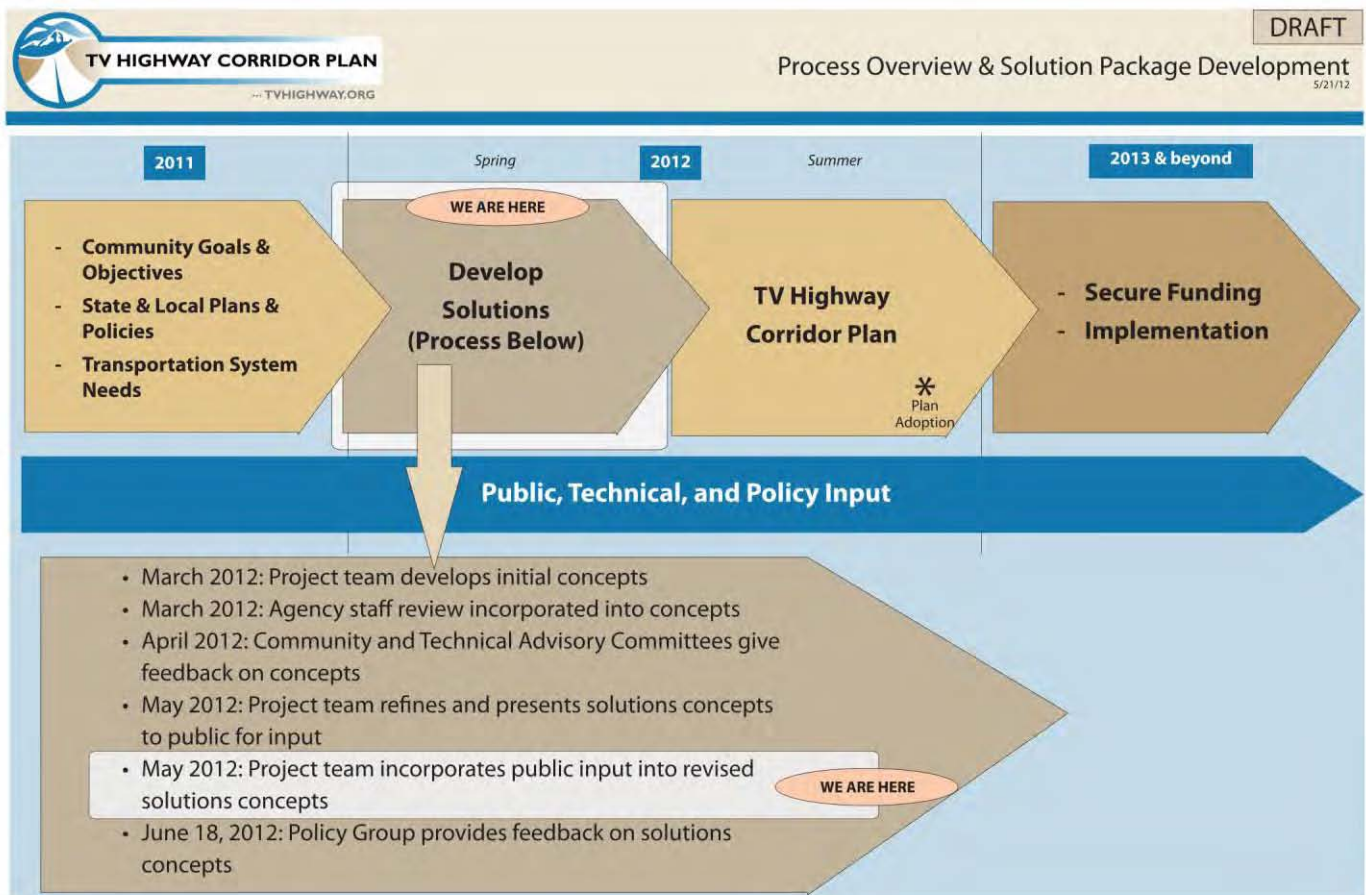
The next TVCP Policy Group (PG) meeting is scheduled from 1:00 – 3:00 PM on Monday, June 18th, 2012 at the, Tualatin Valley Fire and Rescue, North Operating Center (20665 SW Blanton St. Aloha). At this meeting, the PMT will seek the PG's input and preliminary approval of the Draft Solutions Package and proposed implementation timing. From that point, the PMT will complete the Solutions Development Report and will subsequently incorporate the recommended solutions package into the draft TV Highway Corridor Plan (TVCP). The TAC, CAC, and public will review the draft TVCP and provide input to the PG. The PMT will seek input and direction from the PG at their final meeting (tentatively scheduled for early September 2012).

Finally, the PMT will complete the TVCP for approval through hearings from the Hillsboro and Beaverton City Councils, the Washington County Board of Commissioners, the Metro Council, and the Oregon Transportation Commission (OTC). These hearings have not been scheduled.

Upcoming planned meetings in the TVCP process include:

- **Policy Group Meeting #2**, Monday, June 18
- **Technical Advisory Meeting #4**, date TBD, estimated for week of July 9
- **Community Advisory Meeting #4**, date TBD, estimated for week of July 9
- **Policy Group Meeting #3**, date TBD, estimated for early September

Figure 1. Process Overview and Solution Package Development



Agenda Item Number 3.0

**Regional Transportation Safety
Plan**

Metro Council Work Session
Tuesday, May 29, 2012
Metro Council Chamber

METRO COUNCIL

Work Session Worksheet

Presentation Date: May 29, 2012 Time: 2:45p.m. Length: 75 min.

Presentation Title: Regional Transportation Safety Plan: Findings and Recommendations

Service, Office, or Center:
Planning and Development

Presenters (include phone number/extension and alternative contact information):
Anthony Butzek (x1674), Josh Naramore (x1825)

ISSUE & BACKGROUND

Since fall 2009, responding to a Federal Highway Administration recommendation, Metro has been working with the Regional Safety Workgroup to better integrate safety into the transportation planning process. The Workgroup is comprised of the Metro region's cities and counties, Metro, TriMet, ODOT, researchers from Portland State University and practitioners specializing in transportation safety. The first task of the Workgroup was developing a performance target for the 2035 Regional Transportation Plan (RTP) for a 50% reduction in fatalities and serious injuries for pedestrians, bicyclists, and motor vehicle occupants by 2035 as compared to 2005.

The Workgroup has also been working on a Regional Transportation Safety Plan (RTSP), the first of its kind for this region with the goal to help the region meet the RTP target for reducing fatalities and serious injury crashes. The RTSP focuses on the Portland Metro region and is specifically urban-focused. The Regional Safety Workgroup identified the most significant findings, focusing on trends that are clearly apparent from the crash data. Some of the key findings from the data are:

- Arterials have the highest serious crash rate for all modes.
- Alcohol and drugs are a primary contributing factors to fatal crashes.
- Speeding and aggressive driving are the leading contributing factors toward serious crashes.
- Serious pedestrian crashes are disproportionately represented after dark.
- Serious nighttime pedestrian and bicycle crashes occur disproportionately where street lighting is not present.
- Streets with more traffic lanes have particularly high serious pedestrian crash rates per mile and per VMT.

The Workgroup then used these findings to develop short-term recommendations for the region to pursue in the near future to better address transportation safety and work to reduce fatalities and serious injuries. Longer term recommendations, which are necessary if the region is to achieve the targeted reduction in serious crashes, are also identified for future efforts and policy revisions. The key recommendations for improving safety in the Portland Metropolitan area are included in Attachment 1.

Metro staff is proposing to work with regional partners over the next year on the short-term recommendations for reducing fatalities and serious injuries on the region's roadway system.

OPTIONS AVAILABLE

The short-term and long-term recommendations for improving safety in the Portland Metropolitan area from the RTSP are included in Attachment 1. Metro staff is proposing to work with regional partners over the next year on the short-term recommendations for reducing fatalities and serious injuries on the region's roadway system.

The development of the RTSP has been almost exclusively a technical exercise conducted by Metro staff with input from the Regional Safety Workgroup and TPAC. Metro staff is seeking input on the plan recommendations and how to approach the presentation and discussion of the findings and implementation options with policymakers. The May 29 Council Worksession will be divided into a presentation of the findings from the RTSP and a discussion of the plan recommendations. The RTSP presentation and discussion is scheduled for JPACT's July 12 meeting.

QUESTION(S) PRESENTED FOR CONSIDERATION

Does Council have suggestions or direction on communicating the findings and recommendations from the Regional Transportation Safety Plan to other policymakers?

LEGISLATION WOULD BE REQUIRED FOR COUNCIL ACTION __Yes **X**No
DRAFT IS ATTACHED __Yes **X**No

ATTACHMENTS:

- Short-Term and Long-Term Recommendations
- Regional Transportation Safety Plan

Table 1 – Regional Transportation Safety Plan Short-Term Recommendations

	Finding	Strategy or Strategies	Actions	Resources Currently Available?
All Crashes	<i>Alcohol and drugs, excessive speed, and aggressive driving are the most common contributing factors in serious crashes.. Crashes involving alcohol and drugs have a much higher likelihood of being fatal than other crashes.</i>	Policies to reduce the prevalence of speeding and aggressive driving on surface streets and to reduce the prevalence of driving under the influence of intoxicants.	<ul style="list-style-type: none"> • Convene and/or coordinate targeted workgroup of safety professionals (law enforcement, EMS, etc.) to develop targeted strategies to reduce the prevalence of driving under the influence of alcohol and/or drugs, speeding and aggressive driving. 	No
Surface Streets	<i>Arterials roadways have the highest serious crash rate per road mile and per VMT. 59% of the region's serious crashes, 67% of the serious pedestrian crashes, and 52% of the serious bike crashes occur on arterial roadways.</i>	A regional arterial safety program to focus on corridors with large numbers of serious crashes, pedestrian crashes, and bicycle crashes.	<ul style="list-style-type: none"> • Develop systemic performance measures for identifying high severity crash arterials across the region. Use strategies including Highway Safety Manual strategies to address arterial safety, such as medians, speed management, access management, roundabouts, and road diets. 	Need GIS and data analysis support.
Bicycle & Pedestrian	<i>Serious pedestrian crashes are disproportionately represented after dark. Serious nighttime pedestrian and bicycle crashes occur disproportionately where street lighting is not present.</i>	A focus on crosswalk and intersection lighting where pedestrian and bicycle activity is expected, as well as programs to encourage use of reflective equipment by pedestrians and bicyclists.	<ul style="list-style-type: none"> • Research pedestrian/bicycle facility lighting best practices. • Ensure bike routes and crosswalks – marked and unmarked – are adequately lit. • Safety education campaign around “See and be seen.” • Further explore bicycle and pedestrian safety and identify projects as part of the Regional Active Transportation Plan currently underway. 	Yes
	<i>Streets with more traffic lanes have higher serious pedestrian crash rates per mile and per VMT.</i>	Policies to improve the quality and frequency of pedestrian crossings on arterials and multi-lane roadways, as well as enforcement of right-of-way at crosswalks.	<ul style="list-style-type: none"> • Develop safe crosswalks on arterials and multi-lane roads, generally adhering to the region's maximum spacing standard of 530 feet and at all transit stops. • Enforce existing laws through crosswalk enforcement actions. 	Yes

	Finding	Strategy or Strategies	Actions	Resources Currently Available?
	<i>Streets with more traffic lanes have higher serious bicycle crash rates per mile.</i>	Policies to encourage protected bicycle facilities along roadways with high motor vehicle traffic volumes and/or speeds.	<ul style="list-style-type: none"> Along high-volume and/or high-speed roadways, where feasible, provide protected bicycle facilities such as buffered bike lanes, cycle tracks, multi-use paths, or low-traffic alternative routes 	Yes

Table 2 – Regional Transportation Safety Plan Long-Term Recommendations

	Finding	Strategy or Strategies	Actions	Resources Currently Available?
All Crashes	<i>Increases in vehicle miles travelled (VMT) generally correlate with increases in fatal and serious crashes.</i>	Policies that limit the need to drive, and therefore limit vehicle-miles travelled.	<ul style="list-style-type: none"> Continued support of regional and state policies that seek to reduce VMT, including multimodal facilities, transit, RTO, and TDM. 	Yes
Surface Streets	<i>The most common serious crash types on surface streets were rear end and turning. For fatal crashes, the most common types were pedestrian and fixed object.</i>	Develop more detailed understanding of causes of the most common serious crashes in the region and the effectiveness of countermeasures.	<ul style="list-style-type: none"> Develop safety best practices based on the HSM for the region to address the most prevalent crash types. 	No
			<ul style="list-style-type: none"> Further analyze crash types. 	No
	<i>Higher levels of congestion on surface streets are correlated with lower serious crash rates, likely due to lower speeds.</i>	Revisions to state, regional, and local mobility standards to consider safety as equally important, at a minimum, as vehicular capacity.	<ul style="list-style-type: none"> Elevate safety to equal importance as mobility in regional policy as part of the next RTP update that will start in 2013. 	Yes
	<i>Higher levels of congestion on freeways are correlated with higher serious crash rates, except for severe congestion, which is correlated with lower serious crash rates.</i>	Revisions to state, regional, and local mobility standards to consider safety as equally important, at a minimum, as vehicular capacity.	<ul style="list-style-type: none"> Elevate safety to equal importance as mobility in regional policy as part of the next RTP update that will start in 2013. 	Yes
	<i>Surface streets with more traffic lanes have higher crash rates per road mile and per VMT. This follows trends documented in AASHTO's Highway Safety Manual. Roadway designs that increase speed lead to increased crash severity</i>	A regional arterial safety program to focus on corridors with large numbers of serious crashes, pedestrian crashes, and bicycle crashes.	<ul style="list-style-type: none"> Include safety as an element of the update to the Metro Best Design Practices guidebooks. Use strategies including Highway Safety Manual strategies to address safety on 	Yes

	Finding	Strategy or Strategies	Actions	Resources Currently Available?
	in the absence of specific safety considerations.		multi-lane roadways, such as medians, speed management, access management, improved pedestrian crossings, roundabouts, and road diets.	
Data	<i>This report identifies high-level trends in regional crashes, but more detailed work is needed to identify specifically where and why they are occurring in disproportionate amounts.</i>	More detailed analysis of the causes of serious crashes, pedestrian crashes, and bicycle crashes in the region	<ul style="list-style-type: none"> Collect, maintain and analyze ODOT crash data. Provide regional crash data for use in TSP updates and other requests. 	Yes, except for GIS support and data analysis
Additional Research	<i>The analysis of the relationship between land use, neighborhood design, and safety was inconclusive. More research is needed to establish reliable relationships between land use, neighborhood design, and safety.</i>	More detailed research on the relationship between land use patterns and safety	<ul style="list-style-type: none"> Work with OTREC to develop research project to further explore the linkage between transportation safety, land use and the built environment. 	No

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Regional Transportation Safety Plan

Improving transportation safety for the
Portland metropolitan area

May 11, 2012



Metro | *Making a great place*

About Metro

Clean air and clean water do not stop at city limits or county lines. Neither does the need for jobs, a thriving economy, and sustainable transportation and living choices for people and businesses in the region. Voters have asked Metro to help with the challenges and opportunities that affect the 25 cities and three counties in the Portland metropolitan area.

A regional approach simply makes sense when it comes to making decisions about how the region grows. Metro works with communities to support a resilient economy, keep nature close by and respond to a changing climate. Together we're making a great place, now and for generations to come.

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Shirley Craddick, District 1

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Carl Hosticka, District 3

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Rex Burkholder, District 5

Barbara Roberts, District 6

Auditor

Suzanne Flynn

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Regional Safety Workgroup

Anthony Butzek, Metro

Deena Platman, Metro

Josh Naramore, Metro

Beth Wemple, Cambridge Systematics

Ed Anderson, Washington County

Erin Ferguson, Kittelson and Associates, Inc.

Jane McFarland, Multnomah County

Mark Lear, City of Portland

Wendy Cawley, City of Portland

Sharon White, City of Portland

Tegan Enloe, CH2MHILL

Sandra Doubleday, City of Gresham

Nick Fortey, FHWA Oregon Division

Young Park, TriMet

Joshua Rohani, David Evans and Associates, Inc.

Kelly Brooks, ODOT Region 1

Sue D'Agnese, ODOT Region 1

Chris Monsere, Portland State University

Joe Marek, Clackamas County

Margaret Middleton, City of Beaverton

Mike McCarthy, City of Tigard

Marcy McInelly, Urbsworks

Metro is the federally mandated metropolitan planning organization designated by the governor to develop an overall transportation plan and to allocate federal funds for the region.

The Joint Policy Advisory Committee on Transportation (JPACT) is a 17-member committee that provides a forum for elected officials and representatives of agencies involved in transportation to evaluate transportation needs in the region and to make recommendations to the Metro Council.

The established decision-making process assures a well-balanced regional transportation system and involves local elected officials directly in decisions that help the Metro Council develop regional transportation policies, including allocating federal transportation funds.

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DEFINITIONS

Terms that are used throughout this report are defined as follows:

“Portland Metro region” is the scope of this study, and is defined as area within the Urban Growth Boundary (UGB) as of December 31, 2011.

“Injury A” and **“Incapacitating injury”** are used interchangeably. Incapacitating injuries typically are injuries that the victim is not able to walk away from. They are synonymous with the term **“Severe injury”**

“Injury B” and **“Moderate injury”** are used interchangeably.

“Injury C” and **“Minor injury”** are used interchangeably.

“Serious Crashes” in this report refers to the total number of Fatal and Injury A crashes.

Per capita is used to describe crash rate per population. Except where otherwise noted, crash rates are per million residents.

Per VMT is used to describe crash rate per motorized vehicle miles. Except where otherwise noted, crash rates are per 100-million motorized vehicle miles travelled.

Arterial is a functional classification for surface streets. AASHTO defines arterials from the motor vehicle perspective as providing a high degree of mobility for the longer trip lengths and high volumes of traffic, ideally providing a high operating speed and level of service and avoiding penetrating identifiable neighborhoods.

Collector is a functional classification for surface streets. AASHTO defines collectors as providing both land access and traffic circulation within neighborhoods and commercial and industrial areas. The role of the collector system, from the motor vehicle perspective, is to distribute traffic to and from the arterial system.

Local is a functional classification for surface streets that includes all public surface streets not defined as arterial or collector. Local streets are typically low-speed streets with low traffic volumes in residential areas, but also include similar streets in commercial and industrial areas.

EXECUTIVE SUMMARY

Transportation safety is a critical public health issue in the United States. Nationwide, crashes killed an average of 37,500 people per year between 2007 and 2009. During that same time period in Oregon, there were roughly 42,500 traffic crashes and 1,111 people were killed on the state's roadway system, averaging 370 fatalities annually. Traffic crashes are the leading cause of accidental deaths in the United States, and the leading cause of deaths of all kinds for ages 15 – 34¹.

The Portland Metro region, with a population of about 1.4 million, comprises almost 40 percent of the state's population. Between 2007 and 2009, in the Portland Metro region there were more than 18,000 crashes including 159 fatalities and 1,444 crashes resulting in a serious injury. This represents 43% of the state's crashes, 14% of its fatalities, and 36% of its serious injury crashes. The annual economic cost to the region of these crashes is estimated at \$958 million².

It is the Portland Metro region's adopted goal to reduce the number of pedestrians, bicyclists, and automobile occupants killed or seriously injured on the region's roadways each by 50% by 2035 compared to 2005. A 50% reduction in all crash types would therefore be a saving of \$479 million annually in economic costs to the Metro region. This is an ambitious but important step toward realizing the larger vision of zero deaths.

The Regional Transportation Safety Plan (RTSP) is the first of its kind for this region. The goal of the RTSP is to help the region reduce fatalities and serious injury crashes. This work builds on the efforts of the Oregon Department of Transportation's (ODOT) recent adoption of the Transportation Safety Action Plan (TSAP). The RTSP is based on the coordinated efforts of many local agencies, organizations and individuals through the Regional Safety Workgroup. The Workgroup was formed in October 2009 to begin exploring ways to better integrate safety into the transportation planning process.

The RTSP serves as a data-driven framework and specifically urban-focused safety plan to build upon ODOT's statewide success and reduce fatalities and serious injuries in the Portland Metropolitan region. Metro, in coordination with the Regional Safety Workgroup analyzed crash data provided by ODOT and produced the first State of Safety in the Region report. This report provides the data foundation of the RTSP. Some of the key findings from the data are:

- Arterials have the highest serious crash rate for all modes.
- Alcohol and drugs are a primary contributing factors to fatal crashes.
- Speeding and aggressive driving are the leading contributing factors toward serious crashes.
- Serious pedestrian crashes are disproportionately represented after dark.

¹ Source: CDC, Deaths: Final Data for 2009

² Oregon Department of Transportation, *Comprehensive Economic Value per Crash table*, http://www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/docs/excel/BC_Form.xls (Appendix X.X)

- Serious nighttime pedestrian and bicycle crashes occur disproportionately where street lighting is not present.
- Streets with more traffic lanes have particularly high serious pedestrian crash rates per mile and per VMT.

The RTSP aims to address these findings and help to meet the RTP target for reducing fatalities and serious injuries for all crashes by 50 percent. The key recommendations for improving safety in the Portland Metropolitan region are:

- Continue data collection and analysis of ODOT crash data to support regional and local planning efforts.
- Develop scorecard/performance measures for identifying high crash mobility corridors and high crash arterials across the region.
- Convene targeted workgroup of expanded safety professionals to develop targeted strategies to reduce the prevalence of driving under the influence of alcohol and drugs, speeding and aggressive driving.
- Focus on improved pedestrian crossings including lighting, particularly on multi-lane arterials.
- Focus on providing protected bicycle facilities such as buffered bike lanes, cycle tracks, multi-use paths, or low-traffic alternative routes along high-volume and/or high-speed roadways.
- Further explore bicycle and pedestrian safety and identify projects as part of the Regional Active Transportation Plan currently underway.

Metro will be working with regional partners over the next year to work on these recommendations for reducing fatalities and serious injuries on the region's roadway system.

1.0 INTRODUCTION

With the federal surface transportation legislation TEA-21 in 1998, safety and security appeared as planning factors for metropolitan planning organizations (MPOs) to address in transportation planning. SAFETEA-LU, adopted in 2005, placed a greater emphasis on addressing safety. Over the last few years MPOs across the country have struggled to effectively incorporate safety into the transportation planning process. In fact for many MPOs safety was incorporated in name only with a goal statement often independent from a data driven detailed analysis of safety.

Since fall 2009, responding to a Federal Highway Administration recommendation, Metro has been working with local governments, ODOT, TriMet, practitioners and researchers to draft a Regional Transportation Safety Plan (RTSP). The RTSP serves as a data-driven framework and specifically urban-focused safety plan to build upon ODOT's statewide success and reduce fatalities and serious injuries in the Portland Metropolitan region.

