New Look
The Regional Transportation Plan

2035 Regional Transportation Plan Update

Background Paper:

A Profile of Regional Safety in the Portland Metropolitan Region

Prepared by:

METRO
PEOPLE PLACES • OPEN SPACES

February 14, 2007

Metro
People places • open spaces

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

A regional approach simply makes sense when it comes to protecting open space, caring for parks, planning for the best use of land, managing garbage disposal and increasing recycling. Metro oversees world-class facilities such as the Oregon Zoo, which contributes to conservation and education, and the Oregon Convention Center, which benefits the region's economy.

Your Metro representatives

Metro Council President – David Bragdon
Metro Councilors – Rod Park, District 1; Brian Newman, District 2; Carl Hosticka, deputy council president, District 3; Kathryn Harrington, District 4; Rex Burkholder, District 5; Robert Liberty, District 6.
Auditor – Suzanne Flynn

Metro's web site: www.metro-region.org
Project web site: www.metro-region.org/rtp (Click on "2035 RTP update")

List of RTP Background Research Papers

- **Environmental Justice** in Metro's Transportation Planning Process
- A Profile of **Security** in the Portland Metropolitan Region
- A Profile of the **Regional Trends and Travel Characteristics** in the Portland Metropolitan Region
- A Profile of the **Regional Bicycle System** in the Portland Metropolitan Region
- A Profile of the **Regional Transit System** in the Portland Metropolitan Region
- A Profile of the **Regional Pedestrian System** in the Portland Metropolitan Region
- A Profile of **Regional Travel Options and Parking Management Systems** in the Portland Metropolitan Region
- A Profile of the **Regional Freight Transportation System** in the Portland-Vancouver Metropolitan Region
- **Preliminary Financial Analysis** for the 2035 Regional Transportation Plan Update
- A Profile of **Safety** in the Portland Metropolitan Region
- A Profile of the **Regional Roadway System** in the Portland Metropolitan Region
- A Profile of **Key Environmental Issues and Metro's Mitigation-Related Activities** in the Portland Metropolitan Region

The preparation of this report was financed in part by the U.S. Department of Transportation, Federal Highway Administration and Federal Transit Administration. The opinions, findings and conclusions expressed in this report are not necessarily those of the U.S. Department of Transportation, Federal Highway Administration and Federal Transit Administration.

2035 Regional Transportation Plan Update

A Profile of Regional Safety in the Portland Metropolitan Region

TABLE OF CONTENTS

I. INTRODUCTION 1

II. BACKGROUND 1

III. TRENDS AND RESEARCH 2

Self-Enforcing Design 2
Safety Management 4
Public-Private Partnerships 6
Intersection and Safety Data 5
Increasing Emphasis on Managing the System and Intelligent Transportation Systems (ITS) 6

IV. POLICY AND REGULATORY FRAMEWORK 7

Federal 7
State 8
Transportation Planning Rule (TPR) 8
Oregon Transportation Plan (OTP) 8
Transportation Safety Action Plan (TSAP) 9
Regional 11
Metro Charter 11
Regional Framework Plan 11
2040 Growth Concept 11
2004 Regional Transportation Plan 12

V. EXISTING DATA SOURCES 12

Safety Priority Index System 13
Agency-Specific Data 13
Oregon Department of Transportation (ODOT) 13
Clackamas County 14
Multnomah County 14
Washington County 14
City of Portland Department of Transportation (PDOT) 14

VI. METHODOLOGY FOR COMPARATIVE REGIONAL ANALYSIS 15

VIII. CONCLUSIONS AND IMPLICATIONS 16

I. INTRODUCTION

This paper is one of a series of papers that provide background research and analysis to guide Regional Transportation Plan (RTP) update policy discussions. The papers describe trends affecting the regional transportation system, current regional transportation planning policies and regulatory requirements, a profile of performance of the existing transportation system and policy implications to be addressed in the RTP to respond to identified policy gaps and key findings of the background research.

The purpose of this memo is to explore safety from a regional perspective and examine safety-related data in the Portland metropolitan region. It includes a summary of selected national trends and research and a discussion of federal, state and local policies. As the Oregon Department of Transportation (ODOT) and law enforcement work with local governments in the areas of safety education and enforcement, this profile focuses on issues associated with design and engineering that fall more closely under the purview of Metro as the regional planning body. It also describes the Safety Priority Index System (SPIS) that is used by several agencies for monitoring crashes and the methodology recommended for analyzing and generating a region wide safety map. All of this information is used to develop recommended changes to regional policy for the RTP.

II. BACKGROUND

Maximizing the mobility of people and goods depends on making the transportation system as safe as possible. Traffic crashes cause personal tragedy, increased burdens on the region due to medical and insurance costs, lost production potential and delay of passengers and freight. Safety is a key component of the 2040 Growth Concept and supports the six 2040 Fundamentals adopted by the region in 1997:

1. *Healthy Economy*
2. *Vibrant Communities*
3. *Environment Health*
4. *Transportation Choices*
5. *Equity*
6. *Fiscal Stewardship*

Safety supports a *healthy economy* by lowering costs to users by allowing them to choose freely between available modes of travel and selecting the mode most economically efficient for their purposes. Reductions in traffic crashes help manage congestion and improve the movement of people and freight across the region. Safety investments support the concept of *vibrant communities* by creating safe environments for compact, mixed-use development.

A safe transportation system affords *transportation choices* by reducing traffic crashes between modes and ensuring a seamless, interconnected multimodal system. Safe access to bicycle and pedestrian facilities supports regional goals to increase the percentage of trips made by bicycling, walking and transit to provide an integrated system of travel options.

Traffic safety addresses *equity* as it affects all transportation modes and impacts individuals of all income levels and special needs residents of the region, including seniors and people with disabilities and school children. Safety also helps to support *fiscal stewardship* producing high returns on investment saving lives and reducing injuries through safety improvements.

