2015 Clatsop County Transportation System Plan: Volume 2

October 2015

Acknowledgements

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Clatsop County

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Acknowledgements

The 2015 Clatsop County Transportation System Plan was a collaborative process among various public agencies, key stakeholders and the community. Input, assistance and outreach by the following helped make the Plan possible:

Angelo Planning Group

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Shayna Rehberg

Project Advisory Committee Members

Tod Lundy (Citizen Representative), Jan Mitchell (Citizen Representative), Pat O'Grady (Citizen Representative), Vicki Weller (Citizen Representative), Steve Blakesley (Clatsop County Public Health), Patrick Wingard (DLCD), Rosemary Johnson (City of Astoria), Jeff Harrington (City of Astoria), Mark Barnes (City of Cannon Beach), Chad Sweet (City of Gearhart), Kevin Cupples (City of Seaside), Don Snyder (City of Warrenton), and Jeff Hazen (Sunset Empire Transportation District).

A special acknowledgement goes out to all the Clatsop County residents, property owners, and visitors who attended community meetings or submitted comments.

Volume 2 Contents

The contents of Volume 2 represent an iterative process in the development of the TSP. Refinements to various plan elements occurred throughout the process as new information was obtained. In all cases, the contents of Volume 1 supersede those in Volume 2.

Section A:

Memorandum 1- Public and Stakeholder Involvement Strategy

MEMORANDUM #1

DATE: October 02, 2013

TO: Clatsop County TSP Project Management Team

FROM: Chris Maciejewski, PE, PTOE - DKS Associates
Kevin Chewuk, PTP - DKS Associates

SUBJECT: Clatsop County Transportation System Plan
Technical Memorandum #1: Public and Stakeholder Involvement Strategy P11086-016

Clatsop County has recognized that citizen involvement is necessary in making wise and legitimate decisions through its Comprehensive Plan. The following strategy reflects the County's Comprehensive Plan policies regarding citizen involvement and provides specific actions for engaging citizens and stakeholders in the Transportation System Plan (TSP) development process.

The county will involve the public and stakeholders primarily through a series of committee meetings, public open houses, and work sessions with elected officials, in addition to the distribution of project information through a variety of media, including a project website. The following describes each of these outreach mechanisms and a milestone schedule showing the public process is attached.

Project Advisory Committee

A project advisory committee will inform and guide the plan. The committee meetings will be held at locations throughout the county, with the first committee meeting at the Judge Guy Boyington Building at 857 Commercial Street in Astoria. The location of future committee meetings will be determined at the first such meeting. The county will not advertise for it, but the PAC meetings will be open for public attendance.

Project Advisory Committee (PAC) – The primary function of the PAC will be to review drafts and provide comments on technical and regulatory memorandums/reports, as well as provide recommendations for the TSP, acting as community representatives. This committee will consist of representatives from affected agencies and service providers and represent a wide array of interests, including: Clatsop County roads and community development departments, the Cities of Astoria, Cannon Beach, Gearhart, Seaside and Warrenton, Sunset Empire Transit, emergency services and school district representatives, the Department of Land Conservation and Development, the Oregon Department of Transportation, and others (see Table 1).

The PAC is currently scoped to meet six times throughout the plan development process. The first meeting will provide a project orientation and begin the discussion of the goals and objectives that best describe how the transportation system should be developed and managed in Clatsop County. The second meeting will be a review and discussion of existing and future transportation conditions. The third meeting will discuss how transportation solutions will be identified, how much funding the county is expected to have, and updated standards to manage the transportation system. In the fourth meeting, the PAC will review and discuss potential transportation solutions. The fifth meeting will be a review and discussion of projects that are expected to be funded versus not funded. The final meeting will be a review and discussion of the draft TSP prior to beginning the public hearings process.

Table 1: Project Advisory Committee Roster

Name	Affiliation
Tod Lundy	Citizen Representative
Jan Mitchell	Citizen Representative
Pat O'Grady	Citizen Representative
Paul Olheiser	Citizen Representative
Vicki Weller	Citizen Representative
Jennifer Bunch	Clatsop County
Ed Wegner	Clatsop County
Michael Summers	Clatsop County
Dennis Scott	Clatsop County
Bill Johnston	ODOT
Larry McKinley	ODOT
Patrick Wingard	DLCD
Rosemary Johnson	City of Astoria
Mark Barnes	City of Cannon Beach
Chad Sweet	City of Gearhart
Kevin Cupples	City of Seaside
Skip Urling	City of Warrenton
Diana Bartolotta	Sunset Empire Transit

Town Hall Meetings

Two town hall meeting series will be held during the project at up to five locations throughout the county, including Knappa/Svensen (northeast part of county), Warrenton (northwest part of county), Miles Crossing/Jeffers Garden (north part of county), Cannon Beach (southwest part of county), and Jewell (southeast part of county) The first meeting series will introduce the TSP project and obtain input regarding existing and future transportation needs and interests, as well as key areas of interest for inclusion in the goals and objectives. The second meeting series will obtain input on potential solutions to address transportation needs.

Advertisement of town hall meetings will be through a project website, the County's website, and media notices in local newspapers. The county may supplement advertising through its Facebook site, the local radio station, and posters/flyers displayed in public areas or at other community events.

Elected Officials Workshops and Briefings

The County Board of Commissioners and Planning Commissioners of Clatsop County will engage in the TSP development process through a series of two joint work sessions and one Planning Commission update briefing. The initial Planning Commission briefing on September 10, 2013, offered an orientation and opportunity for officials to offer direction. The joint work sessions will gain input on: 1) existing/future conditions and the goals, and objectives, and 2) potential transportation solutions. The joint work sessions will follow each of the two town hall meetings to share public input offered at each project milestone.

Engaging Seniors, Non-English Speakers, and Low Income Populations

As part of the outreach to engage citizens and stakeholders in the TSP project, the county will make special efforts to involve minority and low income groups within the county.

According to the 2012 Census, nearly 87% of the population of Clatsop County is Caucasian and nearly 8% of the population is of Hispanic or Latino origin. In addition, over 14% of individuals within Clatsop County were below the poverty line in 2012.

Given the considerable size of the Hispanic or Latino community in Clatsop County, written materials and translation service will be made available in Spanish upon request. In addition, the county will post project advertisements in locations where Hispanic or Latino community members are likely to see them.

The county will also post project advertisements in locations where representatives or members of Native American tribes in the region such as the Confederated Tribes of the Grand Ronde, Confederated Tribes of Siletz Indians, Confederated Tribes of Warm Springs, Clatsop-Nehalem Confederated Tribes, and the Chinook Indian Nation are likely to see them.

To assist those that cannot drive, town hall meetings will be at locations accessible via transit, walking or biking when feasible given the meeting location. The county will provide downloadable materials on the project website. Hard copies of project documents will be available upon request for those without internet access.

To help engage senior citizens, the county will post project advertisements in locations where seniors will be likely to see them. Such locations may include drugstores, grocery stores, and retirement and assisted living communities.

Distribution and Review of Work Products

The county will email project work products directly to PAC members, and post them to the project website for access by the general public. PAC members will be able to comment directly through regular committee meetings. The general public will be able to comment during the public comment period at the end of PAC meetings, at town hall meetings, and through the project website. The project website will facilitate public input by including a comment mapping feature. The project team will review comments input through the website and include them as part of the project record of public comments.

Section B:

Memorandum 2- Plan Review Summary

MEMORANDUM #2

DATE: November 19, 2013

TO: Clatsop County TSP Project Management Team

FROM: Chris Maciejewski, PE, PTOE - DKS Associates
Kevin Chewuk, PTP - DKS Associates
Carl Olson, EI - DKS Associates

SUBJECT: Clatsop County Transportation System Plan
Technical Memorandum #2: Plan Review Summary P11086-016

This memorandum summarizes planning documents, policies, and regulations that are applicable to the 2013 Clatsop County Transportation System Plan (TSP) update (see Attachment A for a complete list). The County's current TSP will serve as the foundation for the update process, upon which new information obtained from system analysis and stakeholder input will be applied to address changing transportation needs through the year 2035. As new strategies for addressing transportation needs are proposed, compliance and coordination with the plans, policies, and regulations described in this document will be required.

Transportation System Planning in Oregon

Transportation system planning in Oregon is required by Statewide Planning Goal 12 – Transportation.[1] The Transportation Planning Rule (TPR), OAR 660-012, describes how to implement Statewide Planning Goal 12.[2]

By implementing Statewide Planning Goal 12 (Transportation), the TPR promotes the development of safe, convenient, and economic transportation systems that are designed to reduce reliance on the automobile. Key elements include direction for preparing, coordinating, and implementing transportation system plans. In particular, OAR 660-012-0060 addresses amendments to plans and land use regulations and includes measures to be taken to ensure allowed land uses are consistent with the identified function and capacity of existing and planned transportation facilities. This rule includes criteria for identifying significant effects of plan or land use regulation amendments on transportation facilities, actions to be taken when a significant effect would occur, identification of planned facilities, and coordination with transportation facility providers.

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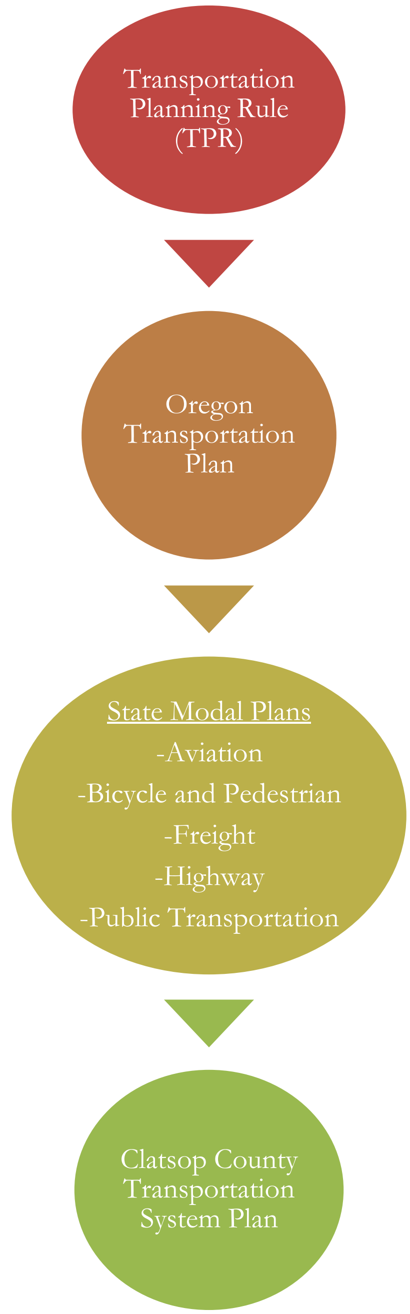
[1] Statewide Planning Goals: http: //www.oregon.gov/LCD/goals.shtml
[2] Transportation Planning Rule: http: //arcweb.sos.state.or.us/rules/OARS_600/OAR_660/660_012.html

Recent amendments to the TPR (effective January 1, 2012) include new language in 660-012-060 that allows a local government to exempt a zone change from the "significant effect" determination if the proposed zoning is consistent with the comprehensive plan map designation and the TSP. The amendments also allow a local government to amend a functional plan, comprehensive plan, or land use regulation without applying mobility standards if the subject area is within a designated multi-modal mixed-use area (MMA). In order to implement these recent amendments to the TPR, the plan amendment language in the county's zoning code may need to be revised during the implementation phase of this TSP update.

OAR 660-012-0045 requires each local government to amend its land use regulations to implement the TSP. It also requires local government to adopt land use or subdivision ordinance regulations consistent with applicable federal and state requirements, to protect transportation facilities, corridors and sites for their identified functions. This policy is achieved through a variety of measures, including access control measures, standards to protect future operations of roads, and expanded notice requirements and coordinated review procedures for land use applications. Measures also include a process to apply conditions of approval to development proposals, and regulations assuring that amendments to land use designations, densities, and design standards are consistent with the functions, capacities, and performance standards of facilities identified in the TSP.



Specifically, the TPR requires:

- The state to prepare a TSP, referred to as the Oregon Transportation Plan (OTP); and
- Counties and cities to prepare local TSPs that are consistent with the OTP.

As the guiding document for local TSPs, the OTP[3] establishes goals, policies, strategies and initiatives that address the core challenges and opportunities facing transportation in Oregon. The goals and policies are further implemented by various modal plans, including the Aviation System Plan, Bicycle and Pedestrian Plan, Freight Plan, Highway Plan, Public Transportation Plan, Rail Plan and the Transportation Safety Action Plan. Each of the OTP's seven goals are defined by more specific policies and strategies:

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[3] Oregon Transportation Plan: http://www.oregon.gov/ODOT/TD/TP/OTP.shtml

OTP Goal 1, Mobility and Accessibility, aims to enhance Oregon's quality of life and economic vitality by providing a balanced, efficient, cost-effective and integrated multimodal transportation system that ensures appropriate access to all areas of the state, the nation and the world, with connectivity among modes and places.

- **Policy 1.1: Development of an Integrated Multimodal System.** It is the policy of the State of Oregon to plan and develop a balanced, integrated transportation system with modal choices for the movement of people and goods.
  - **Strategy 1.1.1:** Plan and develop a multimodal transportation system that increases the efficient movement of people and goods for commerce and production of goods and services that is coordinated with regional and local plans. Require regional and local transportation plans to address existing and future centers of economic activity, routes and modes connecting passenger facilities and freight facilities, intermodal facilities and industrial land, and major intercity and intra-city transportation corridors and supporting transportation networks.
  - **Strategy 1.1.2:** Promote the growth of intercity bus, truck, rail, air, pipeline and marine services to link all areas of the state with national and international transportation facilities and services. Increase the frequency of intercity services to provide travel options.
  - **Strategy 1.1.4:** In developing transportation plans to respond to transportation needs, use the most cost-effective modes and solutions over the long term, considering changing conditions and based on the following:

    - Managing the existing transportation system effectively.

    - Improving the efficiency and operational capacity of existing transportation infrastructure and facilities by making minor improvements to the existing system.

    - Adding capacity to the existing transportation system.

    - Adding new facilities to the transportation system.
- **Policy 1.2: Equity, Efficiency and Travel Choices.** It is the policy of the State of Oregon to promote a transportation system with multiple travel choices that are easy to use, reliable, cost-effective and accessible to all potential users, including the transportation disadvantaged.
  - **Strategy 1.2.1:** Develop and promote inter and intra-city public transportation.
  - **Strategy 1.2.2:** Better integrate, locate, and design passenger and freight multimodal transportation facilities and connections to expedite travel and provide travel options. Locate and design transportation facilities to connect with other modes.
- **Policy 1.3: Relationship of Interurban and Urban Mobility.** It is the policy of the State of Oregon to provide intercity mobility through and near urban areas in a manner which

minimizes adverse effects on urban land use and travel patterns and provides for efficient long distance travel.

- **Strategy 1.3.1:** Use a regional planning approach and inter-regional coordination to address problems that extend across urban growth boundaries.
- **Strategy 1.3.2:** In coordination with affected jurisdictions, develop and manage the transportation network so that local trips can be conducted primarily on the local system and the interstate and statewide facilities can primarily serve intercity movement and interconnect the systems. Develop, maintain and improve parallel roadways, freight rail, transit, bus rapid transit, commuter rail and light rail to provide alternatives to using intercity highways for local trips where possible.

What this means for the Clatsop County TSP Update: *The TSP update will promote the growth of existing and future centers of economic activity, routes and modes connecting passenger facilities and freight facilities, intermodal facilities and industrial land, and major intercity and intra-city transportation corridors and supporting transportation networks. It will also promote the most cost-effective modes and solutions over the long term that are easy to use, reliable, cost-effective and accessible to all potential users, including the transportation disadvantaged.*

OTP Goal 2, Management of the System, aims to improve the efficiency of the transportation system by optimizing the existing transportation infrastructure capacity with improved operations and management.

- **Policy 2.1: Capacity and Operational Efficiency.** It is the policy of the State of Oregon to manage the transportation system to improve its capacity and operational efficiency for the long term benefit of people and goods movement.
  - **Strategy 2.1.1:** Promote transportation demand management and other transportation system operations techniques that reduce peak period travel, help shift traffic volumes away from the peak period and improve traffic flow. Such techniques may include high occupancy vehicle lanes with express transit service, truck-only lanes, van/carpools, park-and-ride facilities, parking management programs, telework, flexible work schedules, peak period pricing, ramp metering, traveler information systems, traffic signal optimization, route diversion strategies, incident management and enhancement of rail, transit, bicycling and walking.
  - **Strategy 2.1.2:** Protect the integrity of statewide transportation corridors and facilities from encroachment by such means as managing access to state highways, limiting interchanges, creating safe rail crossings and controlling incompatible land use around airports, ports, pipelines and other intermodal passenger and freight facilities.
  - **Strategy 2.1.3:** Use advanced traveler information devices, incident management, speed management, improvements to signaling systems and other technologies to extend the efficiency, safety and capacity of transportation systems. Develop protocols and implement methods for alternate routing to respond to incidents.

- **Strategy 2.1.4:** Enhance efficiency and reduce conflicts among transportation users, for example by reducing bottlenecks and geometric constraints, and improving or removing modal crossings. Provide for a network of arterials and highways to efficiently move goods and services while enhancing safety and community movements on local streets. Provide for signal prioritization and road patterns that support public transit. Support rail reconfiguration and additional tracks that benefit passenger and freight movements.

What this means for the Clatsop County TSP Update: *The TSP update will prioritize travel demand management and transportation system operations techniques that fine tune existing systems and policies over costly major roadway capacity improvements.*

OTP Goal 3, Economic Vitality, promotes the expansion and diversification of Oregon's economy through the efficient and effective movement of people, goods, services and information in a safe, energy-efficient and environmentally sound manner.

- **Policy 3.2 – Moving People to Support Economic Vitality.** It is the policy of the State of Oregon to develop an integrated system of transportation facilities, services and information so that intrastate, interstate and international travelers can travel easily for business and recreation.
    - **Strategy 3.2.2:** In regional and local transportation system plans, support options for traveling to employment, services and businesses. These include, but are not limited to, driving, walking, bicycling, ridesharing, public transportation and rail.
    - **Strategy 3.2.4:** Address scenic values in state, regional and local planning, improvements and maintenance. Support state and federal Scenic Byways and Tour Routes and connections to parks and recreation areas.
    - **Strategy 3.2.5:** Promote tourism via air, bicycles, motor vehicles, rail and ships. Support connections to recreational trails.
- **Policy 3.3 – Downtowns and Economic Development.** It is the policy of the State of Oregon to provide transportation improvements to support downtowns and to coordinate transportation and economic development strategies.
    - **Strategy 3.3.1:** Coordinate private and public resources to provide transportation improvements and services to help stimulate active and vital downtowns, economic centers and main streets.

What this means for the Clatsop County TSP Update: *The TSP update will identify projects that support a prosperous and competitive economy by preserving and enhancing business opportunities, and ensuring the efficient movement of people and goods to recreational, employment, housing and other destinations in Clatsop County.*

OTP Goal 4, Sustainability, seeks to provide a transportation system that meets present needs without compromising the ability of future generations to meet their needs from the joint perspective of environmental, economic and community objectives. This system is consistent with, yet recognizes differences in, local and regional land use and economic development plans. It is efficient and offers choices among transportation modes. It distributes benefits and burdens fairly and is operated, maintained and improved to be sensitive to both the natural and built environments.

- **Policy 4.1 – Environmentally Responsible Transportation System.** It is the policy of the State of Oregon to provide a transportation system that is environmentally responsible and encourages conservation and protection of natural resources.
  - **Strategy 4.1.1:** Practice stewardship of air, water, land, wildlife and botanical resources. Take into account the natural environments in the planning, design, construction, operation and maintenance of the transportation system. Create transportation systems compatible with native habitats and species and help restore ecological processes, considering such plans as the Oregon Conservation Strategy and the Oregon Plan for Salmon and Watersheds. Where adverse impacts cannot reasonably be avoided, minimize or mitigate their effects on the environment. Work with state and federal agencies and other stakeholders to integrate environmental solutions and goals into planning for infrastructure development and provide for an ecosystem-based mitigation process.
  - **Strategy 4.1.2:** Encourage the development and use of technologies that reduce greenhouse gases.
- **Policy 4.3 – Creating Communities.** It is the policy of the State of Oregon to increase access to goods and services and promote health by encouraging development of compact communities and neighborhoods that integrate residential, commercial and employment land uses to help make shorter trips, transit, walking and bicycling feasible. Integrate features that support the use of transportation choices.
  - **Strategy 4.3.1:** Support the sustainable development of land with a mix of uses and a range of densities, land use intensities and transportation options in order to increase the efficiency of the transportation system. Support travel options that allow individuals to reduce vehicle use.
  - **Strategy 4.3.2:** Promote safe and convenient bicycling and walking networks in communities. Fill in missing gaps in sidewalk and bikeway networks, especially to important community destinations such as schools, shopping areas, parks, medical facilities and transit facilities. Enhance walking, bicycling and connections to public transit through appropriate community and main street design. Promote facility designs that encourage walking and biking.
  - **Strategy 4.3.4:** Promote transportation facility design, including context sensitive design, which fits the physical setting, serves and responds to the scenic, aesthetic, historic and environmental resources, and maintains safety and mobility.
  - **Strategy 4.3.5:** Reduce transportation barriers to daily activities for those who rely on walking, biking, rideshare, car-sharing and public transportation by providing: Access to public transportation and the knowledge of how to use it. Facility designs that consider

the needs of the mobility-challenged including seniors, people with disabilities, children and non-English speaking populations.

What this means for the Clatsop County TSP Update: *The TSP update will identify solutions that support the movement of people over vehicles, and that reduce transportation barriers to daily activities for walkers, bikers and public transportation users. The solutions will be environmentally responsible and should fit the physical setting and context of the surrounding land use.*

OTP Goal 5, Safety and Security, aims to plan, build, operate 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 5.1.3:** Ensure that safety and security issues are addressed in planning, design, construction, operation and maintenance of new and existing transportation systems, facilities and assets.
- **Policy 5.2 – Security.** It is the policy of the State of Oregon to provide transportation security consistent with the leadership of federal, state and local homeland security entities.
  - **Strategy 5.2.3:** Improve the evacuation and emergency response capabilities of the urban and rural transportation system.

What this means for the Clatsop County TSP Update: *The TSP update will develop projects that ensure the transportation system maintains and improves individual safety and security and maximizes public safety and service access.*

OTP Goal 6, Funding the Transportation System, seeks to create a transportation funding structure that will support a viable transportation system to achieve state and local goals today and in the future.

- **Policy 6.1 – Funding Structure.** It is the policy of the State of Oregon to develop a transportation finance structure that addresses the public funding aspects of all modes and reinforces plan strategies. This structure should include provisions for flexibility in the use of new funding sources and new partnerships to achieve system integration while also protecting transportation funds for transportation purposes.
  - **Strategy 6.1.2:** Develop and maintain adequate resources for demonstrated and proven transportation needs for all transportation modes and jurisdictions.

What this means for the Clatsop County TSP Update: *The TSP update will include an assessment of the level of transportation funding projected to be available through the 20-year planning horizon in comparison to the cost of developing a transportation system that is able to meet the County's needs. Opportunities to establish stable funding sources will be discussed and project prioritization will consider the feasibility of funding.*

OTP Goal 7, Coordination, Communication and Cooperation, pursue coordination, communication and cooperation among transportation users, providers and those most affected by transportation activities to align interests, remove barriers and bring innovative solutions so the transportation system functions as one system.

- **Policy 7.1 – A Coordinated Transportation System.** It is the policy of the State of Oregon to work collaboratively with other jurisdictions and agencies with the objective of removing barriers so the transportation system can function as one system.
  - **Strategy 7.1.1:** Examine transportation functions among and within state and local agencies and providers in order to make the delivery of transportation services and facilities more efficient. Consider consolidation of functions where it can improve efficiency, accountability and service delivery.
- **Policy 7.3 – Public Involvement and Consultation.** It is the policy of the State of Oregon to involve Oregonians to the fullest practical extent in transportation planning and implementation in order to deliver a transportation system that meets the diverse needs of the state.
  - **Strategy 7.3.1:** In all phases of decision-making, provide affected Oregonians early, open, continuous, and meaningful opportunity to influence decisions about proposed transportation activities. When preparing and adopting a multimodal transportation plan, modal/topic plan, facility plan or transportation improvement program, conduct and publicize a program for citizen, business, and tribal, local, state and federal government involvement. Clearly define the procedures by which these groups will be involved.
  - **Strategy 7.3.3:** Seek out and facilitate the involvement of those potentially affected including traditionally underserved populations.

What this means for the Clatsop County TSP Update: *The TSP update will offer public involvement opportunities to all stakeholders and residents, and will coordinate with other jurisdictions and agencies to ensure the transportation system limits barriers and functions as one system.*

Why does Clatsop County need an Updated TSP?