The outline for the RTSP is:

- **Section 1** – An introduction to the report
- **Section 2** – An assessment of federal, state and regional transportation goals and policies as they relate to safety, and highlights of local agency efforts to improve transportation safety.
- **Section 3** – Summary of regional trends in the crash data and compared to state, national and international trends, including an analysis of fatal and serious injury crashes in the region and their relationship to transportation and land use patterns.
- **Section 4** – Recommendations for implementing safety strategies to help meet the 2035 RTP target of reducing fatalities and serious injuries by 50% or more.

PURPOSE

The 2035 Regional Transportation Plan established a performance target for a 50% reduction in fatalities and serious injuries for pedestrians, bicyclists, and motor vehicle occupants by 2035 as compared to 2005. The purpose of the RTSP is to identify ways to help the region meet this goal and reduce fatalities and serious injury crashes. Unlike the TSAP adopted by ODOT that looks at statewide crash trends, this plan focuses on the Portland Metro region and is specifically urban-focused. It provides a data-driven framework to identify trends in the region's crashes and recommends short-term and long-term strategies to begin to reduce fatalities and serious injuries for all modes on the region's roadways.

THE 5 E'S OF SAFETY

When considering the safety of the transportation system, it is important to think about the built environment, the vehicles, and the user including pedestrians, bicyclists and drivers. Research indicates that the vehicle, the roadway and the user are a factor in roughly 12, 34 and 93 percent of traffic crashes respectively. Therefore it is imperative that safety solutions be multidisciplinary and multimodal in nature. A common application of a multidisciplinary approach exists in the 5 E's of transportation safety:

- *Education* – Through education, all transportation system users, including pedestrians, bicyclists, and drivers of all ages develop awareness of how their behavior contributes to safety.
- *Emergency Medical Service (EMS)* – EMS consists of a highly organized system ensuring prompt notification of the location and severity of a crash, timely dispatch of trained emergency care providers, use of evidence-based treatment protocols and triage to an appropriate health care facility.
- *Enforcement* – High visibility enforcement as a deterrent to the violation of traffic laws.
- *Engineering* – Building a safe and efficient multimodal transportation system to meet the needs of all users.
- *Evaluation* – Review processes to track progress

The 5 E's encompass a broad group of solutions administered by a wide variety of stakeholders responsible for making the transportation system safe for all users. To reduce fatalities and serious injuries, the Portland Metropolitan region will need to build on the efforts of these stakeholders. The RTSP recommendations in Section 4 will identify strategies to incorporate all of the 5 E's.

2.0 FEDERAL, STATE & REGIONAL POLICY FRAMEWORK

The following provides an overview of the policies that currently exist at the federal, state and regional level related to transportation safety. It also provides highlights of programs and projects that local agencies in the Portland Metropolitan region are doing to address serious crashes.

FEDERAL POLICIES

The federal transportation planning process requires MPOs to address eight planning factors. The degree to which each factor is addressed will vary depending on the unique conditions of the area, but efforts should be made to think through and carefully consider how to address each factor. The safety factor has created challenges for some MPOs as to how safety should be addressed. SAFETEA-LU established the Highway Safety Improvement Program (HSIP) as a core Federal-aid program for the first time indicating the importance attached to transportation safety at the federal level. The overall purpose of this program is to achieve a significant reduction in traffic fatalities

and serious injuries on all public roads through the implementation of infrastructure-related highway safety improvements.

A key requirement of the HSIP is that all states must develop a Strategic Highway Safety Plan (SHSP), in consultation with other key state and local highway safety stakeholders. Consequently, the MPO must be familiar with the SHSP in order to identify MPO goals and strategies that would address safety, and integrate SHSP goals and strategies into the activities and planning efforts of the MPO; likewise, the SHSP should consider the safety needs and strategies identified in the MPO safety plan.

Recently a shift has started at the federal level to developing a national strategy for reducing fatalities on the nation's roads. The strategy emphasizes that even one death on national roadway system is too great. A recent publication, *Toward Zero Deaths: A National Strategy on Highway Safety* is part of USDOT's development of a national strategy with National Cooperative Highway Research Program Project 17-51 expected to be completed at the end of 2012.

STATE POLICIES AND PROGRAMS

The Oregon Transportation Plan (OTP) is the long-range blueprint for the state's transportation system. The OTP's Goal 5 – Safety and Security, sets statewide policy for improving the safety for all modes and transportation facilities. The OTP serves as the framework for the development and updates to the TSAP. Based on both the OTP and TSAP, the Oregon Highway Plan contains Policy 2F: Traffic Safety, with the following actions:

- 2F1 - Establish a process to develop and implement the most cost-effective solutions to high priority safety problems.
- 2F2 - Whenever safety improvement is the stated objective of the project, include goals and a process to evaluate the outcome and further refine the project selection and solution process.
- 2F3 - In identifying solutions to traffic safety problems, consider solutions including, but not limited to:
 - Increasing traffic enforcement
 - Involving business and community groups and the media in education efforts
 - Using educational materials and special signing to change driving practices
 - Making engineering improvements such as geometrics, signing, lighting, striping, signals, improving sight distance, and assessing conditions to establish appropriate speed
 - Constructing appropriate bicycle and pedestrian facilities including safe and convenient crossings
 - Managing access to the highway
 - Developing incident response and motorist assistance programs
 - Ensuring the uniformity of traffic control devices
 - Developing driver information systems

- 2F4 - Continue to develop and implement the Safety Management System to target resources to sites and routes with the most significant safety problems. Encourage local governments to adopt a safety management system.
- 2F5 - Seek additional funding for state and local traffic law enforcement.
- 2F6 - Work with citizens and local jurisdictions to address safety concerns on the state highway system(1999 Oregon Highway Plan, pages 112-115.)

To help identify the priority facilities for safety improvements, ODOT developed the Safety Priority Index System (SPIS) which is used as part of the HSIP analysis. The SPIS score is based on three years of crash data and considers crash frequency, crash rate, and crash severity. A roadway segment becomes a SPIS site if a location has three or more crashes **or** one or more fatal crashes over the three year period. SPIS sites are 0.10 mile sections on the state highway system.

Each year, a list of the top 10% SPIS sites on state highway facilities is generated and the top 5% sites are investigated by the five Region Traffic Manager's offices. These sites are evaluated and investigated for safety problems. If a correctable problem is identified, a benefit/cost analysis is performed and appropriate projects are initiated, often with funding from the Highway Safety Improvement Program (HSIP). Regions report the results of their site evaluations to the State Traffic Engineer. These results are incorporated into the HSIP 5% report to FHWA by August 31 of each year.

SAFETEA-LU not only increased funding for safety, but it raised its stature by requiring each state department of transportation (DOT) to develop a data-driven Strategic Highway Safety Plan (SHSP) in coordination with its partners. State DOTs are required to consult with MPOs as part of the SHSP development. Periodically, the Oregon Department of Transportation (ODOT) updates the state SHSP that is called the Transportation Safety Action Plan (TSAP). The TSAP sets statewide goals, objectives and targets for reducing fatalities and serious injuries on the state transportation system. It focuses on education and enforcement and provides a set of general strategies to address safety issues across the state.

The Oregon Transportation Safety Action Plan (OTSAP) was recently adopted by the Oregon Transportation Commission in October 2011. The OTSAP guides ODOT's safety investment decisions through a set of Emphasis Area actions to help respond to the contributing factors that contribute to the greatest number of transportation-related fatalities and injuries. The following are the ten priority OTSAP actions:

1. *Safety areas of interest should include intersection crashes, roadway departure, and pedestrian/bicycle.* – State and local governments must work to improve key Infrastructure Safety Emphasis Areas. These areas should include, but not be limited to the following:
 - Intersection crashes – Investigate the usefulness of advance signing, access management techniques, advance technology and features, and improvements to signal timing to smooth traffic flow.
 - Roadway Departure Crashes (including run off the road and head-on crashes) – Investigate the usefulness of rumble strips, shoulder widening, median widening, cable

barrier, raised medians, durable marking, fixed object removal, roadside improvements, safety edge, and other countermeasures and safety treatments of centerline.

- Ped/Bike Crashes – Investigate the usefulness of curb bulb-outs, refuge islands, warning signage improvements and other countermeasures for pedestrian crashes, investigate improvements in traffic controls for bicycles and improvements at intersections to better accommodate pedestrians and bicycles such as bicycle signals and rectangular rapid flash beacons.
 - Further develop and institutionalize the ODOT Safety Corridor and Roadway Safety Audit programs within ODOT. ODOT should embrace the blending of the “4 E approach to transportation safety” as described in FHWA’s Office of Safety Mission Statement (Engineering, Education, Enforcement, and Emergency Services).
2. *Create a plan to ensure that safety is considered in construction/repair decisions.* – Develop a plan or series of plans and policy changes designed to improve the likelihood that when construction or repair decisions are made, safety is the highest weighted consideration.
- Develop tools to assist in weighing the best safety choices that balance risk and benefit
 - Identify and implement incremental improvements and changes that tilt systems and policies toward safety.
 - Establish tangible safety goals or targets at ODOT Region and District levels. Evaluate possibility of localized safety planning in conjunction with local governments.
 - Develop one or more funding mechanisms that allow for quick intervention on emerging safety issues.
 - Identify a safety champion for ODOT to assure that safety has a voice in the decision-making processes.
3. *Develop a communications strategy for raising awareness and acceptance of the need for law enforcement.*
4. *Establish processes to train enforcement personnel, attorneys, judges, and DMV staff.* – Continue efforts to establish processes to train enforcement personnel, deputy district attorneys, judges, DMV personnel, treatment providers, corrections personnel and others. An annual training program could include information about changes in laws and procedures, help increase the stature of traffic enforcement, and gain support for implementing changes.
5. *Pass legislation to establish .04 percent BAC.* – Pass legislation to establish .04 percent BAC as the standard for measuring alcohol impairment for all Oregon drivers 21 years old and older. Continue the zero tolerance law for persons under 21. Initially request legislation requiring that repeat offenders be required to adhere to the .04 standards. Once this step has been proven successful, request the standard be expanded to all drivers.
6. *Improve and expand the delivery system for driver education in Oregon.* – Consider the following in designing a model program:

- Identify and promote strategies that establish a driver and traffic safety education system. This system should promote life-long driver learning and foster a commitment to improve driver performance throughout the driver's life span.
 - Continue to support legislation to make driver education mandatory for new drivers under the age of 18.
 - Evaluate the possibility of funding the increased cost of providing this additional training by raising learning permit fees.
 - If feasible, by the year 2015 extend this requirement to all persons seeking their first driver license.
 - Improve standards to support quality driver and traffic safety education programs.
 - Establish a definition of what a new model driver is in terms of knowledge, skill, behavior and habits needed. These standards should include specific requirements for ongoing professional development.
 - Evaluate the possibility of establishing a licensing process that measures driver readiness as defined by the new model driver, and employs a process that facilitates the safety means to merge the learning driver into mainstream driving.
 - Establish program content standards that apply to every driver education program.
 - Continue to develop oversight and management standards that hold the driver education system accountable. These standards should encourage quality and compel adherence to program standards.
 - Create a partnership to support driver education. Identify and promote best practices for teaching, and learning among and between parents, educators, students and other citizens.
7. *Continue public education efforts aimed at proper use of child safety seats.*
 8. *Consider legislation requiring the inclusion of helmets, reflective gear and lighting with new bicycles.*
 9. *Work with partner agencies to position Oregon's EMS system as world class and affordable for the average Oregonian.* – Work with partner EMS agencies, providers, committees, volunteers, and concerned citizens to position Oregon's EMS system as world class. Raise awareness of the life-saving importance of EMS personnel and equipment to encourage statewide support and involvement. Increase emphasis on the need for well-trained personnel and equipment in rural and volunteer agencies. Create and fund affordable, local and accessible EMS training statewide for pre-hospital and hospital personnel responding to motor vehicle crashes, aid in reaching and sustaining this goal. Continue work towards meeting and exceeding national standards.
 10. *Develop strategies to assure the recruitment and retention of EMS volunteers.* – Work to place a state focus on volunteer creation and development. Develop strategies to assure the recruitment and retention of EMS and fire volunteers. Work to assure that the EMS education standards are attainable to volunteers in terms of time, costs, and resource demands. Develop easy, effective entry points for EMS and fire volunteers. Work with

affected agencies and local jurisdictions to identify existing and emerging barriers to volunteer participation in the EMS and fire systems.

REGIONAL POLICY CONTEXT

In 2008 the Metro Council, with guidance from the Metro Policy Advisory Committee (MPAC), agreed that our planning efforts should start with defining the desired outcomes that the residents of this region have consistently expressed when asked. To that end, the Metro Council and our regional partners adopted six desired outcomes to guide regional planning for the future. The 2035 RTP establishes an outcomes-based planning and decision-making framework to ensure transportation decisions support the six desired outcomes.

Safety is an essential element of the region's desired outcomes, to ensure people have safe and reliable transportation choices. The 2035 Regional Transportation Plan (RTP) lays out the region's transportation concepts and policies that will result in a complete and interconnected transportation system that supports all modes of travel and implementation of the 2040 Growth Concept. Goal 5 of the RTP is to Enhance Safety and Security and to ensure that multi-modal transportation infrastructure and services are safe and secure for the public and goods movement.

In 2008, as part of the quadrennial federal certification review, Metro received a recommendation from the Federal Highway Administration (FHWA) to better incorporate safety into the MPO planning process. FHWA then sponsored a 1.5-day workshop titled, "Incorporating Safety into the Transportation Planning Process," in September 2009 that involved the 6 Oregon MPOs, Southwest Regional Transportation Council (the Vancouver, Washington region's MPO), the Oregon Department of Transportation (ODOT), TriMet and local jurisdictions. In response to the FHWA recommendations, Metro organized an ad-hoc Regional Safety Workgroup in October 2009 to begin exploring ways to better integrate safety into the transportation planning process. The Workgroup is comprised of the Metro region's cities and counties, Metro, TriMet, ODOT, researchers from Portland State University and practitioners specializing in transportation safety.

From the onset Workgroup participants highlighted the importance for creating a data driven approach to incorporate safety data into regional land use and transportation decisions. The Workgroup developed a list of core activities to help Metro focus its safety efforts:

- Improve safety data aggregation and analysis
- Include safety in the development of performance measures
- Use quantitative safety measures in project selection for the RTP and MTIP (Metropolitan Transportation Improvement Program)
- Incorporate safety into Metro's programs, policies, and design best practices
- Encourage the development of a safety culture in member jurisdictions by including safety more directly in the transportation planning, design, construction, and maintenance practices.

- Sharing techniques, needs, accomplishments, and best practices in safety among member jurisdictions

This preliminary framework helped guide the Workgroup's discussion topics and related work products. Highlights of these activities are in **Table 1** below:

Table 1 - Regional Safety Workgroup Activities

Discussion Topic	Activities
Data Collection, Visualization and Analysis	<ul style="list-style-type: none"> • Metro received state crash data for 2007, 2008 and 2009 from ODOT Salem's Crash Analysis and Reporting Unit for the tri-county region. Metro reviewed the data and has formatted it for use by all local governments. • Metro has also conducted an analysis of the safety data that is the basis for the Regional Safety Plan.
Workgroup Mission Statement	<ul style="list-style-type: none"> • Developed the following mission statement to help focus the workgroup's efforts: <i>To support the 2035 RTP target of reducing fatalities and serious injuries by 50%, the mission of the Safety Workgroup is to promote collaboration and commitment among regional partners to plan, build and operate a transportation and land use system that prevents fatal and serious injury crashes in the Portland Metro region. The Safety Workgroup will engage regional partners to consider, evaluate and implement regional multi-disciplinary safety solutions. These include, but are not limited to land use, design, engineering, education, enforcement, and emergency services. The Safety Workgroup will operate from a data-driven foundation and support the improvement and use of safety data and inform transportation and land use decisions at the regional level.</i>
Performance Measures	<ul style="list-style-type: none"> • Developed safety performance target for the 2035 RTP (shown on the following page).
State and Regional Safety Funding	<ul style="list-style-type: none"> • Used Workgroup to review and evaluate candidate projects for the Metro Regional Flexible Fund Allocation process for addressing safety. • Reviewed ODOT Region 1 safety projects as part of the State Transportation Improvement Program (STIP). • Discussed regional, state and local funding of safety projects.
Future Research Topics	<ul style="list-style-type: none"> • Developed a list of research topics to take advantage of future grant opportunities.

Design Best Practices	<ul style="list-style-type: none"> Discussed new ITE recommended practice in publication <i>Designing Walkable Urban Thoroughfares: A Context Sensitive Approach</i>
Highway Safety Manual (HSM)/Multimodal Level of Service	<ul style="list-style-type: none"> Discussed recently published HSM and safety analysis tools
Road Safety Audits (RSAs)	<ul style="list-style-type: none"> ODOT Region 1 hosted a training for local governments, agencies and consultants to learn the process for conducting RSAs

2035 RTP Performance Target

In December 2009, ODOT Region 1 wrote a letter to JPACT requesting that Metro refine the safety performance target for the 2035 Regional Transportation Plan (RTP) and to start work on a Traffic Safety Plan to be completed by December 2011. The Regional Safety Workgroup's first task was to develop the performance target below that was adopted as part of Metro's 2035 RTP in June 2010.

Safety – By 2035, reduce the number of pedestrian, bicyclist, and motor vehicle occupant fatalities plus serious injuries each by 50% compared to 2005.

In addition to the 2035 RTP performance target, safety performance measures will be included in the next update to the Regional Mobility Corridor Atlas, the Congestion Management Process and RTP update.

PORTLAND METRO REGION LOCAL AGENCY SAFETY PROJECTS & PROGRAMS

Local agencies across the region are doing a wide variety of actions to improve the safety of the region's transportation system. The following are a summary of activities provided by Workgroup members.

TriMet – Safety is the focus for all of TriMet's operational, planning and strategic decisions. Rather than thinking of it as a single priority—we are renewing our efforts to create a culture where safety is a core value. A safety management system is being implemented to facilitate proactive identification and control of safety risks to provide for safer transit operations for the community it serves. Among the strategies implemented is safety education. TriMet has a Safety Education Advisory Committee composed of community representatives who have a shared interest and stake in promoting safe interactions between bicyclists, pedestrians, drivers and transit users. Members of this group work together on common education efforts and advise TriMet. In addition, our

outreach staff works directly with schools to educate faculty, parents and students on how to behave safely around buses, MAX light rail and WES commuter rail.

Clackamas County – Clackamas County completed a Transportation Safety Action Plan (TSAP) in spring 2012 which will be incorporated into its Transportation System Plan update. This will be the first county TSAP in Oregon and has served as a template for the RTSP. The County annually develops a Safety Priority Index System list and has their Traffic Safety Commission review it. The County also has an active Traffic Safety Commission and also has a Safe Communities Program with a goal to reduce injuries and fatalities using a 5E approach.

Washington County – Washington County addresses safety issues for all modes of transportation by regularly monitoring its transportation facilities, improving its transportation plans, participating in the activities of a variety of local and regional boards and agencies, and maintaining a robust website. The website promotes topical safety issues such as vegetation removal; construction; back to school; winter weather; new laws; and share the road. Washington County maintains and annually reviews a Safety Priority Index System (SPIS) list. Washington County also participated in ODOT's OASIS (Oregon Adjustable Safety Index System) program which is an all roads SPIS list. Washington County has an active Traffic Safety Campaign Committee whose goal is to facilitate coordination with other agencies to maximize the exposure of safety messages to the public. The County also has multiple staff positions directly working on public safety. (A more detailed listing can be found in Appendix A)

City of Portland – The City of Portland dedicates staff and resources to working on engineering and education solutions that impact transportation safety on specific high crash corridors and Portland Police continue to address enforcement along these stretches of roadway. Each year the City identifies high crash locations and reviews them for safety deficiencies. The City hosts an annual Transportation Safety Summit, featuring presentations from transportation industry leaders. City staff conducts Pedestrian/Driver Safety Trainings, including translations as needed and has a partnership with Portland Police Bureau for Crosswalk Enforcement Actions, resulting in citations to drivers, bicyclists and pedestrians that do not follow Oregon law when pedestrians are crossing at marked or unmarked crosswalks. (A more detailed listing can be found in Appendix A.)

City of Gresham – The City of Gresham puts a high importance on safety with a number of safety policies, programs and projects. The City's Transportation Advisory Committee provides recommendations for safety policies, programs and projects. City staff track safety data through analysis of annual top 10 crash locations in the city. The analysis is to better understand fatalities and injury accidents, identify crash trends, monitor issues and identify countermeasures for prevention. A City Safety Education Program enhances safety for bicyclists, walkers, transit users and motorists and teaches all to share the road. Other programs and amenities that support bicyclists, walkers and transit users include: bike rack installations, bike helmet distributions creation and distribution of a City Bicycle Guide, and a partnership with Gresham Police for Crosswalk Enforcement Actions, resulting in warnings or citation to drivers, bicyclists and pedestrian that do not follow Oregon crosswalk laws. (A more detailed listing can be found in Appendix A.)

City of Tigard – The City of Tigard inputs the state crash data into GIS, and analyzes the data to identify locations that have one or more of the following: a) a high frequency of crashes; b) a high rate of crashes per entering vehicle; c) a high frequency of severe crashes; d) a high rate of severe crashes per entering vehicle; e) high rates of crashes involving pedestrians or bicyclists. The City then performs a more detailed analysis on the crash data and site conditions at these locations to identify if there are any engineering/infrastructure improvements that would reduce these crash rates. This information is considered in selecting upcoming street projects and the data is shared with the City’s police department to keep informed of each other’s issues.

City of Beaverton – The City of Beaverton’s Comprehensive Plan Transportation Element includes Goal 6.2.3, “A safe transportation system” and policies and actions to improve traffic safety through engineering, education and enforcement. The City monitors intersection collision history through Washington County and ODOT’s safety priority index system. Intersections with high collision rates are given special attention for safety improvements. Also, as ODOT crash reports are provided by the Beaverton Police Department to the Transportation Division, they are reviewed. Reporting of safety issues is available by phone, on-line, and at public meetings. The Beaverton Police Department also monitors crash information for subsequent analysis and potential actions.

3.0 SUMMARY OF PORTLAND METRO REGION TRENDS

Roadway safety remains one of the most challenging health issues nationwide. In the US, crashes killed an average of 37,500 people per year between 2007 and 2009. During that same time period in Oregon, there were roughly 42,500 traffic crashes and 1,111 people were killed on the state’s transportation system, averaging 370 fatalities annually.

The Portland Metro region, with a population of about 1.4 million, comprises almost 40 percent of the state’s population. Between 2007 and 2009, in the Portland Metro region there were more than 18,000 crashes including 159 fatalities and 1,444 crashes resulting in an incapacitating injury. This represents 43% of the state’s crashes, 14% of its fatalities, and 36% of its incapacitating injury crashes. To begin better understanding the details behind the crash data in the Portland Metropolitan region, Metro received crash information from the ODOT Crash Analysis and Reporting Unit database beginning in 2007. This dataset includes the geocoded location and detailed data for each crash in the region, and is complemented by Metro’s rich datasets of transportation infrastructure, transportation operations, and spatial land use data. The combination of these data sources provides the opportunity for detailed analysis of the safety of the region’s transportation system and land use patterns.