III. TRENDS AND RESEARCH

Self-Enforcing Design

Understanding the relationship between design, driver behavior and safety is paramount in designing roadways that are safe, livable and reflect the 2040 Fundamentals. Unintended consequences of roadway design affect the safety of the roadway system. There are often differences between the design and a roadways use. Freeways are designed for higher speeds and longer trips with minimal interference from entering and exiting traffic, but are being increasingly used for shorter local trips. Similarly, many local roads were not designed to handle today's higher volume, high-speed traffic.

Design of urban roadways historically has reflected a tension between balancing safety and livability. Recent research points out that little evidence actually supports the claim that livable streetscape treatments (trees, on street parking, etc.) are less safe than conventional counterparts, and indicates they can possibly enhance a roadway's safety performance[1]. Livable streetscape improvements[2] provide psychological traffic calming that encourage operators to drive slower and exercise greater caution for bicyclists and pedestrians.

There is a need for roadway design to be linked with the environmental context to reduce the potential exposures to crashes and injuries. In examining bicycle and pedestrian crashes one might expect that the number of crashes in locations and during time periods when more people are walking and biking witness higher numbers of crashes. Research shows that increases in walking and biking actually diminish the probability of bike and pedestrian crashes[3]. The evidence suggests that drivers are less likely to crash into bicyclers and pedestrians when higher densities of bicyclists and pedestrians exist[4]. Emphasizing strategies to address factors like facility design, speed, traffic laws, driver education and awareness, and 2040 polices and design guidelines that seek to increase walking and bicycling may appear to be an effective way of improving the bicycle and pedestrian safety of the roadway system.

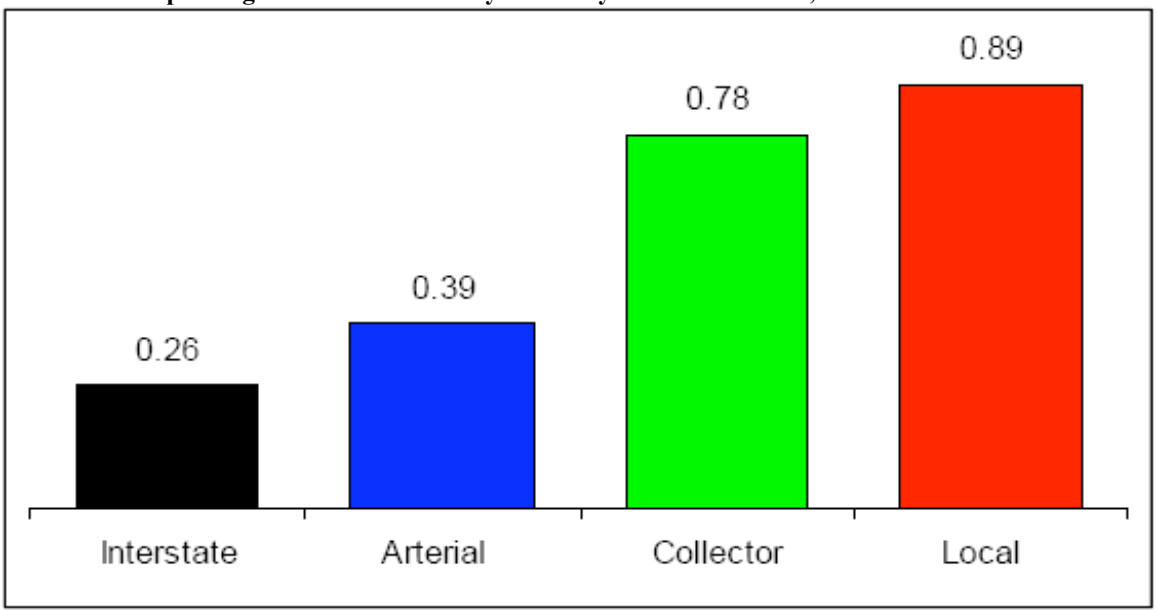
---

[1] Dumbaugh, Eric. "Safe Streets, Livable Streets." *Journal of the American Planning Association*. Vol. 71. No. 3. Summer 2005. p. 295.
[2] For more information on specific livable street improvements see Metro's "Creating Livable Streets: Street design guidelines for 2040." June 2002.
[3] Jacobsen, P L. "Safety in numbers: more walkers and bicyclists, safer walking and bicycling." *Injury Prevention*. 2003. Issue 9. p. 205.
[4] Jacobsen, P L. "Safety in numbers: more walkers and bicyclists, safer walking and bicycling." *Injury Prevention*. 2003. Issue 9. p. 208.

A large percentage of crashes are caused by driver error, including driving under the influence of drugs and alcohol, speeding, seat belt use, and driver distractions like cell phones. Encouraging safe driving behaviors through education and enforcement will require working with the ODOT and local law enforcement agencies to develop policies for the RTP update.

Speeding is a complex safety problem that involves numerous factors like public attitudes, driver behavior, vehicle performance, roadway design, speed design, posted speed limits and enforcement strategies. Speeding has also been estimated to be a contributing factor in approximately one third of all fatal crashes, representing a cost of more than $40 billion[5]. Effective solutions can have a substantial impact when applied locally. Figure 1 shows that the speeding-related fatality rate per vehicle is the highest on local and collector roads. Figure 2 shows the number of crashes throughout the Metro region by roadway type.