The County's current Transportation System Plan was adopted in 2003. Since then, several regulations and requirements have been integrated or modified in the TPR, OTP, and State Modal Plans and overall driving, walking and biking habits have evolved in the county. The current effort will develop a TSP for Clatsop County that brings them into compliance with the TPR and more appropriately serves their transportation needs.

How is the Transportation System Defined?

The following sections summarize the state and local roadway classifications and land use designations for areas of Clatsop County derived from the identified documents. This information ultimately determines the adopted standards, regulations, and policies that apply to the transportation system in Clatsop County.

ODOT Classifications for State Highways in Clatsop County

OHP Goal 1, Policy 1A (State Highway Classification System) categorizes state highways for planning and management decisions. Within Clatsop County, state highways are either classified as Statewide or District Highways (see summary at the end of this section). Statewide Highways typically provide inter-urban and inter-regional mobility and provide connections to larger urban areas, ports, and major recreation areas that are not directly served by Interstate Highways. A secondary function is to provide connections for intra-urban and intra-regional trips. The management objective is to provide safe and efficient, high-speed, continuous-flow operation. In constrained and urban areas, interruptions to flow should be minimal. Inside Special Transportation Areas (see Special Designations below), local access may also be a priority.

District Highways are facilities of county-wide significance and function largely as county and city arterials or collectors. They provide connections and links between small urbanized areas, rural centers and urban hubs, and also serve local access and traffic. The management objective is to provide for safe and efficient, moderate to high-speed continuous-flow operation in rural areas reflecting the surrounding environment and moderate to low-speed operation in urban and urbanizing areas for traffic flow and for pedestrian and bicycle movements. Inside STAs, local access is a priority.

> ***What this means for the Clatsop County TSP Update:*** *While this policy places importance on the efficient travel of through motor vehicle trips on the highways, the policy must still be balanced with other goals and objectives of the Oregon Transportation Plan to ensure its multi-modal intentions are addressed.*

Special Designations: OHP Goal 1, Policy 1B identifies special highway segment designations for specific types of land use patterns to foster compact development on state highways in which the need for appropriate local access outweighs the considerations of highway mobility. Within Clatsop County, a portion of Highway 104 (From Lake Drive (MP 0.10) to Heceta Place (MP 0.52) and from SE 1st Street (MP 3.38) to SW 4th Street (MP 3.62)) has a Special Transportation Area (STA) designation.

The primary objective of a STA is to provide access to and circulation amongst community activities, businesses, and residences and to accommodate pedestrian, bicycle, and transit movement along and across the highway. While traffic moves through an STA and automobiles may play an important role in accessing an STA, convenience of movement within an STA is focused upon pedestrian, bicycle, and transit modes. STAs look like traditional "Main Streets" and are generally located on both sides of a state highway. Direct street connections and shared on-street parking are encouraged. Local auto, pedestrian, bicycle, and transit movements to the area are generally as important as the through movement of traffic. Because of this, ODOT's mobility targets and design standards in STA's are intended to allow for lower speed operations.

> ***What this means for the Clatsop County TSP Update:*** *The STA designation is better suited for multi-modal areas adjacent to the highway, allowing for lower speed operations and associated design standards.*

State Highway Freight System: OHP Goal 1, Policy 1C addresses the need to balance the movement of goods and services with other uses. It states that the timeliness of freight movements should be considered when developing and implementing plans and projects on freight routes. Within Clatsop County, US 26 and US 30 are classified as Oregon Freight Routes, and US 101, US 26, and US 30 are classified as Federal Truck Routes.

What this means for the Clatsop County TSP Update: *Transportation solutions along US 101, US 26, and US 30 through Clatsop County must be accommodating to the Truck Route designations. Truck Routes require 12' travel lanes, with potential for 11' travel lanes within STA's with lower trucks volumes.*

Reduction Review Routes: An Administrative Rule was recently adopted to provide clear direction in the implementation of ORS 366.215. The rule requires review of all potential actions that will alter, relocate, change or realign a Reduction Review Route that could result in permanent reductions in vehicle-carrying capacity. Reduction of vehicle-carrying capacity means a permanent reduction in the horizontal or vertical clearance of a highway section, by a permanent physical obstruction to motor vehicles located on useable right-of-way subject to Commission jurisdiction, unless such changes are supported by the Stakeholder Forum. If ODOT identifies that an action may result in a reduction of vehicle-carrying capacity, a Stakeholder Forum will be convened to help advise ODOT regarding the effect of the proposed action on the ability to move motor vehicles through a section of highway.

What this means for the Clatsop County TSP Update: *Transportation improvements recommended on Reduction Review Routes, including US 26, US 30, and US 101 will include a record of the proposed roadway dimensions and sufficient detail to allow for a review of Vehicle-Carrying Capacity during future design.*

Scenic Byways: OHP Goal 1, Policy 1D addresses the need to preserve and enhance the scenic assets of designated routes. It requires any transportation improvements along designated routes to consider the aesthetics and design elements of the project, along with safety and performance impacts. Within Clatsop County, US 101 is classified as a Scenic Byway.

What this means for the Clatsop County TSP Update: *Transportation improvements recommended along US 101 through Clatsop County must consider aesthetics and design elements that support the Scenic Byway designation.*

Lifeline Routes: OHP Goal 1, Policy 1E designates certain routes to be maintained for emergency response in the event of an earthquake. Seismic Lifeline Routes were originally identified by local emergency coordinators in 1995. Based on the geological analysis available at the time, these routes were determined to most likely be available after a seismic event. The routes were initially used to help assess the need for retrofitting state and local bridges. ODOT has updated the list of designated routes, an effort that was completed in March of 2012; however the updates have yet to be adopted as amendments to Policy 1E.

What this means for the Clatsop County TSP Update: *The County can use the TSP update to designate local lifeline routes to ensure their intended function is considered in system investment and management decisions.*

Summary of ODOT Classifications

Updates to the TSP will support the existing highway classifications and will enhance the ability of the highways in Clatsop County to serve their defined functions. The following summarizes the classifications of state highways in Clatsop County:

- US 101 (Oregon Coast Highway, No. 9) is classified as a Statewide Highway, part of the National Highway System (NHS), a Federal Truck Route, a Reduction Review Route, and a Scenic Byway. From the Cannon Beach Exit (MP 28.08) to South Hemlock Street (MP 31.37), US 101 is considered a Bypass. From Astoria to US 26, US 101 is a Tier 3 Lifeline Route and from US 26 south to the County Border, US 101 is a Tier 2 Lifeline Route.
- US 101B (Warrenton-Astoria Highway, No. 105) is classified as a District Highway.
- US 26 (Sunset Highway, No. 47) is classified as a Statewide Highway, part of the NHS, a Federal Truck Route, an Oregon Freight Route, a Reduction Review Route, and a Tier 2 Lifeline route.
- US 30 (Lower Columbia River Highway, No. 2W (92)) is classified as a Statewide Highway, part of the NHS, a Federal Truck Route, an Oregon Freight Route, a Reduction Review Route, and a Tier 1 Lifeline Route.
- OR 53 (Necanicum Highway, No. 46) is classified as a District Highway.
- OR 103 (Fishhawk Falls Highway, No. 103) is classified as a District Highway.
- OR 104 (Fort Stevens Highway, No. 104) is classified as a district highway. From Lake Drive (MP 0.10) to Heceta Place (MP 0.52) and from SE 1st Street (MP3.38) to SW 4th Street (MP 3.62), OR 104 is designated as an STA.
- OR 104S (Fort Stevens Spur Highway, No. 485) is classified as a District Highway.
- OR 202 (Nehalem Highway, No. 102) is classified as a Statewide Highway from US 101 (MP 0.18) to Williamsport Road (MP 2.64) and a District Highway from Williamsport Road (MP 2.64) to the Clatsop County Border (MP 39.13). From US 101 (MP 0.18) to Williamsport Road (MP 2.64), OR 202 is part of the NHS.

Clatsop County Classification for Roadways

To manage the roadway network, the county classified the roadways based on a hierarchy according to the intended purpose of each road. From highest to lowest intended usage, the classifications are arterials, collectors, and local streets. Roadways with a higher intended usage generally provide more efficient traffic movement (or mobility) through the county, while roadways with lower intended usage provide greater access for shorter trips to local destinations such as businesses or residences.

Arterials are intended to act as a corridor connecting many parts of the county and serve traffic traveling to and from state highways. These roadways provide greater accessibility, often connecting to major activity generators and provide efficient through movement for local traffic. In Clatsop County, Lewis and Clark Road (from US 101B to Logan Road and from the Seaside city Limits to Wahanna Road) and Wahanna Road (from Lewis and Clark Road to 12th Street) are classified as Arterials.

Collectors often connect the neighborhoods to arterial roadways. These roadways serve as major neighborhood routes and generally provide more direct property access or driveways than arterial roadways.

Local Roadways provide more direct access to residences without serving through travel in Clatsop County. These roadways are often lined with residences and are designed to serve lower volumes of traffic with a statutory speed limit of 25 miles per hour.

What this means for the Clatsop County TSP Update: *The functional classification system for the County will be revisited for the TSP update.*

How is the Transportation System Managed?

State Highway Mobility Targets: OHP Goal 1, Policy 1F sets mobility targets for ensuring a reliable and acceptable level of mobility on the highway system. Each intersection along state highways has a mobility target requiring that the highway operate at or below a specified volume to capacity (v/c) ratio. The mobility targets shown in Table 1 are applicable to highways in Clatsop County (pursuant to Policy 1F, Table 6).

- **Volume to capacity (V/C) ratio:** A decimal representation (between 0.00 and 1.00) of the proportion of capacity that is being used (i.e., the saturation) at a turn movement, approach leg, or intersection. It is determined by dividing the peak hour traffic volume by the hourly capacity of a given intersection or movement. A lower ratio indicates smooth operations and minimal delays. As the ratio approaches 1.00, congestion increases and performance is reduced. If the ratio is greater than 1.00, the turn movement, approach leg, or intersection is oversaturated and will experience excessive queues and long delays.

Table 1: Highway Intersection Mobility Targets

Highway	Special Designation	Highway Signalized Intersections	Unsignalized Intersections: Highway Approaches	Unsignalized Intersections: Side Street Approaches to Highway
US 101	Inside UGB	0.80 – 0.90 v/c	0.80 – 0.90 v/c	0.90 – 0.95 v/c
	Outside UGB	0.70 – 0.75 v/c	0.70 – 0.75 v/c	0.75 – 0.80 v/c
US 101B	Inside UGB	0.90 - 0.95 v/c	0.90 - 0.95 v/c	0.90 - 0.95 v/c
	Outside UGB	0.75 – 0.80 v/c	0.75 – 0.80 v/c	0.75 – 0.80 v/c
US 26	Freight Route; Outside UGB	0.70 v/c	0.70 v/c	0.75 – 0.80 v/c
US 30	Freight Route; Inside UGB	0.80 – 0.85 v/c	0.80 – 0.85 v/c	0.90 – 0.95 v/c
	Freight Route; Outside UGB	0.70 v/c	0.70 v/c	0.75 – 0.80 v/c
OR 53	Outside UGB	0.75 – 0.80 v/c	0.75 – 0.80 v/c	0.75 – 0.80 v/c
OR 103	Outside UGB	0.75 – 0.80 v/c	0.75 – 0.80 v/c	0.75 – 0.80 v/c
OR 104	Inside UGB	0.90 - 0.95 v/c	0.90 - 0.95 v/c	0.90 - 0.95 v/c
	Inside UGB; STA	1.00 v/c	1.00 v/c	1.00 v/c
	Outside UGB	0.75 – 0.80 v/c	0.75 – 0.80 v/c	0.75 – 0.80 v/c
OR 104S	Inside UGB	0.90 - 0.95 v/c	0.90 - 0.95 v/c	0.90 - 0.95 v/c
OR 202	Inside UGB	0.80 - 0.90 v/c	0.80 - 0.90 v/c	0.90 - 0.95 v/c
	Outside UGB	0.75 – 0.80 v/c	0.75 – 0.80 v/c	0.75 – 0.80 v/c

Source: 1999 Oregon Highway Plan, Policy 1F Revisions, Table 6

*Note that the mobility targets are shown as ranges, but the actual target will be based on the posted speed

OHP Action 1F.3, of Policy 1F allows local jurisdictions to consider alternate mobility standards for state highways where it would be infeasible to meet the standards listed in Table 1 above. The alternative standards shall be clear and objective and must be related to v/c ratios. The standards must demonstrate that it would be infeasible to meet the highway mobility standards listed in Table 1 above and must be adopted as part of the local TSP. In addition, the TSP shall include all feasible actions for:

- Providing a network of local streets, collectors and arterials to relieve traffic demand on state highways and to provide convenient pedestrian and bicycle ways;
- Managing access and traffic operations to minimize traffic accidents, avoid traffic backups on freeway ramps, and make the most efficient use of highway capacity;
- Managing traffic demand, where feasible, to manage peak hour traffic loads on state highways;

- Providing alternative modes of transportation; and
- Managing land use to limit vehicular demand on state highways consistent with the Land Use and Transportation Policy (1B).

The TSP shall include a financially feasible implementation program and shall demonstrate strong public and private commitment to carry out the identified improvements and other actions. The alternate highway mobility standards will become effective only after the Transportation Commission has adopted them.

What this means for the Clatsop County TSP Update: *System performance for the highways will be measured, in part, using the adopted mobility targets. The TSP update will evaluate the need for adopting alternate mobility targets for the highways if there are no feasible project alternatives identified to meet the existing mobility targets.*

County Mobility Targets: Clatsop County does not have adopted mobility targets for intersections under their jurisdiction. The 2003 Clatsop County TSP applied the ODOT mobility target for District/Local Interest Roads to intersections under county jurisdiction and therefore will be considered as the county standard for the Clatsop County TSP update.

What this means for the Clatsop County TSP Update: *County street performance will be evaluated in part, using a mobility target requiring operation with a v/c of 0.75 or better on rural lands outside of Urban Growth Boundaries, 0.80 or better in unincorporated communities outside of Urban Growth Boundaries, 0.95 or better along streets with posted speeds less than 35 mph inside Urban Growth Boundaries, or 0.90 or better along streets with posted speeds greater than 35 mph inside Urban Growth Boundaries. The County may wish to revisit the mobility targets identified and customize them to meet the needs of the County.*

Access Management on Highways: The Oregon Access Management Rule[4] (OAR 734-051) attempts to balance the safety and mobility needs of travelers along state highways with the access needs of property and business owners. ODOT's rules manage access to the state's highway facilities in order to maintain highway function, operations, safety, and the preservation of public investment consistent with the policies of the 1999 OHP. Access management rules allow ODOT to control the issuing of permits for access to state highways, state highway rights of way and other properties under the State's jurisdiction.

In addition, the ability to close existing approaches, set access spacing standards and establish a formal appeals process in relation to access issues is identified. These rules enable the State to direct location and spacing of intersections and approaches on state highways, ensuring the relevance of the functional classification system and preserving the efficient operation of state routes.

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4 Access Management Rule: http: //arcweb.sos.state.or.us/rules/OARS_700/OAR_734/734_051.html

OHP Goal 3, Policy 3A and OAR 734-051 set access spacing standards for driveways and approaches to the state highway system.[5] The standards are based on state highway classification and differ based on posted speed. The applicable standards for highways in Clatsop County can been seen in Table 2.

Table 2: Highway Access Spacing Standards

Highway	Posted Speed Limit	Minimum Intersection Spacing
US 101 (Oregon Coast Highway)	30 to 55 mph	250 to 1,320 feet
US 101B (Warrenton-Astoria Highway)	25 to 55 mph	150 to 700 feet
US 26 (Sunset Highway)	55 mph	1,320 feet
US 30 (Lower Columbia River Highway)	25 to 55 mph	350 to 1,320 feet
OR 53 (Necanicum Highway)	55 mph	650 feet
OR 103 (Fishhawk Falls Highway)	55 mph	650 feet
OR 104 (Fort Stevens Highway)	25 to 45 mph	150 to 500 feet
OR 104S (Fort Stevens Spur Highway)	35 to 45 mph	250 to 360 feet
OR 202 (Nehalem Highway)	35 to 55 mph	250 to 1,320 feet

Source: 1999 Oregon Highway Plan, Appendix C Revisions to Address Senate Bill 264

What this means for the Clatsop County TSP Update: *ODOT access spacing standards for highways should be incorporated into the TSP, along with supporting policies that work towards meeting the access spacing standards in Table 2.*

Access Management on Local Roadways: Clatsop County does not identify minimum intersection spacing standards for driveways or public roadways under their jurisdiction.

What this means for the Clatsop County TSP Update: *The TSP update will develop access spacing standards for streets in Clatsop County. Access spacing standards can help increase the safety of streets by creating an environment that matches the street functional classification and forestalling costly major capacity improvements.*

Major Projects: OHP Goal 1, Policy 1G requires maintaining performance and improving safety by improving efficiency and management before adding capacity. The intent of policy 1G and Action 1G.2 is to ensure that major improvement projects to state highway facilities have been through a planning process that involves coordination between state, regional, and local stakeholders and the public, and that there is substantial support for the proposed improvement.

What this means for the Clatsop County TSP Update: *The TSP update will consider project alternatives that improve or manage the existing transportation system before implementing higher cost street capacity enhancement projects.*

[5] ODOT Access Management Standards (Appendix C): www.oregon.gov/ODOT/TD/TP/OHP_AM.shtml

Projects off Highways: OHP Goal 2, Policy 2B establishes ODOT's interest in projects on local roads that maintain or improve safety and mobility performance on state roadways, and supports local jurisdictions in adopting land use and access management policies.

What this means for the Clatsop County TSP Update: *The TSP will include sections describing existing and future land use patterns, access management and implementation measures, and will consider solutions that reduce the need for local trips on the highways.*

Traffic Safety: OHP Goal 2, Policy 2F identifies the need for projects in the state to improve safety for all users of the state highway system through engineering, education, enforcement, and emergency services. One component of the TSP is to identify existing crash patterns and rates and to develop strategies to address safety issues. ODOT's Safety Priority Index System (SPIS) will also be used to identify potential safety problems on state highways. Proposed projects will aim to reduce the vehicle crash potential and/or improve bicycle and pedestrian safety by providing upgraded facilities that meet current standards.

What this means for the Clatsop County TSP Update: *The TSP update will develop projects that ensure the transportation system maintains and improves individual safety and security by maximizing the comfort and convenience of walking, biking and transit transportation options, public safety and service access.*

Alternative Passenger Modes: OHP Goal 4, Policy 4B, requires that highway projects encourage the use of alternative passenger modes to reduce local trips. The TSP will also consider ways to support and increase the use of alternative passenger modes to reduce trips on highways and other facilities.

What this means for the Clatsop County TSP Update: *The TSP update will incorporate the recommendations from the Oregon Bicycle and Pedestrian Plan, from Local TSP's, and from the Sunset Empire Transit District Coordinated Human Services Transportation Plan or other service providers of the North by Northwest Connector Alliance, and will consider additional solutions that will enhance multi-modal travel in Clatsop County.*

Transportation Demand Management: OHP Goal 4, Policy 4D, encourages efficient use of the state transportation system through investment in transportation demand management strategies.

What this means for the Clatsop County TSP Update: *The TSP update will consider transportation demand management strategies to create greater mobility, reduce auto trips, make more efficient use of the roadway system, and minimize air pollution.*

Projects on Highways: The Highway Design Manual[6] (HDM) provides uniform design standards and procedures for ODOT and is in general agreement with the 2011 American Association of State Highway and Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets*.

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[6] ODOT Highway Design Manual: http: //www.oregon.gov/ODOT/HWY/ENGSERVICES/hwy_manuals.shtml

Some key areas where guidance is provided are the location and design of new construction, major reconstruction, and resurfacing, restoration or rehabilitation (3R) projects. The HDM should be used for all projects on highways in Clatsop County to determine design requirements, including the minimum required volume to capacity ratios for use in the design of highway projects.

> ***What this means for the Clatsop County TSP Update:*** *System performance of highway improvement projects will be measured, in part, using the HDM v/c ratios. While HDM standards must be applied to ODOT facilities, design exceptions can be granted to those standards where conditions justify such action in order to balance the policies and objectives of the Oregon Transportation Plan.*

Oregon Bike and Pedestrian Plan: The provision of safe and accessible bicycling and walking facilities in an effort to encourage increased levels of bicycling and walking is the goal of the Oregon Bicycle and Pedestrian Plan, which is an element of the Oregon Transportation Plan. The plan identifies actions that will assist local jurisdictions in understanding the principals and policies that ODOT follows in providing bike and walkways along state highways. In order to achieve the plan's objectives, the strategies for system design are outlined, including:

- Providing bikeway and walkway systems and integrating with other transportation systems
- Providing a safe and accessible biking and walking environment
- Developing educational programs that improve bicycle and pedestrian safety

The Policy & Action section contains background information, legal mandates and current conditions, goals, actions and implementation strategies ODOT proposes to improve bicycle and pedestrian transportation. The Bikeway & Walkway Planning Design, Maintenance & Safety section assists ODOT, cities and counties in designing, constructing and maintaining pedestrian and bicycle facilities. Design standards are recommended and information on safety is provided.

> ***What this means for the Clatsop County TSP Update:*** *The TSP update will identify improvements that could enhance safety, increase connectivity and provide seamless connections between walking and biking facilities and other travel modes in Clatsop County.*

Other Background Information for the TSP Update

The following sections summarize additional background information or guidance documents that will be used in updating the Clatsop County TSP.

Public Involvement: OHP Goal 2, Policy 2D requires that citizens, businesses, regional and local governments, state agencies, and tribal governments have opportunities to have input into decisions regarding proposed policies, plans, programs, and improvement projects that affect the state highway system.

> ***What this means for the Clatsop County TSP Update:*** *The TSP update will offer public involvement opportunities to all stakeholders and residents.*

Environmental Resources: OHP Goal 5, Policy 5A requires that the design, construction, operation, and maintenance of the state highway system should maintain or improve the natural and built environment including air quality, fish passage and habitat, wildlife habitat and migration routes, sensitive habitats (i.e. wetlands, designated critical habitat, etc.), vegetation, and water resources where affected by ODOT facilities.

What this means for the Clatsop County TSP Update: *The TSP update will consider the potential for environmental impacts of all proposed solutions.*

Clatsop County Comprehensive Plan: The Clatsop County Comprehensive Plan is the County's long range plan for land and water development and protection. The vision for development and protection is expressed in a series of goals, policies, and actions.

The plan is divided into two sections: Section I (Countywide Elements), which addresses statewide planning goals as they apply locally; and Section II (Community Plans). Highlights of transportation and land use related findings, policies, and actions are presented by goal heading below.

Section I (Countywide Elements):

- **Goal 2 (Land Use Planning)** – Six County land use designations for urban and rural land; approximately 90% of the county is forested land.
- **Goal 4 (Forest Lands)** – Roads in forest areas shall be limited to the minimum width necessary for traffic management and safety.
- **Goal 7 (Natural Hazards)** – Access roads and driveways shall follow slope contours to reduce the need for grading and filling, reduce erosion, and prevent the rapid discharge of runoff into natural drainage ways.
- **Goal 8 (Recreational Lands)** – Action under Parks Management goal to increase connectivity between parks and adjacent recreation areas.
- **Goal 9 (Economy)** – Policies that the County Planning Commission and Recreation/Tourism Subcommittee work together to locate future high intensity Recreation/Tourism activity in Urban Growth Boundaries (UGBs) and Rural Service Areas before developing new facilities elsewhere, and that criteria be established for Destination Resort designation including adequate transportation facilities.
- **Goal 12 (Transportation)** – Goals and objectives of the 2003 TSP incorporated into Comprehensive Plan Goal 12, including Mobility, Livability, Coordination, Public Transportation, Pedestrian and Bicycle Facilities, Accessibility, Environment, System Preservation, Capacity, Transportation Funding, and Safety.
- **Goal 14 (Urbanization)** – Policy that establishing and amending UGBs shall be based upon factors including orderly and economic provision of public facilities and services, including transportation.
- **Goals 16 and 17 (Estuarine Resources and Coastal Shorelands)** – Columbia River Estuary Land and Water Use Plan Policies and Necanicum Estuary Goals and Policies that

regulate the siting of transportation facilities, primarily addressing access to these areas and minimizing impacts on aquatic and shoreland estuarine resources.

Section II (Community Plans): As shown in Figure 1, the unincorporated areas of Clatsop County are divided in five community planning areas: Clatsop Plains, Elsie-Jewell, Lewis & Clark Olney-Wallooskee, Northeast Area, and Southwest Coastal/Seaside Rural. The following is a summary of policies from the community plans that are relevant to transportation planning in unincorporated County land.

- **Transportation** – Transportation policies that address minimizing new access onto U.S. 101; consolidation of access points; designing new roads that minimize disturbance of the land; using "unnecessary" rights-of-way as green belts, walking trails, or bike paths where appropriate; improving safety of pedestrian and bicycle facilities; minimizing visual and noise impacts of U.S. 101; study of rail rights-of-way; developing a Seaside Airport Plan.