It must be noted that Oregon is different from other states in that it collects non-injury crash reports predominantly from citizens involved in the crashes. This impacts the quality of crash reports compared to states that have only law enforcement reporting. However, the available crash data is valuable in identifying urban transportation safety trends for the Portland Metropolitan region.

Metro staff spent 2010 and 2011 working with staff from cities and counties of the Metro region, ODOT, TriMet, and other local safety experts to compile and analyze these data from 2007-09³. Further, a huge amount of US and international data is available to document national and international patterns and trends. This information is important to provide context for local data. All of this analysis was compiled into the first State of Safety in the Region report (available at <http://www.oregonmetro.gov/regionalmobility>), documenting roadway crash data, patterns, and trends in the Portland Metro area and beyond to inform the pursuit of the region's goal of reducing pedestrian, bicyclist, and vehicle occupant fatalities and serious injuries by 50 percent.

The State of Safety report presents the findings, identifying trends and relationships of serious crashes with environmental factors including roadway and land use characteristics and serves as the foundation for the RTSP. Crashes are broken down by a number of factors contained in the dataset provided by ODOT. This data was combined with Metro's mapping database that includes roadway data, such as geometry, traffic volumes, traffic congestion, transit routes, bicycle routes, sidewalk inventory, and spatial land use data. The combined data set allowed for an analysis of the Portland Metropolitan region's crashes from 2007 – 2009 relative to the following attributes:

- Roadway classification
- Mode
- Month
- Time of day and lighting
- Weather
- Road surface conditions
- Crash type
- Contributing factors
- Driver's age and gender
- Seat belt usage
- Number of traffic lanes
- Roadway congestion
- Geography within the UGB (sub-regions, cities, counties, and ODOT Districts)
- People density (population plus employment)
- Urban Land Institute density of services
- Street block density

The State of Safety in the Region report is broken into sections that cover different aspects of the region's crash patterns. It includes:

Section 1 – State, National, and International Trends –Data from the National Highway Traffic Safety Administration (NHTSA) were compiled and analyzed along with population

³ There is more than a year of lag time between a calendar year and the availability of the ODOT crash data. Data for 2010 was made available in April 2012, but was not available in time to be added to the State of Safety in the Region report.

data from the US Census to identify trends in national, state, and city crashes. NHTSA summarizes traffic fatality data by state and by major city, including number of fatalities, fatalities per capita and per vehicle-miles travelled (VMT), and by travel mode. Five years of data between 2005 and 2009 were considered for this analysis. International data from the European Union was also compiled for comparison.

Section 2 – All Crashes – This section summarizes all crashes occurring in the Portland Metro region. The term “serious crashes” refers to all fatal or incapacitating injury (injury A) crashes.

Section 3 – Roadway Characteristics of Non-Freeway Crashes – This section summarizes characteristics of crashes occurring on surface streets in the region.

Section 4 – Roadway Characteristics of Freeway Crashes – This section summarizes characteristics of crashes occurring on freeways in the region.

Section 5 – Pedestrians (Non-Freeway Crashes) – This section summarizes characteristics of crashes involving pedestrians on surface streets in the region.

Section 6 – Bicyclists (Non-Freeway Crashes) – This section summarizes characteristics of crashes involving bicyclists on surface streets in the region.

Section 7 – Crash Type Detail – In this section, the four crash types identified as most prevalent are reviewed relative to all crashes in more detail to identify patterns. The information includes crash severity and contributing factors.

Section 8 – Land Use Analysis – As part of the State of Safety report, Metro performed a spatial analysis of the crash, traffic, and land use patterns in the region. The purpose of the spatial analysis is to identify trends and patterns in serious crashes as they relate to land use patterns.

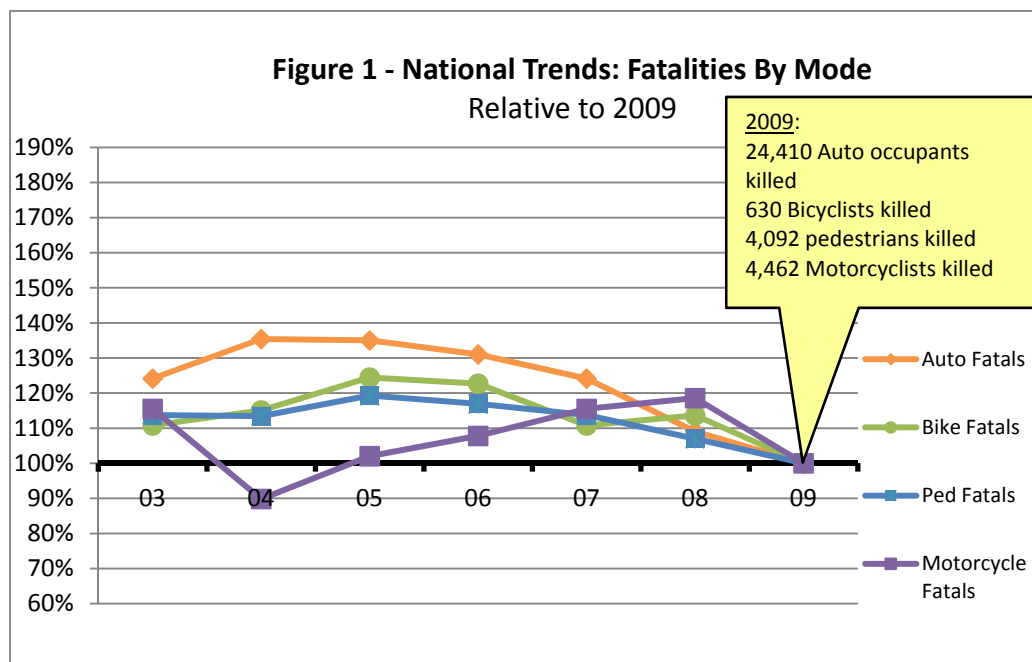
Section 9 – Transit and Rail – This section provides an overview of the crash data available for bus and rail transit and heavy rail in the Portland Metro region.

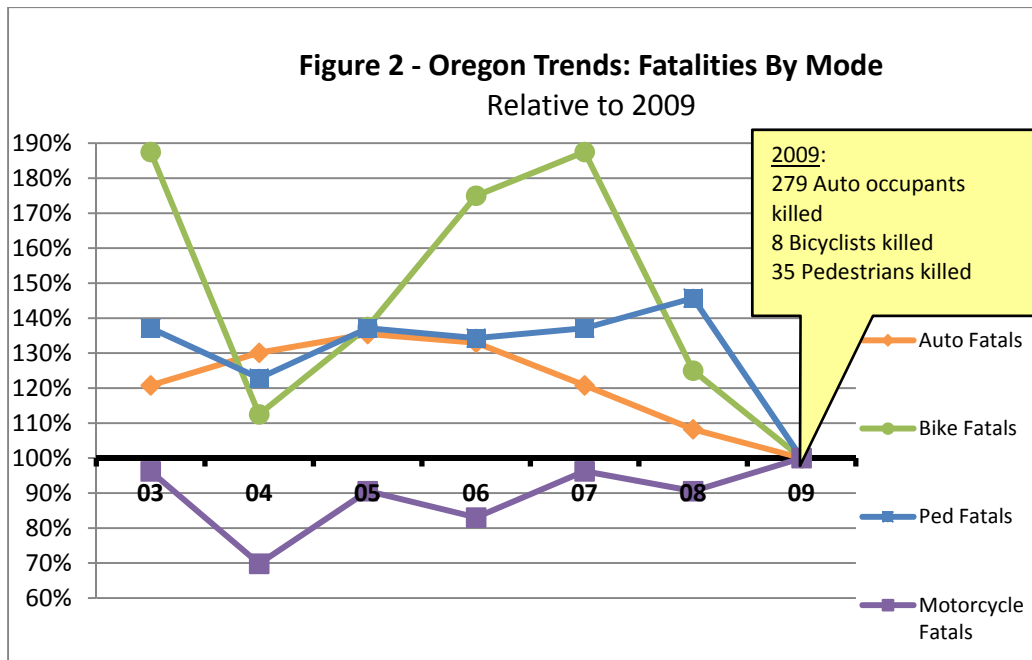
The nine sections of State of Safety report examine the region’s crash data through a variety of lenses. The Regional Safety Workgroup has identified the most significant findings from the State of Safety report and grouped them into three categories: all crashes, surface streets and bicycle and pedestrian. Not all sections of the report yielded significant findings, as the land use analysis was inconclusive. Additionally, though the transit and rail data sources were limited when compared to the ODOT crash data, transit by passenger mile experiences less fatalities and serious injuries compared to motor vehicle travel. The following represent high-level findings, focusing on trends that are clearly apparent from the crash data and presented in detail in the State of Safety in the Region report.

ALL CRASHES

1) *Nationally and in Oregon, fatalities are decreasing year-to-year for all modes except motorcycle, which is increasing.*

Travel patterns in the US have changed in recent years due to a variety of external factors. While the population has continued to increase, VMT per capita and absolute VMT have declined. Roadway fatality rates have begun to decline after decades of increases or stagnation. In Oregon, these trends are consistent with national patterns. The NHTSA data are broken out by mode: automobile occupants, motorcyclists, bicyclists, and pedestrians. **Figures 1 and 2** show recent national and state trends in fatalities for each mode. Fatalities are decreasing over time for all modes except motorcycle, which are generally increasing.



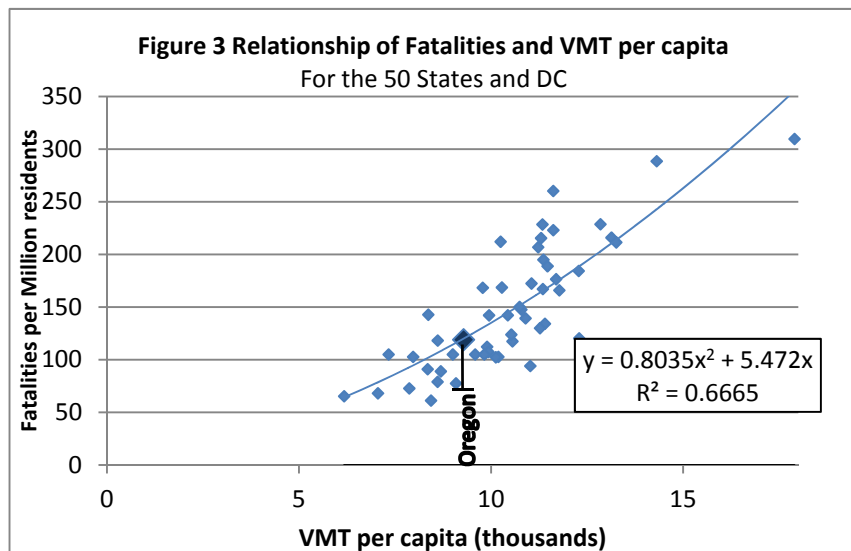


2) Increases in vehicle miles travelled (VMT) generally correlate with increases in fatal and serious crashes.

One of the clearest trends in crash data is the correlation between fatality rates and annual per capita VMT. States with higher VMT typically also have higher per capita fatality rates, as the typical exposure to risk is increased. **Figure 3** shows the relationship by US state for all fatalities.

It is apparent from the data that states with more auto travel typically exhibit higher fatality rates. The District of Columbia has the lowest per capita VMT at 6,170, and exhibits one of the lowest annual fatality rates of 65 per million residents – 50% of the national average.

Massachusetts, New York, and Rhode Island have the next lowest VMT per capita, and exhibit some of the

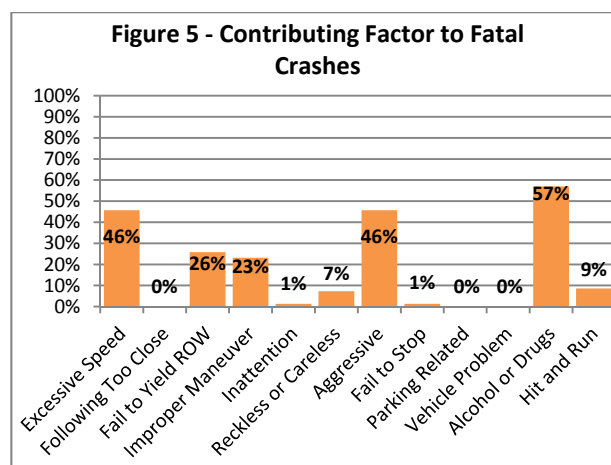
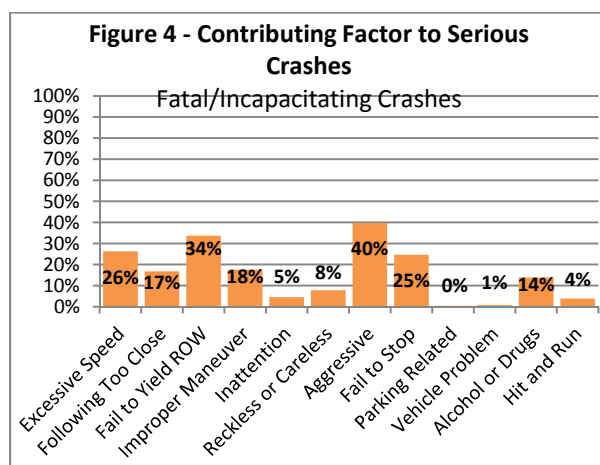


lowest fatality rates in the US. Wyoming, with the highest per capita VMT of 17,900, also has the highest annual fatality rate at 310 per million residents – 235% of the national average. The national average is 9,920 VMT per capita and 132 fatalities per million residents. Oregon statistics

are 9,280 VMT per capita (94% of the national average) and 119 fatalities per million residents (90% of the national average).

- 3) Alcohol and drugs, excessive speed, and aggressive driving are the most common contributing factors in serious crashes. Crashes involving alcohol and drugs have a much higher likelihood of being fatal than other crashes.**

Figures 4 and 5 illustrate the percentage of serious injury and fatal crashes by contributing factor. Each crash may have several contributing factors. Alcohol or drugs are a factor in 57% of fatal crashes. Aggressive driving (a combination of excessive speed and following too close) is a factor in 40% of serious crashes.



SURFACE STREETS

- 4) Arterials roadways have the highest serious crash rate per road mile and per VMT. 59% of the region's serious crashes, 67% of the serious pedestrian crashes, and 52% of the serious bike crashes occur on arterial roadways.**

Arterial roadways are the location of the majority of the serious crashes in the region. **Figure 6** sorts all the region's serious crashes by roadway classification. **Figure 7** shows serious crashes per VMT and by roadway classification. Freeways and their ramps are relatively safe, per mile travelled, compared to arterial and collector roadways.

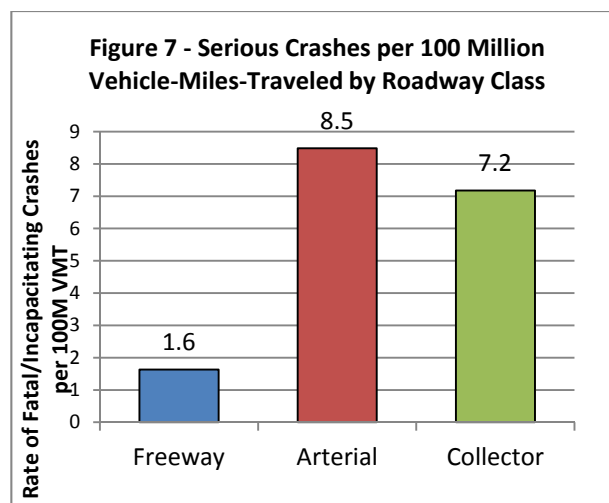
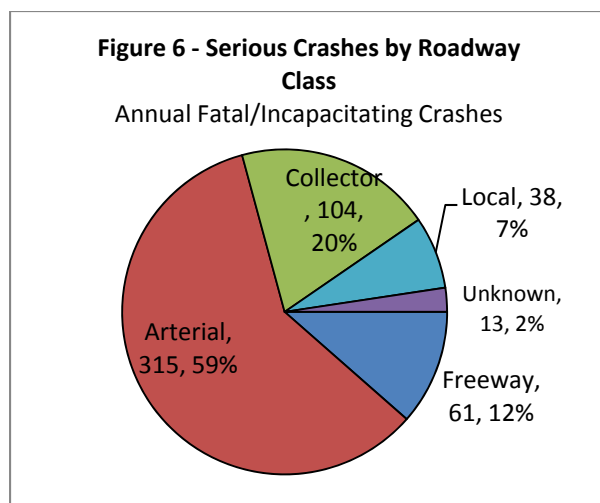
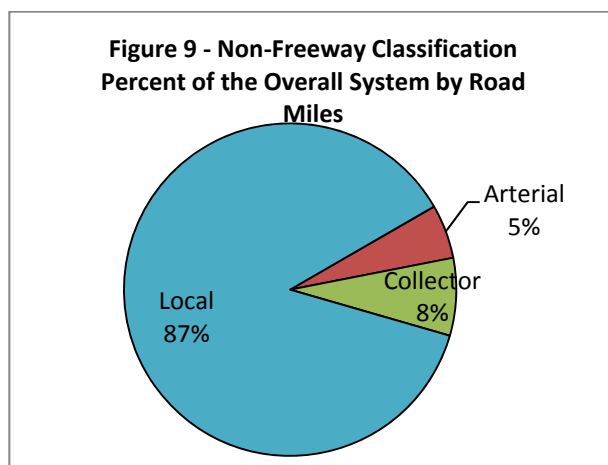
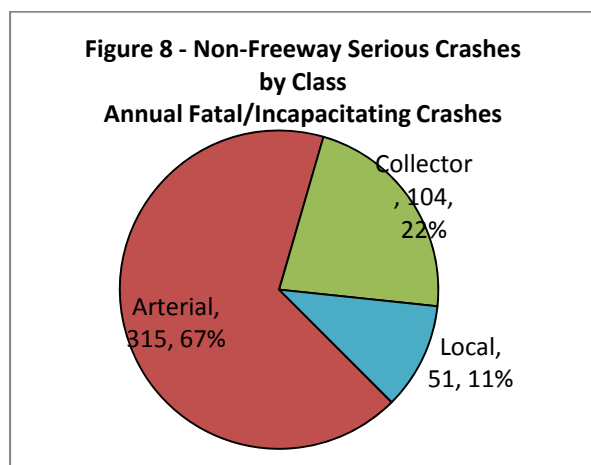


Figure 8 breaks down the non-freeway serious crashes by roadway classification and **Figure 9** shows the percent by roadway classification of the overall system. Arterial roadways account for 67% of non-freeway crashes, despite making up only 5% of the region's non-freeway road miles.



The majority of pedestrian and bicycle crashes occur on the non-freeway system. Arterials experience a higher number of serious pedestrian and bicycle crashes overall and a higher rate per mile of road than other roadway classifications.

Figure 10 shows that arterials account for 67% percent of non-freeway serious pedestrian crashes. **Figure 11** shows the serious pedestrian crash rate per mile of road. Although arterials account for only 5% of the overall non-freeway system, their serious pedestrian crash rate per road mile is roughly four times that of collectors and about 125 times that of local streets.

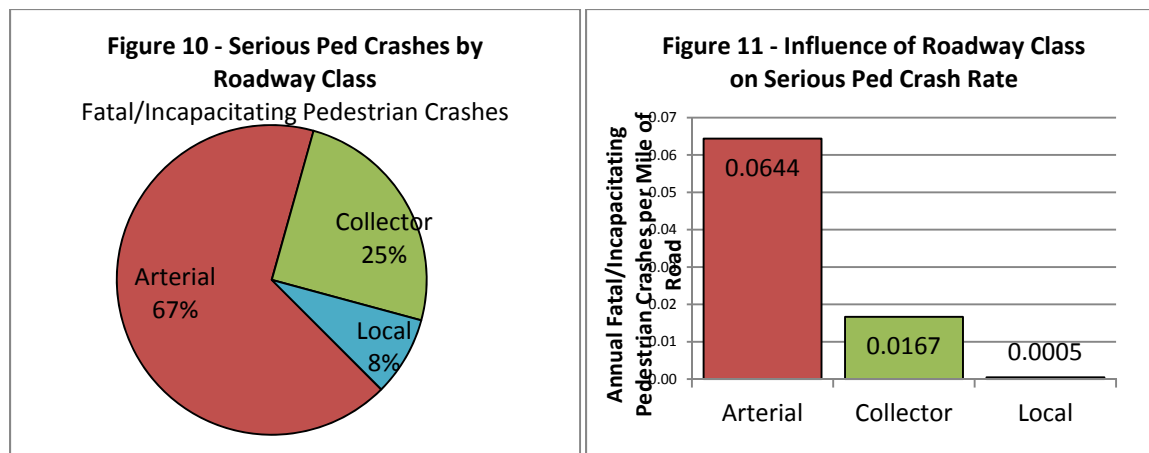
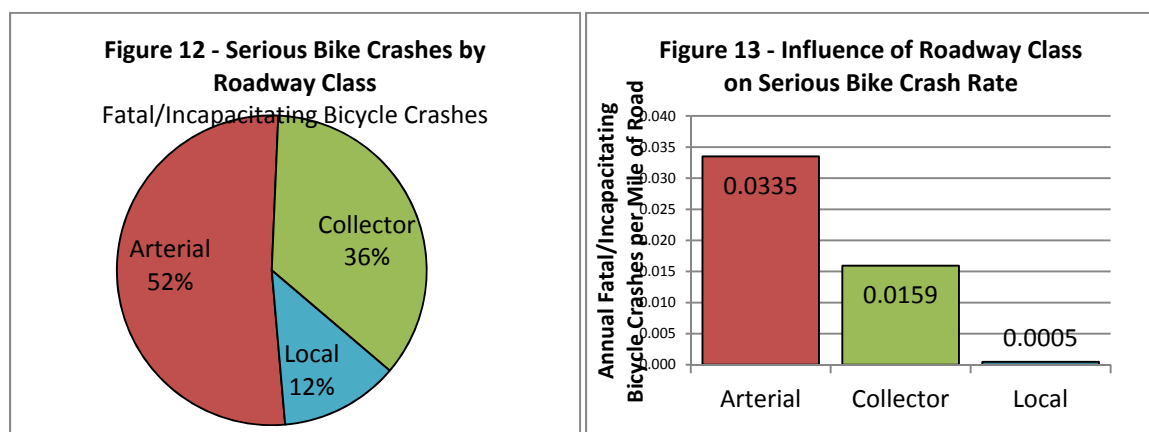


Figure 12 shows that arterials account for 52% of serious bicycle crashes. **Figure 13** shows the serious bicycle crash rate per mile of road. Although arterials account for only 5% of the overall non-freeway system, their serious bicycle crash rate per road mile is more than twice that of collectors and 67 times that of local streets.



5) The most common serious crash types on surface streets were rear end and turning. For fatal crashes, the most common types were pedestrian and fixed object.