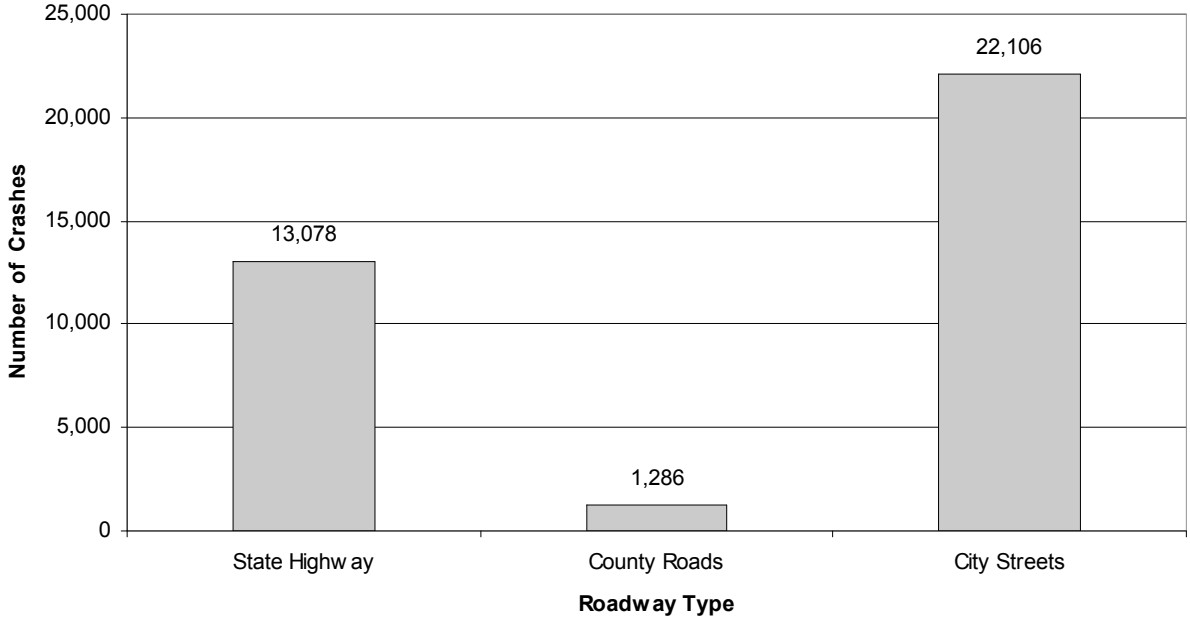
FIGURE 1 – Speeding-Related Fatalities by Roadway Functional Class, 1983-2003



(Source: FARS, Highway Statistics 2002 – USDOT, "Speed Management Strategic Initiative, June 2005)

[5] "Speed Management Strategic Initiative." USDOT. June 2005. p. 1.

FIGURE 2 - Crashes by Roadway Type in 2005 for Metro Region



Roadway design elements that reduce speed can have a positive influence on crashes and injuries, especially with respect to bicycle and pedestrian crashes. Such roadway design elements can include but are not limited to on street parking, trees, planter boxes, benches, narrower lanes, marked pedestrian crosswalks, and priority signaling for bicyclists and pedestrians.

There is no single solution to speeding. Speed management decisions are largely centered on achieving a balance between safety and mobility. Applying roadway design principles, like the livable street improvements and engineering measures may help change driver behavior and reduce the risk they pose to other drivers, bicyclists, and pedestrians.

Safety Management

Assigning a greater prominence to safety in transportation investment decisions can help reduce crashes. A recent Federal Highway Administration (FHWA) publication examined intersection safety approaches and techniques throughout the United States. The report found that the first step toward achieving significant safety improvements is establishing a culture of safety within an organization[6]. To do this agencies must raise the awareness and importance of highway safety throughout all branches of government. This requires developing and implementing procedures to monitor and manage the

[6] "Innovative Intersection Safety Improvement Strategies and Management Practices: A Domestic Scan." USDOT – FHWA. Sept 2006. p. 63.

performance of the roadway system with measurable safety criteria, including frequency, rates, location and severity.

The report also found that truly performance-based safety management was the foundation of safety planning programs. Agencies that had established formal numerical goals and measurable objectives with respect to safety experienced the greatest gains in crash reductions[7]. This ensures that safety performance can be measured and compared to performance standards. It also allows for an evaluation of the effects of safety investments and helps to guide future investments.

Intersection and Safety Data

The importance of timely and accurate crash data is paramount in improving automobile, bicycle and pedestrian safety. There are various inherent problems with crash data. Reasons that a crash is not successfully assigned to an existing roadway database are many. For example, a crash will not be successfully located if:

- The location description on the crash form is incomplete or erroneous.
- The street names given on the form do not match the street names in the database (this is a problem for crashes occurring on streets commonly known by several different aliases).
- Underreporting of bicycle incidences that fall below threshold value as set by state ($1000 in Oregon).
- Most local governments do not collect info on bicycle and pedestrian incidences unless a fatality or serious injury occurs.

The Oakland County (Michigan) Traffic Improvement Association (TIA) is a 38 year old private/public non-profit corporation funded by public sources, grants, private donations and corporate sponsorship which is used to collect, compile, and analyze crash data for all roads in Oakland County[8].

The TIA has established standards for collecting and inputting crash data in a database to ensure that reported incidences are accurately located and summarized. This has required the TIA to develop working relationships with 68 cities and villages and 45 police agencies. A cooperative arrangement with the Michigan State Police that permits the TIA to receive crash reports from local police agencies and enter them into a database before being forward to the State Police has also been established. The TIA provides services that are typically handled by public agencies and for obtaining crash reports directly from police agencies. It is potentially a model that could be adapted for other local transportation planning agencies.

[7] "Innovative Intersection Safety Improvement Strategies and Management Practices: A Domestic Scan." USDOT – FHWA. Sept 2006. p. 63.
[8] "Innovative Intersection Safety Improvement Strategies and Management Practices: A Domestic Scan." USDOT – FHWA. Sept 2006. p. 10.

Public-Private Partnerships

To address issues of limited resources in addressing transportation improvements public-private partnerships have emerged to implement and sustain safety improvements. One of the most notable models has been a partnership sponsored by the American Automobile Association Club of Michigan (AAA Michigan). Working with its partners Wayne State University, the Michigan Office of Highway Safety Planning, the Southeastern Michigan Council of Governments (SEMCOG), and the City of Detroit's Public Safety Department, AAA Michigan began in 1996 to identify high-crash intersections and develop plans to improve them.