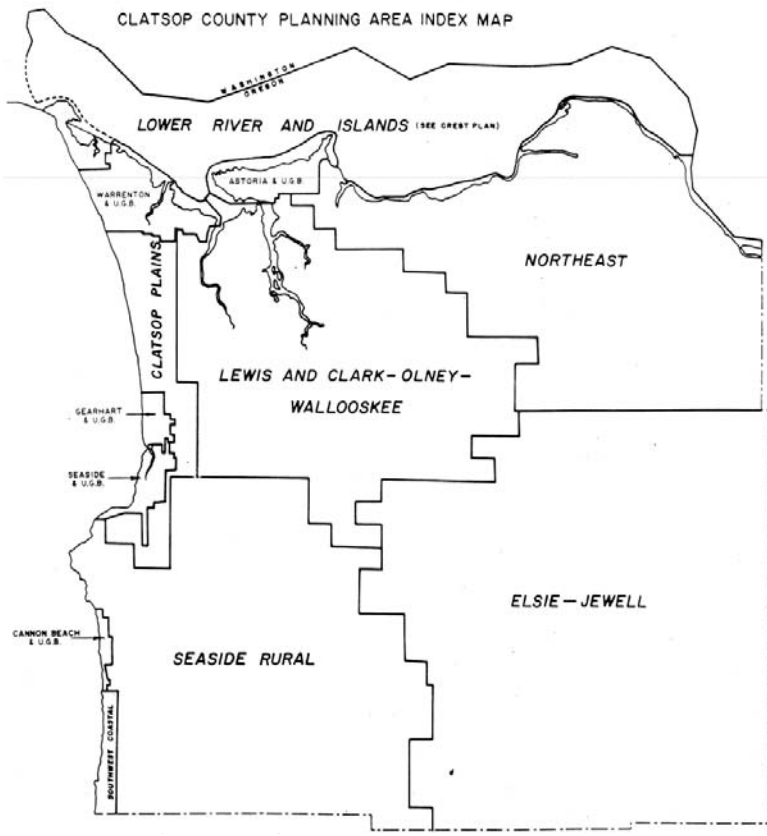


Figure 1: Clatsop County Community Plan Areas

- **Natural resources** – Natural resource land use designations with policies about limited or no impacts in these areas.
- **Recreation** – Recreation policies including changing the Coast bike trail designation from Lewis and Clark Road to US 101; providing access to major streams and rivers for new subdivisions and planned developments.
- **Development** – General policies for commercial development regarding the clustering of commercial development to allow for joint use of vehicular access and parking and other objectives.
- **Rural land** – Rural lands policies about commercial areas having adequate off-street parking to prevent traffic congestion.

Planning for a discrete area of Clatsop Plains – the North Clatsop Plains Sub-Area Plan – is currently being conducted. The Existing Conditions Report (2013), the most recent documentation from the planning project, includes the following findings and recommendations related to transportation in the sub-area.

- **Plan area** – The plan area extends area from Warrenton city limit to the northern edge of Cullaby Lake County Park, and from the ocean on to the eastern boundary of the Clatsop Plains.
- **Transportation needs** – Camp Rilea, the major land use in the plan area, serves as training grounds for the Oregon Army National Guard and as a regional emergency response center, as well as hosts various events and seasonal activities. Military vehicles to and from the camp may travel as a convoy, which may require prior permit approval by ODOT, or in smaller groups of approximately six or fewer vehicle serials staggered over the course of an hour. Other events may generate high volumes of traffic temporarily.
- **Safety and operational conditions** – Only one fatal crash was recorded at the camp entrance (US 101/Patriot Way) during the 2005-2012 time period. No military convoys or tactical vehicles were involved in crashes during this period No traffic counts were collected at US 101/Patriot Way as part of the existing conditions analysis. Observations indicate that there can be high delays during the peak summer months, apparently due to visitors and staff using the access throughout the day and for events. A subsequent step in transportation analysis in the plan area will examine alternative treatments that may be considered at US 101/Patriot Way to accommodate convoys.
- **Recreation and trails**
  - Existing Oregon Coast Trail - The first 16 miles of this 382-mile trail travels on the beach from Columbia River South Jetty south through the study area.
  - Existing Fort to Sea Trail - Roughly six-mile trail is accessible to hiking and mountain biking, and passes through the southeast corner of Camp Rilea as it connects to the ocean.
  - Proposed Delaura Beach Road Trail - Proposed to run along the northern boundary of Camp Rilea, partly on Delaura Beach Road itself and including paved shoulder improvements along Delaura Beach Lane.
  - Proposed Ridge Road Trail – A 1.2-mile trail proposed by the City of Warrenton and Warrenton Trails Association to connect Ridge Road to the Fort to Sea Trail, along Camp Rilea's northeast border and potentially to be maintained by Oregon Parks and Recreation Department
  - Many informal trails are found in the area. Trespass is a continuing concern for trails proposed adjacent to Camp Rilea, including the increased use of Delaura Beach Road, and must be addressed in trail planning, design, and management.

> ***What this means for the Clatsop County TSP Update:*** *The TSP should consider and reflect the goals and policies of the Comprehensive Plan and Community Plans, as well as recommendations emerging from the North Clatsop Plains Sub-Area Plan. The Comprehensive Plan may also need to be amended to implement the TSP recommendations, as was done to incorporate updated goals and policies in Goal 12 of the Comprehensive Plan as part of the 2003 TSP adoption process.*

Clatsop County Land and Water Development and Use Ordinance: The Clatsop County Land and Water Development and Use Ordinance regulates the use of land and water in unincorporated areas of the county. It is intended to implement the goals and policies established in the County Comprehensive Plan and its Community Plans. The ordinance includes requirements for development, including requirements for land division.

Specific development standards – such as site development, vehicle access and circulation, and street design – are established in the County Standards Document, which is addressed in the next section of this report. Both the Land and Water Development and Use Ordinance and Standards Document are reviewed for compliance with the State Transportation Planning Rule (TPR) in Technical Memorandum #3 (Regulatory Review).

> ***What this means for the Clatsop County TSP Update:*** *The Land and Water Development and Use Ordinance may need to be amended to be consistent with the updated TSP, implement its recommendations, and comply with state transportation regulations such as the TPR. (See Technical Memorandum #3, Regulatory Review.)*

Clatsop County Standards Document: Specific development standards for site development, vehicle access and circulation, and street design are established in the County Standards Document, a companion adopted document to the Land and Water Development and Use Ordinance. The following important transportation-related standards are included in this document.

- Chapter 2 (Site Oriented Improvements)
  - Off-street parking and loading requirements and plans, including bicycle parking
- Chapter 5 (Vehicle Access Control and Circulation)
  - Access control and spacing standards
  - Pedestrian and bicycle access and circulation, pathways within sites, connections to land adjacent to site, and street connectivity (pathways through blocks)
  - Subdivision design standards, including street and block design
- Chapter 6 (Road Standard Specifications for Design and Construction)
  - County and public road design standards (narrative and table(s), not figures/cross-sections), by functional classifications and volumes

The Standards Document and Land and Water Development and Use Ordinance are both the subject of a TPR compliance review in Technical Memorandum #3 (Regulatory Review).

What this means for the Clatsop County TSP Update: *The Land and Water Development and Use Ordinance may need to be amended to be consistent with the updated TSP and implement its recommendations, as well as to comply with state transportation regulations such as the TPR. (See Technical Memorandum #3, Regulatory Review.)*

Clatsop County Strategic Plan: The Clatsop County Strategic Plan presents a vision for the county and prioritizes projects representing the array of County facilities and services, projects which are to be reviewed and revised as needed on an annual basis. The projects were developed and reviewed through a public process and were prioritized by the County Planning Commission and County Board of Commissioners. The following is a list of the projects identified in the strategic plan that are relevant to county transportation planning.

- **TSP Update** – Started 2013; an update of policies and projects; collaborating agencies ODOT, Department of Land Conservation and Development (DLCD), cities, special districts, interested parties.
- **US 101 Camp Rilea to Surf Pines Lane Improvement Plan** – Started 2011; a facility plan with a focus on access management; collaborating agencies ODOT, Division of State Lands (DSL), Oregon Department of Environmental Quality (DEQ). The Plan recommended improving the north segment to 3-lanes, with lower-cost spot improvements in rest of corridor.
- **Ensign Lane Extension** – Started 2011; from existing terminus in front of Costco to Business Route 101 at the North Coast Industrial Park; collaborating agencies Oregon Department of Transportation, Clatsop County, and City of Warrenton, Oregon DEQ, DSL, ACOE, National Oceanic and Atmospheric Administration (NOAA).
- **Fire Station Access Development** – Started 2012; assessing safety in accessing Fire District Stations in areas off of the highway system; collaborating agencies ODOT, fire districts, Clatsop County
- **Westport Corridor and Community Plan** – Started 2011; projects for areas of significant traffic on OR 30; collaborating agencies ODOT, Westport community, Clatsop County. Recommendations included a new collector street from US 30 to the Ferry Landing and pedestrian improvements along US 30.
- **Countywide Bypass, Truck, Evacuation Route** – Started in 2012; study and consensus building for an alternate route, earthquake or tsunami evacuation road or by-pass of US 30; collaborating agencies ODOT, DLCD, cities, special districts, private business, environmental and business organizations.

What this means for the Clatsop County TSP Update: *Projects and priorities in the Strategic Plan will inform the development of the TSP update and relevant transportation improvements will be reflected in the updated TSP. The TSP should consider recommendations from the US 101 Camp Rilea to Surf Pines Lane Improvement Plan and the Westport Corridor and Community Plan.*

Clatsop County Parks and Recreation Lands Master Plan: The Clatsop County Parks and Recreation Lands Master Plan is an update of the 1992 Clatsop County Recreational Lands Master Plan, and has been adopted as an element of the County's Comprehensive Plan. The following actions and recommendations address connections between transportation, parks and recreation for the purposes of transportation planning.

- **Actions under Goal 5 (Regional Recreational Connections)**
  - Action 5.1.1 – Create a Land and Water Trails Plan (support Lower Columbia Trail development)
  - Action 5.1.2 – Create uniform land and water trail use guidelines and consistent signage to minimize user conflicts.
  - Action 5.1.5 – Identify and investigate opportunities to secure public access to rivers, streams and lakes, as well as significant trails and natural or historic sites.
- **Recommendation** – Increase connectivity between parks and adjacent recreation areas, including between trails being developed in Clatsop State Forest and Tillamook State Forest, between Cullaby/Carnahan Parks and Fort-to-Sea Trail, and between County Fairground/ODF District Office area and trails in the Astoria Basin.

What this means for the Clatsop County TSP Update: *The TSP update process should be coordinated with the Clatsop County Parks Department so that trail guidelines and connections between parks, recreation areas and trails are incorporated into the TSP as appropriate.*

City of Astoria Comprehensive Plan: The City of Astoria Comprehensive Plan is a long range plan for development and protection of land and water in the City of Astoria. Policies in this local Comprehensive Plan that address coordination between the City and County regarding land use and transportation are summarized below.

- **General Urban policies** – The City or County will notify each other of an application for development within the Urban Growth Boundary outside the city limits, include applications for extensions of public facilities and annexations.
- **Specific Urban Growth policies** – It is the policy of the City that the route of the US 30 Bypass should be within the UGB, and ultimately within city limits. At such time that the alignment is determined, the City, County, and State will address its inclusion in the city and the development potential of lands along the alignment.
- **Transportation policies** – These policies are currently being revised by an update of the City's Transportation System Plan (TSP).

What this means for the Clatsop County TSP Update: *Astoria Comprehensive Plan policies should be reflected in the Clatsop County TSP to the extent that the updated TSP addresses jurisdiction coordination and the US 30 Bypass.*

City of Astoria Recreational Trail Master Plan: The City of Astoria Recreational Trail Master Plan was completed earlier this year. The Trails Advisory Committee included County representatives. Two extensions of the River Walk trail that are proposed to travel potentially outside the city onto or across county land include proposed routes traveling south and west from Tongue Point and traveling south toward Miles Crossing/Jeffers Gardens (Figure 2).

Figure 2: Proposed Trails in Astoria

What this means for the Clatsop County TSP Update: *Trails that are proposed to travel from Astoria on or adjacent to county land should be reflected in the TSP.*

City of Warrenton Comprehensive Plan: The City of Warrenton Comprehensive Plan is a long range plan for development and protection of land and water in the City of Warrenton. Policies in the Comprehensive Plan that address coordination between the city and county regarding land use and transportation are summarized below.

- **Urban Development findings** – A large area of unincorporated land in the Warrenton UGB near the Astoria Regional Airport and Lewis and Clark River shown in the Comprehensive Plan is now incorporated. There is a smaller area of significant unincorporated land between Fort Stevens Highway (Highway 104) and Smith Lake.
- **Urban Development policy** – Orderly and economic provision of public facilities and services, including transportation, must be demonstrated for annexation and any future UGB amendments. Annexations should also demonstrate efficient urban use of incorporated land before annexing unincorporated land.

- **Transportation element** – The 2004 Warrenton TSP was adopted as an addendum to the City's Comprehensive Plan and is referenced throughout the Transportation Article of the Comprehensive Plan. The Transportation Article has existing and proposed trail maps and a tsunami evacuation route map that are not included in the local TSP.

> ***What this means for the Clatsop County TSP Update:*** *Transportation-related elements in the City of Warrenton Comprehensive Plan that may have bearing on county land and coordination, such as trails and evacuation routes, and that are not reflected in the Warrenton TSP should be reflected in the Clatsop County TSP.*

City of Seaside Comprehensive Plan: The City of Seaside Comprehensive Plan is a long range plan for development and protection of land and water in the city. A lot of the area within the City UGB is annexed and most areas within the city limits have been developed. There is a large area of unincorporated land and potential growth in the UGB along Wahanna Road north of Broadway, east of Neawanna Creek and US 101, and south of the Seaside Municipal Airport.

Policies in the Comprehensive Plan that potentially affect county transportation planning are summarized below.

- **Transportation policies** – Planning Commission shall review all proposed development adjacent to US 101 to consider safety and capacity/mobility impacts; City and ODOT will cooperate to limit access to US 101 and possibly widen or relocate right-of-way (particularly in the southern part of the city); encourage improvement and maintenance of the coastal US 101 bike route ODOT; and support Seaside and Gearhart, the County, the Port of Astoria, and the State Aeronautics Division to work together to retain the Seaside Airport.
- **Transportation and energy conservation policies** – Work with the County to develop a transit system.
- **Utilities/street system policies** – Cooperate with Clatsop County to bring all county roads that are surrounded by the City and are in future annexed areas to an acceptable standard and then accept those roads into the city system; City shall accept all county bridges of future annexed areas into the city system; City and County shall develop a method to assess developments (i.e., systems development charge) that will not be adjacent to Wahanna Road but will impact Wahanna Road; and City annexes the entire county road when annexing property abutting a county road.
- **Recreation policies** – City will protect the Oregon Coast Trail.
- **Housing policies** – Recognize the need for recreational types of housing/lodging and require that development plans be reviewed for limiting on- and off-site congestion.

> ***What this means for the Clatsop County TSP Update:*** *The TSP should address, as appropriate, City of Seaside policies about a US 101 bypass, transit, the US 101 bike route, Seaside Airport, Oregon Coast Trail, and jurisdictional transfers of roadways.*

City of Cannon Beach Comprehensive Plan: The City of Cannon Beach Comprehensive Plan is a long range plan for development and protection of land and water in the city. Policies in the Comprehensive Plan that potentially affect county transportation planning are summarized below.

- **Transportation policies** – Develop a safer and more efficient north entrance to the City (e.g., northbound underpass/overpass); cooperate with ODOT in making interim improvements to US 101; cooperate with ODOT in protecting scenic elements of the US 101 corridor; and limit access to US 101 (e.g., shared access points, existing streets).
- **Urban growth area policies** – Work with the County to ensure that land along US 101 south of the OR 26/US 101 junction, adjacent to the city, is not designated for a destination resort.
- **Recreation, open space, natural, visual, and historic resources policies** – Protect the important Oregon Coast Trail and preserve its scenic character.

What this means for the Clatsop County TSP Update: *The TSP should address, as appropriate, City of Cannon Beach policies about the north entrance to the city, scenic elements of US 101, destination resorts, and the Oregon Coast Trail.*

City of Gearhart Comprehensive Plan: The City of Gearhart Comprehensive Plan is a long range plan for development and protection of land and water in the city. Policies in the Comprehensive Plan that potentially affect county transportation planning are summarized below.

- **Transportation policies** – Address US 101, controlling access, clustering development, and otherwise minimizing impacts on the highway; coordination with Clatsop County about transit; and coordination with jurisdictions about regional bike trails.
- **Urban Growth policies** – Address extending services only in the UGB and maintaining the predominantly low-density semi-rural residential character of the community, including limiting commercial development, especially tourist commercial development.

What this means for the Clatsop County TSP Update: *The TSP should address, as appropriate, City of Gearhart policies, particularly pertaining to countywide transit and regional trails.*

Attachment A: Applicable Plans and Policies

The following plans and policies were reviewed for the Clatsop County TSP Update:

Clatsop County

- Clatsop County TSP, July 2003
- Clatsop County Comprehensive Plan, June 2012
- Clatsop County Standards Document, March 2013
- Clatsop County Capital Improvement List, 2005
- Clatsop County Strategic Plan, March 2012
- Clatsop County Parks and Recreation Lands Master Plan, March 2006

State of Oregon

- 1999 Oregon Highway Plan, amended August 2013
- Oregon Transportation Plan, September 2006
- Oregon Bicycle and Pedestrian Plan, 1995
- Oregon Rail Plan, 2001
- Oregon Freight Plan, June 2011
- Oregon Aviation Plan, 2007
- Transportation Planning Rule (OAR 660-012), amended December 2011
- Access Management Rules (OAR 734-051), amended December 2011
- Statewide Transportation Improvement Program (STIP), June 2012

Regional Documents

- Astoria TSP (including current draft update materials), 2013
- Astoria Comprehensive Plan, 2010
- City of Astoria Recreational Trail Master Plan, 2013
- Warrenton TSP, February 2004
- Warrenton Comprehensive Plan, 2011
- Seaside TSP, October 2010
- Seaside Comprehensive Plan, 1996
- Cannon Beach Comprehensive Plan, 2012
- Gearhart Comprehensive Plan, 1994
- Sunset Empire Transit District Comprehensive Plan, 2000
- Sunset Empire Transit District Coordinated Human Services Transportation Plan, January 2011
- Portland-Astoria (US30) Corridor Plan, 1999
- Greater Astoria-Warrenton Area Regional Transportation Refinement Plan (not adopted into TSP), October 2007
- Miles Crossing/Jeffers Garden Transportation Refinement Plan, June 2009
- Eastgate Transportation Refinement Plan
- Westport Community Plan
- US 101 Camp Rilea Corridor Plan

Section C:

Memorandum 3- Regulatory Review

MEMORANDUM #3

DATE: October 02, 2013

TO: Clatsop County TSP Project Management Team

FROM: Darci Rudzinski, Angelo Planning Group
Shayna Rehberg, Angelo Planning Group

SUBJECT: Clatsop County Transportation System Plan
Technical Memorandum #3: Regulatory Review P11086-016

The purpose of this memorandum is to discuss and identify Clatsop County Comprehensive Plan and Land and Water Development and Use Ordinance (LWDUO or "code") provisions that may need to be updated in order to: (1) to be consistent with and implement the updated TSP; and (2) to comply with the Oregon Transportation Plan (OTP) and the Transportation Planning Rule (TPR).

Draft Transportation System Plan (TSP)

The objectives, outcomes, and recommendations of the TSP update process are expected to result in needed policy and regulatory amendments to ensure consistency between adopted County documents. These amendments are likely to be related to issues that have received state and local attention since the TSP was adopted in 2003, such as the emphasis on multimodal transportation and finding ways to better manage and maximize the existing transportation system.

Policy amendments will reflect issues identified through the TSP update. The Comprehensive Plan Goals and Policies document contains the County's transportation-related goals and objectives (see *Goal 12 – Transportation* section). The goals and objectives reflect "the input of residents, businesses, and agencies that was obtained during the course of preparing the TSP," as well as local, regional, and State goals and policies existing at the time of TSP adoption. The goals and objectives developed as part of the 2003 TSP will be reviewed in light of existing and future projected conditions. Transportation-related policy language may need to be modified to reflect recommendations from locally adopted city TSPs, as they pertain to County facilities, as well as recent state policy changes, such as those focused on greenhouse gas reduction, mobility, and access management.

Code amendments may also be necessary to implement the recommendations of the updated TSP. Examples include modifying street standards and other multi-modal, system and transportation facility design standards.[1] Some preliminary recommended changes are identified in Table 1, based on State requirements related to implementing local transportation system plans (see Transportation Planning Rule section in this memorandum). These and other code changes, as well as recommended policy amendments, will be identified and developed as part of the TSP update.

Oregon Transportation Plan (OTP)

The OTP, updated in 2006, is the State's comprehensive transportation plan. The planning horizon of the current plan extends through 2030. Its purpose is to establish goals, policies, strategies, and initiatives for long-range transportation planning in the state. A summary of the OTP is provided in Technical Memorandum #2 (Plan Review Summary).

The OTP emphasizes maximizing the investment in the existing transportation system, integrating transportation and land use regulations, and integrating the transportation system across jurisdictions and modes. The following are key initiatives in the OTP:

- Maintain the existing transportation system to maximize the value of the assets. If funds are not available to maintain the system, develop a triage method for investing available funds.
- Optimize system capacity and safety through information technology and other methods.
- Integrate transportation, land use, economic development and the environment.
- Integrate the transportation system across jurisdictions, ownerships and modes.
- Create a sustainable funding plan for Oregon transportation.
- Invest strategically in capacity enhancements.

OTP policy and investment strategies are translated into plans for specific transportation modes in order to implement statewide multimodal priorities. The Oregon Highway Plan, the Oregon Bicycle and Pedestrian Plan, the Oregon Public Transportation Plan, Oregon Aviation Plan, and the Oregon Rail Plan are modal plans that have been reviewed for this project to ensure that the updated TSP will be consistent with policies, strategies, and design guidelines in these modal plans (See Technical Memorandum #2).

Transportation Planning Rule (TPR)

The Transportation Planning Rule (TPR) (OAR 660-012) implements Statewide Planning Goal 12 (Transportation), which is intended to promote the development of safe, convenient, and economic transportation systems that are designed to maximize the benefit of investment and reduce reliance on the automobile. The TPR includes direction for preparing, coordinating, and implementing TSPs. In particular, TPR Section -0045 (Implementation of the Transportation System Plan) requires local

[1] At the time that TSP-related amendments to the Development Code are considered for adoption, the County may wish to take the opportunity to make other procedural amendments to the Development Code.

governments to amend their land use regulations to implement the TSP. It also requires local governments to adopt land use and subdivision regulations to protect transportation facilities for their identified functions.

TPR Section -0060 (Plan and Land Use Regulation Amendments) addresses amendments to plans and land use regulations. It specifies measures to be taken to ensure that allowed land uses are consistent with the identified function and capacity of existing and planned transportation facilities. These include access control measures, standards to protect future operations of roads, expanded notice requirements and coordinated review procedures for land use applications, a process to apply conditions of approval to development proposals, and regulations ensuring that amendments to land use designations, densities, and design standards are consistent with the functions, capacities, and performance standards of facilities identified in the TSP. Section -0060 also establishes criteria for identifying the significant effects of plan or land use regulation amendments on transportation facilities, actions to be taken when a significant effect would occur, identification of planned facilities, and coordination with transportation facility providers.

Table 1 provides an evaluation of the Clatsop County Land and Water Development and Use Ordinance based on Sections -0045 and -0060 of the TPR.[2] The evaluation includes findings confirming whether existing code language complies with the TPR. Where necessary, it provides recommendations for amending the code to better address TPR requirements.

[2] Note that the focus of the TPR evaluation is on how the County implements the local transportation plan through land use and development requirements. As such, Table 1 does not include an evaluation of existing policy language. However, as stated earlier in this memorandum, a review and update of policy language will be a focus of, and outcome of, the TSP update.

Table 1: TPR Evaluation of the Clatsop County Land and Water Development and Use Ordinance (LWDUO) and Clatsop County Standards Document

TPR Requirement	Local Development Code References and Recommendations
OAR 660-012-0045	
(1) Each local government shall amend its land use regulations to implement the TSP.	
(a) The following transportation facilities, services and improvements need not be subject to land use regulations except as necessary to implement the TSP and, under ordinary circumstances do not have a significant impact on land use: (A) Operation, maintenance, and repair of existing transportation facilities identified in the TSP, such as road, bicycle, pedestrian, port, airport and rail facilities, and major regional pipelines and terminals; (B) Dedication of right-of-way, authorization of construction and the construction of facilities and improvements, where the improvements are consistent with clear and objective dimensional standards; (C) Uses permitted outright under ORS 215.213(1)(m) through (p)[3] and 215.283(1)(k) through (n)[4], consistent with	LWDUO Section 3.035 (Review of Land Transportation Facilities for Compliance with Land Use Regulations) establishes the following transportation and transportation-related uses as permitted outright unless otherwise specified by the code. (A) Normal operation, maintenance, repair, and preservation activities of existing transportation facilities. (B) Installation of culverts, pathways, medians, fencing, guardrails, lighting, water lines, sewer lines, and similar types of improvements within existing right-of- way. (C) Projects specifically identified in the County's adopted Transportation System Plan including those projects in resource zones where the TSP includes required goal findings or a goal exception and the proposed project is determined to be consistent with the adopted goal findings or exception. Resource zones for the purpose of this section are: Lake and Wetland Zone (LW), Conservation Shoreland Zone (CS), Natural Shoreland Zone (NS), Ecola Aquatic Conservation Zone (EAC), Aquatic Conservation Two Zone (AC-2), Aquatic Conservation One (AC1), Beach and Dune Overlay Zone (BDO). (D) Landscaping as part of a land transportation facility. (E) Emergency measures necessary for the safety and protection of the public and property.