Figures 14 and 15 present serious and fatal crashes by crash type. Fatal crashes are specifically broken out here because the distribution is substantially different. For the purpose of establishing crash type, bicycles are considered vehicles, and so there is no separate bicycle crash type. 29 and 22 percent of all serious crashes are rear end and turning crashes respectively. However, when looking at just fatalities, the predominant crash types change. 31 and 29 percent of all fatalities are fixed object and pedestrian crashes respectively.

Figure 14 - Serious Crashes by Crash Type
Fatal/Incapacitating Crashes

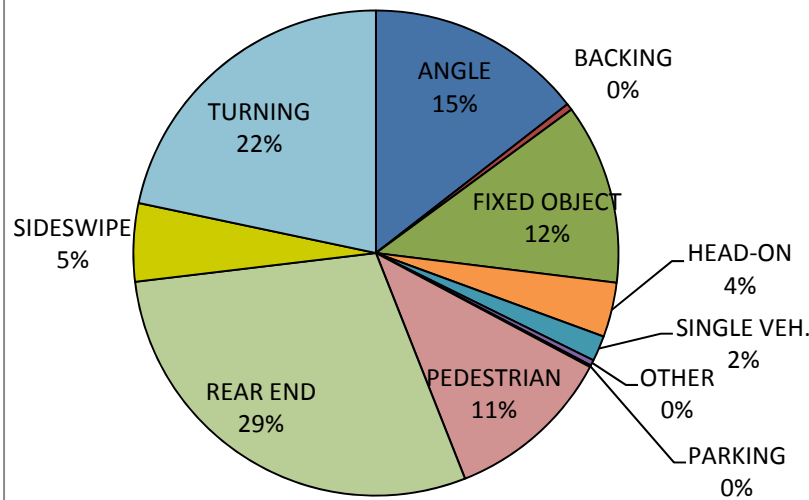
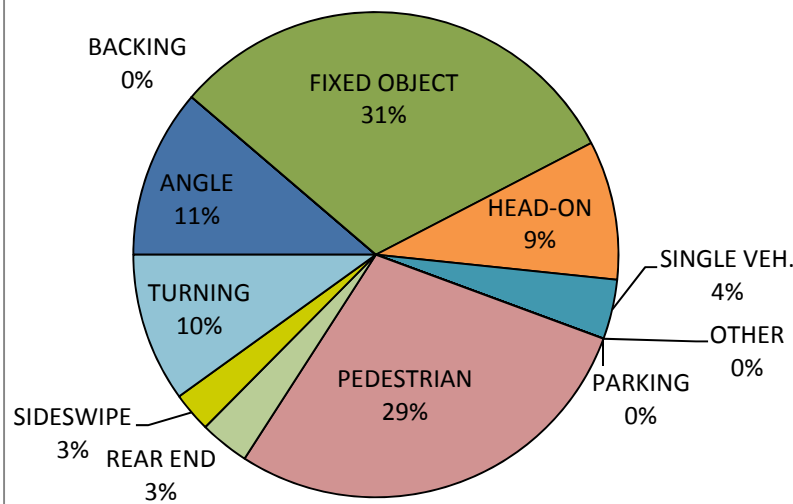


Figure 15 - Fatal Crashes by Crash Type
Fatal Crashes only

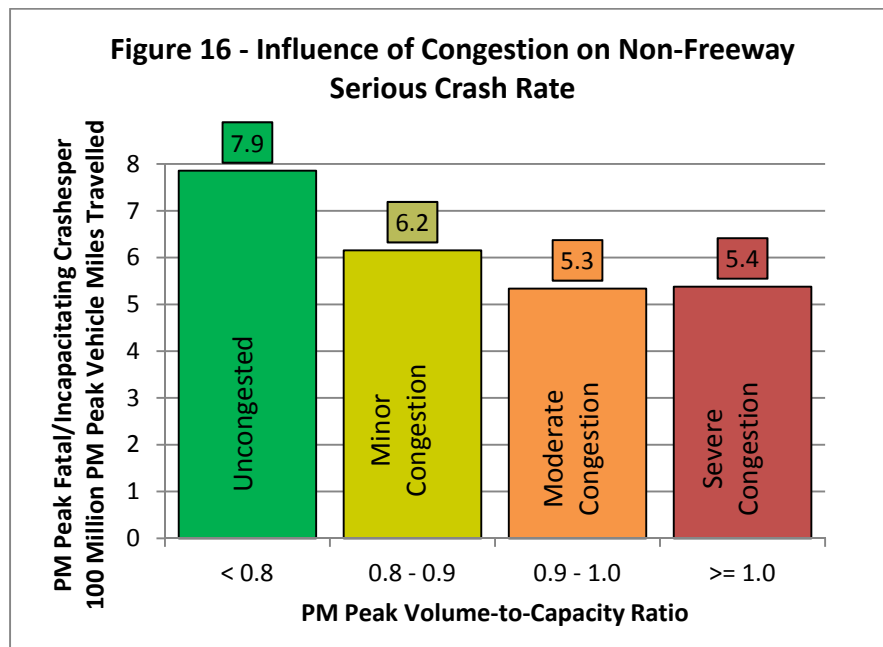


- 6) Higher levels of congestion on surface streets are correlated with lower serious crash rates, likely due to lower speeds.**

The combination of traffic data available from the region's travel demand model and crash data allowed for a comparison of traffic congestion with safety. For non-freeways, the analysis included all roadways in the regional travel demand model, including all arterials and collectors, as well as

certain local streets serving a collector function. The intent was to establish the relationship between congestion and safety.

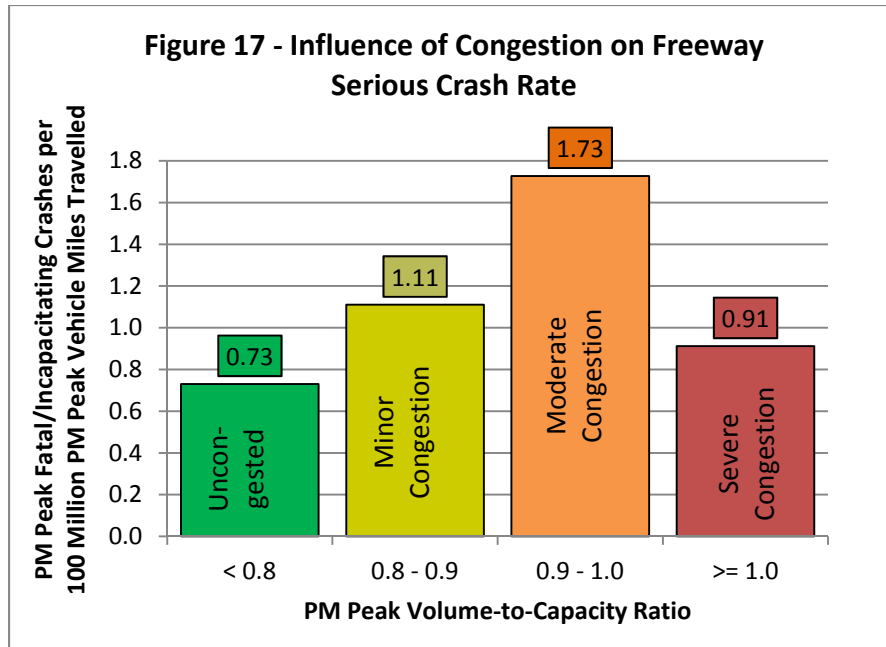
PM peak 3-hour Volume-to-Capacity ratios as determined by the travel demand model were compared to the same 3-hours of weekday crash data. **Figure 16** presents the relationship of serious crash rates and roadway congestion for the region's non-freeway roadways.



The serious crash rate per vehicle-mile travelled is highest for uncongested non-freeway roadways. Non-freeway roadways with higher levels of congestion exhibit lower crash rates.

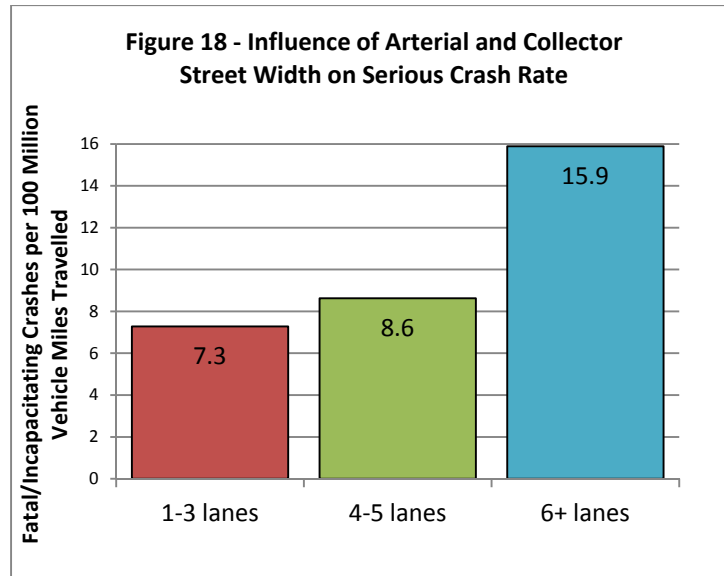
7) Higher levels of congestion on freeways are correlated with higher serious crash rates, except for severe congestion, which is correlated with lower serious crash rates.

For freeways, the analysis of crashes by congestion yielded different results. **Figure 17** shows that serious crashes on freeways increase to a point as congestion increases. However, in severe congestion, the serious crash rate declines. This could be attributed to the speed differentials experienced during congested conditions. As congestion increases on freeways, stop and go conditions and mixes of speeds could contribute to higher crash rates. However, in severely congested conditions the speed of all vehicles is diminished and serious crashes are less frequent.



8) Surface streets with more traffic lanes have higher crash rates per road mile and per VMT. This follows trends documented in AASHTO's Highway Safety Manual. Roadway designs that increase speed lead to increased crash severity in the absence of specific safety considerations.

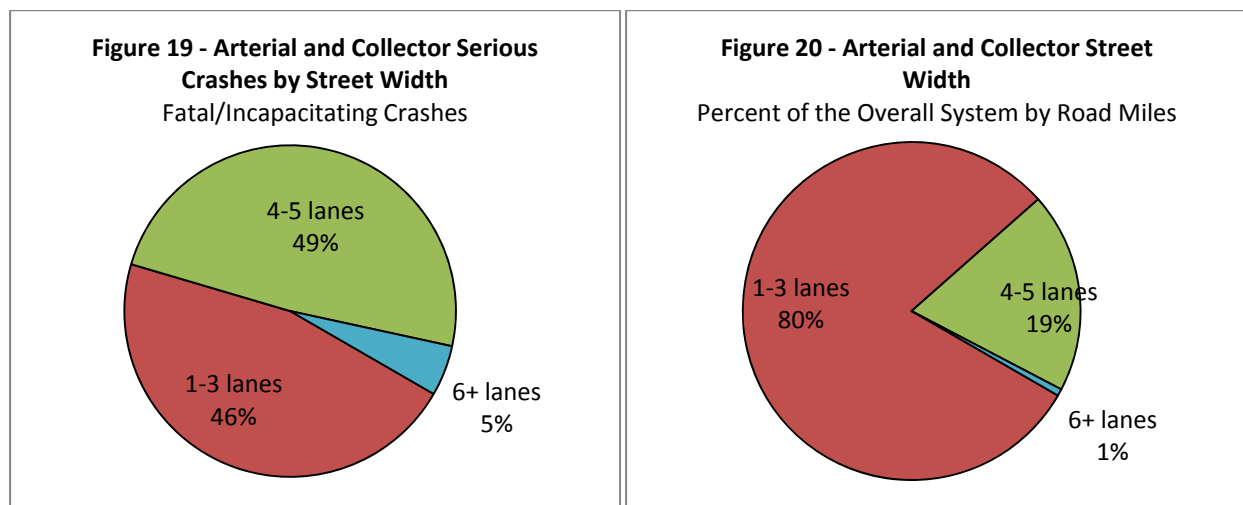
Figure 18 presents the crash rate per traffic volume for the non-freeway system in the region. As the number of traffic lanes increases so does the serious crash rate per VMT. The influence of street width is consistent with the influence of roadway classification. The crash rate increases dramatically for roadways with 6 or more lanes. Similar patterns are documented in AASHTO's Highway Safety Manual (2010), Chapter 12.



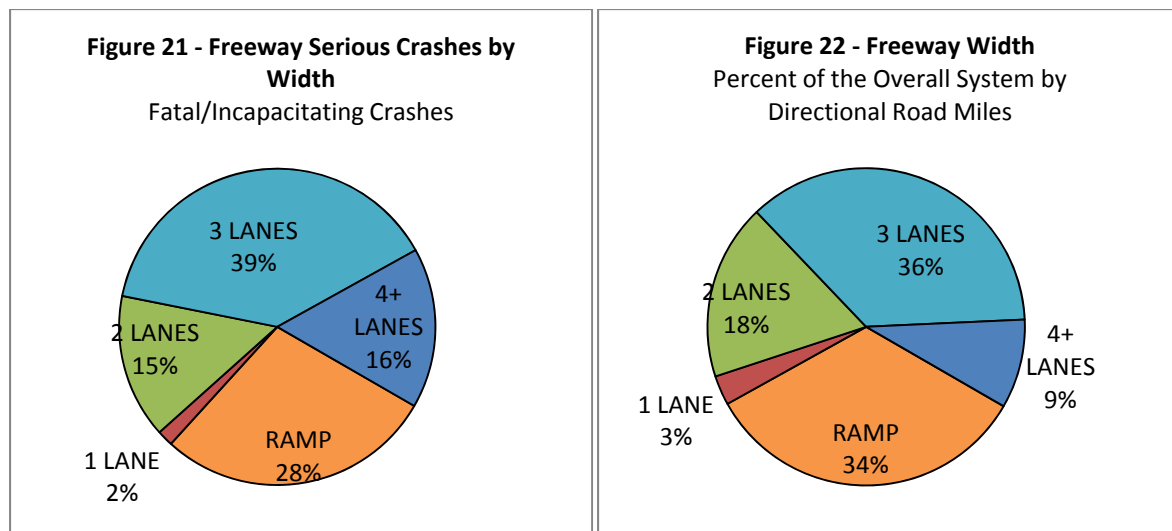
Roadways with more traffic lanes are the location of a disproportionate number of serious crashes in relation to both their share of the overall system and the vehicle-miles travelled they serve.

Figure 19 shows the percent of serious crashes on arterials and collectors by the number of lanes.

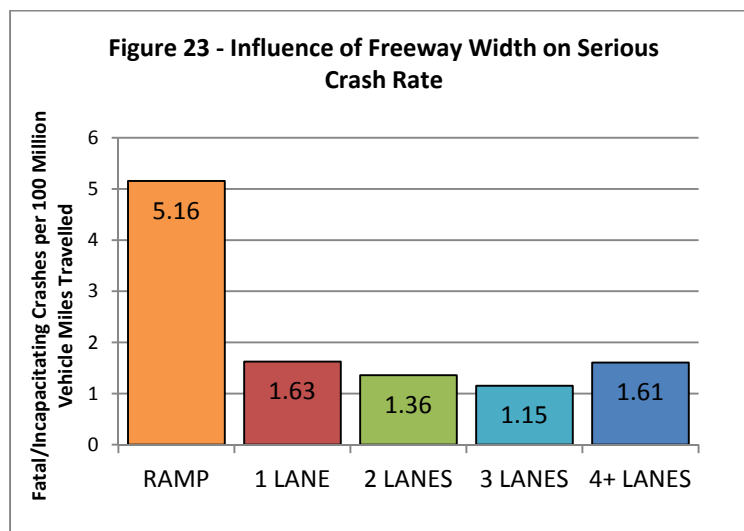
Figure 20 displays the percent of arterials and collectors by number of lanes as a percent of the overall system road miles. Four to five lane roadways account for 49 percent of all non-freeway serious crashes, but comprise only 19 percent of the overall system. Six plus lane roadways account for 5 percent of all non-freeway serious crashes, but comprise only 1 percent of the overall system.



Figures 21 and 22 present the distribution of freeway crashes by number of lanes. They also present the proportion of freeway crashes that occur on ramps.



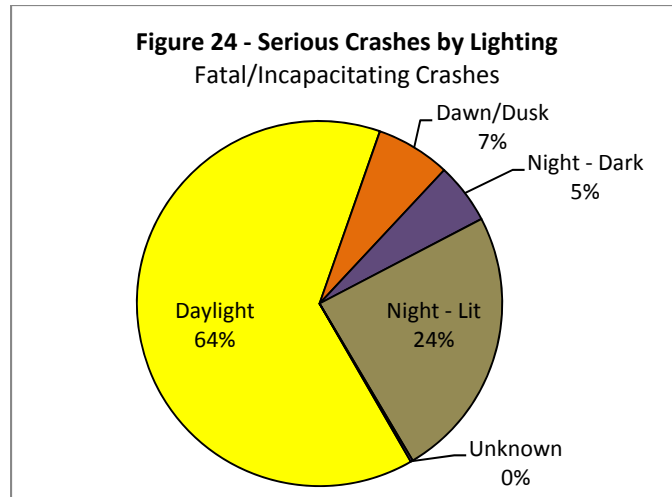
The influence of freeway width is not as pronounced as for non-freeway roadways. Freeways with three directional lanes (including auxiliary lanes) exhibit the lowest crash rates, while the rate increases for freeways with more or fewer lanes (**Figure 23**). Ramps exhibit a higher rate per mile travelled due to slowing of vehicles, merging, and ramp terminal intersections(**Figure 21**).



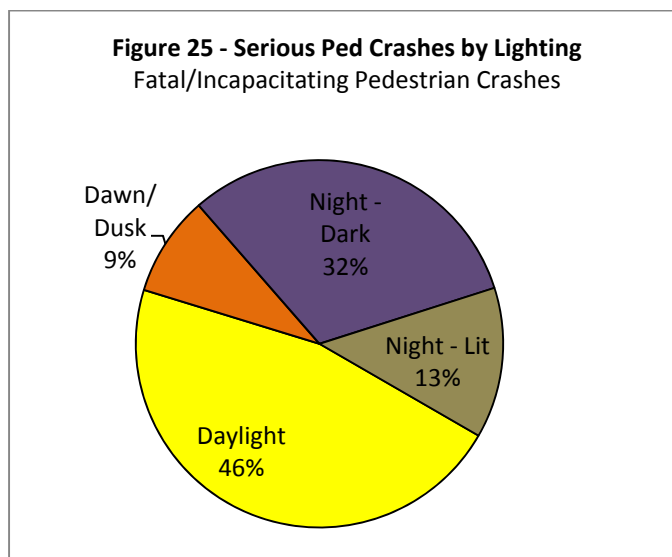
BICYCLE & PEDESTRIAN

- 9) *Serious pedestrian crashes are disproportionately represented after dark. Serious nighttime pedestrian and bicycle crashes occur disproportionately where street lighting is not present.*

Figure 24 shows that almost two-thirds of all serious crashes occur during the day.



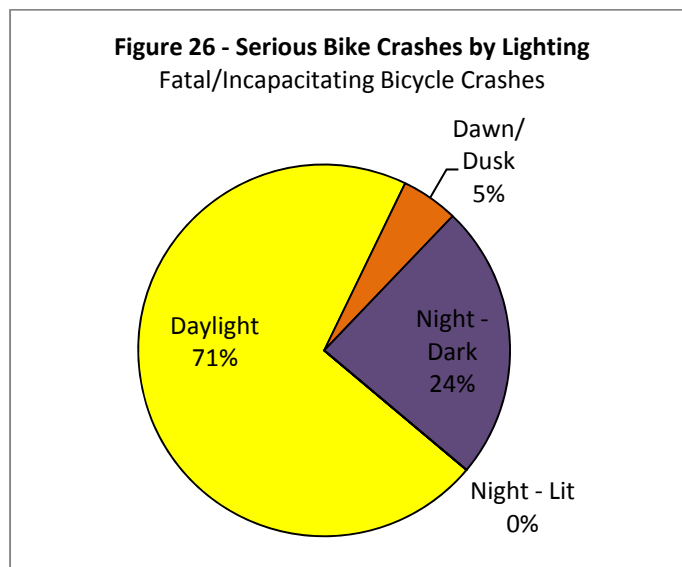
However, when looking at just pedestrians, the number increases to 45 percent of serious crashes occurring at night (**Figure 25**).



10) Serious pedestrian and bicycle crashes occur disproportionately where street lighting is not present.

Street lighting appears to be an important factor for pedestrians and cyclists. **Figure 24** above illustrates that while 29% of crashes occur at night, only 5% happen where street lighting is not present. This means that 17% of all night time crashes happen where street lighting is not present. This is dramatically different when looking at bicyclists and pedestrians. **Figure 25** shows that 45% of serious pedestrian crashes occur at night, but 71% of these nighttime serious crashes happen where lighting is not present. For bicyclists, the nighttime serious crash rate is even higher. **Figure**

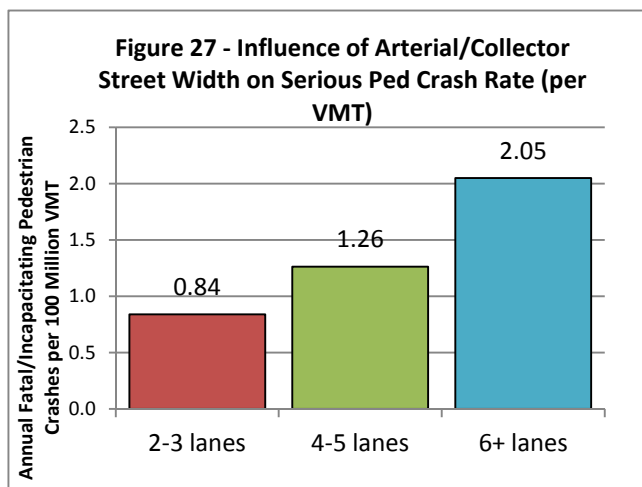
26 shows that 24 percent of serious bicycle crashes occur at night, but 100% of these crashes happen where lighting is not present.



Lighting appears to be particularly important for the safety of pedestrians and bicyclists.

11) Streets with more traffic lanes have higher serious pedestrian crash rates per mile and per VMT.

As can be seen in **Figure 27**, when normalized by motor vehicle traffic volume, the serious pedestrian crash rate on roadways with more traffic lanes is still substantially higher than on narrower roads. Roadways with more traffic lanes are particularly hazardous to pedestrians. Many transit routes follow these multi-lane roadways, increasing the need for people to cross these roadways safely.



The influence of street width is consistent with the influence of roadway classification for serious pedestrian crashes as seen in **Figure 28**.