The focus of the demonstration project was to identify low cost, effective improvements to be implemented at high crash locations, including adjusting the timing and placement of signal lights, replacing signal lenses to make them more visible, and adding left-turn signals and turning lanes. After improvements were made, beginning in the spring of 1997, their safety performance was evaluated, and adjustments were initiated to make them even more effective. Results of the improvements have been positive. One study of 84 intersections revealed that at improved locations there was a reduction of twenty-five percent in total crashes and forty percent in total injuries[9].

The Road Improvement Demonstration Project leveraged the initial $1 million investment by AAA Michigan into an additional $7 million in federal, state, and local funds to continue its work. This program has successfully obtained additional funding because of its strong and thorough evaluation component. This is particularly important in attracting private-sector support. AAA Michigan has found that fewer crashes mean fewer claims and lower payouts for damages resulting from crashes.

Increasing Emphasis on Managing the System and Intelligent Transportation Systems (ITS)

Intelligent Transportation Systems (ITS) apply advanced and emerging technologies in information processing, communications, and control to surface transportation needs. ITS safety projects, like traveler information, aim to give drivers necessary information to avoid hazardous conditions and prevent accidents. Similarly, traffic control devices seek to minimize the frequency and severity of crashes. At the intersection of Columbia and Macrum, the City of Portland installed a combination of devices that detect approaching trucks and in particular circumstances, extends the yellow light long enough to allow the truck to pass before turning red. Thirty-two trucks ran the light the day before the system was activated, but only six ran it after activation. This reduction in red-light running reduces crash hazards for truck and passenger cars. Numerous technologies are being experimented with across the Metro region[10].

---

[9] "Intergovernmental Cooperation: Case Studies in Southeast Michigan." SEMCOG. March 2004. p. 28.
[10] For more information on ITS in the Portland Metro Region see, "Metropolitan Mobility the Smart Way: The State of ITS in the Portland Region." <http://www.metro-region.org/article.cfm?articleid=21611>

With limited resources, focusing improvements on corridors has emerged as a way to manage the existing roadway system. Corridors are the focus of traffic safety projects that typically initiate a combination of roadway improvements, enforcement efforts, and public information and education programs. Using a grant from Oregon Department of Transportation's Transportation Safety Division (ODOT), the Rogue Valley Metropolitan Planning Organization (RVMPO) generated a Geographic Information Systems (GIS) accident database[11]. It sought to couple ODOT accident data with the RVMPO's GIS system to pinpoint accident locations on specific transportation corridors. Using the corridor analysis the RVMPO can examine trends in crashes over multiple years and to track whether or not improvements on a corridor contributed to a reduction in crashes.

IV. POLICY AND REGULATORY FRAMEWORK

Federal

Congress enacted the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991. ISTEA gave Metropolitan Planning Organizations (MPOs) increased funding, expanded authority to select projects and mandates for new planning initiatives in their regions. ISTEA created driver and vehicle safety programs as well as motor carrier safety programs and supported infrastructure safety by requiring ten percent of state Surface Transportation Program (STP) apportionment of funds for safety construction.

Congress passed the Transportation Equity Act for the 21st Century (TEA-21) in 1998. It reduced the 15 planning factors from ISTEA to seven and continued the majority of its predecessor's programs. TEA-21 recognized that transportation investments impact the economy, environment, and community quality of life and continued the safety programs from ISTEA.

In 2005, Congress built on both ISTEA and TEA-21 with the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). SAFETEA-LU addresses the many challenges facing our transportation system today, such as improving safety, reducing traffic congestion, improving efficiency in freight movement, increasing intermodal connectivity, and protecting the environment. SAFETEA-LU promotes safety and security as separate factors to be included in metropolitan planning and establishes a new core Highway Safety Improvement Program that is structured and funded to make significant progress in reducing highway fatalities. It creates a positive agenda for increased safety on our highways by almost doubling the funds for infrastructure safety and requiring strategic highway safety planning, focusing on results. Other programs target specific areas of concern, such as work zones, older drivers, and pedestrians, including children walking to school (Safe Routes to Schools), further reflect SAFETEA-LU's focus on safety.

[11] "RVMPO Transportation Safety Planning Project." Rogue Valley MPO. 23 Apr. 2004.

State

Transportation Planning Rule (TPR)
In 1991, the Land Conservation and Development Commission adopted the Oregon Transportation Planning Rule (TPR). The TPR implements State Land Use Planning Goal 12, Transportation[12], which was adopted by the Oregon Legislature in 1974. The TPR requires most cities and counties and the state's Metropolitan Planning Organizations, such as Metro, to adopt transportation system plans that consider all modes of transportation, encourage a safe environment and avoid principal reliance on any one mode to meet transportation needs. By state law, local plans in MPO areas must be consistent with the regional transportation system plan (TSP). In the Portland metropolitan region, the Regional Transportation Plan serves as the regional TSP. Likewise, the regional TSP must be consistent with the Oregon Transportation Plan and TPR. Recent updates to the TPR do not affect the requirements for safety planning.

Oregon Transportation Plan (OTP)
Amended in September 2006 by the Oregon Transportation Commission (OTC), the OTP includes Goal 5 addressing safety and security and detailing a policy and strategies. Table 2 below summarizes the goal, policy and strategies of the 2006 OTP:

[12] Goal 12 states, "To provide and encourage a safe, convenient, and economic transportation system."

TABLE 1 – 2006 OTP Safety Goals, Policies and Strategies
Goal 5 – To plan, build and maintain the transportation system so that it is safe and secure.

Policy 5.1 – Safety – It is the policy of the State of Oregon to continually improve the safety and security of all modes and transportation facilities for system users including operators, passengers, pedestrians, recipients of goods and services and property owners.