[3] Transportation uses in ORS 215.213(1) have shifted from (m) through (p) to (j) through (m):
(j) Climbing and passing lanes within the right of way existing as of July 1, 1987.
(k) Reconstruction or modification of public roads and highways, including the placement of utility facilities overhead and in the subsurface of public roads and highways along the public right of way, but not including the addition of travel lanes, where no removal or displacement of buildings would occur, or no new land parcels result.
(l) Temporary public road and highway detours that will be abandoned and restored to original condition or use at such time as no longer needed.
(m) Minor betterment of existing public road and highway related facilities, such as maintenance yards, weigh stations and rest areas, within right of way existing as of July 1, 1987, and contiguous public-owned property utilized to support the operation and maintenance of public roads and highways.
[4] Transportation uses in ORS 215.283(1) have shifted from (k) through (n) to (h) through (k):
(h) Climbing and passing lanes within the right of way existing as of July 1, 1987.
(i) Reconstruction or modification of public roads and highways, including the placement of utility facilities overhead and in the subsurface of public roads and highways along the public right of way, but not including the addition of travel lanes, where no removal or displacement of buildings would occur, or no new land parcels result.

Table 1: TPR Evaluation of the Clatsop County Land and Water Development and Use Ordinance (LWDUO) and Clatsop County Standards Document

TPR Requirement	Local Development Code References and Recommendations
the provisions of 660-012-0065[5]; and (D) Changes in the frequency of transit, rail and airport services. (b) To the extent, if any, that a transportation facility, service, or improvement concerns the application of a comprehensive plan provision or land use regulation, it may be allowed without further land use review if it is permitted outright or if it is subject to standards that do not require interpretation or the exercise of factual, policy or legal judgment.	(F) Acquisition of right-of-way for public streets, highways, and other transportation improvements designated in the Transportation System Plan (TSP). The Clatsop County Standards Document (2004), a document adopted by ordinance, includes subsections specifically addressing the design of "Land Transportation Systems" in sections on the Columbia River Estuary Shoreland and Aquatic Use and Activity Standards (Section S4.200) and on the Ecola Creek and Necanicum Estuarine Standards (Section S4.260). **Recommendation: Existing code provisions meet this TPR requirement. No further changes to the code are recommended.**
(c) In the event that a transportation facility, service or improvement is determined to have a significant impact on land use or requires interpretation or the exercise of factual, policy or legal judgment, the local government shall provide a review and approval process that is consistent with 660-012-0050. To facilitate implementation of the TSP, each local government shall amend regulations to provide for consolidated review of land use decisions required to permit a transportation project.	LWDUO Section 2.080 (Referral and Review of the Development Permit Applications) allows for the Community Development Director to consolidate action on approvals, "whenever feasible." In terms of coordination with other transportation agencies, Section 2.110 (Mailed Notice of a Public Hearing) and Section 2.115 (Mailed Notice for a Type II Procedure) require that ODOT be notified of hearings and notice of intent to issue a development permit for applications "within 750 feet of a state highway or that in the opinion of the Community Development Director may be found to have a significant impact on State facilities." **Recommendations: Existing code includes some provisions for consolidated review of applications and coordination with agencies like ODOT. It is recommended that these provisions be strengthened by:** ▪ **Requiring that ODOT and applicable transportation facilities and services agencies be invited to participate in the pre-application conferences (Section**

(j) Temporary public road and highway detours that will be abandoned and restored to original condition or use at such time as no longer needed.
(k) Minor betterment of existing public road and highway related facilities such as maintenance yards, weigh stations and rest areas, within right of way existing as of July 1, 1987, and contiguous public-owned property utilized to support the operation and maintenance of public roads and highways.

[5] OAR 660-012-0065 (Transportation Improvements on Rural Lands); *(1) This rule identifies transportation facilities, services and improvements which may be permitted on rural lands consistent with Goals 3, 4, 11, and 14 without a goal exception.*

Table 1: TPR Evaluation of the Clatsop County Land and Water Development and Use Ordinance (LWDUO) and Clatsop County Standards Document

TPR Requirement	Local Development Code References and Recommendations
	2.045); and ■ **Adding explicit references to ODOT and applicable transportation facilities and services agencies in referral and review of development applications (Section 2.080).** **Further, ODOT is requesting that language explicitly allowing the agency to be a signatory on land use applications be integrated into code amendments when amendments are being prepared as part of a TSP or another planning process. A new Section 2.036 on who can initiate development applications can be included in the code after an overview of application review procedure types and before explanations of pre-application conferences and application review details.**
(2) Local governments shall adopt land use or subdivision ordinance regulations, consistent with applicable federal and state requirements, to protect transportation facilities corridors and sites for their identified functions. Such regulations shall include:	
(a) Access control measures, for example, driveway and public road spacing, median control and signal spacing standards, which are consistent with the functional classification of roads and consistent with limiting development on rural lands to rural uses and densities;	Existing code language addresses access in a general manner. ■ Section 6.020 (Access) sets minimum street frontage for lots and allows for variation in the minimum frontage if access "adequate to handle the types and amount of traffic expected for the use" and adequate for emergency service vehicles is provided. ■ Section 5.209 (Exceptions to General Standards for Minor and Major Partitions and Property Line Adjustments) allows for the reduction and/or consolidation of access points if doing so better serves public health, safety, and welfare. ■ Chapter 12.24 addresse5s access permit procedures but does not include access spacing standards. The 2003 TSP does not include access management standards, neither County standards nor references to State standards. Access spacing standards are included in the County Standards Document in Section (S5.033 Access Control Standards). Block standards are established in Section S5.104 (Blocks) in which "no block shall be more than 1,000 feet in length between street corner lines unless it is adjacent to an arterial street or unless the topography or the location of adjoining street justifies an exception. The recommended minimum length of blocks along an arterial street is 1,800 feet." **<u>Recommendation:</u> Existing County standards currently address this TPR requirement. It**

Table 1: TPR Evaluation of the Clatsop County Land and Water Development and Use Ordinance (LWDUO) and Clatsop County Standards Document

TPR Requirement	Local Development Code References and Recommendations
	is recommended that the access spacing standards in the Standards Document be updated as needed through the TSP update process, and that the updated TSP refer to the Standards Document. References to local and State spacing standards may also be included in the TSP.
(b) Standards to protect the future operations of roads, transitways and major transit corridors	The 2003 TSP assesses the future performance of County roads based on mobility standards in the Oregon Highway Plan (Table 3-4). Otherwise, the County code protects transportation facilities through Traffic Impact Study (TIS) requirements and transportation improvement-related criteria associated with plan, zone, and land use regulation amendments. Section 5.350 (Transportation System Impact Review) establishes applicability, study requirements, approval criteria, and conditions of approval provisions for TISs. Section 5.354 (Amendments Affecting the Transportation System) addresses potential significant effects to the transportation system. One significant effect specified is degrading performance below the acceptable standards established in the TSP. **<u>Recommendation:</u> Existing code provisions address this TPR requirement. To ensure consistency between the code and the TSP, include performance standards in the TSP. Consider performance standards beyond typical roadway mobility standards.**
(c) Measures to protect public use airports by controlling land uses within airport noise corridors and imaginary surfaces, and by limiting physical hazards to air navigation;	LWDUO Section 3.920 (Airport Overlay Zone/AO) regulates land uses within airport noise corridors and imaginary surfaces, and by limiting physical hazards to air navigation. **<u>Recommendation:</u> Existing code provisions address this requirement. No changes to the code are recommended.**
(d) A process for coordinated review of future land use decisions affecting transportation facilities, corridors or sites;	See response to -0045(1)(c).
(e) A process to apply conditions to development proposals in order to minimize impacts and protect transportation facilities, corridors or sites;	Conditions of approval are authorized in the code for Type II procedures (Section 2.020.1), Type IIa procedures (Section 2.025.1), Type III procedures (Section 2.030.3), Type IV procedures (Section 2.035.6), subdivision review (Section 5.228.3), and for applications that required a TIS (Section 5.352.5). In addition to Conditional Use procedures (Section 5.000), Planned Development Overlay District development and use standards establish that land may be set aside, improved, conveyed, or dedicated for

Table 1: TPR Evaluation of the Clatsop County Land and Water Development and Use Ordinance (LWDUO) and Clatsop County Standards Document

TPR Requirement	Local Development Code References and Recommendations
	right-of-way, streets, and easements as a condition of planned development approval (Section 4.145.6). **Recommendation: Existing code provisions address this requirement. No changes to the code are recommended.**
(f) Regulations to provide notice to public agencies providing transportation facilities and services, MPOs, and ODOT of: (A) Land use applications that require public hearings; (B) Subdivision and partition applications; (C)Other applications which affect private access to roads; and (D)Other applications within airport noise corridor and imaginary surfaces which affect airport operations.	See response to -0045(1)(c).
(g) Regulations assuring amendments to land use designations, densities, and design standards are consistent with the functions, capacities and performance standards of facilities identified in the TSP.	See response related to traffic impact study requirements, Section -0045(2)(b), and to plan and land use regulation amendments, Section -0060.
(3) Local governments shall adopt land use or subdivision regulations for urban areas and rural communities as set forth below. The purposes of this section are to provide for safe and convenient pedestrian, bicycle and vehicular circulation consistent with access management standards and the function of affected streets, to ensure that new development provides on-site streets and accessways that provide reasonably direct routes for pedestrian and bicycle travel in areas where pedestrian and bicycle travel is likely if connections are provided, and which avoids wherever possible levels of automobile traffic which might interfere with or discourage pedestrian or bicycle travel.	
(a) Bicycle parking facilities as part of new multi-family residential developments of four units or more, new retail, office and institutional developments, and all transit transfer stations and park-and-ride lots.	Section S2.211 (Bicycle Parking Requirements) of the County Standards Document establishes bicycle parking requirements for new multi-family residential developments of four or more units, retail, office, and institutional developments as well as transit transfer and park and ride lots **Recommendation: Existing standards address this TPR requirement. No substantive changes to the code are recommended; however, adding a code reference to the bicycle parking requirements in the Standards Document should be considered.**
(b) On-site facilities shall be provided which accommodate safe and convenient pedestrian and bicycle access from	Section S5.040 (Pedestrian and Bicycle Access and Circulation) in the Standards Document requires all new development, except single-family detached housing, to provide a continuous pathway system "throughout

Table 1: TPR Evaluation of the Clatsop County Land and Water Development and Use Ordinance (LWDUO) and Clatsop County Standards Document

TPR Requirement	Local Development Code References and Recommendations
within new subdivisions, multi-family developments, planned developments, shopping centers, and commercial districts to adjacent residential areas and transit stops, and to neighborhood activity centers within one-half mile of the development. Single-family residential developments shall generally include streets and accessways. Pedestrian circulation through parking lots should generally be provided in the form of accessways. (A) "Neighborhood activity centers" includes, but is not limited to, existing or planned schools, parks, shopping areas, transit stops or employment centers; (B) Bikeways shall be required along arterials and major collectors. sidewalks shall be required along arterials, collectors and most local streets in urban areas except that sidewalks are not required along controlled access roadways, such as freeways; (C) Cul-de-sacs and other dead-end streets may be used as part of a development plan, consistent with the purposes set forth in this section; (D) Local governments shall establish their own standards or criteria for providing streets and accessways consistent with the purposes of this section. Such measures may include but are not limited to: standards for spacing of streets or accessways; and standards for excessive out-of-direction travel; (E) Streets and accessways need not be required where one or more of the following conditions exist: (i) Physical or topographic conditions make a street or accessway connection impracticable. Such conditions include but are not limited to freeways, railroads, steep	the development site, and connect to all future phases of development, adjacent trails, public parks and open space areas whenever possible. The developer may also be required to connect or stub pathway(s) to adjacent streets and private property." The on-site system must provide connections between primary building entrances and parking areas, storage areas, recreational facilities, and common areas (as applicable). ■ Parking lots – Pedestrian accessways through parking lots are not addressed in existing off-street parking regulations. ■ Bikeways and sidewalks – The County Standards Document includes right-of-way and improvement standards in Chapter 6 (Road Standards Specifications for Design and Construction; Table 1). However, sidewalks and bikeways are not specified in these standards. The 2003 TSP shows bike lanes in arterial and collector cross-sections but no sidewalks (Figure 5-4 and 5-5). ■ Cul-de-sacs – Section S5.041.4 in the Standards Document requires that pathways be provided "where cul-de-sacs or dead-end streets are planned, to connect the ends of the streets together, to other streets, and/or to other developments." ■ Street spacing standards – See response related to access standards, Section -0045(2)(a). Also, where block length exceeds those in the Standards Document (Section S5.104), multiuse pathways must be provided at or near mid-block. ■ Exceptions for streets and accessways – Section S5.041.4 in the County Standards Document states that "(s)tairs or switchback paths using a narrower right-of-way/easement may be required in lieu of a multi-use pathway where grades are steep." **Recommendations:** ■ **Add requirements related to pedestrian accessway in parking lots in the Standards Document, Section S2.206 (Off-Street Parking Plan).** ■ **Include definitions for pedestrian and bicycle facilities (e.g., accessway) in the Standards Document, and make definitions consistent between the Standards Document and code.** ■ **Amend Section S5.041.4 of the Standards Document to allow for exceptions to street and accessway requirements under the constraints and conditions**

Table 1: TPR Evaluation of the Clatsop County Land and Water Development and Use Ordinance (LWDUO) and Clatsop County Standards Document

TPR Requirement	Local Development Code References and Recommendations
slopes, wetlands or other bodies of water where a connection could not reasonably be provided; (ii) Buildings or other existing development on adjacent lands physically preclude a connection now or in the future considering the potential for redevelopment; or (iii) Where streets or accessways would violate provisions of leases, easements, covenants, restrictions or other agreements existing as of May 1, 1995, which preclude a required street or accessway connection.	**described in TPR Section -0045(3)(b)(E).**
(c) Off-site road improvements are otherwise required as a condition of development approval, they shall include facilities accommodating convenient pedestrian and bicycle and pedestrian travel, including bicycle ways on arterials and major collectors	See response related to conditions of approval, Section -0045(2)(e).
(e) Internal pedestrian circulation within new office parks and commercial developments shall be provided through clustering of buildings, construction of accessways, walkways and similar techniques.	See response related to accessways, Section -0045(3)(b).
(6) In developing a bicycle and pedestrian circulation plan as required by 660-012-0020(2)(d), local governments shall identify improvements to facilitate bicycle and pedestrian trips to meet local travel needs in developed areas. Appropriate improvements should provide for more direct, convenient and safer bicycle or pedestrian travel within and between residential areas and neighborhood activity centers (i.e., schools, shopping, transit stops). Specific measures include, for example, constructing walkways between cul-de-sacs and adjacent roads, providing walkways between buildings, and providing direct access between adjacent	This TPR requirement is addressed by other TPR requirements. ▪ Walkways between cul-de-sacs and adjacent roads – See response and recommendations related to cul-de-sacs, Section -0045(3)(b). ▪ Walkways between buildings – See response and recommendations related to accessways, Section -0045(3)(b). ▪ Access between adjacent uses – See response and recommendations related to accessways, Section -0045(3)(b).

Table 1: TPR Evaluation of the Clatsop County Land and Water Development and Use Ordinance (LWDUO) and Clatsop County Standards Document

TPR Requirement	Local Development Code References and Recommendations
uses.	
(7) Local governments shall establish standards for local streets and accessways that minimize pavement width and total ROW consistent with the operational needs of the facility. The intent of this requirement is that local governments consider and reduce excessive standards for local streets and accessways in order to reduce the cost of construction, provide for more efficient use of urban land, provide for emergency vehicle access while discouraging inappropriate traffic volumes and speeds, and which accommodate convenient pedestrian and bicycle circulation. Notwithstanding section (1) or (3) of this rule, local street standards adopted to meet this requirement need not be adopted as land use regulations.	County roadway right-of-way and improvement standards are provided in Table 1 in Chapter 6 (Road Standard Specifications for Design and Constructions) of the County Standards Document. They consist of modest pavement widths of 20-32 feet, from driveways/roadways serving partitions (1-10 lots) to arterials. Cross-sections in the 2003 TSP show pavement widths of 22 feet of pavement (plus a 6-foot gravel shoulder) for local streets to 36 feet for collectors and 36-60 feet for two- to four-lane arterials (Figures 5-4 and 5-5). **Recommendations:** ■ **The TSP update process will evaluate the cross-sections established in the 2003 TSP to ensure that right-of-way and pavement dimensions are sufficient to serve the operational needs of each roadway functional classification without requiring excessive paved widths.** ■ **Make the street standards consistent between the TSP and the County Standards Document.**
OAR 660-12-0060	
Amendments to functional plans, acknowledged comprehensive plans, and land use regulations that significantly affect an existing or planned transportation facility shall assure that allowed land uses are consistent with the identified function, capacity, and performance standards of the facility.	LWDUO Section 5.354 (Amendments Affecting the Transportation System) provides guidance for determining significant effects on transportation facilities and actions to take if a significant effect is found, pursuant to Section -0060 of the TPR. **Recommendation: Update Section 5.354 to reflect the most recent changes to TPR Section -0060 and to simplify the reference to Section -0060.**

Section D:

Memorandum 4- Goals, Objectives, and Criteria

MEMORANDUM #4

DATE: April 04, 2014

TO: Clatsop County TSP Project Management Team

FROM: Chris Maciejewski, PE, PTOE - DKS Associates
Kevin Chewuk, PTP - DKS Associates

**SUBJECT: Clatsop County Transportation System Plan
Technical Memorandum #4: Goals, Objectives, and Criteria** P11086-016

The purpose of this memorandum is to facilitate the process of developing the transportation-related vision, goals, and objectives for Clatsop County. This effort will continue throughout the planning process, shaped by input received from the Project Advisory Committee (PAC) and the general public.

A Guiding Framework for Transportation Planning

The process of identifying a vision, goals, and objectives helps describe the transportation system that best fits Clatsop County's values and guides how the Transportation System Plan (TSP) will be developed and implemented. This process typically begins with the development of a **vision statement**. A vision statement generally consists of an imaginative description of the desired condition in the future. It is important that the vision statement align with the community's core values.

Goals and objectives create manageable stepping stones through which the broad vision statement can be achieved. **Goals** are the first step down from the broader vision. They are still somewhat general in nature and should be challenging, but not unreasonable. Each goal must be supported by more finite **objectives**. In contrast to goals, objectives should be specific and measurable. Where feasible, providing a targeted time period helps with objective prioritization and achievement.

The solutions recommended through the TSP must be consistent with the goals and objectives. To accomplish this, measurable evaluation criteria that are based on the goals and objectives will be developed as part of the process to screen and prioritize TSP actions.

The vision, goals, and objectives can be refined continuously throughout the TSP process. Towards the end of the process, when solutions have been identified, **policy** statements to guide future decisions can be developed to help the county implement plan recommendations.

Transportation Vision

All transportation modes flow smoothly and safely to and throughout the county, meeting the needs of residents, businesses, visitors, and people of all physical and financial conditions. Existing transportation assets are protected and complemented with multi-modal improvements. Evacuations and emergency response preceding and following natural disasters are managed effectively.

Transportation Goals and Objectives

Members of the Project Advisory Committee (PAC) for the TSP project discussed the desired Clatsop County transportation system at the first PAC meeting. The following goals and objectives were developed from the input provided.

Goal 1: Provide for efficient motor vehicle travel to and through the county.

Objective 1a: Develop a program to systematically implement improvements that enhance mobility at designated high-priority locations.

Objective 1b: Adopt a standard for mobility to help maintain a minimum level of motor vehicle travel efficiency and by which land use proposals can be evaluated. State and City mobility standards will be supported on facilities under the respective jurisdiction.

Objective 1c: Identify opportunities to reduce the use of state highways for local trips.

Objective 1d: Limit access points on highways and arterials. Support consolidated and shared access points.

Goal 2: Increase the convenience and availability of pedestrian and bicycle modes.

Objective 2a: Identify improvements (e.g., street lighting, bike parking) that complement pedestrian and bicycle facilities such as sidewalks and bike lanes and that encourage more use of these facilities.

Objective 2b: Improve walking and biking connections to county amenities.

Objective 2c: Enhance way finding signage for those walking and biking, directing them to bus stops, and key routes and destinations.

Objective 2d: Promote walking, bicycling, and sharing the road through public information and participation.

Objective 2e: Identify necessary changes to the land development code to ensure connectivity between compatible land uses for pedestrian and bicycle trips.

Goal 3: Provide transit service and amenities that encourage a higher level of ridership.

Objective 3a: Identify locations for designated park-and-ride lots.

Objective 3b: Locate transit stops in locations that are safe and convenient for users.

Objective 3c: Identify areas that support additional transit services, and coordinate with transit providers to improve the coverage, quality and frequency of services

Objective 3d: Identify improvements (e.g., sidewalk and bicycle connections, shelters, benches) that complement transit facilities such as bus stops and that encourage higher usage of transit.

Objective 3e: Coordinate countywide transit services, facilities, and improvements with local jurisdictions.

Goal 4: Provide an equitable, balanced and connected multi-modal transportation system.

Objective 4a: Ensure that the transportation system provides equitable access to underserved and vulnerable populations.

Objective 4b: Identify new or improved transportation connections to enhance system efficiency.

Objective 4c: Ensure that existing and planned pedestrian throughways are clear of obstacles and obstructions (e.g., utility poles).

Objective 4d: Provide connections for all modes that meet applicable county and Americans with Disabilities Act (ADA) standards.

Objective 4e: Provide for multi-modal circulation internally on site and externally to adjacent land use and existing and planned multi-modal facilities.

Objective 4f: Support connectivity between the various communities in the county.

Goal 5: Enhance the health and safety of residents.

Objective 5a: Identify improvements to address high collision locations and improve safety for walking, biking and driving trips in the county.

Objective 5b: Enhance existing highway crossings for walking and biking users.

Objective 5c: Identify deficient locations in the county where enhanced street crossings for walking and biking users are needed.

Objective 5d: Identify investments needed along tsunami evacuation and Seismic Lifeline Routes.

Objective 5e: Improve the visibility of transportation users in constrained areas, such as on hills and blind curves.

Objective 5f: Install amenities at signalized pedestrian crossings to improve safety of underserved and vulnerable populations (e.g., chirpers).

Objective 5g: Identify programs that encourage walking and bicycling, and educate regarding good traffic behavior and consideration for all users.

Goal 6: Foster a sustainable transportation system.

Objective 6a: Develop and support reasonable alternative mobility targets for motor vehicles that align with economic and physical limitations on state highways and County streets where necessary.

Objective 6b: Minimize impacts to the scenic, natural and cultural resources in the county.

Objective 6c: Support alternative vehicle types by identifying potential electric vehicle plug-in stations and developing implementing code provisions.

Objective 6d: Identify areas where alternative land use types would significantly shorten trip lengths or reduce the need for motor vehicle travel within the county.

Objective 6e: Maintain the existing transportation system assets to preserve their intended function and maintain their useful life.

Objective 6f: Identify opportunities to improve travel reliability and safety with system management solutions.

Objective 6g: Identify stable and diverse revenue sources for transportation investments to meet the needs of the county.

Objective 6h: Consider costs and benefits when identifying project solutions and prioritizing public investments.

Objective 6i: Identify new and creative funding sources to leverage high priority transportation projects.

Objective 6j: Utilize transparency when determining transportation system investments.

Goal 7: Ensure the transportation system supports a prosperous and competitive economy.

Objective 7a: Improve the freight system efficiency, access, capacity and reliability.

Objective 7b: Identify transportation improvements that will enhance access to employment.

Objective 7c: Increase the distribution of travel information to maximize the reliability and effectiveness of highways.

Goal 8: Coordinate with local and state agencies and transportation plans.

Objective 8a: Work with the North Coast Regional Solutions Center to promote projects that improve regional linkages.

Objective 8b: Coordinate with the Clatsop County Parks and Recreation Master Plan regarding trail guidelines and connections between parks, recreation areas, and trails.

Objective 8c: Develop TSP policy and municipal code language to implement the TSP update.

Objective 8d: Meet the requirements of the Oregon Transportation Planning Rule.

Objective 8e: Coordinate with the Oregon Transportation Plan and associated modal plans.