Figure 28 - Serious Ped Crashes by Street Width
Fatal/Incapacitating Pedestrian Crashes

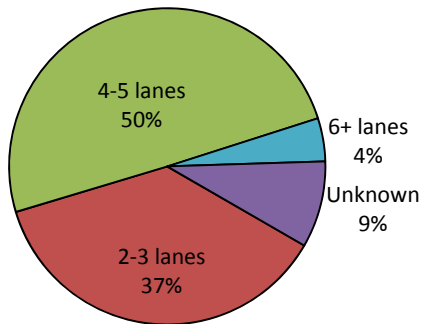
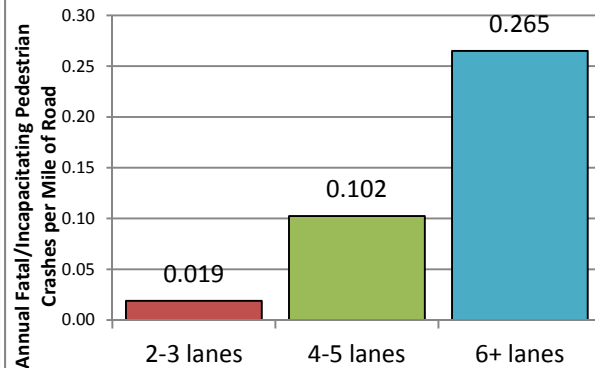


Figure 29 - Influence of Street Width on Serious Ped Crash Rate



Wider roadways are the location of a disproportionate number of serious pedestrian crashes in relation to both their share of the overall system (**Figures 28 and 29**) and the vehicle-miles travelled they serve (**Figure 30**). The serious pedestrian crash rate increases dramatically for roadways with four or more lanes, and again for roadways with six or more lanes.

4.0 RECOMMENDATIONS

For the Regional Transportation Safety Plan to accomplish the RTP target for reducing fatalities and serious injury crashes by 50 percent, the findings must result in action. There are many partner organizations that share the responsibility of improving safety in Portland Metropolitan region, including federal, state, regional, and local governments and other safety stakeholders. The Regional Safety Workgroup has developed a list of short-term and long-term solutions to help address the findings presented in Section 3 and in the State of Safety in the Region report.

Understanding budget and resource constraints, the Regional Safety Workgroup has highlighted short-term recommendations for the region to pursue in the near future to better address transportation safety and work to reduce fatalities and serious injuries. Longer term recommendations, which are necessary if the region is to achieve the targeted reduction in serious crashes, are also identified for future efforts and policy revisions.

SHORT-TERM RECOMMENDATIONS

	Finding	Strategy or Strategies	Actions	5 E's of Safety	Resources Currently Available?	Involved Agencies	Workgroup Recommendation
All Crashes	<i>Alcohol and drugs, excessive speed, and aggressive driving are the most common contributing factors in serious crashes.. Crashes involving alcohol and drugs have a much higher likelihood of being fatal than other crashes.</i>	Policies to reduce the prevalence of speeding and aggressive driving on surface streets and to reduce the prevalence of driving under the influence of intoxicants.	<ul style="list-style-type: none"> Convene and/or coordinate targeted workgroup of safety professionals (law enforcement, EMS, etc.) to develop targeted strategies to reduce the prevalence of driving under the influence of alcohol and/or drugs, speeding and aggressive driving. 	Education, Enforcement, Engineering, and EMS	No	Possibly Metro	A regionwide workgroup is needed to complement state and local efforts. Metro could lead if grant funds become available.
Surface Streets	<i>Arterials roadways have the highest serious crash rate per road mile and per VMT. 59% of the region's serious crashes, 67% of the serious pedestrian crashes, and 52% of the serious bike crashes occur on arterial roadways.</i>	A regional arterial safety program to focus on corridors with large numbers of serious crashes, pedestrian crashes, and bicycle crashes.	<ul style="list-style-type: none"> Develop systemic performance measures for identifying high severity crash arterials across the region. Use strategies including Highway Safety Manual strategies to address arterial safety, such as medians, speed management, access management, roundabouts, and road diets. 	Engineering and Evaluation	Need GIS and data analysis support.	Metro	Use RTP performance measure to prioritize safety projects in region. Develop a regional arterial safety workgroup to identify tools and strategies.
Bicycle & Pedestrian	<i>Serious pedestrian crashes are disproportionately represented after dark. Serious nighttime pedestrian and bicycle crashes occur disproportionately where street lighting is not present.</i>	A focus on crosswalk and intersection lighting where pedestrian and bicycle activity is expected, as well as programs to encourage use of reflective equipment by pedestrians and bicyclists.	<ul style="list-style-type: none"> Research pedestrian/bicycle facility lighting best practices. Ensure bike routes and crosswalks – marked and unmarked – are adequately lit. Safety education campaign around “See and be seen.” Further explore bicycle and pedestrian safety and identify projects as part of the Regional Active Transportation Plan currently underway. 	Education, Engineering, and Evaluation	Yes	Locals, Metro, ODOT	
	<i>Streets with more traffic lanes have higher serious pedestrian crash rates per mile and per VMT.</i>	Policies to improve the quality and frequency of pedestrian crossings on arterials and multi-lane roadways, as well as enforcement of right-of-way at crosswalks.	<ul style="list-style-type: none"> Develop safe crosswalks on arterials and multi-lane roads, generally adhering to the region's maximum spacing standard of 530 feet and at all transit stops. Enforce existing laws through crosswalk enforcement actions. 	Education, Engineering, Enforcement, and Evaluation	Yes	Locals, Law enforcement	
	<i>Streets with more traffic lanes have higher serious bicycle crash rates per mile.</i>	Policies to encourage protected bicycle facilities along roadways with high motor vehicle traffic volumes and/or speeds.	<ul style="list-style-type: none"> Along high-volume and/or high-speed roadways, where feasible, provide protected bicycle facilities such as buffered bike lanes, cycle tracks, multi-use paths, or low-traffic alternative routes 	Education, Engineering and Evaluation	Yes	Locals, Metro, ODOT	Incorporate into Metro design best practices and incorporate into new projects as cost feasible.

LONG-TERM RECOMMENDATIONS

	Finding	Strategy or Strategies	Actions	5 E's of Safety	Resources Currently Available?	Involved Agencies	Workgroup Recommendation
All Crashes	<i>Increases in vehicle miles travelled (VMT) generally correlate with increases in fatal and serious crashes.</i>	Policies that limit the need to drive, and therefore limit vehicle-miles travelled.	<ul style="list-style-type: none"> Continued support of regional and state policies that seek to reduce VMT, including multimodal facilities, transit, RTO, and TDM. 	Engineering and Education	Yes	Locals, Metro, TriMet, ODOT	
Surface Streets	<i>The most common serious crash types on surface streets were rear end and turning. For fatal crashes, the most common types were pedestrian and fixed object.</i>	Develop more detailed understanding of causes of the most common serious crashes in the region and the effectiveness of countermeasures.	<ul style="list-style-type: none"> Develop safety best practices based on the HSM for the region to address the most prevalent crash types. 	Engineering	No	Locals, Metro, TriMet, ODOT	
			<ul style="list-style-type: none"> Further analyze crash types. 	Evaluation and Engineering	No	Metro, ODOT	
	<i>Higher levels of congestion on surface streets are correlated with lower serious crash rates, likely due to lower speeds.</i>	Revisions to state, regional, and local mobility standards to consider safety as equally important, at a minimum, as vehicular capacity.	<ul style="list-style-type: none"> Elevate safety to equal importance as mobility in regional policy as part of the next RTP update that will start in 2013. 	Education and Evaluation	Yes	Locals, Metro, ODOT	
	<i>Higher levels of congestion on freeways are correlated with higher serious crash rates, except for severe congestion, which is correlated with lower serious crash rates.</i>	Revisions to state, regional, and local mobility standards to consider safety as equally important, at a minimum, as vehicular capacity.	<ul style="list-style-type: none"> Elevate safety to equal importance as mobility in regional policy as part of the next RTP update that will start in 2013. 	Education and Evaluation	Yes	Locals, Metro, ODOT	
	<i>Surface streets with more traffic lanes have higher crash rates per road mile and per VMT. This follows trends documented in AASHTO's Highway Safety Manual. Roadway designs that increase speed lead to increased crash severity in the absence of specific safety considerations.</i>	A regional arterial safety program to focus on corridors with large numbers of serious crashes, pedestrian crashes, and bicycle crashes.	<ul style="list-style-type: none"> Include safety as an element of the update to the Metro Best Design Practices guidebooks. Use strategies including Highway Safety Manual strategies to address safety on multi-lane roadways, such as medians, speed management, access management, improved pedestrian crossings, roundabouts, and road diets. 	Engineering and Education	Yes	Locals, Metro, ODOT	
Data	<i>This report identifies high-level trends in regional crashes, but more detailed work is needed to identify specifically where and why they are occurring in disproportionate amounts.</i>	More detailed analysis of the causes of serious crashes, pedestrian crashes, and bicycle crashes in the region	<ul style="list-style-type: none"> Collect, maintain and analyze ODOT crash data. Provide regional crash data for use in TSP updates and other requests. 	Evaluation	Yes, except for GIS support and data analysis	Metro	
Additional Research	<i>The analysis of the relationship between land use, neighborhood design, and safety was inconclusive. More research is needed to establish reliable relationships between land use, neighborhood design, and safety.</i>	More detailed research on the relationship between land use patterns and safety	<ul style="list-style-type: none"> Work with OTREC to develop research project to further explore the linkage between transportation safety, land use and the built environment. 	Evaluation	No		

APPENDIX A - ADDITIONAL LOCAL GOVERNMENT SAFETY ACTIONS AND PROGRAMS

The following are a more detailed listing of the summary of activities provided in Section 2.0 Local Agencies.

Washington County - Washington County addresses safety issues for all modes of transportation by regularly monitoring its transportation facilities, improving its transportation plans, participating in the activities of a variety of local and regional boards and agencies, and maintaining a robust website. The website promotes topical safety issues such as vegetation removal; construction; back to school; winter weather; new laws; and share the road. Washington County maintains and annually reviews a Safety Priority Index System (SPIS) list to identify intersections with a history of moving up on the list. Washington County also participated in ODOT's OASIS (Oregon Adjustable Safety Index System) program which is an all roads SPIS list.

Washington County has an active Traffic Safety Campaign Committee whose goal is to facilitate coordination with other agencies to maximize the exposure of safety messages to the public. Complementary county policies aim to improve safety, including: (1) a midblock crossing policy to facilitate trail development; (2) a "Minor Betterment" program which funds the construction of safety improvements including sidewalk fill-ins and ADA ramps; and (3) an "access spacing standards" policy which is considered during project development review and in Capital Improvement Program projects.

Several Washington County employees perform tasks directly targeting public safety, including: (1) a bicycle/pedestrian specialist who prepares policy, provides planning, design, maintenance and operations guidance, and acts as a facilitator with bicycle/pedestrian advocacy groups, other agencies and other departments within the county; (2) a school safety coordinator who oversees the Safe Routes To School program who also works closely with local school districts, transportation safety personnel to assist with improving the safety of school walk routes and increasing the numbers of kids walking and biking to school; and (3) a neighborhood streets program coordinator who coordinates the installation of traffic calming devices including speed display reader boards.

Finally, in addition to the above, Washington County monitors the crashes at intersections where a flashing yellow arrow has been installed and has implemented at some of these intersections "pedestrian friendly logic" which eliminates the FYA/pedestrian conflict at intersections running on the latest controller hardware; participates in ODOT's Tripcheck local entry program; and worked with the Commission for the Blind to install audible pedestrian signal equipment at some intersections.

City of Portland - The City of Portland conducts the following safety-related actions:

- 1) Dedicated staff and resources to implementing engineering, education, and enforcement along designated high crash corridors. Portland Transportation has multiple staff members working on engineering and education solutions that impact transportation safety on specific corridors and Portland Police continue to address enforcement along these stretches of roadway.
- 2) Annual Transportation Safety Summit, featuring presentations from transportation industry leaders. Over 200 people typically participate in the Summit and enjoy opportunities to visit transportation related vendors, share information, discuss safety issues, and network with others. This year's Summit will be held on March 13, 2012.
- 3) Pedestrian/Driver Safety Trainings, including translations as needed
 - Portland Walks Be Safe! training to learn how to continue to make Portland a GREAT place to walk, drive and take transit.
 - Every Corner Is A Crosswalk training to learn Oregon crosswalk laws for drivers and pedestrians.
 - Trauma Nurse Talk Tough "Young Driver" presentations.
 - Active Living for Older Adults the StreetSmart Way Pilot Program to share ideas and develop a pedestrian safety education/encouragement program for adults 60+ in the community.
 - Beacon Buddies training to learn what Rapid Flash Beacons are and how to use/respond to them as a pedestrian and as a driver.
 - Development of "Mr. Sharrows" bicycle and driver training about sharrow pavement markings.
- 4) Partnership with Portland Police Bureau for Crosswalk Enforcement Actions, resulting in citations to drivers, bicyclists and pedestrians that do not follow Oregon law when pedestrians are crossing at marked or unmarked crosswalks.
- 5) Over-the-Street Banners and billboards installed on high crash corridors with rotating safety messages.
- 6) Safe Routes to School Program to improve walking and bicyclist routes to school and safer auto circulation around the school.
- 7) Neighborhood Greenways Program to increase the network of residential streets that connect schools, parks, and provide access to business and transit.
- 8) Pedestrian Fatality Research Project (Tri-Met, PBOT, ODOT) to better understand pedestrian fatalities, identify crash trends, identify countermeasures for prevention.
- 9) Other Regional Partner Efforts
 - "Share the Road" Bicycle-Pedestrian-Motorist Safety Class offered by Multnomah County Circuit Courts, Legacy Emanuel Hospital and Portland Police to increase education of and compliance with Oregon law that applies to motorists, pedestrians and bicyclists who share our roadways. The goal is to reduce preventable crashes which cause property damage, injury and death to the citizens of our community.
 - ACTS Oregon provides car seat check clinics, distributes car seats and booster seats to low-income families and present assemblies at public schools in coordination with Safe Routes

to Schools. (This specifically supports State Emphasis Area #7.) **ACTS Oregon staff are interested in participating in the Metro Safety Committee.

- BTA is working on a Vision Zero project.
- Willamette Pedestrian Coalition may have some projects in the works – it would be good to check with them.

City of Gresham – The City of Gresham puts a high importance on safety with a number of safety policies, programs and projects:

1. The City of Gresham has a Transportation Advisory Committee that provides recommendations for safety of policies, programs and projects.
2. Tack safety data through analysis of annual top 10 crash locations in the city through inputs of state accident data into a GIS system. The analysis is to better understand fatalities and injury accidents, identify crash trends, monitor issues and identify countermeasures for prevention. Specific project development relies on a more detailed assessment of accident type and severity.
3. The city's bicycle policies include bike lanes on all arterial streets, buffered bike lanes where feasible, implement NACTO design recommendations where feasible and off-street bike facilities are designed to establish safe and convenient routes separate from auto traffic or bicycles, walking and other non-motorized users.
4. City policy provides for future street connections and logical continuation of the City Street System to ensure safe and convenient pedestrian circulation, and safe and comfortable bicycle network.
5. Implemented Bicycle Action Plan and was awarded a bronze level certificate proclaiming Gresham to be a Bicycle Friendly Community by the League of American Bicyclists in 2010.
6. Provide Safety Education Program to enhance safety for bicyclists, walkers, transit users and motorist and to teach all to share the road. Other programs and amenities that support bicyclist, walkers and transit users include: bike rack installations, bike helmet distributions and bike maps.
7. Partner with Gresham Police for Crosswalk Enforcement Actions, resulting in warnings or citation to drivers, bicyclists and pedestrian that do not follow Oregon Cross Walk Laws.
8. Develop and implement Safe Routes to School Program to implement walking and biking routes to schools and to enhance auto circulation around schools.
9. Provide Neighborhood Traffic Calming and Speedwatch Programs to allow residents to participate in solving neighborhood problems. Such as speed bumps and digital speed advisory signs.
10. Curb Ramp Safety Program works independently from street repair to install and upgrade curb ramps citywide to meet ADA standards. School zones take priority. Other priority areas for ramp construction are identified in pedestrian districts of Rockwood, Downtown Gresham, and Civic Neighborhood.
11. Infill missing sidewalk links project. This includes inventory of missing links and prioritization based on city advocacy group to provide safety criteria.

12. Modify traffic signals to give more time to cross street and meet current ADA standards (from 3.5'/sec. to 4'/sec.)
13. Enhance pedestrian safety by installing Rapid Rectangular Flashing Beacons (RRFB) at mid block crossings.
14. New directional signage provides greater information and directions to provide safe and convenient access for cyclists and pedestrians on designated routes to specific destinations such as libraries, parks, schools, and trails.

Materials following this page were distributed at the meeting.



TV HIGHWAY CORRIDOR PLAN
TVHIGHWAY.ORG


TV Highway Corridor Plan Metro Council Work Session May 29, 2012

Potential Transportation Solutions



1

Previous Work Sessions



- October 2011
Partnering Agreement includes project goals and decision-making framework
- January 2012
Throughway v. Arterial classification for TV Hwy

2

Throughway v. Arterial



Regional Arterial Street



Regional
City
Table 2.6
Arterial and Throughway Design Concepts

Regional Street
Industrial areas
Employment areas
Intermodal facilities

Major Arterial



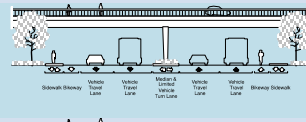
THROUGHWAYS

⁷ The number of through lanes may vary based on right-of-way constraints or other factors. Some places may have more than 6 through lanes. Major and minor arterial streets may have different lane configurations.

Regional Throughway



Interstate/
regional
Throughway
(Highway)
Principal
arterial



6 through lanes (plus auxiliary lanes) with grade separated intersections/interchanges

Discussion Questions



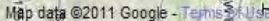
Questions:

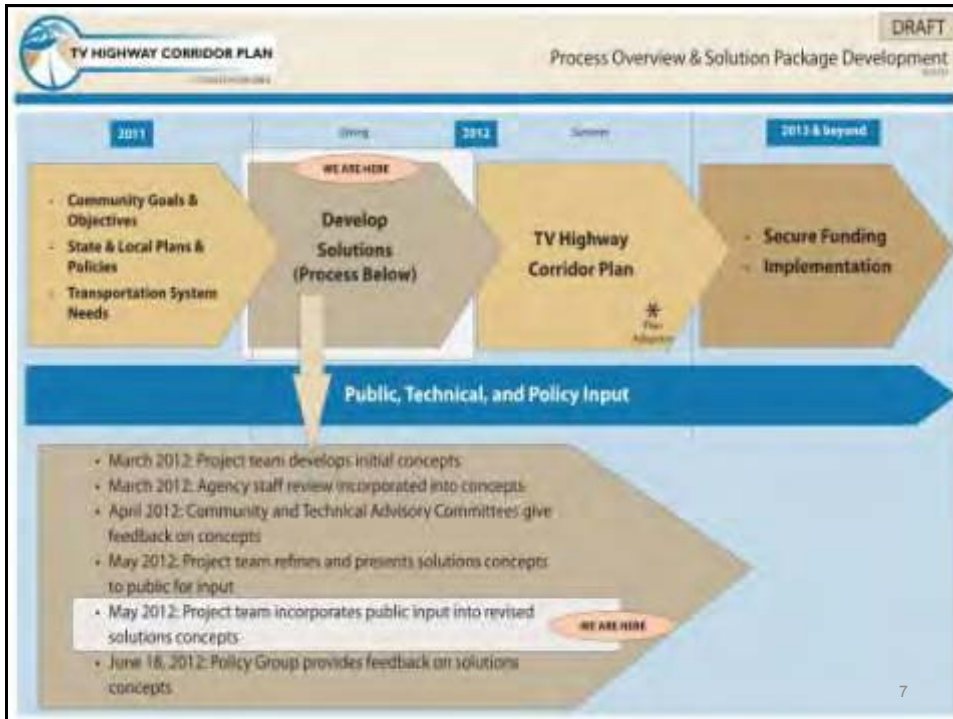
- Does Metro Council affirm the list of proposed projects as appropriate to a multimodal, community-serving arterial street?
- Does Metro Council have ideas/suggestions for creating funding partnerships to support implementation of the TVCP?