- **Strategy 5.1.1** – Enhance the safety leadership group to provide for cooperation among federal, state and local governments, private enterprises, and user and advocacy groups in order to address safety issues strategically and implement more effective safety programs.
- **Strategy 5.1.2** – Develop a comprehensive Strategic Safety Action Plan addressing all modes of transportation based on risk analysis to reduce fatal, injury and property damage accidents among system users. This plan and other state transportation plans should include, but not limited to, measures involving education, engineering, enforcement and emergency response that address:
    - Key areas in driver behavior and impairment,
    - Commercial driver performance and vehicle standards,
    - Use of technology,
    - Safety needs of vulnerable populations such as the young, aged, persons with disabilities and non-English speaking populations,
    - Regular opportunity for information sharing across the modes, and
    - Adequacy of trauma care statewide.
- **Strategy 5.1.3** – Ensure that safety and security issues are addressed in planning, design, construction, operation and maintenance of new and existing transportation systems, facilities and assets.
- **Strategy 5.1.4** – Support the further development and improvement of interoperable communication systems among safety and security-related agencies, jurisdictions and private entities. Ensure that clear communication protocols are established.
- **Strategy 5.1.5** – Ensure that laws and regulations are appropriate to meet multimodal safety and security goals. Coordinate enforcement of transportation safety and security laws and regulations intended to reduce injury and property damage. Use enforcement strategically to address the identified problems of each mode.
- **Strategy 5.1.6** – Ensure the development and delivery of coordinated and comprehensive safety and security awareness, education and training programs.
- **Strategy 5.1.7** – Support the delivery of timely emergency medical services to transportation-related incidents and crashes in urban and rural areas. Improve the transportation system to facilitate delivery of necessary supplies and services for non-transportation emergencies. Support incident response units on major facilities where warranted.
- **Strategy 5.1.8** – Support the safe and secure transport of hazardous materials in Oregon through driver education and screening, vehicle inspections, regulations and enforcement.
- **Strategy 5.1.9** – Develop and implement a reliable, comprehensive and coordinated multimodal transportation data, crashes and incidents reporting program to manage and evaluate transportation safety with the goal of better data integration. The data should be timely, easy to use and accessible to all users to support analysis, effective response to safety problems and identification of projects.

Future RTP updates will be developed to be consistent with the Strategic Transportation Safety Action Plan.

Transportation Safety Action Plan (TSAP)

The OTC adopted the TSAP in July 2004 and is one of several modal plans called for in the OTP to define in greater detail safety goals and details, system improvements and target performance measures. The TSAP seeks to ensure that Oregon's transportation-related death and injury rates continue to decline through a twenty-year plan consisting of sixty-nine actions. The TSAP serves as Oregon's strategic highway safety plan required

under federal law. The following actions listed in Table 2 may potentially affect safety investments in the Metro region:

TABLE 2 – ODOT Transportation Safety Action Plan

Action 13 – Continue to incorporate the concepts of Intelligent Transportation Systems (ITS) into the transportation safety public information program so the public gains familiarity with and accepts changes. These messages should include specific information about the traveler information tools provided by the Department.

Action 18 – In planning and project development, continue to consider access management techniques that show significant improvements in safety for the roadway user. Access management techniques which may be used individually or in various combinations include the following:

- Appropriate access and public street spacing and design
- Proper spacing and coordination of traffic signals
- Installation of non-traversable medians
- Proper spacing and design of median openings
- Provision of lanes for turning traffic
- Inter-parcel circulation
- Use of city and county road infrastructure as an alternative to increased access
- Protection of the functional area of an intersection
- Proper spacing of interchanges

Action 22 – ODOT, Metropolitan Planning Organizations (MPOs), and other appropriate agencies should develop regional ITS plans that serve as part of a statewide ITS plan. The regional plans should include safety standards for the design, implementation, and operation of all ITS measures.

Action 23 – Evaluate the value of individual ITS tools and subsystems for use in improving the Safety Management System. Adopt those tools or subsystems deemed to be effective and efficient.

OTP ACTION – Interagency Cooperation – Increase interagency cooperation among federal, state, and local governments and private enterprises in order to implement more effective community-based safety programs. Work with local, state, and federal governments to permit efficient transportation operations consistent with environmental or safety goals.

Action 35 – Continue implementation of recommendations from Traffic Records Assessment conducted in 2000, which will create a traffic records system that will adequately serve the needs of state and local agencies. Key elements include:

- Methods to improve reporting of traffic crashes by police and citizens
- Better integration of the various accident records systems that are currently maintained by separate state and local agencies or the development of one accident data system
- Wider, more timely distribution of accident and related data, including quarterly distribution of available data
- Evaluation of new technology to improve quality and timeliness of reporting accident and other data
- Improved coordination among state and regional criminal justice system information systems and other traffic records systems
- Utilization of geospatial referencing systems to locate and code crashes

OTP ACTION – Transit, Pedestrian, and Bicyclist Safety – Increase availability and use of transit, walking, bicycling, and ridesharing. Promote the design and development of infrastructure and land use patterns which encourage alternatives to single occupancy vehicles. Make walkways, pedestrian shelters and bikeways an integral part of the circulation pattern within and between communities to enhance safe interactions between motor vehicles and pedestrians and bicyclists, using techniques such as:

- Renovating arterials and major collectors with bike lanes and walkways and designing intersections to encourage bicycling and walking for commuting and local travel

Developing all transit centers near residential areas to be safely and expeditiously accessible to pedestrians and bicyclists

Regional

Metro Charter
In 1979, the voters in this region created Metro, the only directly elected regional government in the nation. In 1991, Metro adopted Regional Urban Growth Goals and Objectives (RUGGOs) in response to state planning requirements. In 1992, the voters of the Portland metropolitan area approved a home-rule charter for Metro. The charter identifies specific responsibilities of Metro and gives the agency broad powers to regulate land-use planning throughout the three-county region and to address what the charter identifies as "issues of regional concern." Among these responsibilities, the charter directs Metro to provide transportation and land-use planning services. The charter also directed Metro to develop the 1997 Regional Framework Plan that integrates land-use, transportation and other regional planning mandates.