Objective 8f: Coordinate regional project development and implementation with local jurisdictions (e.g., evacuation routes, countywide transit, and jurisdictional transfer of roadways).

Objective 8g: Coordinate with local agency Transportation System Plans.

Evaluation Criteria

Project alternatives developed through this update will be evaluated by criteria that are an extension from the goals and objectives. These project level criteria provide a point-based technical rating method that will be used to evaluate how well proposed design alternatives meet the measure of effectiveness criteria. By summing ratings (and weighting if desired), alternatives can be compared. In this way, a consistent method will be used to evaluate and rank the alternatives.

Evaluation Criteria and Scoring Methodology

The evaluation criteria were selected based on the County's proposed transportation related goals and objectives. The criteria focuses on compliance with state and local plans and policies, engineering design requirements, and a desire to maximize positive (and minimize negative) economic, social (livability), and environmental impacts. Table 1 lists the evaluation criteria and the corresponding scoring methodology.

Table 1: Clatsop County TSP Evaluation Criteria and Scoring

Measure of Effectiveness	Evaluation Score	
Goal 1: Provide for efficient motor vehicle travel to and through the county.		
Street Connectivity Connection enhances system efficiency.	+4	Improves system efficiency
	+2	Improves efficiency of a localized area, but has no impact on efficiency of the system
	0	No change
	-2	Improves efficiency of a localized area, but may detract from the efficiency of another location
	-4	Negative impact on system efficiency
Alternative Local Routes Improvement reduces reliance on state highways for shorter local trips.	+4	Significantly reduces reliance on state highways for shorter local trips
	+2	Reduces reliance on state highways for shorter local trips
	0	No change
	-2	Increases reliance on state highways for shorter local trips
	-4	Significantly increases reliance on state highways for shorter local trips
Daily Traffic Capacity Optimize daily traffic capacity.	+4	Significantly optimizes daily traffic capacity
	+2	Optimizes daily traffic capacity
	0	No change
	-2	Reduces daily traffic capacity
	-4	Significantly reduces daily traffic capacity
Goal 2: Increase the convenience and availability of pedestrian and bicycle modes.		
Pedestrian and Bicycle Improvements Adds pedestrian and bicycle improvements that fill in system gaps, improve system connectivity, and are accessible to all users.	+4	Significantly improves pedestrian or bicycle connectivity or accessibility
	+2	Improves pedestrian or bicycle connectivity or accessibility
	0	No change
	-2	Reduces pedestrian or bicycle connectivity or accessibility

Table 1: Clatsop County TSP Evaluation Criteria and Scoring

	-4	Significantly reduces pedestrian or bicycle connectivity or accessibility
Access to Community Destinations Improve walking and biking connections to community destinations such as schools and parks.	+4	Significantly enhances pedestrian or bicycle access to community destinations
	+2	Enhances pedestrian or bicycle access to community destinations
	0	No change
	-2	Reduces pedestrian or bicycle access to community destinations
	-4	Significantly reduces pedestrian or bicycle access to community destinations
Facility Amenities or Furnishings Improves user experience and comfort to encourage higher levels of walking and biking trips (e.g., provide benches, planter strips, lighting, wayfinding)	+4	Significantly improves facility amenities
	+2	Improves facility amenities
	0	No change
	-2	Negatively impacts facility amenities
	-4	Significantly negative impacts on facility amenities
Goal 3: Provide transit service and amenities that encourage a higher level of ridership.		
Transit Access Improves access to transit facilities. Promotes transit as a viable alternative to the single occupant vehicle.	+4	Significantly improves access to transit facilities
	+2	Improves access to transit facilities
	0	No change
	-2	Negatively impacts access to transit facilities
	-4	Significantly negative impacts on access to transit facilities
Transit Amenities or Facilities Improves user experience and comfort to encourage higher levels of transit ridership (e.g., provide benches, shelters, lighting, schedules)	+4	Significantly improves amenities or facilities for transit
	+2	Improves amenities or facilities for transit
	0	No change
	-2	Negative impact on amenities or facilities for transit
	-4	Significantly negative impacts on amenities or facilities for transit
Goal 4: Provide an equitable, balanced and connected multi-modal transportation system.		
Multiple Travel Modes Connection or improvement serves a variety of travel modes.	+4	Serves more than two travel modes
	+2	Serves more than one travel mode
	0	Serves single travel mode
	-2	Serves single travel mode, but has a negative impact on another
	-4	Serves single travel mode, but has negative impact on more than one travel mode
Connected System	+4	Significantly increases access to all areas of the county

Table 1: Clatsop County TSP Evaluation Criteria and Scoring

Improves access to all areas of the county.	+2	Increases access to all areas of the county
	0	No change
	-2	Decreases access to all areas of the county
	-4	Significantly decreases access to all areas of the county
Accommodate all Ages Improves accessibility for all ages and supports travel independence in the county.	+4	Connection or improvement benefits residents of all ages
	+2	Connection or improvement benefits some residents, but not all
	0	No change
	-2	Connection or improvement benefits some residents, but has a negative impact on another age group
	-4	Connection or improvement benefits some residents, but has a negative impact on more than one age group
Goal 5: Enhance the health and safety of residents.		
Safety Improves public safety (e.g., visibility of transportation users in constrained areas, street lighting, emergency vehicle access)	+4	Significantly improves public safety
	+2	Improves public safety
	0	No change
	-2	Has potential for reducing public safety
	-4	Has potential for reducing public safety significantly
Health Encourages active living and physical activity.	+4	Significantly encourages active living and physical activity
	+2	Encourages active living and physical activity
	0	No change
	-2	Discourages active living and physical activity
	-4	Significantly discourages active living and physical activity
Emergency Routes Enhances awareness and reliability of tsunami evacuation and Seismic Lifeline Routes.	+4	Significantly enhances awareness and reliability of tsunami evacuation and Seismic Lifeline Routes
	+2	Enhances awareness and reliability of tsunami evacuation and Seismic Lifeline Routes
	0	No change
	-2	Worsens awareness and reliability of tsunami evacuation and Seismic Lifeline Routes
	-4	Significantly worsens awareness and reliability of tsunami evacuation and Seismic Lifeline Routes
Goal 6: Foster a sustainable transportation system.		
Environment Minimizes impact to the natural environment.	+4	Significantly enhances the natural environment
	+2	Enhances the natural environment
	0	No change

Table 1: Clatsop County TSP Evaluation Criteria and Scoring

	-2	Negatively impacts the natural environment
	-4	Negatively impacts the natural environment in significant ways
Improved Roadway Efficiency Implements Transportation Demand Management (TDM) and Transportation System Management (TSM) or other strategies to create greater mobility, reduce auto trips, make more efficient use of the roadway system, and minimize air pollution.	+4	Significantly improves roadway efficiency
	+2	Improves roadway efficiency
	0	No change
	-2	Negatively impacts roadway efficiency
	-4	Significantly negative impact on roadway efficiency
Goal 7: Ensure the transportation system supports a prosperous and competitive economy.		
Freight Improves freight access/connectivity and accommodates deliveries.	+4	Significantly improves freight facilities
	+2	Improves freight facilities
	0	No change
	-2	Negatively impacts freight facilities
	-4	Significantly negative impacts on freight facilities
Employment Enhances access to employment.	+4	Significantly enhances travel comfort and convenience to employment in the county.
	+2	Enhances travel comfort and convenience to employment in the county.
	0	No change
	-2	Negative impact on travel comfort and convenience to employment in the county.
	-4	Significantly negative impacts on travel comfort and convenience to employment in the county.
Corridor Reliability Implements strategies to provide stable and reliable multimodal operations on US 101 and along corridors connecting to it.	+4	Significantly improves multimodal operational reliability
	+2	Improves multimodal operational reliability
	0	No change
	-2	Negative impact on multimodal operational reliability
	-4	Significantly negative impacts on multimodal operational reliability
Goal 8: Coordinate with local and state agencies and transportation plans.		
No evaluation criteria for Goal 8, this is required for all solutions.		

Section E:

Memorandum 5- Existing Transportation Conditions

Destination 2035

MEMORANDUM #5

REGISTERED PROFESSIONAL ENGINEER
13019
OREGON
JAN. 11, 2005
C. S. MACIEJEWSKI
EXPIRES: 12/31/16

DATE: August 20, 2014

TO: Clatsop County TSP Project Management Team

FROM: Chris Maciejewski, PE, PTOE - DKS Associates
Kevin Chewuk, PTP - DKS Associates
Carl Olson - DKS Associates
Ben Fuller - DKS Associates
Ben Chaney - DKS Associates

SUBJECT: Clatsop County Transportation System Plan
Technical Memorandum #5: Existing Transportation Conditions P11086-016

This memorandum provides a summary of the existing transportation conditions for Clatsop County, providing answers to the following questions:

- What makes Clatsop County unique?
- Where do people want to go?
- How do people get there?
- Where do people come from?
- What factors determine how people travel?
- How is the transportation system managed?
- What is the condition of the existing transportation system?

What Makes Clatsop County Unique?

Bordered by the Columbia River and Pacific Ocean, Clatsop County is home to the historic waterfront town of Astoria and popular beach towns, including Seaside and Cannon Beach. With popular destinations within a two hour drive of the Portland Metropolitan area, Clatsop County is largely a tourism-based county. Visitors are drawn to the county's beaches, hiking and camping, fairgrounds, and more.

Clatsop County is a historical county with Oregon's oldest city (Astoria), Oregon's oldest ocean resort community (Seaside), and one of the oldest aquariums on the West Coast (Seaside Aquarium). Clatsop County is also home to

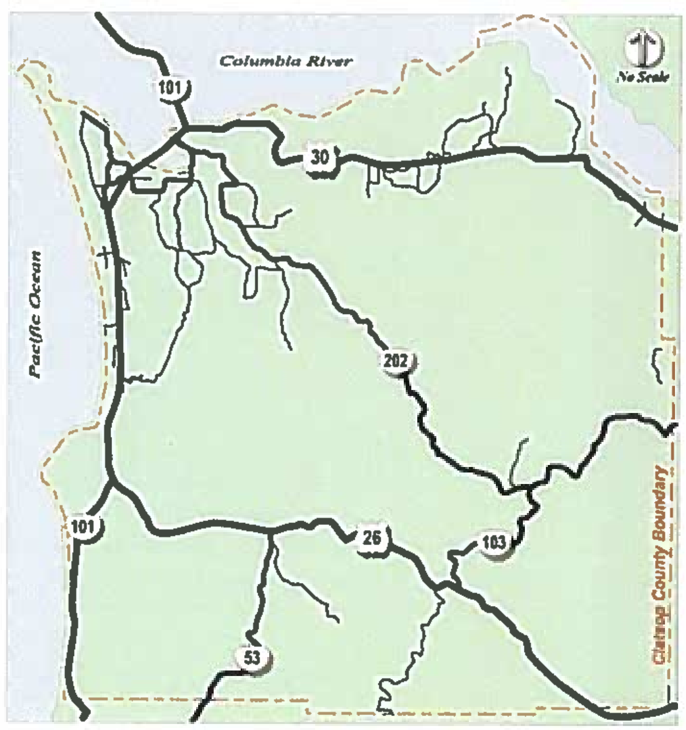


Figure 1: Clatsop County Major Roadways

Fort Stevens, which was the only US continental military installation that was attacked during World War II, and the Westport Ferry, which provides the only crossing opportunity of the Columbia River between Astoria and Longview.

Clatsop County's economy is largely driven by tourism and trade (including timber and fishing). The Port of Astoria was created to support trade and commerce, and now also serves cruise lines that connect to Canada, Seattle, San Francisco, San Diego, and other west coast cities.

Where do People Want to Go?

One of first steps in planning for an effective transportation system is gaining an understanding of the key destinations that people currently travel to throughout the county. These destination points are referred to as activity generators (or trip attractors).

Clatsop County, most known for its coastal attractions, is home to numerous destinations that attract tourists and residents alike. The most common categories of activity generators in the county include (see Figure 2 for the general locations of some of these activity generators):

- Recreational/Entertainment (e.g. Beaches, Clatsop County Fairgrounds, Lewis and Clark National Park, and Saddle Mountain, Fort Stevens, and Ecola State Parks)
- Schools (e.g. Clatsop Community College, Jewell School, Knappa School, Astoria High, Warrenton High)
- Places of employment (e.g. hospitals, business areas, industrial areas, offices)
- Shopping (e.g. Astoria, Seaside, Cannon Beach, Warrenton)
- Cultural (e.g. Fort Clatsop, Astoria Column, Columbia River Maritime Museum)
- Public Transportation (e.g. Westport Ferry, bus stops)

How do People Get There?

Most Clatsop County residents commuted to work between the years of 2008 and 2012 via single occupant motor vehicles (about 72 percent). A notable number of residents carpooled (about twelve percent) to work. Approximately six percent walked, two percent biked, and two percent used public transit.

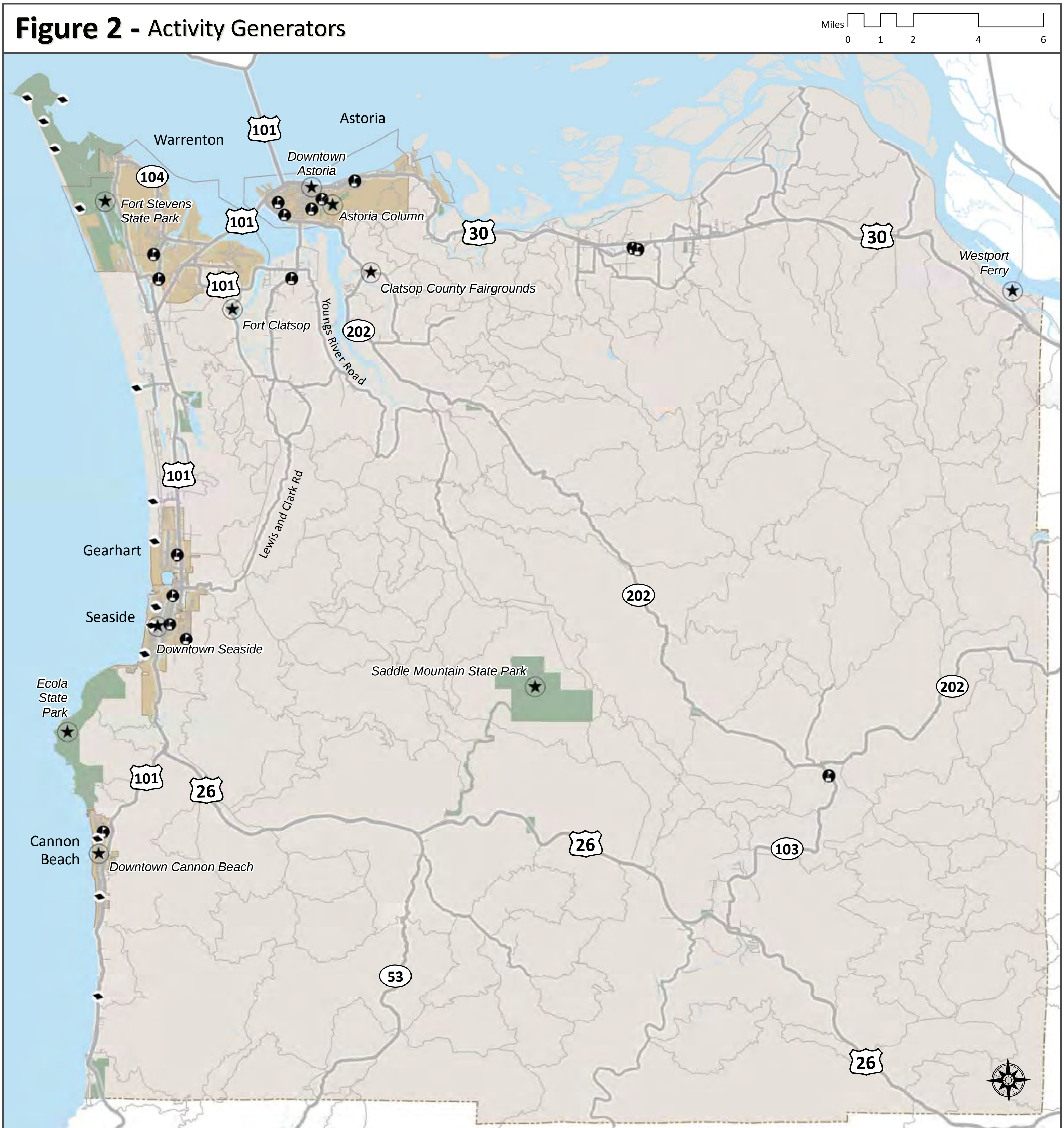
Table 1 compares the commute patterns of Clatsop County residents to other neighboring counties. Biking, public transit, and telecommuting mode shares are similar for each of the counties. About six percent of employees in Clatsop County and Tillamook County walked to work, about four percent more than employees in Columbia County. More residents drove alone in Columbia County and Tillamook County than in Clatsop County (about six to seven percent more).

Table 1: Transportation Modes Used to Commute to Work

Transportation Mode	Percent of Commuters Clatsop County	 Tillamook County	 Columbia County
Workers over 16 years	*16,900*	*10,500*	*20,200*
Motor Vehicle-Single Occupant	72%	78%	79%
Motor Vehicle-Carpool	12%	8%	12%
Walked	6%	6%	2%
Biked / Other	2%	2%	1%
Public Transportation	2%	1%	1%
Worked at Home	6%	5%	5%

Source: US Census Bureau, 2008-2012 American Community Survey

Figure 2 - Activity Generators



Legend

Activity Generators

- Major Beach Access
- Place of Interest
- Public School

- City
- Park
- Clatsop County
- Stream

Although the U.S. Census Bureau is a valuable source of information for work-related commute patterns in Clatsop County, it does not truly represent the transportation modes utilized to other activity generators like schools, recreation, shopping or access to transit. Non-motor vehicle transportation modes are likely higher within the city limits of Cannon Beach, Seaside, Astoria and Warrenton.

How Transportation Modes are used in the County

Detailed traffic counts of pedestrian, bicycle, and motor vehicle activity at key intersections throughout Clatsop County were recorded during the late afternoon and evening peak period (3:00 p.m. to 6:00 p.m.) in late September. Analysis of seasonal trends using data from always-on automated traffic recorders shows that activity levels in early June or late August generally represent typical average weekday traffic conditions in the county (see Figure 3). During the summer, traffic volumes increase as much as 25 percent on major highways throughout the county. This summer increase is due to the overall pleasant weather and longer days enticing residents and visitors of Clatsop County to get out and travel to various activity generators throughout the county. It should be noted that although weekend pedestrian and bicycle activity levels were not measured, they would generally be expected to be higher than the activity levels of a typical weekday in Clatsop County.

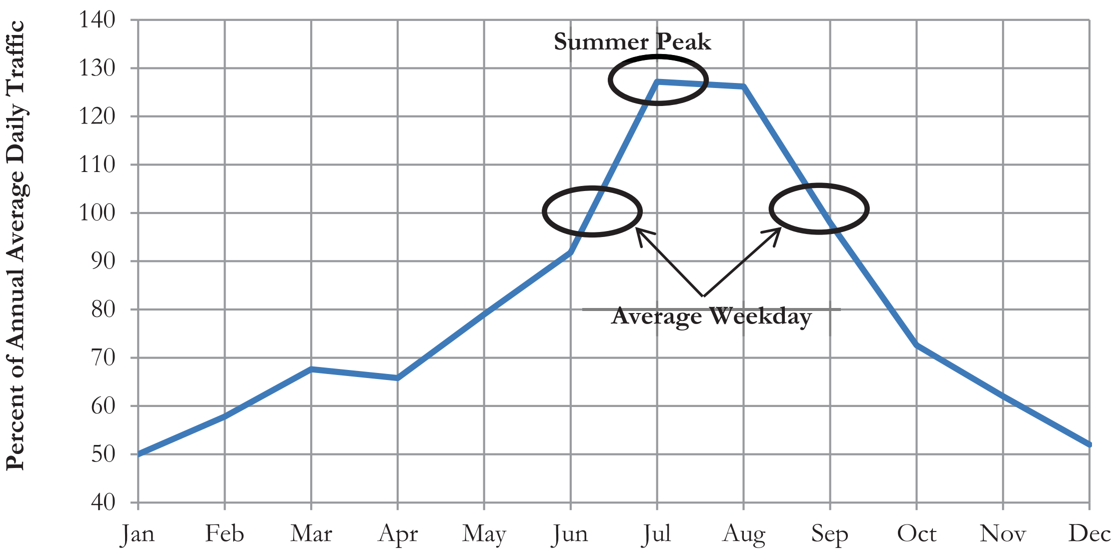


Figure 3: Typical Traffic Volume Profile for Highways in Clatsop County

- **Pedestrian volumes** are generally higher within the downtown cores of the major cities in Clatsop County (e.g., Astoria, Seaside, Cannon Beach, Warrenton). Outside of these downtown cores, pedestrian volumes are relatively low. The highest observed pedestrian activity occurred at the Fort Stevens Highway/Warrenton-Astoria Highway/NE Skipanon Drive intersection in Warrenton, with 43 pedestrian crossings in a three hour period. Noticeable pedestrian activity also occurred at the Fort Stevens Highway/Fort Stevens Highway Spur intersection near the Warrenton High School, with 22 pedestrian crossings in a three hour period. During this three hour evening peak observation period, there was no pedestrian activity at 16 of the 28 study intersections. Pedestrian activity levels are displayed in Figure A1 in the appendix.

- **Bicycle volumes** observed were also generally low during the evening peak period, with 12 of the 28 intersections having no bicycle activity. The Fort Stevens Highway/Warrenton-Astoria Highway/NE Skipanon Drive intersection in Warrenton had the highest observed bicycle volumes, with eight bicyclists in the three hour evening peak period. The observed bicycle activity levels at reviewed intersections during the evening peak period are displayed in Figure A1 in the appendix.
- **Motor vehicle volumes** on the roadways in Clatsop County peak during the evening around 4:30 p.m., but generally vary depending on the time of year. During the summer months, traffic volumes increase due to an influx of visitors. For this reason, the traffic count data was adjusted to represent two separate conditions: summer and average weekday. The final p.m. peak summer and average weekday traffic volumes developed for the study intersections are displayed in Figure A2 in the appendix.

  Study intersections with the greatest summer motor vehicle volumes are along US 101, with 2535 total entering vehicles in the p.m. peak hour at the US 101/E Harbor Street intersection in Warrenton. Other intersections with substantial p.m. peak hour volumes include the US 101/Marlin Drive, US 101/Fort Stevens Highway, and US 101/Sunset Beach Lane intersections.

Where do People Come From?

Most of the trip destinations in Clatsop County are related to employment and tourism. These trips either originate within the county or enter from the various regional facilities connecting Clatsop County to adjacent counties.

Clatsop County Employees

The majority of the workers in Clatsop County also live within the county (about 87 percent). However, just under half of the workers live outside their city of employment (about 45 percent)—the commute mode for these employees is often dependent on the regional transportation system.[1]

Throughout Clatsop County, approximately seventy percent of the commuters travel to work via single occupant motor vehicle (see Table 2). Carpooling has a much higher mode share in northwest and southwest Clatsop County than in east Clatsop County (thirteen percent versus eight percent). The greatest percent of residents walking or taking transit to their place of employment occurs in eastern Clatsop County (17 percent of residents). Biking accounts for about two percent of commuting throughout the county.

[1] US Census Bureau, Census Transportation Planning Product. Based on American Community Survey 2006-2010 five-year estimates.

Table 2: Work Commute Mode by Area of Clatsop County

Transportation Mode	Northwest Clatsop (1)	Southwest Clatsop (2)	East Clatsop (3)
Motor Vehicle- Single Occupant	72%	72%	66%
Motor Vehicle- Carpool	13%	13%	8%
Walked	6%	3%	14%
Biked / Other	2%	2%	2%
Public Transportation	2%	1%	3%
Worked at Home	5%	9%	7%

Source: US Census Bureau, 2008-2012 American Community Survey
1. Includes Astoria, Warrenton and Seaside
2. Includes Cannon Beach and Arch Cape
3. Includes Jewell and Westport

Clatsop County Tourism

With several major coastal destination communities and recreational areas located within a short drive of the Portland metropolitan region, Clatsop County attracts a significant amount of tourism. Visitors primarily enter the county via US 26, US 30, and US 101 and often stay for extended periods. Washington State residents also visit via the Astoria-Megler Bridge, often to enjoy shopping within the county. Tourists primarily travel to Clatsop County via motor vehicle. However, once within the downtown cores of the major cities, walking and biking is typically a popular choice for visitors traveling between major destinations.

What Factors Affect how People Travel?

Travelers are often influenced by a number of factors when deciding how to get to a destination. Whether the trip will be via motor vehicle, walking, bicycle, or public transportation, the choice is often a balance between cost, time, and convenience of travel.

Where are you going? Whether you are going to work, school, shopping, or to a park, your trip type often determines your mode of transportation. Those destined for a park or school generally have a higher likelihood to walk or bicycle than those going to work or shopping. The distance of that destination plays a role in mode choice. Trips that are shorter generally present a better opportunity to walk or bicycle; longer distance trips more often require transit or motor vehicle modes.