TV HIGHWAY CORRIDOR PLAN

- 5

TV HIGHWAY CORRIDOR PLAN





Solutions Development Process

- Concepts developed as part of Needs, Opportunities and Constraints Report
- Matrix developed to tie each improvement concept to project goals & objectives
- Analysis, prioritization & timing
 - State/Metro priorities
 - Need
 - Cost
- TAC & CAC review & recommendations
- Public review & comment (open house and survey)

Transportation System Solutions Development



Priority #1 – Protect Existing System:

- Safety 
- Technology 
- Transit 
- Bicycle System 
- Pedestrian System 

Priority #2 – Improve to Street Network:

- Completing the Street Network
- Add vehicle turn lanes at intersections
- Urban grade separated intersections

Priority #3 – Add Capacity:

- Add vehicle lanes on TV Highway

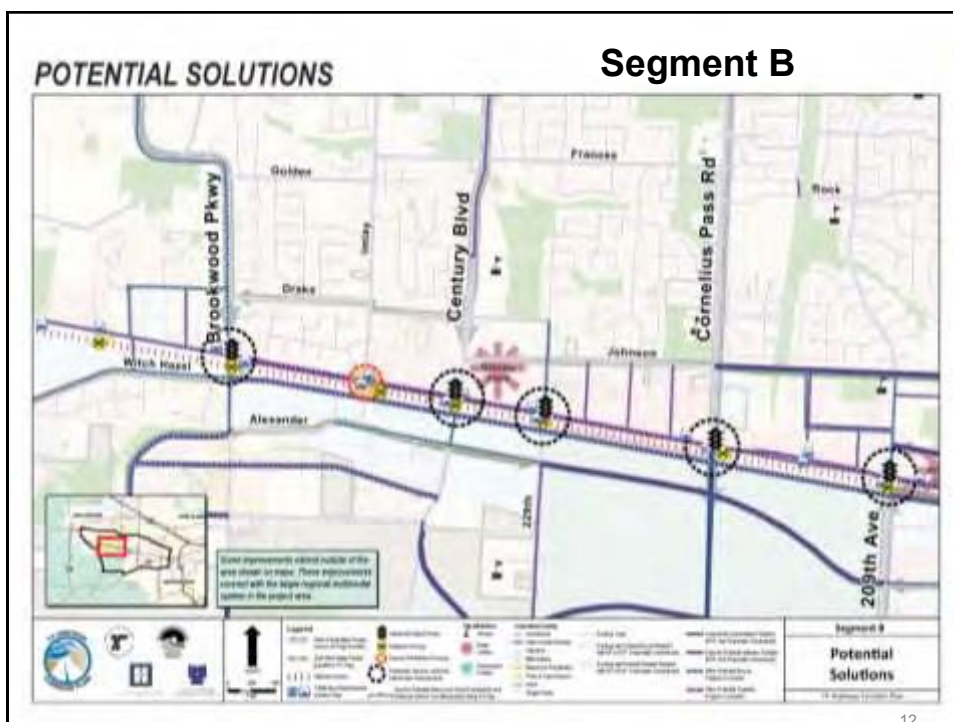
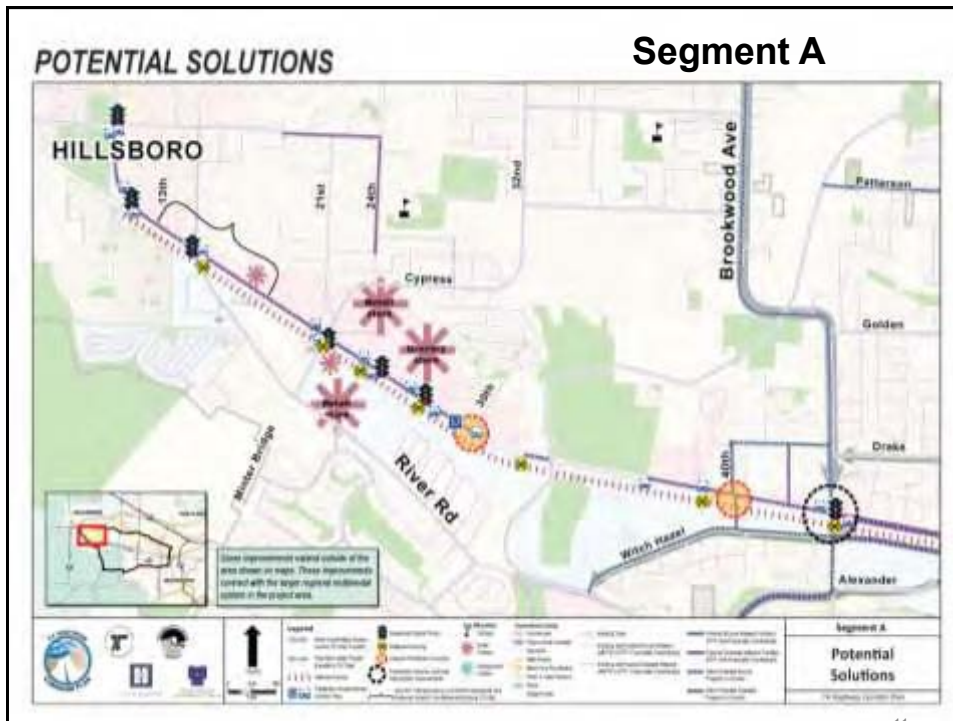
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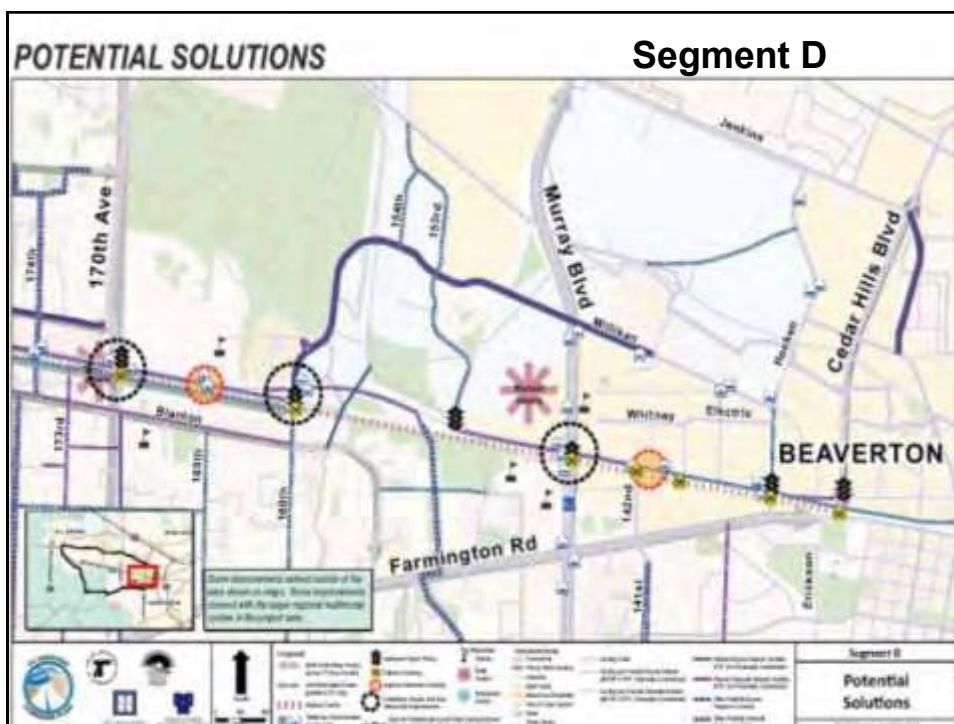
Potential Solutions



	Short Term (0-5 years)**	Mid Term (5-15 years)	Long Term (15+ years)
Multi-Modal	Support and promote employer incentives programs to reduce driving		
	Provide real-time traveler information for TV Hwy and other major routes in the area		
	Improve bus stops along TV Hwy		
	Add street lighting on TV Hwy*		
	Improve signal timing (all routes)		
	Reduce vehicle turn movements left/right driveway on TV Hwy	Reduce vehicle turn movements left/right driveway on TV Hwy	
Bicycle & Pedestrian	Improve existing north-south routes for all modes	Improve existing north-south routes for all modes	Improve existing north-south routes for all modes
	Provide new local streets to improve connectivity around TV Hwy	Provide new local streets to improve connectivity around TV Hwy	
	Add directional wayfinding signs	Develop continuous east-west parallel bike routes north and south of TV Hwy	Add a buffered bicycle lane on TV Hwy
	Improve TV Hwy pedestrian and bicyclist crossings	Complete regional trails in corridor	
	Add gaps in sidewalks along TV Hwy and on north-south connecting streets	Add landscape buffer with trees between sidewalks and TV Hwy*	
	Provide bicycle facilities on TV Hwy		
Transit	Improve existing bus service within TSOV Area (SOV and other routes)	Add new North-South bus service between South Willbore and N&S	
	Move detailed study to determine long-term transit solutions for TV Hwy		
Motor Vehicles	Add automated speed enforcement cameras*	Improve existing intersections along TV Hwy	Improve existing intersections along TV Hwy
	Provide community rail safety education		

10





Solutions Not Recommended



- Security cameras at transit stops
- Secure fencing on south side of railroad track between authorized crossings
- Consolidate number of at-grade rail crossings
- New bus service on parallel streets north and south of TV Hwy (e.g., Alexander, Blanton)
- High-occupancy vehicle (HOV) lane
- Couplet between Cornelius Pass Road and 170th avenue (makes Alexander one-way westbound and Blanton one-way eastbound)
- Relocate railroad underneath the TV Highway median (cut-and-cover) and use existing railroad land for multimodal use
- Undercrossing of railroad tracks for pedestrians and bicyclists (between 209th and 160th Avenues)

15

The logo for the TV Highway Corridor Plan, featuring a stylized blue and white circular emblem with a road and a mountain, followed by the text "TV HIGHWAY CORRIDOR PLAN" and the website "TVHIGHWAY.ORG" below it.

Discussion questions:

- Does Metro Council affirm the list of proposed projects as appropriate to a multimodal, community-serving arterial street?
- Does Metro Council have ideas/suggestions for creating funding partnerships to support implementation of the TVCP?

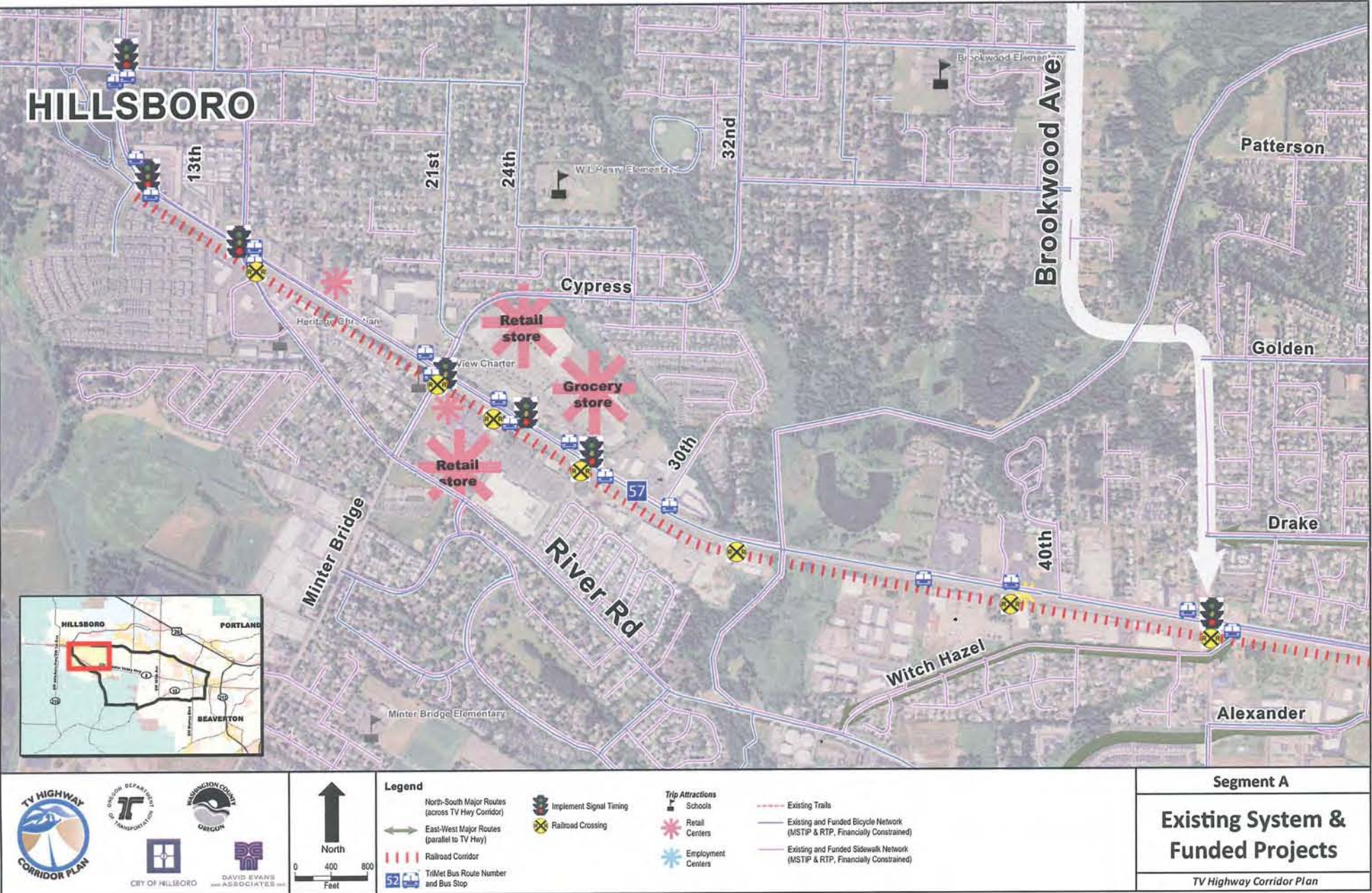
Next Steps:

- 1. Policy Group Discussion**
- 2. Prepare TV Highway Corridor Plan**
3. Recommend Implementing Plan & Code Amendments

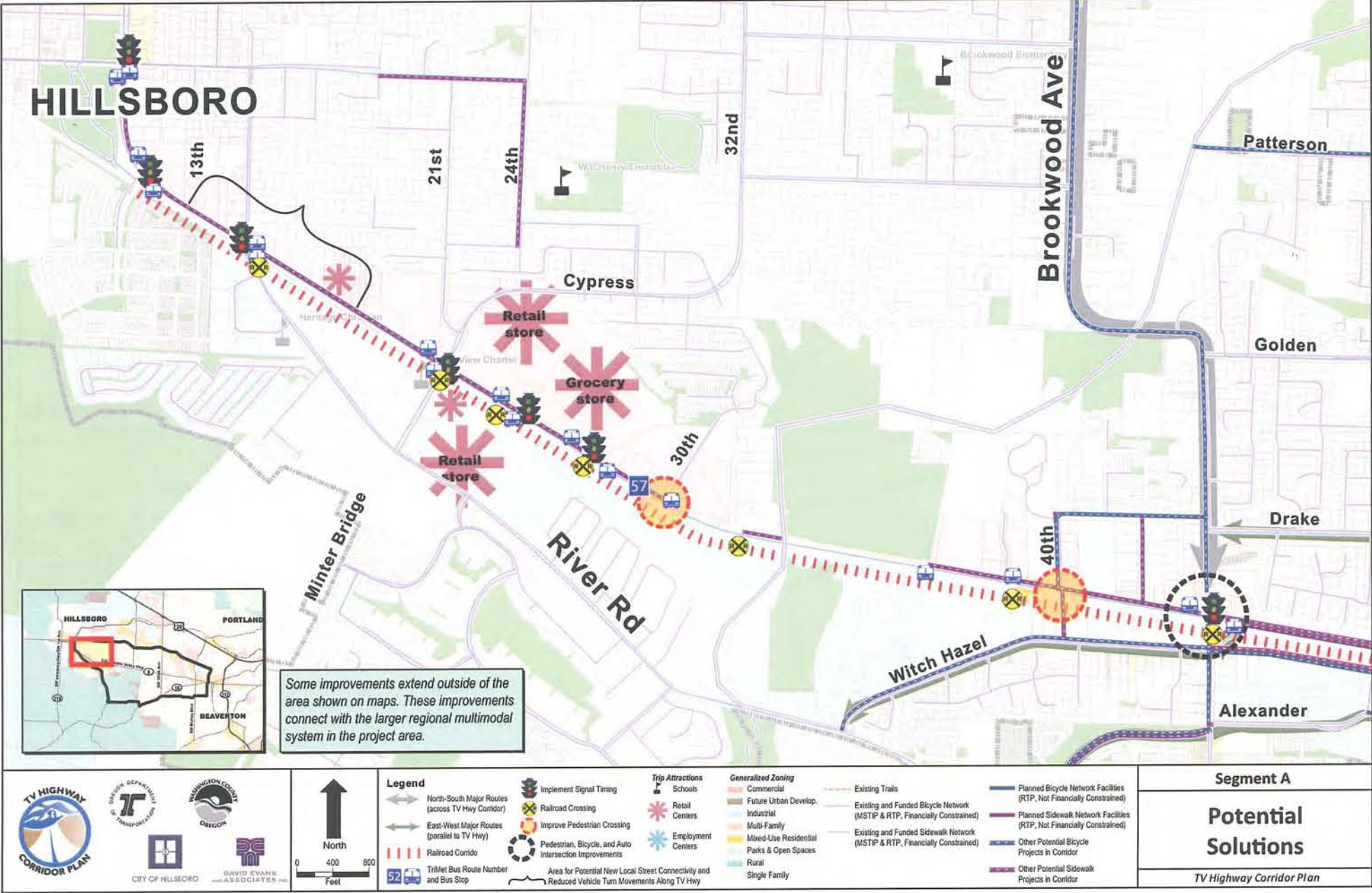
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SEGMENT A