Regional Framework Plan
Updated in 1995 and acknowledged by the Land Conservation Development Commission in 1996, the RUGGOs establish a process for coordinating planning in the metropolitan region in an effort to preserve regional livability. The 1995 RUGGOs, including the 2040 Growth Concept, were incorporated into the 1997 Regional Framework Plan to provide the policy framework for guiding Metro's regional planning program, including development of functional plans and management of the region's urban growth boundary. The Regional Framework Plan is a comprehensive set of policies that integrate land-use, transportation, water, parks and open spaces and other important regional issues consistent with the 2040 Growth Concept. The Framework Plan is the regional policy basis for Metro's planning to accommodate future population and employment growth and achieve the 2040 Growth Concept. Specific safety goals include:

> 2.7.1 – Improve the safety of the transportation system. Encourage bicyclists, motorists and pedestrians to share the road safely.
> 2.17.1 – Continue efforts to make public transportation an environmentally friendly and safe form of motorized transportation.
> 2.20.1 – Plan for efficient, cost-effective and safe movement of freight in and through the region.
> 2.22.1 – Plan for a continuous regional network of safe and convenient bikeways connected to other transportation modes and local bikeway systems, consistent with regional street design guidelines.
> 2.24.1 – Plan the pedestrian environment to be safe, direct, convenient, attractive and accessible for all users.
> 2.34.1 – Anticipate and address system deficiencies that threaten the safety of the traveling public in the implementation of the RTP.

2040 Growth Concept
The 2040 Growth Concept text and map identify the desired outcome for the compact urban form to be achieved in 2040. It envisions more efficient land use and a diverse and balanced transportation system closely coordinated with land use plans. The 2040 Growth Concept has been acknowledged to comply with statewide land use goals by the Land

Conservation and Development Commission (LCDC). It is the foundation of Metro's 1997 Regional Framework Plan.

2004 Regional Transportation Plan

The RTP implements the goals and policies in 1995 RUGGOs and the 1997 Regional Framework Plan, including the 2040 Growth Concept. The region's planning and investment in the regional safety system are not directed by current RTP policies and objectives as shown in Table 3.

TABLE 3 – 2004 RTP Policies

Policy 6.0 – Transportation Safety and Education Improve the safety of the transportation system. Encourage bicyclists, motorists, and pedestrians to share the road safely.
Policy 14.2 – Public Transportation Safety and Environmental Impacts Continue efforts to make public transportation an environmentally-friendly and safe form of motorized transportation.
Policy 15.0 – Regional Freight System Provide efficient, cost-effective and safe movement of freight in and through the region.
Policy 16.0 – Regional Bicycle System Connectivity Provide a continuous regional network of safe and convenient bikeways connected to other transportation modes and local bikeway systems, consistent with regional street design guidelines.
Policy 17.0 – Regional Pedestrian System Design the pedestrian environment to be safe, direct, convenient, attractive and accessible for all users.
Policy 20.3 – Transportation Safety Anticipate and address system deficiencies that threaten the safety of the traveling public in the implementation of the RTP.

The 2004 RTP established broad safety goals for the overall regional system. Most of the actual safety policy and project decisions are left to ODOT and local government agencies. With the advent of safety becoming a more defined federal emphasis area under SAFETEA-LU, the RTP will need to respond with more specific regional safety goals and policies.

V. EXISTING DATA SOURCES

In 2005 there were 44,888 crashes and 444 fatalities in the State of Oregon[13]. Figure 3 displays total crashes, fatalities, injuries, and property damage only crashes by local jurisdiction and roadway type.

[13] Information is available on the ODOT, Crash Analysis and Reporting Unit website, <http://www.oregon.gov/ODOT/TD/TDATA/car/CAR_Main.shtml>

FIGURE 3 – Crashes in the Portland Metropolitan Region in 2005

Location	Fatalities	Non-Fatal Injuries	Property Damage Only	Total Crashes	Crashes on State Highway System	Crashes on County & Local Roads	Crashes on City Streets
Clackamas County	40	1,827	2,122	3,989	1,629	575	809
Multnomah County	37	4,438	6,771	11,246	3,349	99	7,658
Portland	33	3,732	5,896	9,661	3,194	0	6,467
Washington County	29	2,601	3,365	5,995	2,243	612	2,648
Beaverton	5	736	1,106	1,847	771	0	1,076
Hillsboro	2	514	595	1,111	362	0	749
Tualatin	2	180	246	428	184	0	244
Sherwood	2	52	70	124	41	0	83
Gresham	1	452	628	1,081	49	0	1,032
Lake Oswego	1	115	168	284	81	0	203
West Linn	1	80	106	187	134	0	53
Forest Grove	1	50	68	119	30	0	89
Canby	1	37	49	87	36	0	51
Tigard	0	333	478	811	442	0	369
Oregon City	0	186	265	451	220	0	231
Milwaukie	0	90	90	180	84	0	96
Wilsonville	0	72	93	165	83	0	82
Gladstone	0	64	73	137	74	0	63
Troutdale	0	55	54	109	20	0	89
Cornelius	0	30	36	66	52	0	14
TOTAL	155	15,644	22,279	38,078	13,078	1,286	22,106

(Based on information from ODOT's Crash Analysis and Reporting Unit)

Safety Priority Index System

The Safety Priority Index System (SPIS) was created by ODOT to prioritize projects for safety improvements. SPIS uses an algorithm to determine a safety score for each intersection in the system based on crash frequency (total number of crashes), crash rate (total number of crashes per VMT by 1/10 of a mile) and crash severity (determined by the existence and extent of any injuries). ODOT's SPIS rating is limited to state-funded facilities. Counties also use the SPIS ranking system, but limit theirs to county-funded facilities, except that Washington County limits SPIS analyses to any intersection having at least one leg on a county facility.