Will you have to cross a busy road or walk along a road without sidewalks? The availability of sidewalks, curb ramps to provide wheelchair access, crosswalks, and bicycle lanes increases the comfort and access of walking and biking. A lack of these facilities, particularly on higher volume or higher speed roadways, discourages people from utilizing non-motor vehicle modes of transportation.

Where you work and how long it takes you to get there. Most Clatsop County residents (about 55 percent) who have jobs work within their respective cities. Around eight percent of Clatsop County residents work outside the county.[2] On average, Clatsop County residents travel about 20 minutes to work and typically commute via motor vehicle.[3]

What public transportation service is available? Distance to bus stops, frequency of service, route coverage, connections to other transportation options, and amenities at stops are some of the factors that play a role in a user's decision to utilize public transportation.

Age and income. Demographic characteristics such as age and income play a key role in determining mode of transportation. Clatsop County residents with lower incomes, as well as the youngest and oldest residents, often account for more trips via walking, biking, and public transportation. As seen in Table 3, school-age children and residents over 65 make up about 40 percent of the population in the county. Seaside has the highest median household income of any of the cities within Clatsop County (around $43,000), which is up to 20 percent higher than other cities within Clatsop County. The highest median income in Clatsop County is found in areas outside and adjacent to the cities.

Table 3: Key Demographics in Clatsop County

	Astoria	Cannon Beach	Seaside	Warrenton	Clatsop County
Age (By Percent of Residents)					
Under 18	21%	18%	21%	28%	21%
18 to 64	63%	56%	60%	60%	62%
Over 65	16%	26%	19%	12%	17%
Median Household Income	$40,600	$39,600	$43,100	$35,300	$44,300

Source: US Census Bureau, 2008-2012 American Community Survey

Is it cold or raining? Weather plays a role in determining how trips are made. Clatsop County experiences cool, rainy winters, with mild and generally dry summers. According to the national weather service, average temperatures in the winter months (November to March) are around 45 degrees Fahrenheit, with measurable rainfall occurring about 20 days each winter month. The spring and fall months (April, May, and October) are slightly warmer and dryer, with average temperatures around 50 degrees Fahrenheit, and about 15 days of measurable rainfall. The summer months (June to September) are typically very pleasant, with average temperatures around 60 degrees Fahrenheit, with less than 10 days of measurable rainfall each month.[4] Cold, rainy weather generally discourages walking and biking trips, often forcing users to make a trip via motor vehicle when they would otherwise walk or bike.

[2] US Census Bureau, Census Transportation Planning Product. Based on American Community Survey 2006-2010 five-year estimates.
[3] US Census Bureau, 2008-2012 American Community Survey
[4] Climate Summary for Astoria, National Weather Service

Are you able to walk or bike on a steep hill? Sloping and hilly topography can be a deterrent to walking and bicycling. While there are some significantly sloping streets (e.g., in Astoria), this is typically not an issue in Clatsop County as the majority of urban roadways are relatively flat.

How is the Transportation System Managed?

A variety of measures are used to assess the condition and performance of Clatsop County's transportation system. These measures help to ensure acceptable quality of the transportation system for its residents, and visitors. These measures include:

Transportation Infrastructure Inventory: The TSP reviews existing transportation facilities, with a focus on gaps and deficiencies in the pedestrian, bicycle, transit, and roadway systems.

Roadway Jurisdiction: In Clatsop County, roadways are under the jurisdiction of ODOT, Clatsop County, and the various cities within the county. Each responsible jurisdiction sets standards for its roadways based on intended use (known as functional classification).

Intersection Mobility Targets: The TSP compares intersections in Clatsop County to mobility targets intended to maintain a minimum level of efficiency for motor vehicle travel. Intersection operations in Clatsop County are monitored through volume-to-capacity (v/c) ratios.

- **Volume-to-capacity (v/c) ratio:** A decimal representation (between 0.00 and 1.00) of the proportion of capacity that is being used (i.e., the saturation). It is determined by dividing the peak hour traffic volume by the hourly capacity of a given turn movement, approach leg, or intersection. A lower ratio indicates smooth operations and minimal delays. As the ratio approaches 1.00, congestion increases and performance is reduced. At 1.00, capacity has been reached and the turn movement, approach leg, or intersection is oversaturated—this results in excessive queues and long delays. ODOT's Oregon Highway Plan (OHP) mobility targets for intersections along state facilities are based on v/c ratios.

Intersection mobility targets vary by jurisdiction of the roadways. All intersections under state jurisdiction in Clatsop County must comply with the v/c ratios in the Oregon Highway Plan (OHP). The ODOT v/c targets are based on highway classification and posted speed. Clatsop County does not have adopted mobility targets for intersections under their jurisdiction. The 2003 Clatsop County TSP applied the ODOT mobility target for District/Local Interest Roads to intersections under county jurisdiction and therefore will be considered as the county standard for the Clatsop County TSP update.

Access Spacing: Proper access spacing balances efficient, safe, and timely travel with access to individual destinations. Proper spacing between accesses (driveways and streets) can reduce congestion, collision rates, and the need for additional roadway capacity.

ODOT access spacing standards for driveways and approaches to state highways are based on state highway classification and vary with posted speed (see Table 4). Generally, the faster the speed limit, the greater the minimum required distance between accesses.

Table 4: Highway Access Spacing Standards

Highway	Posted Speed Limit	Minimum Intersection Spacing
US 101 (Oregon Coast Highway)	30 to 55 mph	250 to 1,320 feet
US 101B (Warrenton-Astoria Highway)	25 to 55 mph	150 to 700 feet
US 26 (Sunset Highway)	55 mph	1,320 feet
US 30 (Lower Columbia River Highway)	25 to 55 mph	350 to 1,320 feet
OR 53 (Necanicum Highway)	55 mph	650 feet
OR 103 (Fishhawk Falls Highway)	55 mph	650 feet
OR 104 (Fort Stevens Highway)	25 to 45 mph	150 to 500 feet
OR 104S (Fort Stevens Spur Highway)	35 to 45 mph	250 to 360 feet
OR 202 (Nehalem Highway)	35 to 55 mph	250 to 1,320 feet

Source: 1999 Oregon Highway Plan, Appendix C Revisions to Address Senate Bill 264

Clatsop County does not identify minimum intersection spacing standards for driveways or public roadways under their jurisdiction. Access spacing will be reviewed along county roadways to provide a baseline to develop standards for County facilities as part of the TSP Update.

Collision Evaluation: Collision data is useful in monitoring the safety of the roadways and intersections in the county. Study intersection evaluation and network screening techniques help to identify locations with potential safety problems. High crash rates, fatal or severe injuries, and crashes involving pedestrians and bicyclists are all indicators of dangerous roadways. Analysis of the collision data can identify patterns in the collisions and suggest possible countermeasures and safety improvements.

Seismic Lifeline Routes: Oregon Highway Plan (OHP) Goal 1, Policy 1E designates routes for emergency response in the event of an earthquake and are categorized by the following priorities:

- **Priority 1 Lifeline Routes** are considered essential for emergency response within the first 72 hours after an incident and include: US 30/Old US 30 (Astoria to Knappa), and US 101 (Warrenton to Arch Cape), OR 104S, NW Ridge Road (access to Hammond), and NE Airport Lane (access to Port of Astoria Airport).

- **Priority 2 Lifeline Routes** are considered desirable for emergency response within the first 72 hours after an incidence and include: US 30 (east of Knappa) and US 26 (west of OR 103).
- **Priority 3 Lifeline Routes** are routes that serve relatively few people but are still important because they are the only access. There are no Priority 3 Lifeline Routes in Clatsop County.

Priority Lifelines routes in Clatsop County are shown in Figure A5 in the appendix. ODOT is currently in the process of updating the list of designated routes, which would change the existing priority levels of lifeline routes in Clatsop County.[5] US 30 is proposed as Tier 1, US 26 and US 101 south of US 26 would be classified Tier 2, and US 101 from Warrenton to US 26 would be Tier 3. These draft designations are subject to change and have not been adopted yet by the Oregon Transportation Commission.

Tsunami Evacuation Routes: The Oregon Department of Geology and Mineral Industries has developed tsunami evacuation plans for several developed coastal communities including: Arch Cape, Astoria, Cannon Beach, Seaside and Gearhart, Sunset Beach and Del Rey Beach, Warrenton, and Youngs River Valley. These plans detail evacuation routes, evacuations sites, shelters, and evacuation areas (see the appendix). Evacuation signs have been installed along roadways to indicate the direction inland or to higher ground.

What is the Condition of the Existing Transportation System?

The measures described in the previous section were used to assess the existing transportation system. Findings are summarized in this section.

Pedestrian System

Walking plays a key role for the county's urban transportation network. Planning for pedestrians not only helps to provide a complete, multi-modal transportation system, it supports healthy lifestyles and ensures that the young, the elderly, and those not financially able to afford motorized transport have access to goods, services, employment, and education. It is important to ensure that county and state facilities within city limits provide pedestrian facilities to support the city's pedestrian network. Outside of the city limits, it is still important that collector and arterial roadways provide ample space for pedestrian travel (e.g., a shoulder area) to separate those walking from motor vehicles along these higher volume and speed facilities.

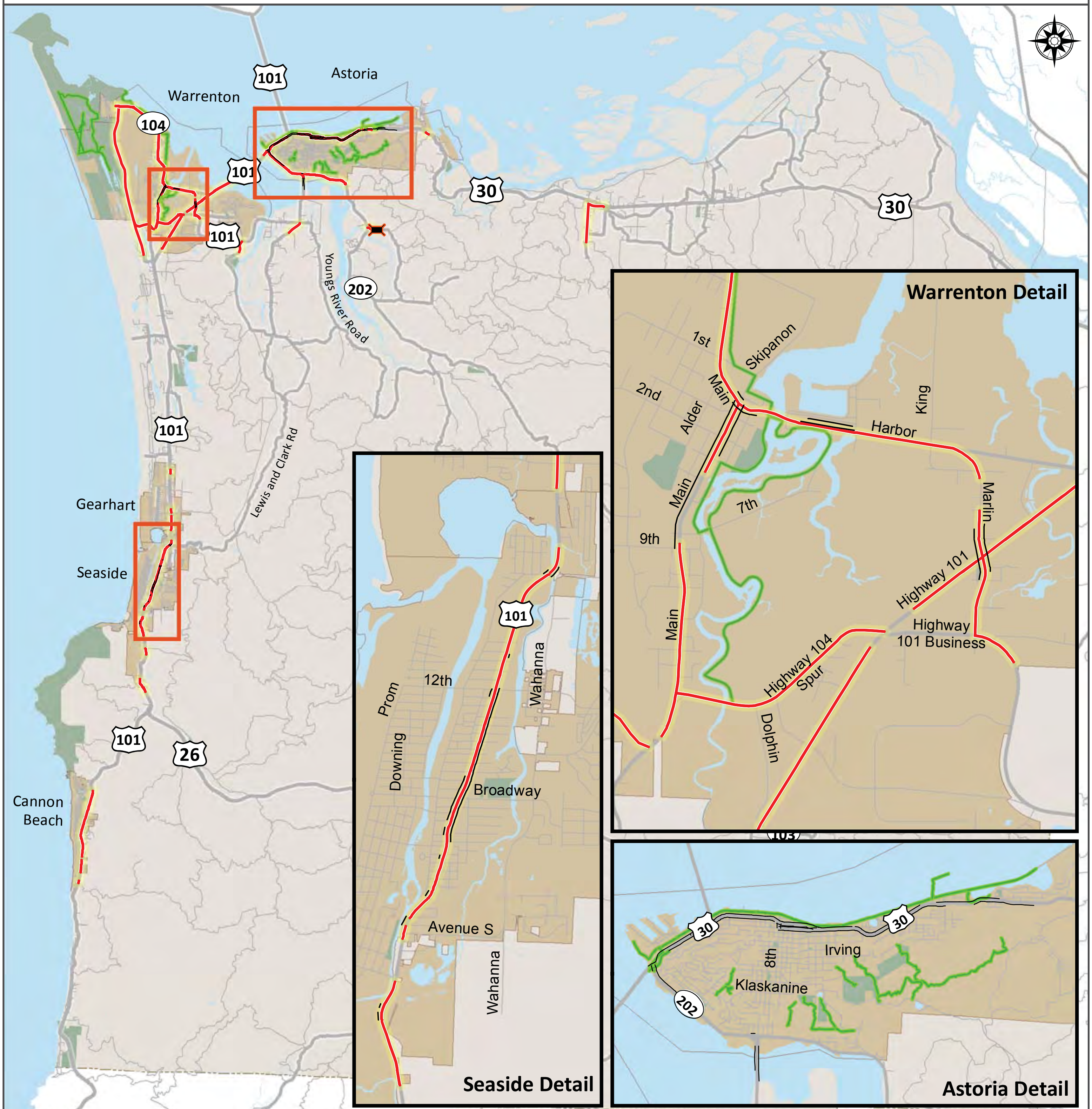
Existing Pedestrian Infrastructure

County and state pedestrian facilities along arterials and collectors, shown in Figure 4, include sidewalks, shared use paths, and roadway shoulders.

[5] Oregon Highways Seismic Options Report: June 2012, ODOT.

Destination 2035

Figure 4 - Existing Pedestrian and Bicycle Facilities



Legend

Pedestrian Facilities

- Sidewalk
- Shared Use Path
- Pedestrian Bridge
- Bicycle Lane
- City
- Park
- Clatsop County
- Water

Sidewalks are located along roadways, are often separated from the roadway with a curb and/or planting strip, and have a hard, smooth surface, such as concrete. The Oregon Department of Transportation (ODOT) standard for sidewalk width is six feet for arterial and collector roadways. Sidewalks are typically appropriate within city limits. Sidewalks are present on state and county roadways in Seaside, Warrenton, and Astoria.

Shared use paths serve a variety of non-motorized travelers, including pedestrians, bicyclists, skateboarders, and runners. Shared use paths are typically paved (asphalt or concrete), but may also consist of an unpaved smooth surface as long as it meets Americans with Disabilities Act (ADA) standards. Shared use paths are usually wider (e.g., 10 – 14 feet) than an average six-foot sidewalk. A short shared use path segment exists in Astoria along US 101 near the OR 202 intersection.

Roadway shoulders serve as pedestrian routes in rural communities. On roadways within city limits with slow speeds and low traffic volumes (i.e., less than 3,000 vehicles per day) or on roadways outside of city limits, shoulders may be adequate for pedestrian travel. These shoulders must be wide enough so that both pedestrians and bicyclists can use them, usually six feet or wider.

Deficiencies in the Pedestrian System

The presence of adequate pedestrian facilities along major streets (arterial and collectors) in Clatsop County is limited. Deficient pedestrian systems may discourage walking in developed communities, and presents a safety concern in rural areas.

Sidewalk gaps along state highways in Astoria, Seaside, and Warrenton: State highways act as the transportation backbone for walking in urban areas of the county, especially in Astoria, Seaside and Warrenton. The disconnected and sometimes absent sidewalk system along the highways in these cities creates a major pedestrian barrier.

Inadequate shoulders along rural sections of state and county facilities: Outside of city limits, roadway shoulders are typically adequate as a pedestrian facility. However, many of the state and county roadway shoulders in Clatsop County are too narrow to be safe for pedestrian travel. This is an especially dangerous situation on high speed or limited visibility roadways.

Bicycle System

The bicycle system provides a non-motorized travel option for trips that are longer than a comfortable walking distance. A well-developed bicycle system promotes a healthy and active lifestyle for its residents, and visitors. Recreational bicyclists can be found touring regional highways in Clatsop County, especially along coastal routes.

Existing Bicycle Infrastructure

Clatsop County's bicycling network, also shown in Figure 4, consists of bike lanes, shared use paths, and roadway shoulders.

Bike lanes are portions of the roadway designated specifically for bicycle travel via a striped lane and pavement stencils. ODOT standard width of a bicycle lane is six feet. The minimum width of a bicycle lane against a curb or adjacent to a parking lane is five feet. A bicycle lane may be as narrow as four feet, but only in very constrained situations. Bike lanes are most appropriate in developed communities where separation of motor vehicle, bicycle, and pedestrian modes is essential, but are also desired in rural areas where higher travel speeds may warrant separated facilities. Existing bike lanes can be found throughout Warrenton, along US 101 in Cannon Beach, Seaside, and Gearhart, along US 30 and US 101 Business in Astoria and along other short segments of roadways throughout the county.

Shared use paths serve a variety of non-motorized travelers, including pedestrians, bicyclists, skateboarders, and runners. Shared use paths are typically paved (asphalt or concrete), but may also consist of an unpaved smooth surface as long as it meets Americans with Disabilities Act (ADA) standards. Shared use paths are usually wider (e.g., 10 – 14 feet) than an average six-foot sidewalk. A short shared use path segment exists in Astoria along US 101 near the OR 202 intersection.

Shoulder bikeways are paved roadways that have striped shoulders wide enough for bicycle travel. ODOT recommends a six-foot paved shoulder to adequately provide for bicyclists, and a four-foot minimum width in constrained areas. Shoulder bikeways can be signed to alert motorists to expect bicycle travel along the roadway. Shoulder bikeways are typically adequate for bicycle travel along rural state and county facilities.

Deficiencies in the Bicycle System

Clatsop County's bicycle system has several deficiencies that may discourage potential users.

Bike lane gaps along state highways in Astoria, Seaside, and Warrenton: While bike lanes are available along most state highways within incorporated cities in Clatsop County, there are several gaps within the network.

Inadequate shoulders along rural sections of state and county facilities: Outside city limits, roadway shoulders provide separated travel for bicyclists from the motor vehicle travel way. Many of the state and county rural roadways, however, do not provide standard shoulder widths for bicycle travel.

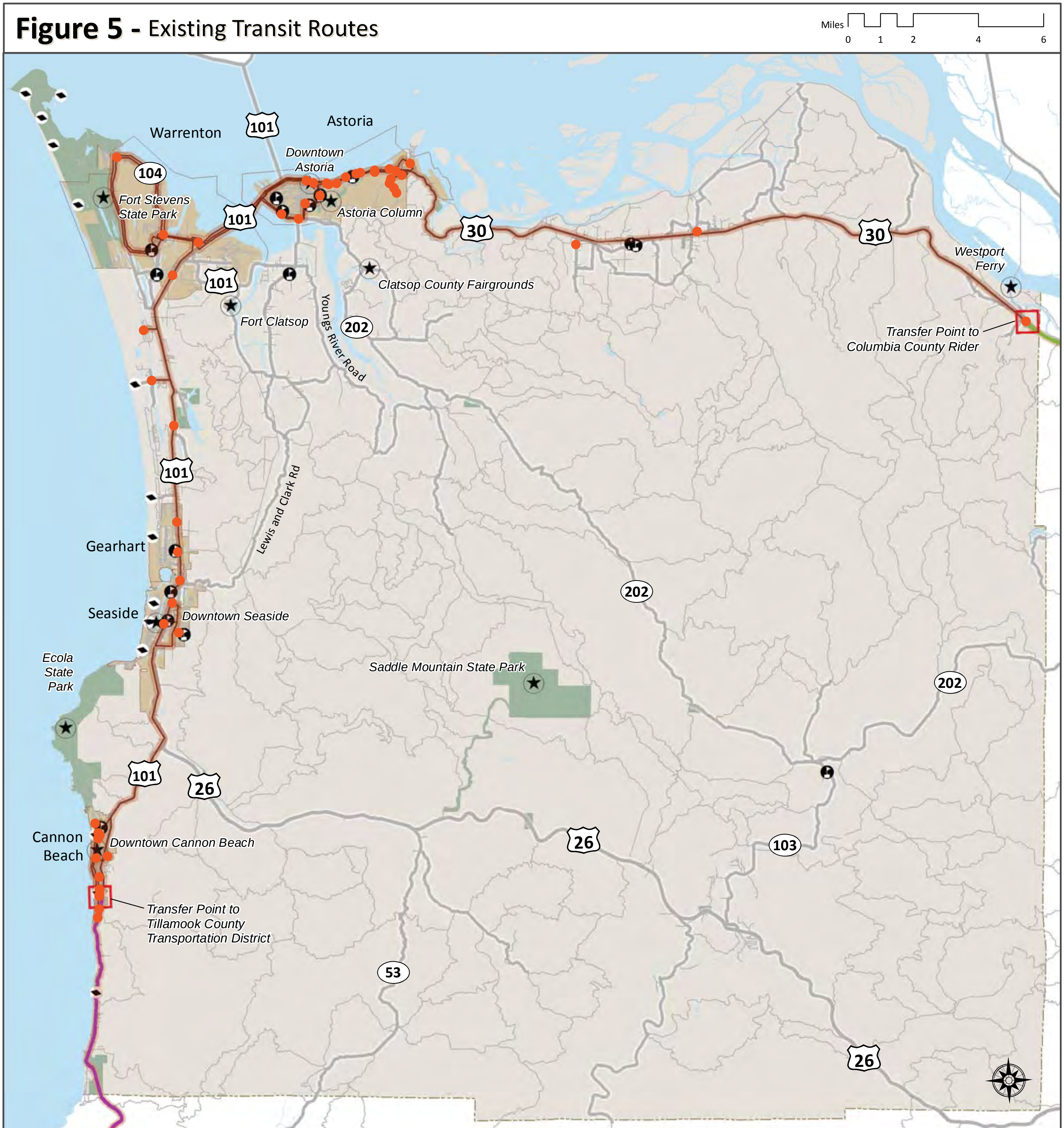
Transit System

Sunset Transit Services (STS) provides transit service in Clatsop County, known as The Bus, connecting Cannon Beach, Seaside, Warrenton, Astoria, Svensen, Knappa, Westport, Clatskanie, and Kelso. There are four routes that operate Monday through Friday from approximately 6:00 a.m. to 8:00 p.m. Three routes provide service on Saturday and Sunday, running from approximately 8:30 a.m. to 6:30 p.m. Figure 5 shows the fixed transit routes in Clatsop County. As shown in Table 5, headways between buses vary between one hour and five hours. All STS buses are wheelchair accessible.

Table 5 Sunset Transit Services Operating Summary

Route	Connections	Days of Operations	Hours of Operation	Approximate Headways
Connector Columbia: Gold River	Warrenton to Kelso, WA	Saturday to Sunday	9:00 a.m. to 6:30 p.m.	5 Hours
Connector Pacific: Orange Sunset	Astoria to Manzanita	Saturday to Sunday	9:00 a.m. to 5:30 p.m.	3 Hours
Route 10: Red Cedar Route	Astoria to Warrenton	Monday to Friday	5:45 a.m. to 7:30 p.m.	1 Hour
Route 20: Gray Sea Gull	Cannon Beach to Seaside	Monday to Friday	7:00 a.m. to 7:00 p.m.	1 Hour
Route 21: Blue Star Fish	Cannon Beach to Seaside	Saturday to Sunday	9:00 a.m. to 6:30 p.m.	1 Hour
Route 30: Yellow Sun Route	Warrenton to Kelso, WA	Monday to Friday	6:15 a.m. to 7:00 p.m.	5 Hours
Route 101: Pink Salmon	Astoria to Cannon Beach	Monday to Friday	6:00 a.m. to 8:00 p.m.	2 Hours

Figure 5 - Existing Transit Routes



Legend

Transit Facilities

- Sunset Transportation Services (STS) Route
- STS Stop
- Columbia County Rider Route
- TCTD Route
- Transfer Point

Activity Generators

- Major Beach Access
- Place of Interest
- Public School
- City
- Park
- Clatsop County
- Stream

ADA Paratransit Service is provided by STS for persons with disabilities who are unable to use regular fixed route buses. This Americans with Disabilities Act (ADA) paratransit service is a curb-to-curb service through wheelchair lift equipped mini-buses.

NorthWest Point is a privately operated service that provides a connection from the Astoria Transit Center to the Portland Amtrak and Greyhound stops. Service is provided between 8:30 a.m. and 8:30 p.m. with a morning and evening route. Buses are equipped with free Wi-Fi.

Pacific Transit System is Pacific County's regional transit system, and connects to the STS system at the Astoria Transit Center.

Tillamook County Transportation District provides regional transit service in Tillamook County, known as Ride the Wave, and connects to the STS system at Cannon Beach.

Columbia County Rider (CC Rider) is a Columbia County regional transit service that connects to the STS system at Westport.

North by Northwest Connector is a regional transit partnership that coordinates services and marketing for five transit agencies in northwest Oregon: Lincoln County Transit, CC Rider, STS, The Wave, and Benton County Rural Transportation. When combined, the regional transit system connects destinations such as Portland Union Station, US 101 from Astoria to Newport, and Albany Multimodal Transportation Center. The goal of North by Northwest Connector is to enhance livability and economic vitality through the implementation of regional transit strategies. Transit passes purchased from North by Northwest Connector are valid on all partnering agency routes to provide convenient access to the regional transit system.

Deficiencies in the Transit System

There are several deficiencies in Clatsop County's transit system that may limit transit use.