EXISTING SYSTEM & FUNDED PROJECTS

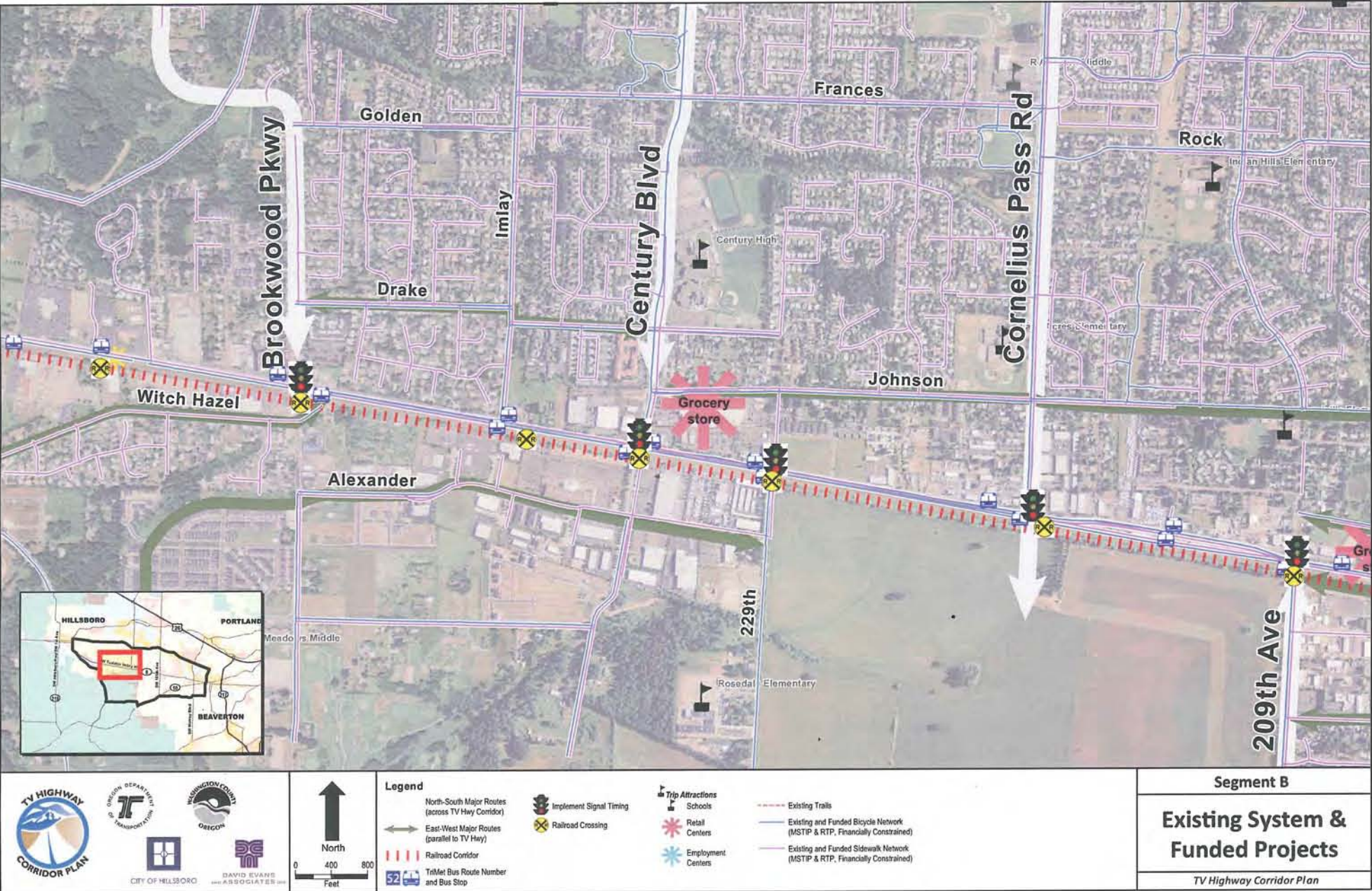


POTENTIAL SOLUTIONS

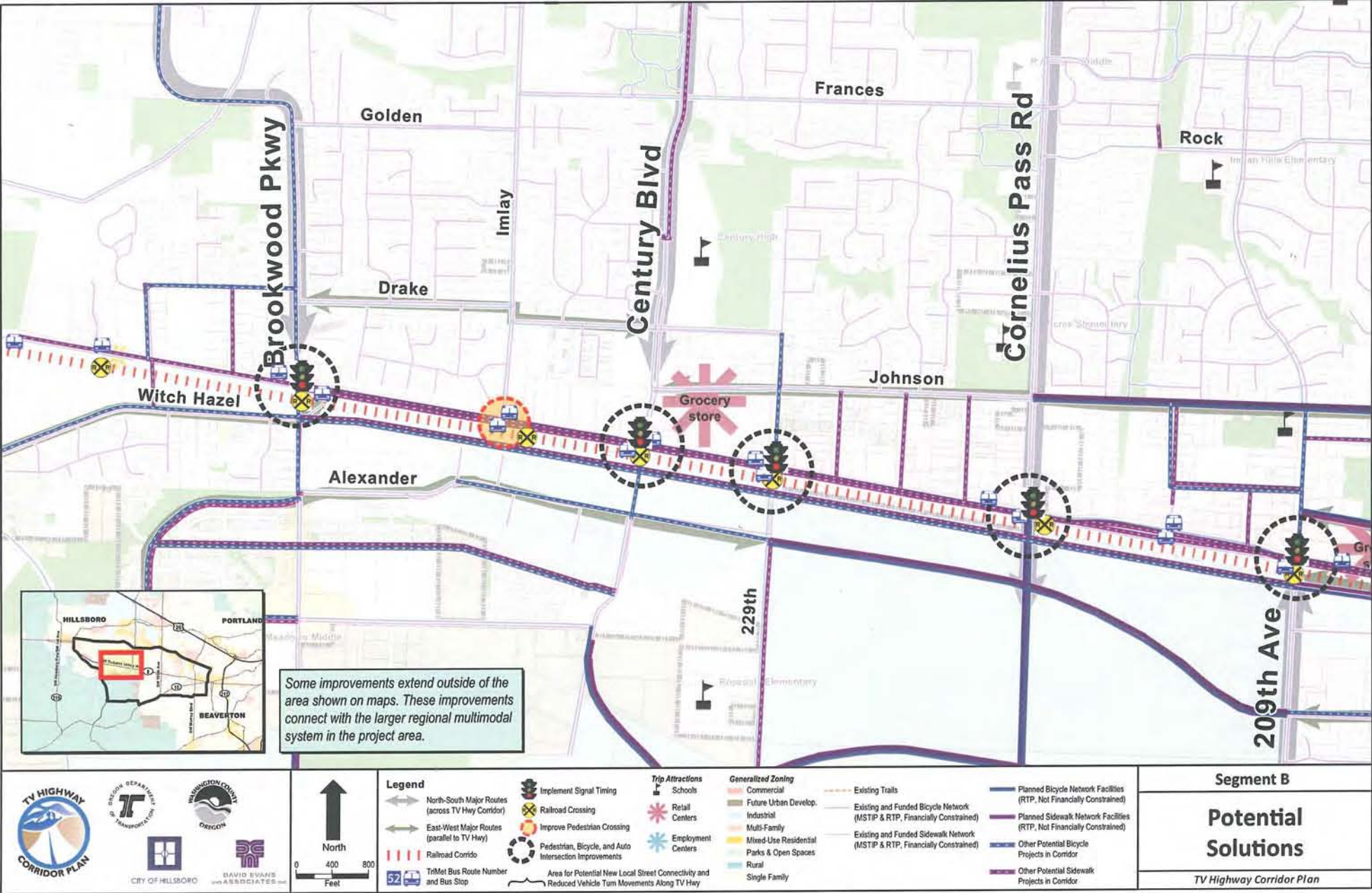


SEGMENT B

EXISTING SYSTEM & FUNDED PROJECTS

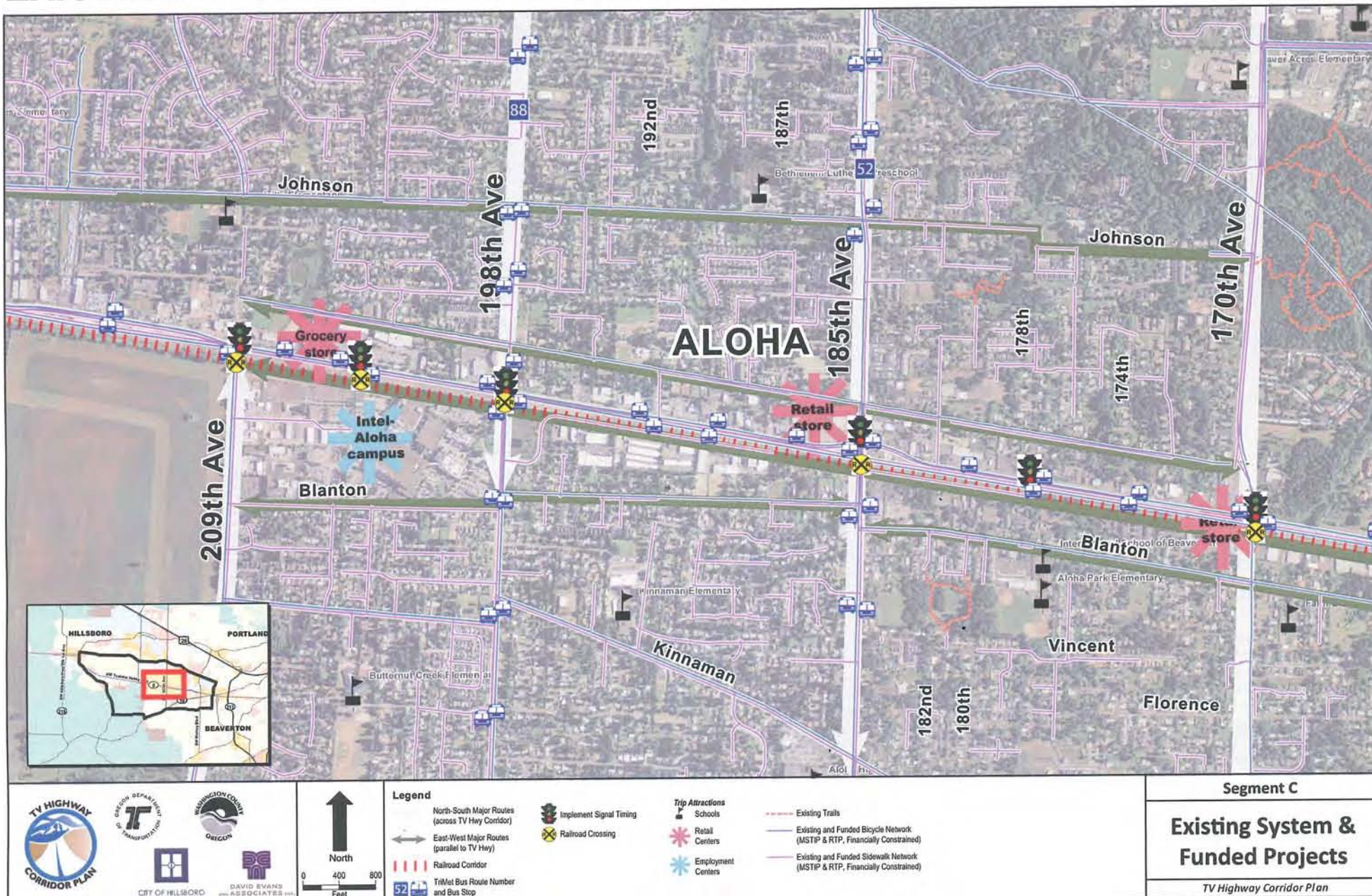


POTENTIAL SOLUTIONS

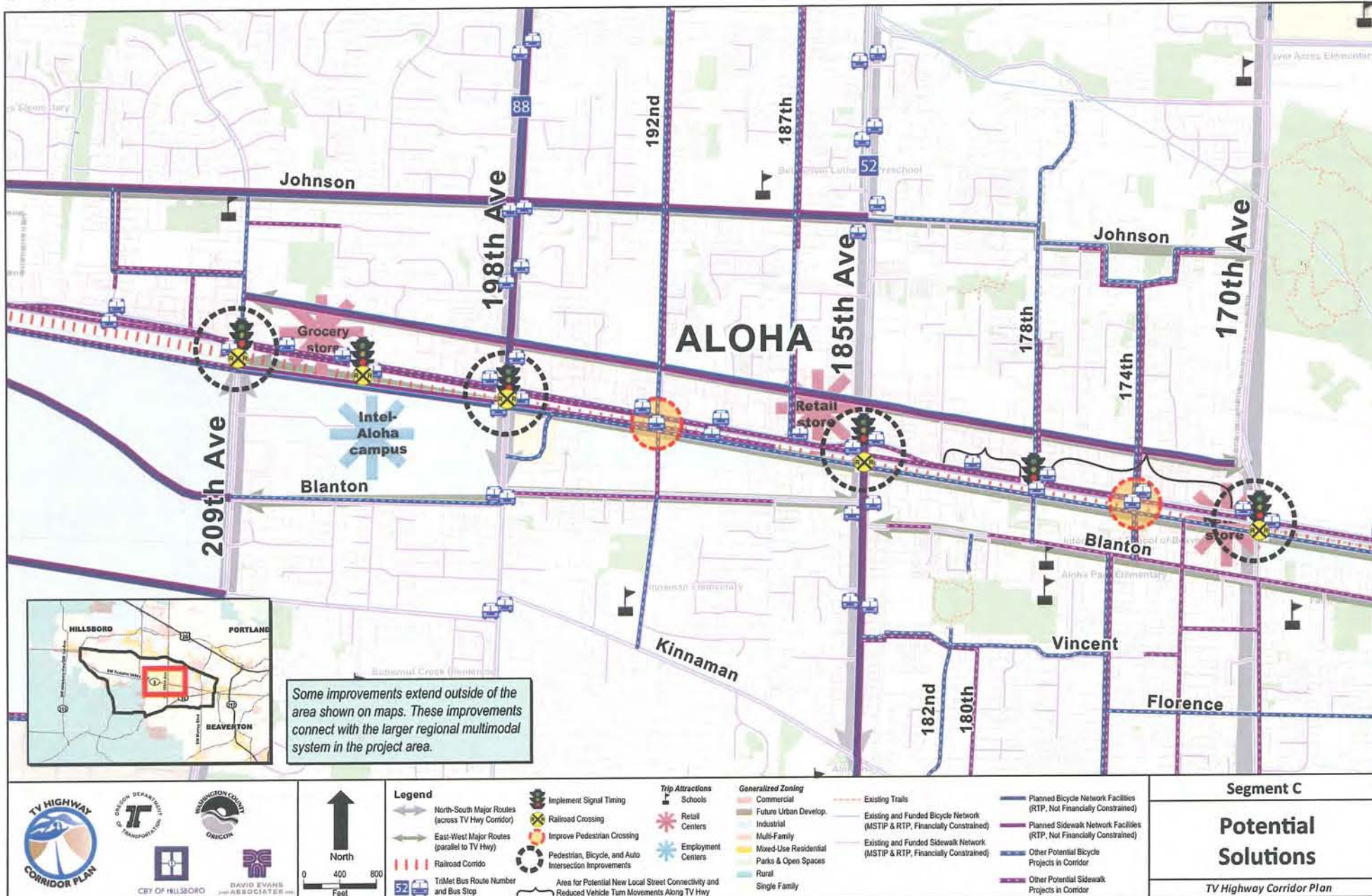


SEGMENT C

EXISTING SYSTEM & FUNDED PROJECTS

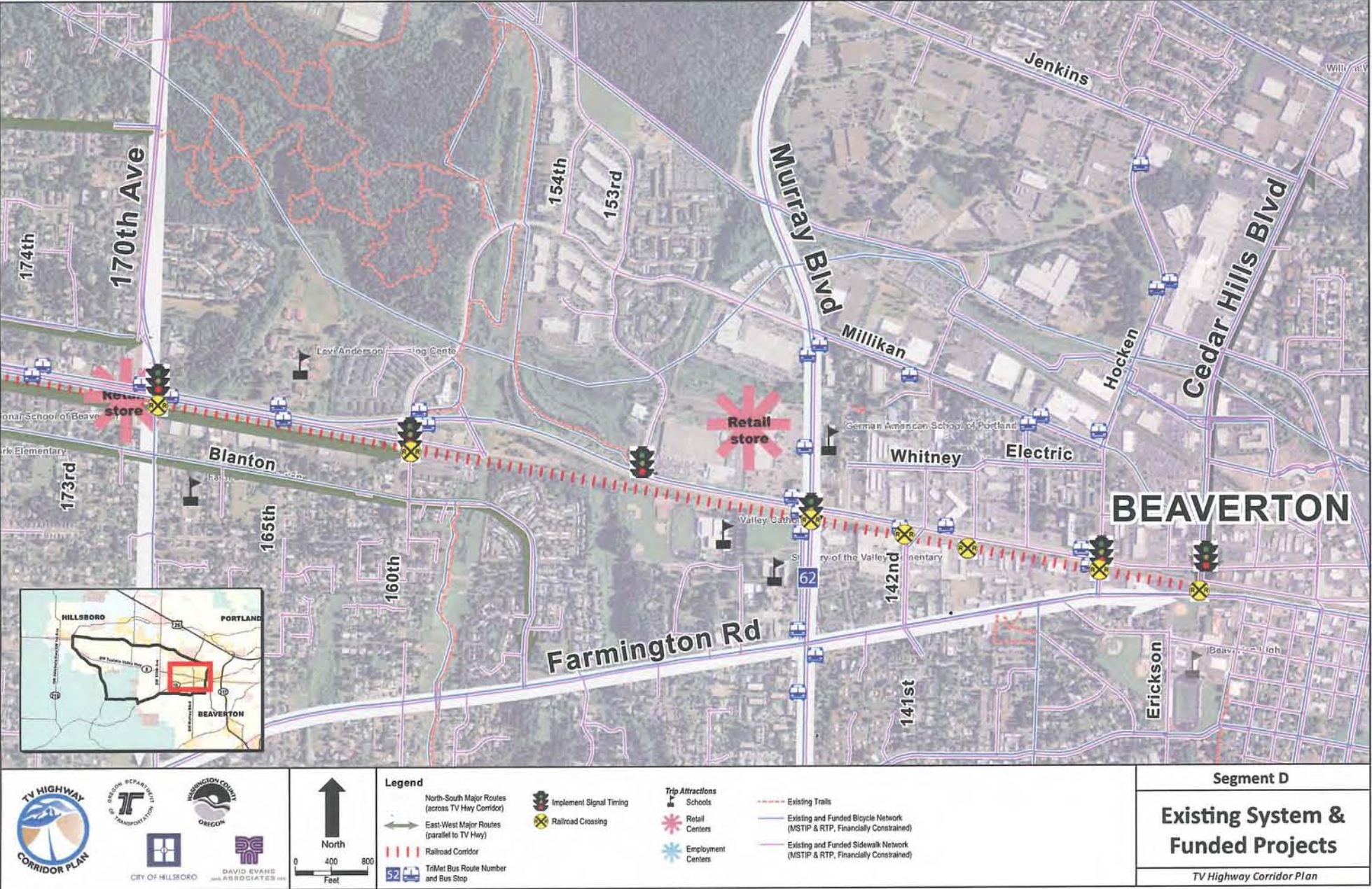


POTENTIAL SOLUTIONS

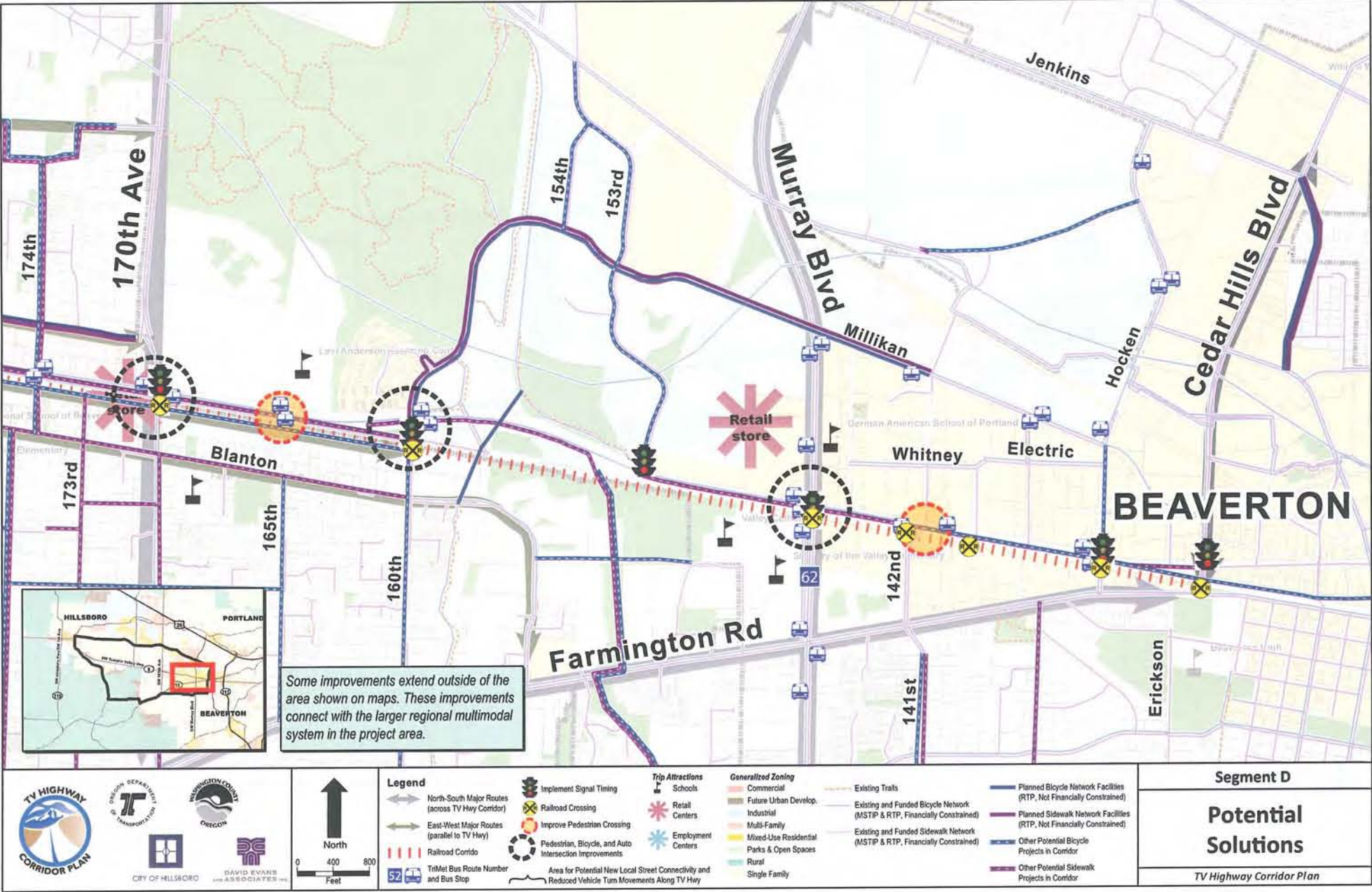


SEGMENT D

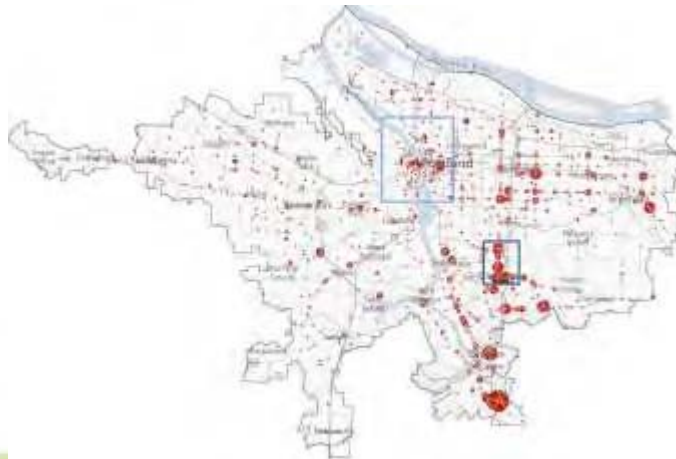
EXISTING SYSTEM & FUNDED PROJECTS




POTENTIAL SOLUTIONS



Regional Transportation Safety Plan: Findings and Recommendations



 Metro | *Making a great place*

Background

- 2008 federal certification review FHWA recommendation
- MPOs across the country have struggled incorporating safety into the planning process
- FHWA sponsored workshop in fall 2009

Regional Vision for Safety

- One of the 6 Desired Outcomes
- 2035 RTP Goal



3

Getting Started

- Convened Regional Safety Workgroup
 - 2035 RTP performance target
 - State of Safety in the Region report (<http://www.oregonmetro.gov/regionalmobility>)
 - Regional Transportation Safety Plan



4

The Problem

- US roads
 - 2000 – 2009: 411,212 people killed
 - Average of one person killed every 13 minutes....24/7 for 10 years straight
 - Leading cause of accidental deaths
 - Leading cause of all deaths, age 15 – 34
- Metro region roads
 - 2007 – 2009: 159 people killed, 1,400+ severely injured
 - Societal costs of \$958 Million/year

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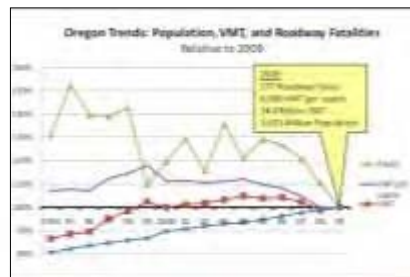
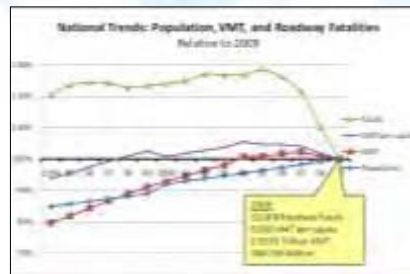
Section 1

National and International data

Source: NHTSA

State and National Trends

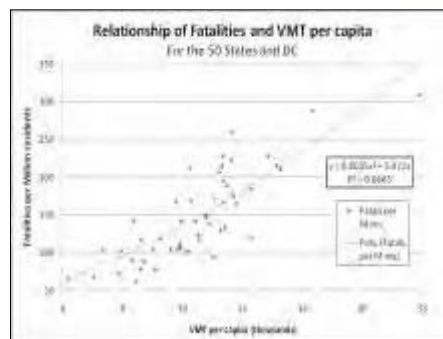
- Fatalities are decreasing nationally
- From 43,510 in 2005 to 33,808 in 2009.
- Declines are greater than VMT



7

VMT and Fatalities

- By State
- Relationship with VMT is strong but only part of the story



8

State-by-State

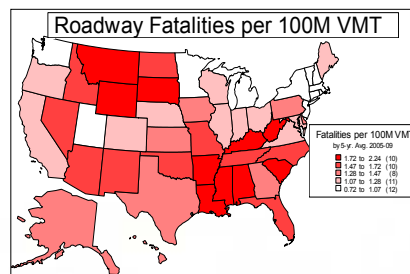
- Southeast and Mountain West are doing most poorly



9

State-by-State

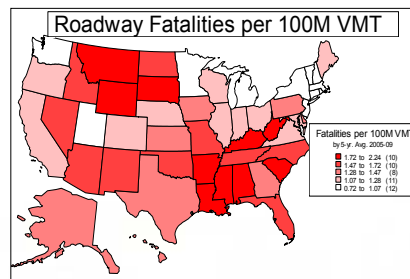
- Southeast and Mountain West are doing most poorly



10

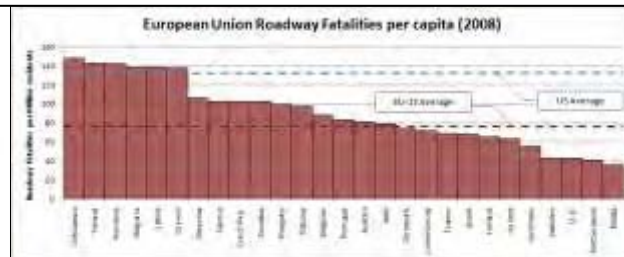
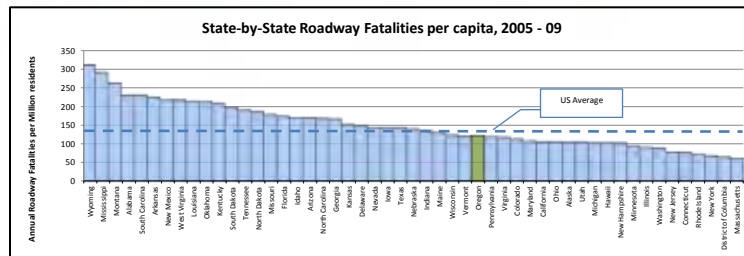
State-by-State

- Southeast and Mountain West are doing most poorly



11

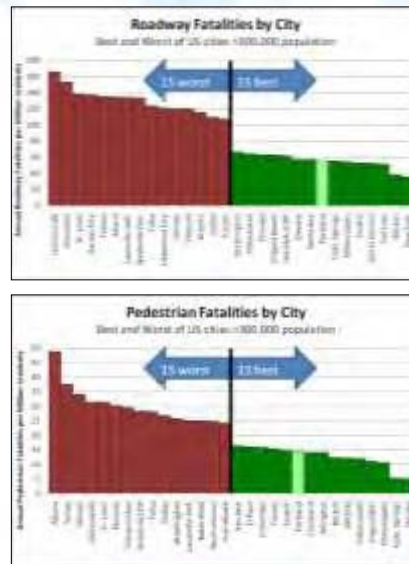
National & International context



12

Fatalities by large US city

- Portland has fewer fatalities and pedestrian fatalities compared to peers



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Section 2

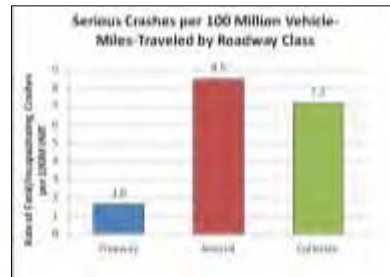
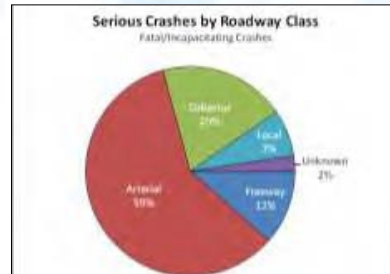
Data in the Metro region

Sources: ODOT Crash Reporting, Metro RLIS, Metro Traffic Model

- What this is: *High-level comparison of roadway types to crash types*
- What this isn't: *Detailed analysis of why crashes are/aren't occurring in any given location*

Roadway class

- Arterials are the main problem
- 59% of all serious crashes
- Arterials include 82nd, Foster, 181st, 185th, etc.
- Collectors include NE Fremont, SW Millikan Way, SE River Rd, etc.