For more information about SPIS, see:
http://www.oregon.gov/ODOT/HWY/TRAFFIC/Safety_Priority_Index_System.shtml

Agency-Specific Data

Oregon Department of Transportation (ODOT)
ODOT's Traffic Engineering section published a spreadsheet entitled 2006--Top 5% SPIS sites for ODOT Region 1. This lists the top priority intersections by highway and milepost that ODOT has ranked within the SPIS system for Region 1. It also gives the Average Daily Traffic (ADT) of the intersection, the number of crashes, and the number

of fatalities. ODOT generally looks at the top 5% of its SPIS sites when determining safety needs and prioritization.

ODOT's Crash Analysis and Reporting Unit has also provided the entirety of Crash data in the Tri-County region for 2003-2005. This database can be queried to find pedestrian crashes, bicycle crashes, crashes with fatalities, and many other variables. The data comes from the DMV, is reported on all street levels, and is the best available source of crash data by mode. Most of the crash and safety analysis in the region is derived from this data source. Another advantage of this data source is that it is already geocoded, whereas SPIS locations are not.

Clackamas County
Clackamas County provided three pieces of information on the SPIS locations for 2002-2004 in Clackamas County, and lists the corresponding SPIS rankings, crash frequency, crash severity and crash locations. The County tracks all intersections where bicycle and pedestrian crashes have occurred. While the bicycle and pedestrian data does not have SPIS rankings, the data lists crash severity and crash frequency.

Multnomah County
Multnomah County provided data on the SPIS intersections for 2003-2005 in Multnomah County, and lists the corresponding crash frequency, rate and severity. Multnomah County does not document pedestrian or bicycle crashes.

Also, the County recently transferred a number of County-owned roads to the City of Gresham. The Gresham Traffic Engineering Department provided data on 2002 to 2004 SPIS Intersections, establishing a much more detailed data set for all of Multnomah County.

Washington County
Washington County provided data on the SPIS intersections for 2002-2004 and the corresponding crash frequency, rate and severity. Washington County, similar to Multnomah County, does not document pedestrian or bicycle crashes.

City of Portland Department of Transportation (PDOT)
PDOT uses ODOT's crash data to do a comprehensive analysis of safety issues within the City of Portland. Bicycle and pedestrian safety are a special focus of PDOT's efforts, and as such they have produced a number of documents analyzing pedestrian and bicycle safety within different neighborhoods of the city. PDOT has provided two sample maps as examples of the documentation that they have: Arbor Lodge Neighborhood Crash Map and Pedestrian Serious Injuries and Fatalities 1995-2004.

PDOT also provided a spreadsheet that ranked priority intersections throughout the City using a methodology other than SPIS. Their analysis accounts for the financial impacts of crashes, by assigning costs to fatalities, injuries and property damage only based on federal standards. The foundation of their crash information was derived from ODOT's database. The information on the spreadsheet was normalized allowing for a regional comparison by calculating SPIS scores for each intersection based on the ODOT methodology.

VI. METHODOLOGY FOR COMPARATIVE REGIONAL ANALYSIS

Metro staff assembled a TPAC Safety Work Group to identify different sources of safety information and develop a regional map of automobile, pedestrian and bicycle crashes across the Metro region.

The Safety Work Group met on September 17th, 2006 and October 31st, 2006 to discuss the regional safety data. The work group provided Metro with guidance on constructing a regional safety map that will shows SPIS Intersections throughout the Portland Metropolitan region. The top quartile of intersection data from each county[14] and the City of Portland were geocoded, inputted into a Geographic Information System (GIS), and mapped for a regional comparison. The top quartile was used because the total of SPIS intersections across the region was roughly 2,000. Because of the variation in SPIS scores (ranging from 92 to 6) it was difficult to draw comparisons.

The work group determined it was important to synthesize the top quartile from all of the individual intersection data sets into one regional intersection list for clearer comparison. The work group also suggested using a threshold SPIS score of 75 or better to capture the most dangerous intersections. Additionally, it was recommended that all of the ODOT SPIS intersections be added to the map, but listed separately. The ODOT crash data is listed using beginning and ending mileposts whereas the County and PDOT data is listed by intersection. The formation of a regional safety map based on the Safety Work Group's input is still in progress and will be finalized during Phase 3 of the RTP update. A rough draft of the map is included in Appendix B.

VII. POLICY IMPLICATIONS

Listed below are potential policy implications for the RTP update that have been derived from the Trends and Research as well as the data descriptions above in Sections V and VI.

Key Finding	RTP Implication
1. Creating a culture of safety within an organization helps achieve significant safety improvements.	• Raise awareness of safety issues by adopting formal regional safety policy that considers land-use, self-enforcing design, and completing gaps in the system.
2. Establishing formal goals and measurable objectives for safety improvements helps guide investment and reduce crashes.	• Consider adopting explicit goals and measurable objectives for safety to be incorporated into the RTP.
3. Public-private partnerships have emerged to help invest limited resources in addressing needed	• Explore the option of developing a regional partnership with insurance providers and other private partners to

[14] The City of Gresham SPIS intersection data was added to Multnomah County to create a more representative County data set.

Key Finding	RTP Implication
transportation improvements.	address safety issues.
4. Growing emphasis in safety investments in corridors.	• Develop a list of targeted regional safety corridors based on existing crash information to examine more closely for potential corridor safety investments.
5. Need for accurate crash information to development safety investment policies and strategy.	• Establish a regional crash data collection strategy for all modes. • Work with local governments and police agencies to improve collection methodology.

VIII. CONCLUSIONS AND IMPLICATIONS

Through the work of the Safety Work Group, a number of data gaps have been identified. Not all of the counties collect pedestrian and bicycle data and do not have data for similar years. Additionally, the information that is collected may only represent the most severe crashes. A large number of bike, pedestrian and minor automobile crashes go unreported. As a result, the available information could not be compared regionally and was not included. It is essential to establish a regional data collection effort to gather better bicycle and pedestrian crash information.

The best and most comprehensive source of crash data in the region is the Crash Data in the Tri-County Region database from ODOT's Crash Analysis and Reporting Unit. This data is distributed to all three counties as well as PDOT and serves as the foundation for generating SPIS Intersection scores. The TPAC Safety Work Group will continue to use this information to generate a regional safety map to begin to identify regional safety issues and potential solutions.