Transit Coverage: The existing transit routes serve the coastal communities, which make up most of the county's population. However, inland residents, such as those in Jewell, do not have feasible transit options. Fixed route service for inland residents may not be a cost effective measure.

Transit Access: Transit access should be a comfortable experience for passengers and those considering riding transit. Several streets adjacent to existing transit stops lack sidewalk coverage and safe crossing opportunities. This can create uncomfortable conditions for transit passengers seeking to access their bus stop or final destination. It is also a deterrent for some potential transit users, including elderly users and persons with disabilities.

Transit Operations: The hours of operation should be convenient to encourage transit ridership. As shown in Table 5, service is infrequent through the county with one to five hour waits between buses. While transit service is provided every day and serves the typical business hour employee, the existing hours of service is not convenient for those making trips outside of typical business hours.

Transit Amenities: Attractive stops with clear signage, user information and amenities help promote transit as an easy, comfortable way to get around. Transit stops with distinctive signage and amenities are lacking in Clatsop County's transit system. While some stops may provide shelter, seating, signage, route information, and trash receptacles, others only provide a sign designating the stop location. Bus stops can at times be difficult to find, which may discourage ridership. It is also important to provide route information at stops to help riders navigate the system.

Roadway System

The major transportation routes through the county include US 26, US 30, and US 101. US 26 and US 30 run east-to-west, connecting the county to the Portland metropolitan area. US 101 parallels the coast running north-to-south, providing a connection between US 30 and US 26. Most county roads provide direct connections to these highways.

Functional Classification and Designations

To manage the roadway network, the county classified the roadways based on a hierarchy according to the intended purpose of each road (as shown in Figure 6). From highest to lowest intended usage, the classifications are arterial, collector, and local roadways. Roadways intended for high usage generally provide more efficient traffic movement (or mobility) through the county; roadways that primarily provide access to local destinations, such as businesses or residences, have lower usage.

- **Arterials** are intended to act as a corridor connecting many parts of the county and serve traffic traveling to and from state highways. These roadways provide greater accessibility, often connecting to major activity generators and provide efficient through movement for local traffic. In Clatsop County, Lewis and Clark Road (from US 101B to Logan Road and from the Seaside city limits to Wahanna Road) and Wahanna Road (from Lewis and Clark Road to 12th Street) are classified as Arterials.
- **Collectors** often connect the neighborhoods to arterial roadways. These roadways serve as major neighborhood routes and generally provide more direct property access or driveways than arterial roadways.
- **Local Roadways** provide more direct access to residences without serving through travel in Clatsop County. These roadways are often lined with residences and are designed to serve lower volumes of traffic with a statutory speed limit of 25 miles per hour.

ODOT classifies roadways in Clatsop County under its jurisdiction as well, which includes principal arterials and rural major collectors/urban collectors (see Figure 6).

Access Spacing

An access inventory was conducted along state highways in Clatsop County, comparing the number of existing driveways to the applicable ODOT access spacing standards (previously documented in Table 4). The purpose of this inventory is to document deficient locations so when a property develops or redevelops, alternative access options will be explored. It is important to note that this process will not recommend closure of existing access locations in deficient areas.

Table 6 documents the segments of highways that fail to meet ODOT access spacing standards. As shown, significant highway segments that do not meet access spacing standards include: most of US 101 from Warrenton through Seaside, US 101B between the Lewis and Clark River Bridge and the Old Youngs Bay Bridge, US 26 from US 101 to OR 53, US 30 between Astoria and Knappa, most of OR 104, OR 104S, and much of OR 202 south of Astoria.

Table 6: Summary of State Highway Segments that do not meet ODOT Access Spacing Standards

Roadway Segment	Allowed Number of Accesses	Number of Accesses on Critical Side of the Highway
US 101 (Oregon Coast Highway)		
OR 104 to Gearhart	33	114
Through Gearhart	8	41
Through Seaside	32	118
Seaside to US 26	14	20
Carnahan Road to E Shingle Mill Lane	14	17
US 101B (Warrenton-Astoria Highway)		
Old Youngs Bay Bridge to Lewis and Clark Bridge	25	46
US 101 to OR 104	21	32
US 26 (Sunset Highway)		
US 101 to OR 53	36	73
US 30 (Lower Columbia River Highway)		
Valley Creek Lane to Abbot Road	2	5
Twilight Creek Road to Maritime Road	15	42
OR 53 (Necanicum Highway)		
US 26 to Hamlet Road	6	9
OR 104 (Fort Stevens Highway)		
US 101 to Whiskey Road (South)	9	18
Whiskey Road (North) to Lake Drive	98	180
OR 104S (Fort Stevens Spur Highway)		
US 101 to OR 104	13	20
OR 202 (Nehalem Highway)		
Dyblie Lane to MP 3.2	5	11
Walluski Loop (North) to Youngs River Road	42	64

Note: Segment groups are composed of one or more adjacent analysis segments that exceed ODOT standards—values reported are the sum of component segments. The critical side approach value for a segment is for the side of the roadway with the greater number of accesses.

Figure 6 - Existing Functional Classification

Driving Conditions

Motor vehicle conditions in Clatsop County vary based on the time of year. During the summer peak (typically in August), traffic volumes are much higher than during the average weekday (typically in May and September) and, therefore, intersection operations are worse. For this reason, the TSP evaluated motor vehicle conditions at the 28 study intersections during both summer and average weekday conditions. The evaluation utilized 2000 Highway Capacity Manual methodology[6] for signalized intersections and 2010 Highway Capacity Manual methodology[7] for unsignalized intersections.

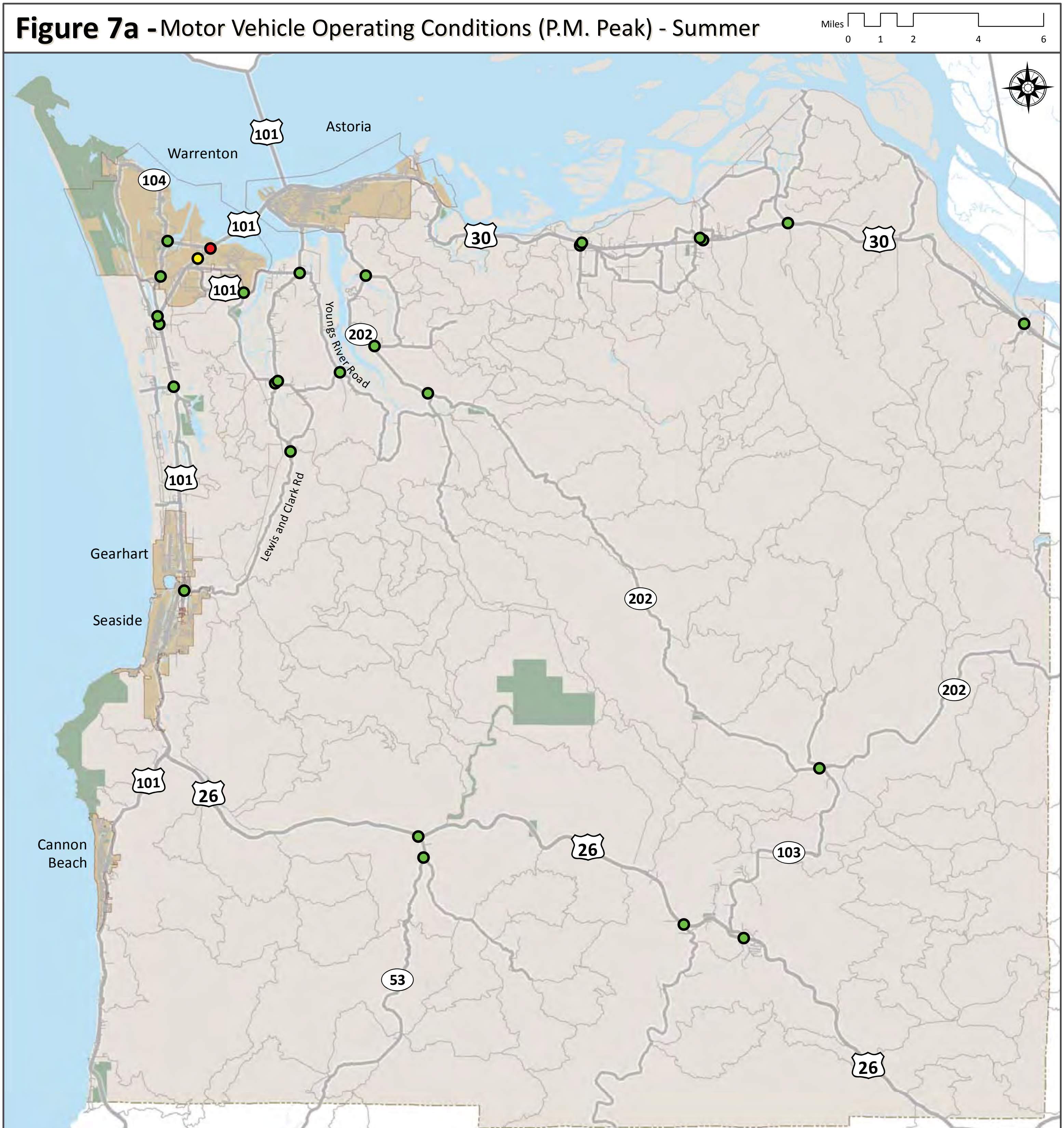
Summer p.m. peak hour intersection operations are all within the Oregon Highway Plan mobility targets, with the exception of the US 101/E Harbor Street signalized intersection, as shown in Figure 7a and in the appendix—this intersection operates in the summer p.m. peak at capacity (v/c ratio of 1.0), while its mobility target is 0.90. The US 101/Warrenton-Astoria Highway/Marlin Drive signalized intersection operates at a v/c ratio of 0.82, which is nearing its 0.90 mobility target.

It is also important to note that while the US 101/Sunset Beach Road meets its 0.95 mobility target (operating with a v/c ratio of 0.62 on the side street), the side street experiences high delays (over 90 seconds per vehicle).

Average weekday p.m. peak hour intersection operations (shown in Figure 7b and summarized the appendix) are better than the summer operations at all intersections reviewed. In the average weekday condition, all intersections are well within the Oregon Highway Plan mobility targets. Only one intersection (US 101/E Harbor Street) operates with a v/c ratio greater than 0.60.

[6] *2000 Highway Capacity Manual*, Transportation Research Board, Washington DC, 2000.
[7] *2010 Highway Capacity Manual*, Transportation Research Board, Washington DC, 2010.

Figure 7a - Motor Vehicle Operating Conditions (P.M. Peak) - Summer



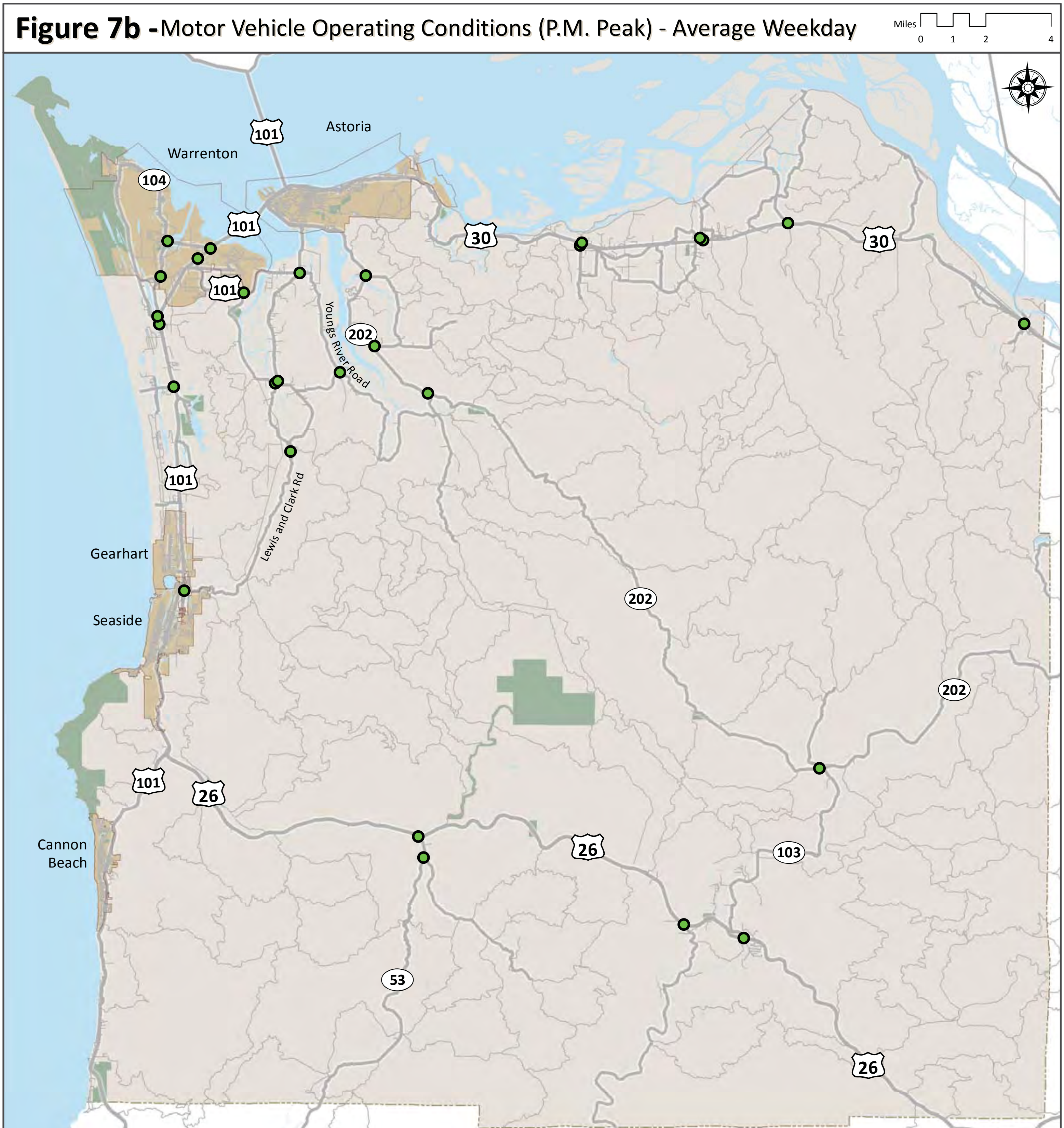
Legend

Peak Seasonal Intersections Operations

- Good
- Approaching Target
- Does Not Meet Target

- City
- Park
- Clatsop County
- Water

Figure 7b - Motor Vehicle Operating Conditions (P.M. Peak) - Average Weekday



Legend

Peak Seasonal Intersections Operations

- Good
- Approaching Target
- Does Not Meet Target

- City
- Park
- Clatsop County
- Water

Transportation System Management and Operations (TSMO)

Transportation System Management and Operations (TSMO) is a set of integrated transportation solutions for improving the performance of existing transportation infrastructure through a combination of system and demand management strategies and programs.

Transportation System Management (TSM): TSM solutions attempt to better manage the flow of traffic to achieve maximum efficiency of the current roadway system, and to increase safety through increased driver awareness of unexpected roadway conditions. In Clatsop County, US 26, US 30, and US 101 benefit from TSM infrastructure, as described below:

- Cameras for monitoring travel conditions along US 26 (approximately 2.5 miles east of the OR 103 intersection), along US 101 (on the Astoria-Megler Bridge), and along US 30 (approximately 1 mile east of Clifton Road intersection).
- A Variable Message Sign (VMS) facing northbound traffic on US 101 (approximately 0.5 miles south of the US 101/OR 104 intersection).
- "Caution, Possible Water on Roadway Ahead When Lights Flash" sign with flashing beacons facing northbound traffic on US 101 (at the US 26/US 101 intersection).
- "Travel Advisory, Tune Radio 1650 AM When Light Flash" signs with flashing beacons facing westbound traffic on US 26 (approximately 4 miles east of the US 101 intersection), northbound traffic on US 101 (approximately 0.5 miles north of Cannon Beach), southbound traffic on US 101 (approximately 2 miles north of the US 26 intersection), and northbound traffic on US 101 (approximately 1 mile north of the OR 104 intersection).
- A flashing beacon "Congestion Ahead" warning sign facing southbound traffic on US 101 just north of the New Youngs Bay Bridge.

Transportation Demand Management (TDM): TDM solutions encourage travelers to choose alternatives to driving alone in their car by providing services, incentives, supportive infrastructure and awareness of travel options. These strategies improve the performance of the existing infrastructure and services, and may result in fewer vehicles on the roadway system. TDM measures in use in Clatsop County include:

- Investment in pedestrian/bicycle facilities.
- Investment in transit infrastructure and operations.

Environmental Justice

The Environmental Protection Agency states, "Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." Within the context of the TSP, environmental justice is an effort to identify underserved and vulnerable populations, so the county can improve transportation services and avoid future negative impacts. Figure A7 in the appendix identifies the locations of low-income populations most likely to be dependent on public transportation and minority groups.

Groups of minority populations exist in Astoria, including the Tongue Point area, the area along US 30 between 17th Street and 37th Street, and the area south of Lexington Avenue between Denver Avenue and 5th Street. Groups of low income populations exist in Astoria and Seaside. In Astoria these populations are located along US 30 between 43rd Street and Millcreek Road (including Tongue Point and the area along Nimitz Drive), just south of US 30 between Downtown Astoria and OR 202, and the area south of Lexington Avenue between Denver Avenue and 5th Street. In Seaside, a group of low income residents are located in the area bound by Wahanna Road, Broadway Street, Sundquist Road, and the Necanicum River.

Safety Evaluation

A review of collision data identified patterns of motor vehicle, pedestrian, and bicyclist collisions.

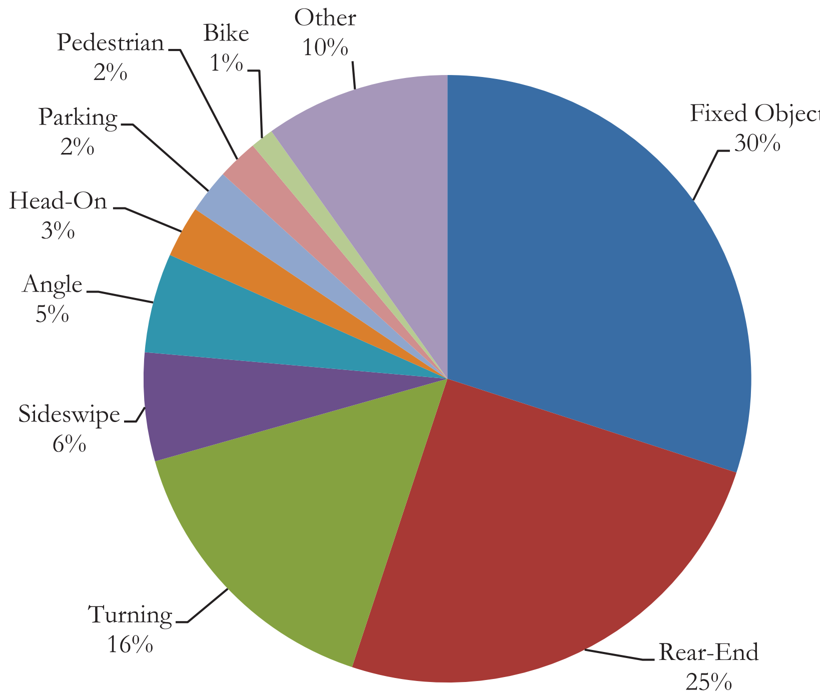


Figure 8: Collision Types (2008 to 2012)

ODOT's collision data from 2008 to 2012 (the most recent five years of available data) for all roadways in Clatsop County showed a total of 2,440 collisions (an average of 448 collisions a year) in the county. Over the past five years, 2009 had the fewest collisions at 432. Since then, there has been a minor increasing trend, with the highest annual collisions during 2012 at 543.[8] The most predominate of the collisions (about 36 percent) were fixed-object collisions (see Figure 8). There were also a significant proportion of rear-end collisions (about 30 percent), and turning/angled collisions (about 25 percent). Three percent of the collisions (about eleven a year) involved pedestrians, and one percent (about six a year) involved bicycles.

While 92 percent of the collisions involved property damage only (no injuries) or minor injuries, there were 25 fatalities over the past five years (about one percent of the collisions). Of these 25 fatalities, 4 were pedestrian collisions. The other fatal collisions were mostly fixed object (7) or head-on (8) collisions. The most common causes of the fatal collisions were reckless or improper driving (11) and speeding (5).

[8] 2008: 478 collisions, 2009: 432 collisions, 2010: 462 collisions, 2011: 525 collisions, 2012: 543 collisions

Pedestrian Safety

Of the 53 pedestrian collisions over the five year period, 31 occurred in Astoria, 11 in Seaside, three in Warrenton, 3 in Cannon Beach, one in Gearhart, and four outside of city limits (see Figure 9). Of the 53 collisions involving pedestrians, 66 percent (or about 34 of the collisions) took place on state highways, while 34 percent (or 19 of the collisions) occurred on county and city streets.

Four of the collisions involving a pedestrian resulted in a fatality. Two of the fatalities occurred along US 101 in Seaside at the Broadway Street and Avenue B intersections. The other two fatalities occurred along US 30—one in Astoria at the Commercial Street/12th Street intersection, and one near the Old US 30 intersection (east of the Koppisch Road intersection).

Bicycle Safety

From 2008 to 2012, 30 collisions occurred that involved a bicyclist. Sixteen of the collisions occurred in Seaside, seven in Astoria, five in Warrenton, and two outside of city limits (see Figure 9). Of the 30 collisions, 20 took place on state highways, including eleven on US 101, five on US 30, two on OR 104, one on OR 53, and one on US 101B.

The majority of bicyclist-involved collisions (about 63 percent) were turning/angled collisions at intersections. While none of the collisions resulted in a fatality, 60 percent of the bicyclists sustained at least moderate injuries.

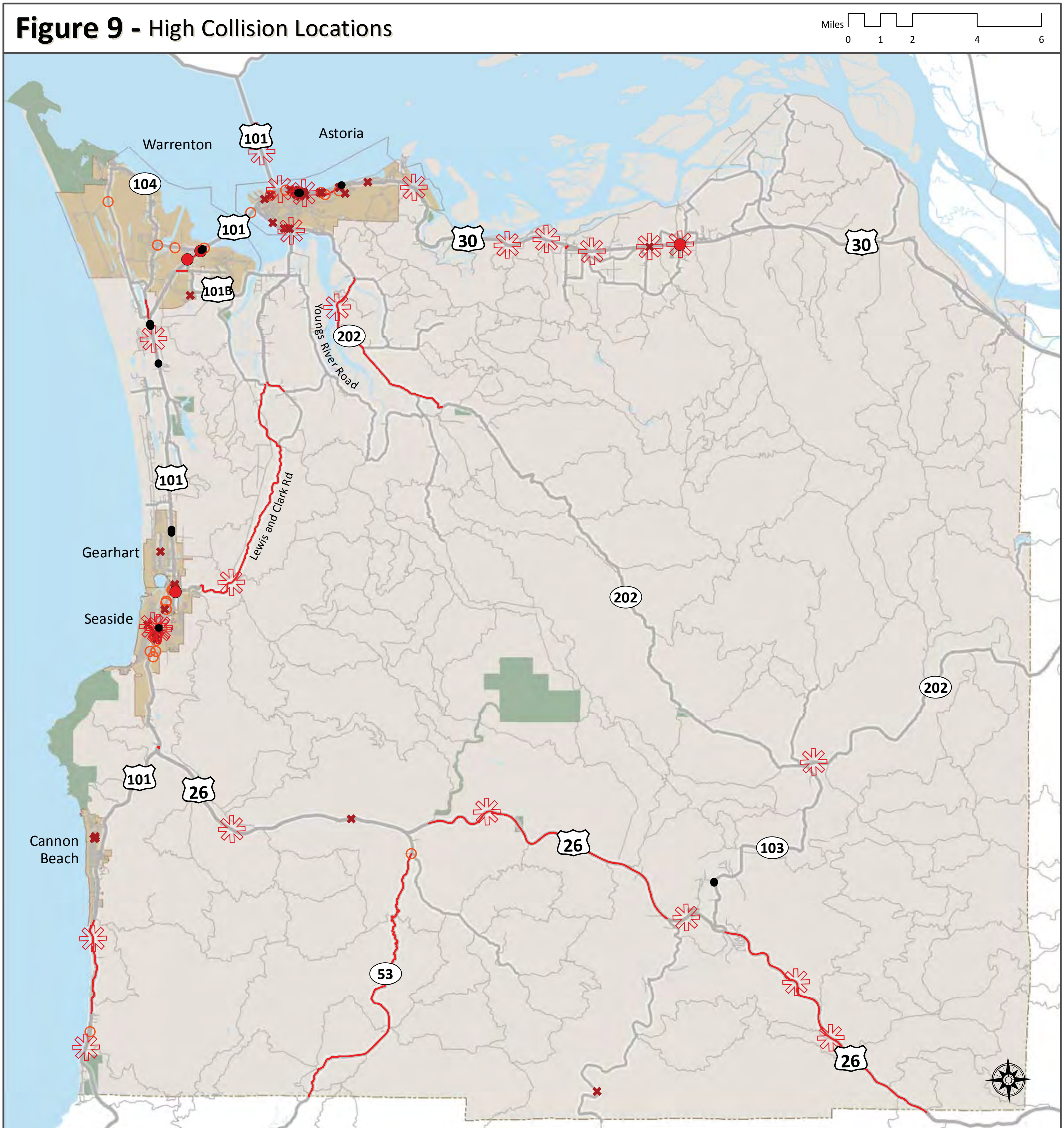
Intersection Safety

Collision rates (based on 2008-2012 collision data) for each of the 28 study intersections in Clatsop County can be found in the appendix and summarized in Figure 9. Crash rates at four of the study intersections were high compared to similar intersections in the county.