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By Day and Hour

Serious Crashes by Day of Week and Hour												
Annual Fatal/Incapacitating Crashes												
Hour	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Hour	Avg Weekday	Avg Weekend	Avg All Day	Avg All Day
12AM	2.5	1.0	1.0	0.7	1.3	1.7	4.0	12AM	5.5	5.5		
1AM	2.0	1.0	1.0	0.5	2.0	0.7	4.0	1AM	1.5	1.0		
2AM	1.7	1.0	0.5	0.7	2.0	2.3	5.7	2AM	1.5	1.7		
3AM	1.7	0.0	0.0	0.5	0.0	1.0	1.0	3AM	0.5	1.5		
4AM	0.0	0.0	0.0	0.0	0.0	0.0	2.7	4AM	0.0	1.5		
5AM	1.5	1.7	1.5	0.5	0.7	1.5	0.0	5AM	1.5	0.7		
6AM	0.7	3.7	5.5	3.0	0.5	2.0	0.7	6AM	3.5	0.7		
7AM	1.7	3.5	3.7	3.5	3.0	3.7	1.5	7AM	3.4	1.5		
8AM	1.0	4.7	3.5	3.7	3.5	0.0	1.5	8AM	4.4	1.5		
9AM	0.7	2.5	4.7	1.5	1.5	3.7	2.7	9AM	3.7	1.7		
10AM	0.5	3.5	4.5	4.5	2.0	3.7	2.0	10AM	3.5	2.0		
11AM	2.5	4.0	3.7	4.0	2.7	4.7	4.0	11AM	4.0	3.5		
12PM	3.5	5.5	4.7	5.5	2.7	2.7	4.0	12PM	4.4	3.7		
1PM	3.7	3.5	3.7	4.7	4.7	4.0	7.0	1PM	3.7	5.5		
2PM	0.5	5.0	5.0	4.5	2.5	0.0	3.7	2PM	4.5	5.0		
3PM	0.7	7.0	5.5	7.0	0.5	3.7	4.7	3PM	6.7	4.2		
4PM	0.0	6.5	5.7	6.0	6.5	5.0	3.7	4PM	6.5	3.0		
5PM	5.0	11.0	5.5	7.7	7.7	9.0	7.7	5PM	6.5	6.5		
6PM	4.0	6.7	5.0	3.7	4.5	6.5	3.7	6PM	5.5	3.0		
7PM	3.5	4.0	2.5	2.7	5.5	4.7	5.5	7PM	3.0	4.5		
8PM	1.0	1.5	2.0	1.7	3.0	3.0	1.7	8PM	2.0	3.0		
9PM	2.5	3.0	2.0	3.0	3.0	3.5	2.5	9PM	2.5	3.5		
10PM	1.7	1.7	1.7	1.5	2.5	4.0	4.5	10PM	2.5	3.0		
11PM	1.7	2.0	2.0	1.7	3.0	3.7	3.0	11PM	2.5	3.0		
All Day	Sun	Mon	Tue	Wed	Thu	Fri	Sat	All Day	Avg Weekday	Avg Weekend	Avg All Day	Avg All Day
All Day	60.7	63.7	75.7	73.0	76.7	84.7	76.3	All Day	76.5	67.7		

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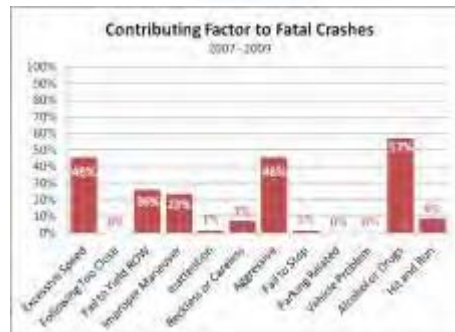
By Day and Hour



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Contributing Factor

- Alcohol and Drugs
- Excessive Speed
- Aggressive Driving



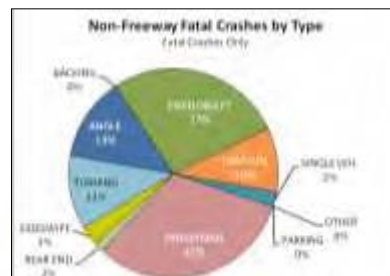
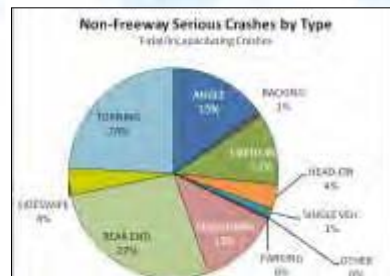
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Section 3

Non-Freeway Data

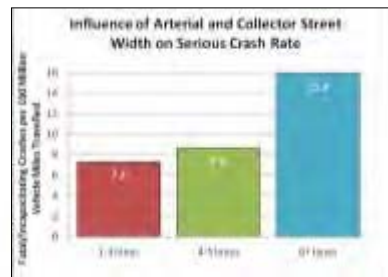
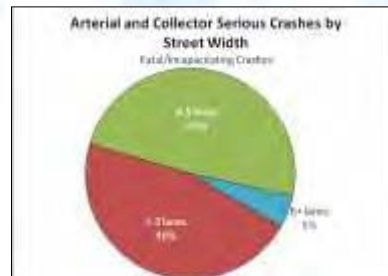
Crash Type

- Serious: Turning, Rear End
- Fatal: Pedestrian, Fixed Object



Number of Lanes

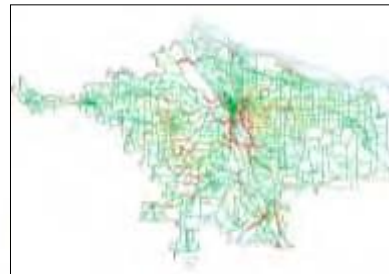
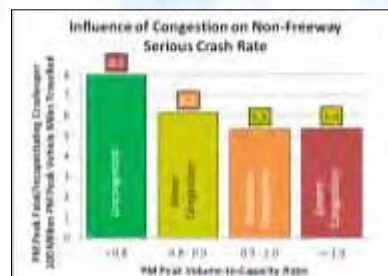
- Streets with more lanes have higher crash rates
- Rate increases for 6+ lanes
- Consistent with HSM



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Non-Freeway Congestion

- Surface streets with more congestion have lower serious crash rates
- Likely due to speed



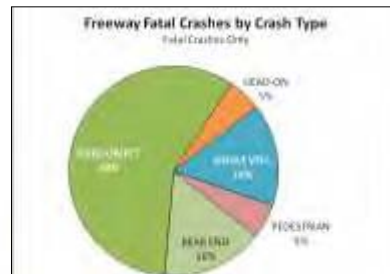
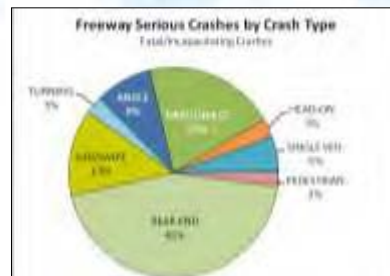
22

Section 4

Freeway Data

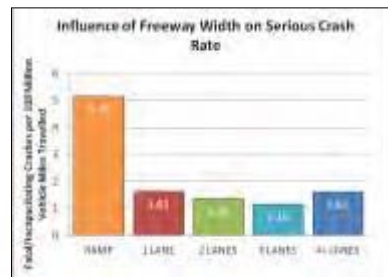
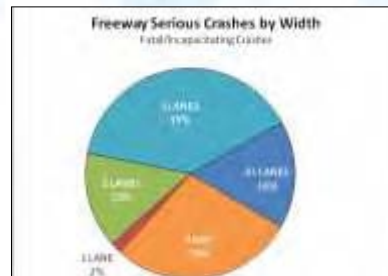
Freeway Crash Type

- Serious: Rear end
- Fatal: Fixed object



Number of Freeway Lanes

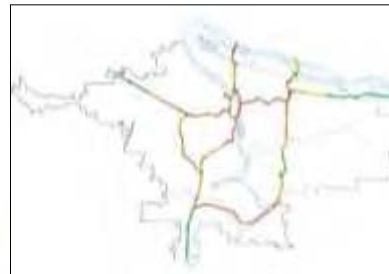
- Ramps
- 3 lanes including aux lanes has lowest crash rate
- Crash rate is higher above 3 lanes



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Freeway Congestion

- Serious crash rate increases with increasing congestion; drops with severe congestion
- Likely due to speed



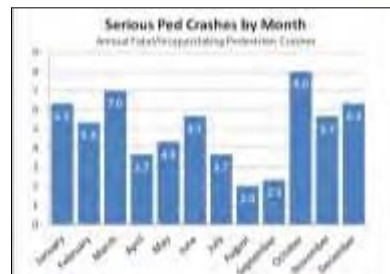
26

Section 5

Pedestrians

By month

- Summer is better, winter months have more crashes



Pedestrians by Day and Hour

Hour	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Average	Average
								Weekday	Weekend
12 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All Day	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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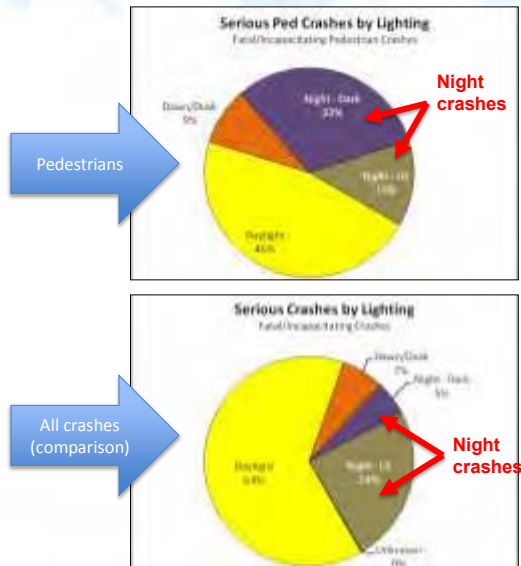
Pedestrians by Day and Hour

Hour	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Average	Average
								Weekday	Weekend
12 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All Day	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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By Lighting

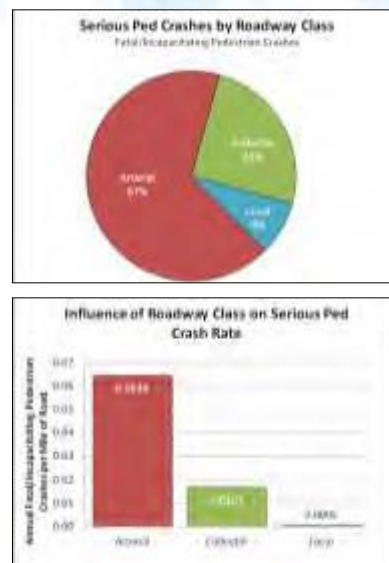
- More crashes at night than autos or bikes



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Roadway Class

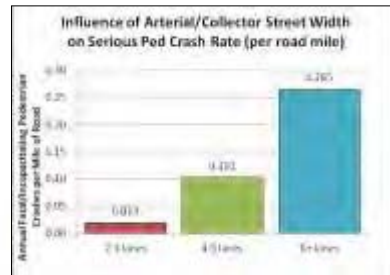
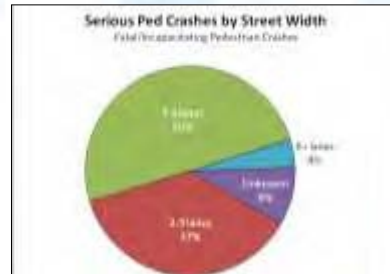
- 67% of serious ped crashes happen on arterials
- Often serve as bus routes



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Number of Lanes

- Wider roads are disproportionately represented

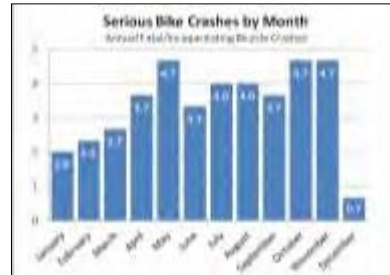


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Section 6 Bicyclists

By month

- Warmer, drier months have more crashes



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Bicyclists by Day and Hour

Serious Bicycle Crashes by Day of Week and Hour									
Annual Total/No. Registered Bicyclist Crashes, 2007-2009									
Hour	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	Average
12 AM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1 AM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2 AM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
3 AM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
4 AM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
5 AM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
6 AM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
7 AM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
8 AM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
9 AM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
10 AM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
11 AM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
12 PM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1 PM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2 PM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
3 PM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
4 PM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
5 PM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
6 PM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
7 PM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
8 PM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
9 PM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
10 PM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
11 PM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
All Day	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7

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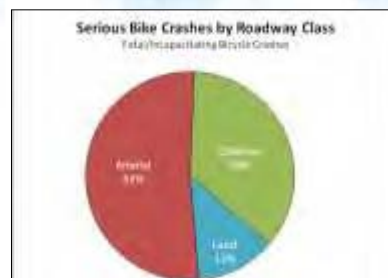
Bicyclists by Day and Hour

Hour	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Hour	Average	Average
									Weekday	Weekend
12 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12 AM	0.0	0.0
1 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1 AM	0.0	0.0
2 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2 AM	0.0	0.0
3 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3 AM	0.0	0.0
4 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4 AM	0.0	0.0
5 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5 AM	0.0	0.0
6 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6 AM	0.0	0.0
7 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7 AM	0.0	0.0
8 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8 AM	0.0	0.0
9 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9 AM	0.0	0.0
10 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10 AM	0.0	0.0
11 AM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11 AM	0.0	0.0
12 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12 PM	0.0	0.0
1 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1 PM	0.0	0.0
2 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2 PM	0.0	0.0
3 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3 PM	0.0	0.0
4 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4 PM	0.0	0.0
5 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5 PM	0.0	0.0
6 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6 PM	0.0	0.0
7 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7 PM	0.0	0.0
8 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8 PM	0.0	0.0
9 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9 PM	0.0	0.0
10 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10 PM	0.0	0.0
11 PM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11 PM	0.0	0.0
All Day	0.0	0.0	0.0	0.0	0.0	0.0	0.0	All Day	0.0	0.0

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Roadway Class

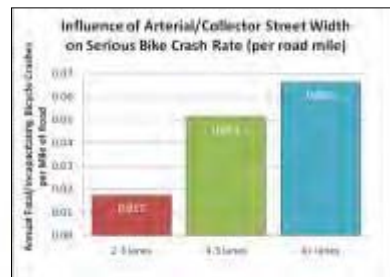
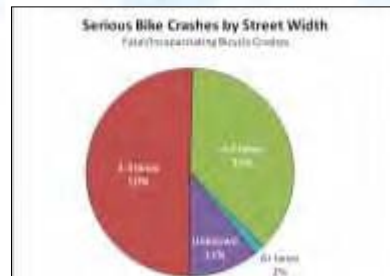
- Arterials are the problem (again!)
- 52% of serious bike crashes are on arterials



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Number of Lanes

- Most crashes happen on 2-3 lane roads
- Crash rate increases with street width

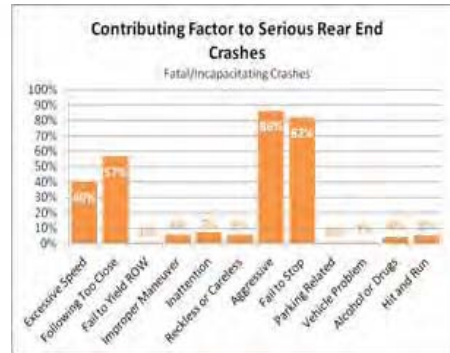


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Section 7 Contributing Factors

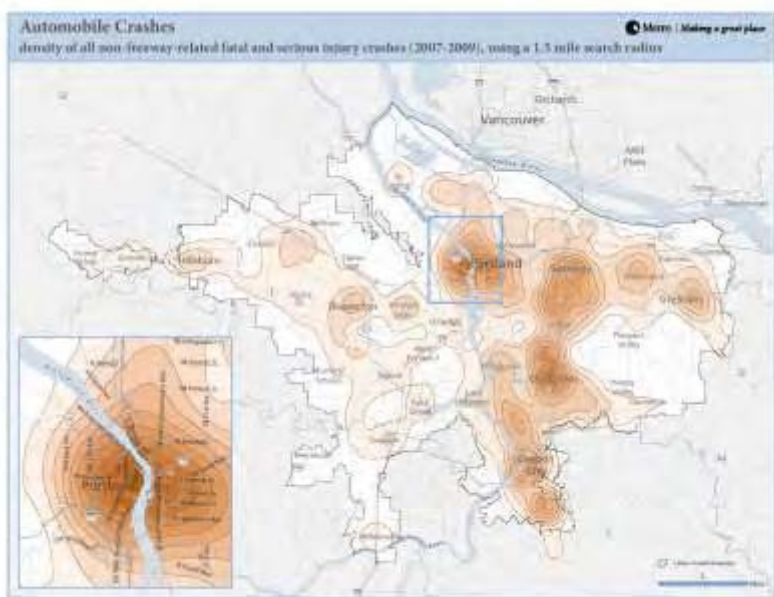
Rear End crashes

- Most common serious crash type (29%)



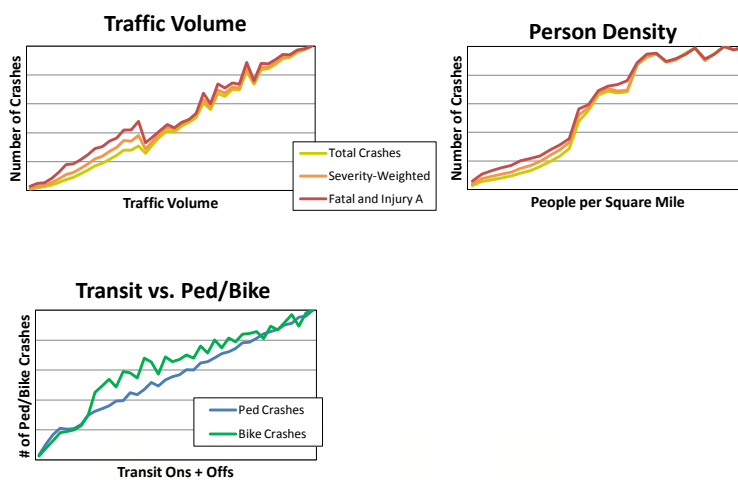
41

Section 8 Land Use



43

Relationship of Variables



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Transit and Rail

- TriMet
 - 2007 – 2009: 3 accidental fatalities (1/year)
 - 0.23 fatalities/100M passenger-miles (compared to 0.42 for all vehicles)
- Freight Rail
 - 2007 – 2009: No reported fatalities at RR crossings

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What are the general patterns?

- Arterials are the major safety challenge in the region
- Alcohol/Drugs, Speed, and Aggressive Driving are major factors to be addressed
- Higher VMTs = more serious crashes
- Streets with more lanes = higher serious crash rates, particularly for people walking
- Risk for people walking increases most after dark
- Street lighting is important for bikes and peds

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Regional Transportation Safety Plan

- Urban focused
- Data-driven
- Multimodal
- Focuses on fatal and severe injury crashes
- Identify recommendations to meet RTP targets

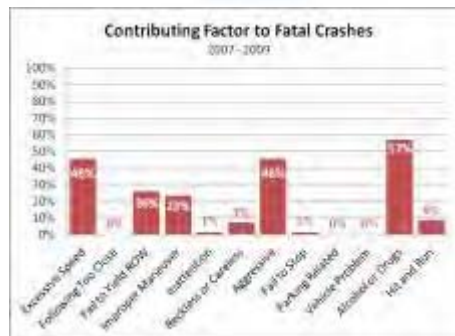


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Short-Term Workgroup Recommendations

Contributing Factors

- Alcohol and Drugs
- Excessive Speed
- Aggressive Driving

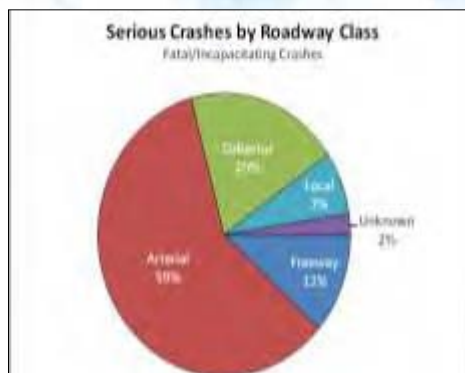


Workgroup Recommendation: Convene targeted Workgroup of safety professionals (law enforcement, education, EMS etc.) to focus on these contributing factors.

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Roadway class

- Arterials are the major safety challenge in the region.



Workgroup Recommendation: Develop arterial safety program to identify high severity crash arterials across the region.

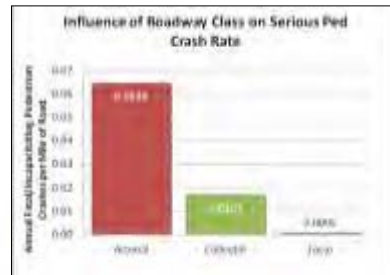
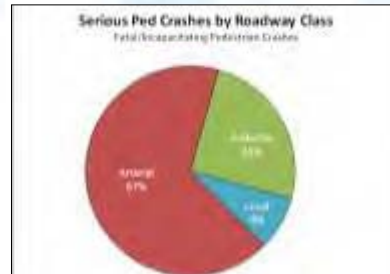
50

Pedestrian Crashes #1

- 67% of serious ped crashes happen on arterials
- Wider roads are over-represented

Workgroup Recommendation:

- 1) Develop safe crosswalks on arterials & multi-lane roadways, 2) Crosswalk enforcement actions



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Pedestrian Crashes #2

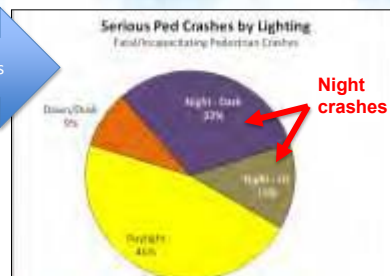
- More crashes at night than autos or bikes

Workgroup Recommendation:

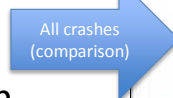
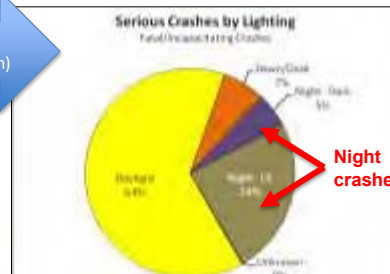
Improved pedestrian crossings, including lighting, with focus on multi-lane arterials.



Pedestrians



Night crashes

All crashes
(comparison)

Night crashes

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Bike Crashes

- Serious bike crash rate increases with street width



Workgroup Recommendation: Provide protected bike facilities, where feasible, along high volume and/or high speed roadways.

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Long-Term Recommendations

- Potential future policy changes
- Developing safety design best practices based on the Highway Safety Manual
- Further research on the linkage between safety, land use and the built environment.



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Resources to Leverage

- Regional Active Transportation Plan
- Federal, state and local partners