Traffic safety affects the Metro region on multiple levels. Crashes cause personal tragedy, lost production potential, rising costs of insurance, and delay to passengers and freight. A first step to furthering regional safety policy is raising awareness of safety issues. To bring more attention to safety a better system for centralized crash data for all modes is needed. Public-private partnerships may provide outlets for addressing safety on a regional level. Crashes ultimately affect the mobility of people and goods across the entire regional transportation system and achieving reductions is in the best interest of the entire Metro region.

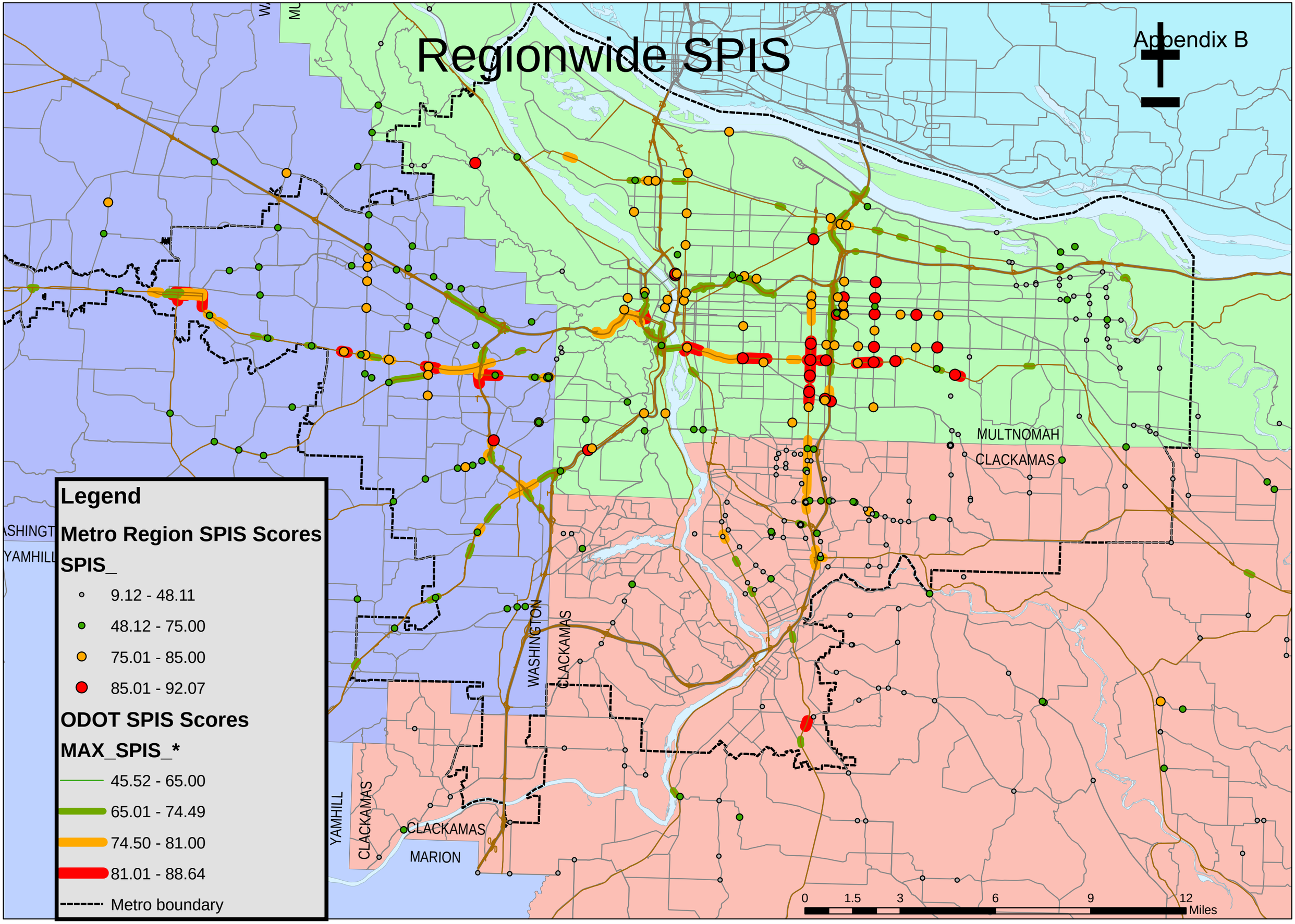
APPENDIX A

TPAC Safety Work Group

Dennis Mitchell, ODOT
Lidwein Rahman, ODOT
Ron Papsdorf, City of Gresham
Ron Weinman, Clackamas County
Andy Back, Washington County
Mike McKillip, City of Tualatin
Bob Hillier, PDOT
Margaret Middleton, City of Beaverton
Scott Bricker, Bicycle Transportation Alliance
Jonathan Makler, Metro
Josh Naramore, Metro
Kim Ellis, Metro
Tom Kloster, Metro

Safety Data Contacts by Agency

Agency	Name	Phone	Email
ODOT Region 1	Merle Hill	503-731-8285	merle.e.hill@odot.state.or.us
ODOT Traffic Engineering (Salem)	Doug Bish	503-986-3594	Douglas.W.BISH@odot.state.or.us
ODOT Crash Analysis and Reporting	Sylvia Vogel	503-986-4240	Sylvia.M.Vogel@odot.state.or.us
Clackamas County	Rick Nys	503-353-4702	RichardNys@co.clackamas.or.us
Multnomah County	Ed Abrahamson	503- 988-5050 ext. 29620	ed.abrahamson@co.multnomah.or.us
Washington County	Greg Leion	503- 846-3969	Gregg_Leion@co.washington.or.us
PDOT	Greg Raisman	(503) 823-1052	Greg.Raisman@pdxtrans.org

Regionwide SPIS

Appendix B