- **Lewis and Clark Road/N Wahanna Road/Crown Camp Road** is a two-way stop controlled intersection, with a free southbound movement along Lewis and Clark Road. Both of the collisions at this intersection involved drivers traveling too fast around the channelized right turn from westbound to northbound Lewis and Clark Road. Both drivers ran off the road and hit a fixed object. Lewis and Clark Road has a rural character east of this intersection, so some drivers may be approaching at higher rates of speed.
- **US 101/US 101B/Marlin Drive** is a signalized intersection located in Warrenton between the signals at Ensign Lane and Neptune Drive. Most of the collisions (20 of the 28) involved drivers hitting a stopped vehicle when approaching the signal on US 101. This may indicate that drivers are caught off guard by queues from the intersection. The severities of the collisions were generally low, with most (26 of 28) involving property damage only (no injuries) or minor injuries. There were no major injuries or fatalities.
- **US 30/Hillscrest Loop Road** is two-way stop controlled intersection, with Hillscrest Loop Road yielding the right-of-way. Nearly half (5 of the 11) of the collisions at this intersection were turning type from Hillscrest Loop Road to US 30. This may indicate that drivers are caught off guard by the travel speeds of vehicles on the highway. The severity of the collisions was low, with all involving property damage only (no injuries) or minor injuries.

- **US 101/E Harbor Street** is a signalized intersection located just south of the New Youngs Bay Bridge. This is the first signalized intersection when traveling into Warrenton from Astoria. Most of the collisions (30 of the 36) involved drivers hitting a stopped vehicle when approaching the signal on US 101. This may indicate that drivers are caught off guard by queues from the intersection after traveling at uninterrupted higher speeds for an extended period of time. The severities of the collisions were generally low, with over 85 percent involving property damage only (no injuries) or minor injuries. Major injuries were involved in one of the collisions and there were no fatalities.

Figure 9 - High Collision Locations



Legend *High Collision Locations (2008-2012)*

- High Collision Location
- Collision Involving Bicycle
- Collision Involving Pedestrian
- Fatal Collision
- Hazardous Roadway (SPIS) Location
- High Collision Segments
- City
- Park
- Clatsop County

Roadway Segment Safety

Table 8 shows roadway segments where non-intersection crash rates were found to be significantly higher than Clatsop County averages for similar facilities. Comparisons were made using the critical crash rate method. The critical crash rate method from the Highway Safety Manual is a statistical method that identifies values that are significantly higher than average while adjusting for the effects of low-volume segments.[9]

Critical crash rates were developed using the average crash rates by functional class of roads within Clatsop County. An additional critical crash rate comparison was made using statewide average crash rates. Clatsop County roadways generally have lower crash rates than the state as a whole. As a result the statewide comparison set less stringent standards and identified a subset of segments already flagged by the county-based analysis. More analysis details and the results of the statewide comparison are included in the appendix.

Table 8: Road Segments Exceeding Critical Crash Rates

Roadway	Roadway Segment	City	Crash Rate*	Critical Crash Rate**
County Roadways				
Fort Clatsop Road	East leg of Y at Warrenton-Astoria Hwy	N/A	13.3	12.5
Lewis And Clark Road	Seaside City limits to Logan Rd (south)	N/A	3.3	1.5
Lewis And Clark Road	Logan Road (south) to Fort Clatsop Rd.	N/A	3.0	2.2
Logan Road	Lewis and Clark Rd (south) to Tucker Creek Lane	N/A	2.4	2.4
Svensen Market Road	Hwy 30 to Old Hwy 30	N/A	5.5	4.5
State Highways				
Highway 101 Connector	Hwy. 26 West to Hwy. 101 South Connector	N/A	33.1	7.5
Highway 101 Business	Hwy. 101 to Marlin Dr.	Warrenton	8.4	5.4
Commercial Street	8th St. to 9th St.	Astoria	9.5	3.7
Commercial Street	11th St. to 14th St.	Astoria	10.2	3.0
Highway 101	Carnahan Rd. to South Hemlock St. (just south of Cannon Beach)	N/A	1.2	1.0
Highway 101	Hwy. 105/South East Marlin Dr. to Hwy. 105 Spur / East Harbor St.	Warrenton	2.0	1.1

[9] 2010 Highway Safety Manual, AASHTO.

Highway 101	Hwy. 105 Spur / East Harbor St. to Hwy. 101 Bridge	Warrenton	2.7	1.3
Highway 101	Avenue A to Avenue B	Seaside	5.7	3.4
Highway 104	Columbia Beach Ln. to Whiskey Rd. (south)	N/A	3.8	2.5
Highway 202	Olney Cutoff Rd. to Youngs River Rd.	N/A	9.4	3.6
Highway 202	Youngs River Rd. to Walluski Loop (south)	N/A	2.4	2.0
Highway 202	Walluski Loop (south) to Walluski Loop (north)	N/A	2.8	1.7
Highway 26	South County Limits to Hwy. 103	N/A	1.0	0.8
Highway 26	Lower Nehalem Rd. to Saddle Mountain Rd.	N/A	1.0	0.8
Highway 53	South County Limits to Hamlet Rd.	N/A	2.0	1.8
Marine Drive	11th St. to 14th St.	Astoria	7.0	2.8

* Crash rate is the number of non-intersection crashes per million vehicle-miles traveled during 2008-2012.

** Critical crash rates developed using a 95% confidence level, grouping facilities by functional class. County averages developed using 2008-2012 data by DKS, statewide averages from ODOT Table II: 2008-2012 Crash Rates.

SPIS Assessment

The Safety Priority Index System (SPIS) is a method developed by ODOT for identifying and ranking hazardous locations on state highways. The score for each 0.10-mile segment of highway is based on three years of crash data, considering crash frequency, rate, and severity. Segments which meet a minimum crash criteria are then ranked from most-hazardous to least-hazardous. The SPIS ranking for a segment indicates safety performance relative to other highways throughout the state.

According to the ODOT 2013 SPIS ratings, seven groups of continuous segments in Clatsop County rank in the top ten percent of SPIS segments. These are among the most hazardous sections of state highways in Oregon. The identified locations are shown in Figure 9 and summarized in Table 9.

Table 9: 2013 SPIS Analysis

SPIS Segment	Percentile	Collisions (2010 to 2012)	Crash Rate per Million Vehicle Miles	Oregon Average Rate
US 101 at the US 101/E Harbor Street intersection	Top 95%	25	9.80	0.81
US 30 between 33rd Street and 34th Street	Top 95%	12	11.17	2.56
US 101 at the US 101/OR 104 intersection	Top 95%	5	1.59	0.81
OR 202 just south of Ordway Lane	Top 90%	7	32.29	1.43
OR 202 just west of Olney Cutoff Road	Top 90%	4	42.72	1.43
US 30 from the US 101/Astoria-Megler Bridge intersection to just east of the US 30/Basin Street	Top 90%	13	7.94	2.56
OR 103 just south of Bay Road	Top 90%	3	36.24	1.43

The following is a discussion of each SPIS segment:

- **US 101 at the US 101/E Harbor Street intersection in Warrenton**

  This segment includes the US 101/E Harbor Street intersection, which is the first signalized intersection entering Warrenton from Astoria. Seventy-five percent of the crashes were rear-end type with most involving drivers traveling southbound on US 101. Advanced warning of the upcoming signal for southbound traffic could potentially mitigate this issue.

- **US 30 between 33rd Street and 34th Street in Astoria**

  This segment includes the US 30/33rd Street/Safeway access intersection in Astoria. This is the first signalized intersection entering Astoria from the east; however, the data does not suggest this it is a trend as just only 25 percent of the crashes were read-end type heading into Astoria. Half of the collisions were related to vehicles not yielding to oncoming traffic as they attempt the permissive left turn. While a mitigation measure for this could be to remove the permissive phasing of the protective/permissive left turn phasing for highway traffic, this could have a negative impact on operations

- **US 101 at the US 101/OR 104 intersection**

  This segment includes the US 101/OR 104 intersection. Each of the five collisions were turning/angled type involving a driver heading southbound through the intersection. This could be related to drivers having difficulty navigating across a five-lane high-speed corridor. A signal would likely not be warranted here. Advanced signage along US 101 could help alert motorists of the approaching cross traffic.

- **OR 202 just south of Ordway Lane**

  This segment involves a curved section of roadway between Astoria and Jewell. Six of the seven collisions were fixed-object collisions, and involved drivers traveling too fast with wet pavement conditions. This could potentially be mitigated through signing and speed enforcement.

- **OR 202 just west of Olney Cutoff Road**

  This segment also involves a curved section of roadway between Astoria and Jewell. All four of the collisions that occurred within the segment were related to speeding. Installing advisory curve speed signs could help mitigate this issue.

- **US 30 from the US 101/Astoria-Megler Bridge intersection to just east of the US 30/Basin Street in Astoria**

  This segment involves the US 30/Basin Street intersection in Astoria. 55 percent of the collisions were rear-end type, and 38 percent were turning type. There were no clear trends in the crash history.

- **OR 103 just south of Bay Road**

  This segment involves a curved section of roadway on OR 103. All three collisions were a result of improper driving.

Corridor Health

The U.S. Department of Transportation recommends the use of a multiple criteria to analyze needs and prioritize transportation projects and investments in rural areas.[10] Following this guidance, a Corridor Health Tool was applied for all state highways and county roads within the county with a functional classification of collector or higher. The corridor health concept is based on the idea of measuring the "health" of a corridor for several different categories of performance, and then combining the measurements to provide a picture of overall corridor health.

Development of Factors, Weights, and Formulas

The Corridor Health Tool uses a set of evaluation categories with formulas and weights that are used to calculate a composite health score for each road segment. The four evaluation categories that were used included safety, geometrics, traffic operations, and access spacing.

- **Safety scores** were based on a comparison of historical crash rates to averages for similar roads.
- **Geometric scores** were based on the available shoulder width, which is also the primary bicycle and pedestrian facility in rural areas.
- **Traffic operation scores** were based on a comparison of the segment v/c ratios to established mobility targets.

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[10] U.S. Department of Transportation, Planning for Transportation in Rural Areas, (2001).

- **Access spacing scores** were based on an evaluation of the number of road access points to maximum accesses permitted.

Each segment was given a score from 0 to 1 for each of the four categories detailed above, with each of the four categories weighted equally. A score of 0.75 or more is described as "good," a score of less than 0.50 is described as "poor," and all other scores are described as "fair." More details, including the formulas for each evaluation category, are provided in the appendix.

Clatsop County maintains an active road surface maintenance program that keeps county roads in good physical condition. Because of this program and the dynamic nature of road surface conditions, general road maintenance was not included in the Corridor Health Tool assessment.

Corridor Health Results

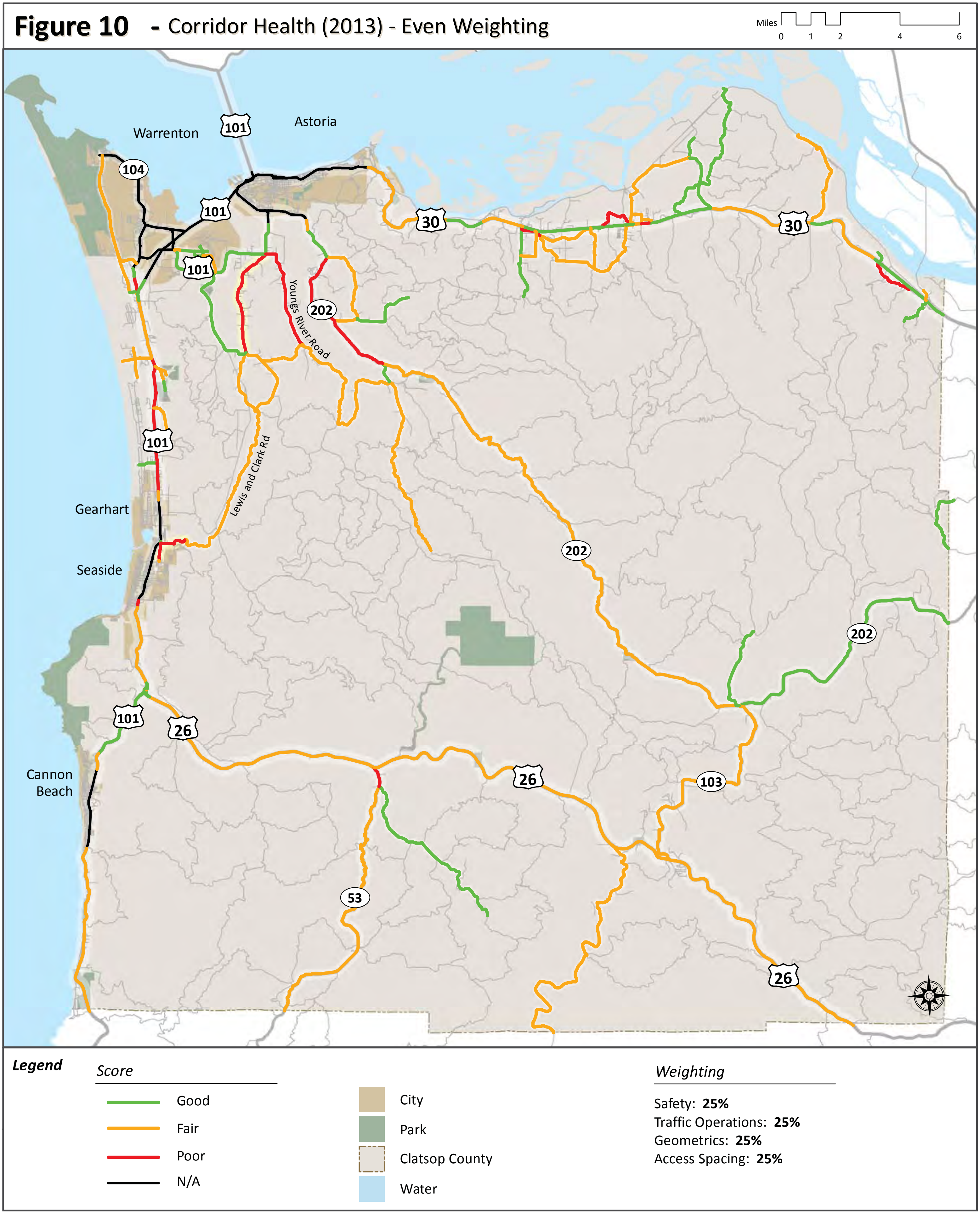
A map of corridor health scores is shown in Figure 10. It should be noted that within incorporated city limits, state facilities were not analyzed. The majority of the roads in Clatsop County received a "good" or "fair" corridor health score overall. A "good" score indicates generally high performance on all evaluation categories. A "fair" score indicates medium performance on all evaluation categories, or a mix of high and low performance. A "poor" score indicates low performance in more than one evaluation category, and should be considered as a location for further study in the future.

County and state facility segments that received an overall corridor health score of "poor" are summarized in Table 10. A total of eight county street segments and eight state highway segments were identified as "poor" by the corridor health scoring. Most of these scores are the result of low performance in the geometrics and/or access spacing evaluation categories. Limited right of way, mountainous terrain, and grandfathered access points are largely responsible for these low scores and often represent inherent limitations that are not feasible to address directly. It should be noted that only state facility segments outside of city limits were analyzed.

Table 10: Segments with an overall Corridor Health Score of Poor

Roadway	Segment Limits	Overall Corridor Health Score	Evaluation Categories: Safety	Geometrics	Traffic Operations	Access Spacing
Roadway under County Jurisdiction						
N Wahanna Rd.	Lewis and Clark Rd. to 13th Ave.	**Poor**	*Poor*	*Poor*	*Good*	*Poor*
Lewis and Clark Rd.	N Wahanna Rd. to Seaside City Limits	**Poor**	*Poor*	*Poor*	*Good*	*Poor*
N Cottage Ave.	Gearhart Ave. to Pacific Way	**Poor**	*Poor*	*Poor*	*Good*	*Poor*
Lewis and Clark Rd.	US 101B to Logan Rd.	**Poor**	*Fair*	*Poor*	*Good*	*Poor*
Youngs River Rd.	US 101B to Tucker Creek Ln.	**Poor**	*Poor*	*Poor*	*Good*	*Fair*
Old Highway 30	Svensen Market Rd. to Hillcrest Loop	**Poor**	*Poor*	*Poor*	*Good*	*Fair*
Old Highway 30	US 30 to Knappa Dock Rd.	**Poor**	*Poor*	*Poor*	*Good*	*Fair*
Taylorville Rd.	US 30 to US 30	**Poor**	*Poor*	*Poor*	*Good*	*Fair*
Roadways under State Jurisdiction						
OR 53	US 26 to Hamlet Rd.	**Poor**	*Poor*	*Poor*	*Good*	*Good*
US 101	Avenue U to Avenue S	**Poor**	*Fair*	*Poor*	*Good*	*Poor*
US 101	Gearhart Loop Rd. to Shamrock Rd.	**Poor**	*Poor*	*Poor*	*Good*	*Poor*
US 101	Shamrock Rd. to Highlands Ln.	**Poor**	*Good*	*Poor*	*Poor*	*Poor*
US 101	Highlands Ln. to Sunset Beach Ln.	**Poor**	*Fair*	*Fair*	*Fair*	*Poor*
OR 104	Columbia Beach Ln. to Whiskey Rd.	**Poor**	*Poor*	*Poor*	*Good*	*Fair*
OR 202	Walluski Loop to Youngs River Rd.	**Poor**	*Poor*	*Poor*	*Good*	*Fair*
US 30	Abbott Rd. to Valley Creek Ln.	**Poor**	*Poor*	*Poor*	*Good*	*Poor*

Figure 10 - Corridor Health (2013) - Even Weighting



Bridges

Within Clatsop County there are a total of 137 bridges—68 of which are along state facilities and 69 along county facilities, as shown in Figure A5 in the appendix. ODOT has flagged 3 bridges along state facilities as structurally deficient, including:

- Ecola Creek, Hwy 9; located along US 101 at the north end of Cannon Beach
- Beneke Creek, Hwy 102; located along OR 202 just east of the OR 103 intersection in Jewell
- Young Bay, Hwy 105 (Old Youngs Bay); located along US 101B at the south end of Astoria, crossing Youngs Bay

See the appendix for documentation on all state and county bridges along with their sufficiency ratings and deficiencies.

Freight

Efficient truck movement plays a vital role in the economical movement of raw materials and finished products. The designation of through truck routes provides for this efficient movement, while maintaining neighborhood livability, public safety, and minimizing maintenance costs of the roadway system.

Highways designated at truck routes by the federal government include US 26, US 30, and US 101 (see Figure A6 in the appendix). Federal truck routes generally require 12-foot travel lanes. ODOT also classifies US 26 and US 30 as state freight routes, which are subject to reduction of capacity review. Reduction review routes, which include US 26, US 30, and US 101, are highways that require review with any proposed changes to determine if there will be a reduction of vehicle-carrying capacity.

Rail

The Portland & Western Railroad (PNWR) is a 520 mile short line freight railroad that runs along the northern border of Clatsop County from the Portland Metropolitan area. It connects with the Albany & Eastern Railroad, BNSF Railway, Central Oregon & Pacific Railroad, Coos Bay Rail Link, Hampton Railway, Port of Tillamook Bay Railroad, and Union Pacific Railroad. The tracks run through Astoria to Uniontown. However, west of Tongue Point, the tracks are owned by the City of Astoria through the National Rails-To-Trails railbanking program. Astoria provides local passenger service via the Astoria Riverfront Trolley on the tracks between Portway Street and 39th Street.

A landslide has caused a segment of rail between Knappa and Westport (near Aldrich Point Road) to be inoperable. While there is desire to reintroduce freight rail service to Tongue Point in Astoria, it would require improvements to the tracks, siding for loading and unloading of the rail cars, and a possible engine front/back or engine turnaround. Rail service is currently provided to the industrial site in Taylorville (west of Westport).

Air

The Astoria Regional Airport, owned and operated by the Port of Astoria, is the only public airport in Clatsop County (see Figure A6 in the appendix). It is a general aviation airport located just west of Astoria on Youngs Bay. The airport has two runways and serves an average of about 106 aircraft operations a day. The airport is also home to the United States Coast Guard. Limited commercial air service between Astoria and Portland has been provided in the past, but is not currently provided.

Waterway

Clatsop County is bordered by the Pacific Ocean to the west and the Columbia River to the north. The coast is lined with popular beaches and is used for recreation purposes only.

The riverfront waterway, however, is lined with boat activity. Harbors are located in Hammond, Warrenton, Astoria, and Westport. The Port of Astoria operates three piers and a marina in the Uniontown area of northwest Astoria, one pier at 36th Street in Astoria, and five piers at Tongue Point in northeast Astoria. The piers include:

- Uniontown Pier 1 serves as a cruise ship berth and port-of-call for a variety of cruise lines. It is also used for timber export and can accommodate general cargo, military and industrial vessels up to 1,100 feet in length.
- Uniontown Pier 2 serves the commercial fishing needs of port users with multitenant building.
- Uniontown Pier 3 serves as a boatyard for boat storage and haul-out.
- West Mooring Basin on Industry Street in Uniontown serves as a marina.
- East Mooring Basin at 36th Street serves as a marina.
- Tongue Point includes five piers totaling 15,000 linear feet just off the Columbia River channel.

The City of Astoria owns the 17th Street pier, which is used for moorage for various tour boats, historic vessels, and the US Coast Guard. The Hammond Marina is owned by the Army Corp of Engineers and is leased to the City of Warrenton. Privately owned docks are located near Westport for industrial use.

The Wahkiakum County Ferry is a passenger and auto ferry that serves trips made between US 30 in Westport to SR 409 on Puget Island, and to SR 4 in Cathlamet, Washington. The ferry runs between 5 a.m. and 10 p.m. every day at the top of the hour. The total distance of the trip is approximately 1.5 miles.

Pipeline

Natural gas pipelines in Clatsop County are operated by Northwest Natural Gas. Service is provided to communities along US 30 and communities along US 101 from Warrenton (including Hammond) to Cannon Beach (including Tolovana Park) via main lines and feeder lines. There are no other major regional pipeline facilities in the county.

Summary of Existing Conditions (Deficiencies)

Several existing transportation system gaps and deficiencies were noted in the previous sections.

Key transportation system gaps for pedestrians in Clatsop County include:

- Lack of sidewalk along state highways in urban areas
- Lack of adequate roadway shoulder along rural state and county roads

Key transportation system gaps for bicyclists in Clatsop County include:

- Lack of bike lanes along state highways in urban areas
- Lack of adequate roadway shoulder along rural state and county roads

Key transportation system gaps for transit users in Clatsop County include:

- Lack of transit service to inland residents
- Lack of pedestrian facilities (including pedestrian crossings) near bus stops
- Long wait times between buses
- Lack of bus stop amenities

Key transportation system issues for drivers in Clatsop County include:

- Congestion at the US 101/E Harbor Street intersection in the summer p.m. peak period
- High side street delays at the US 101/Sunset Beach Road intersection in the summer p.m. peak period

Key locations with safety issues in Clatsop County include:

Intersections:

- Lewis and Clark Road/N Wahanna Road/Crown Camp Road
- US 101/US 101B/Marlin Drive
- US 30/Hillcrest Loop Road
- US 101/E Harbor Street

Safety Priority Index System Segments:

- US 101 at the US 101/E Harbor Street intersection in Warrenton
- US 30 between 33rd Street and 34th Street in Astoria
- US 101 at the US 101/OR 104 intersection
- OR 202 just south of Ordway Lane
- OR 202 just west of Olney Cutoff Road

- US 30 from the US 101/Astoria-Megler Bridge intersection to just east of the US 30/Basin Street in Astoria
- OR 103 just south of Bay Road

Key ODOT bridges that are structurally deficient in Clatsop County include:

- Ecola Creek, Hwy 9; located along US 101 at the north end of Cannon Beach
- Beneke Creek, Hwy 102; located along OR 202 just east of the OR 103 intersection in Jewell
- Young Bay, Hwy 105 (Old Youngs Bay); located along US 101B at the south end of Astoria, crossing Youngs Bay

Key rail system issues in Clatsop County include:

- Repairs needed near Aldrich Point Road due to the landslide
- General track improvements west of Westport

Technical Memo #5: Existing Conditions

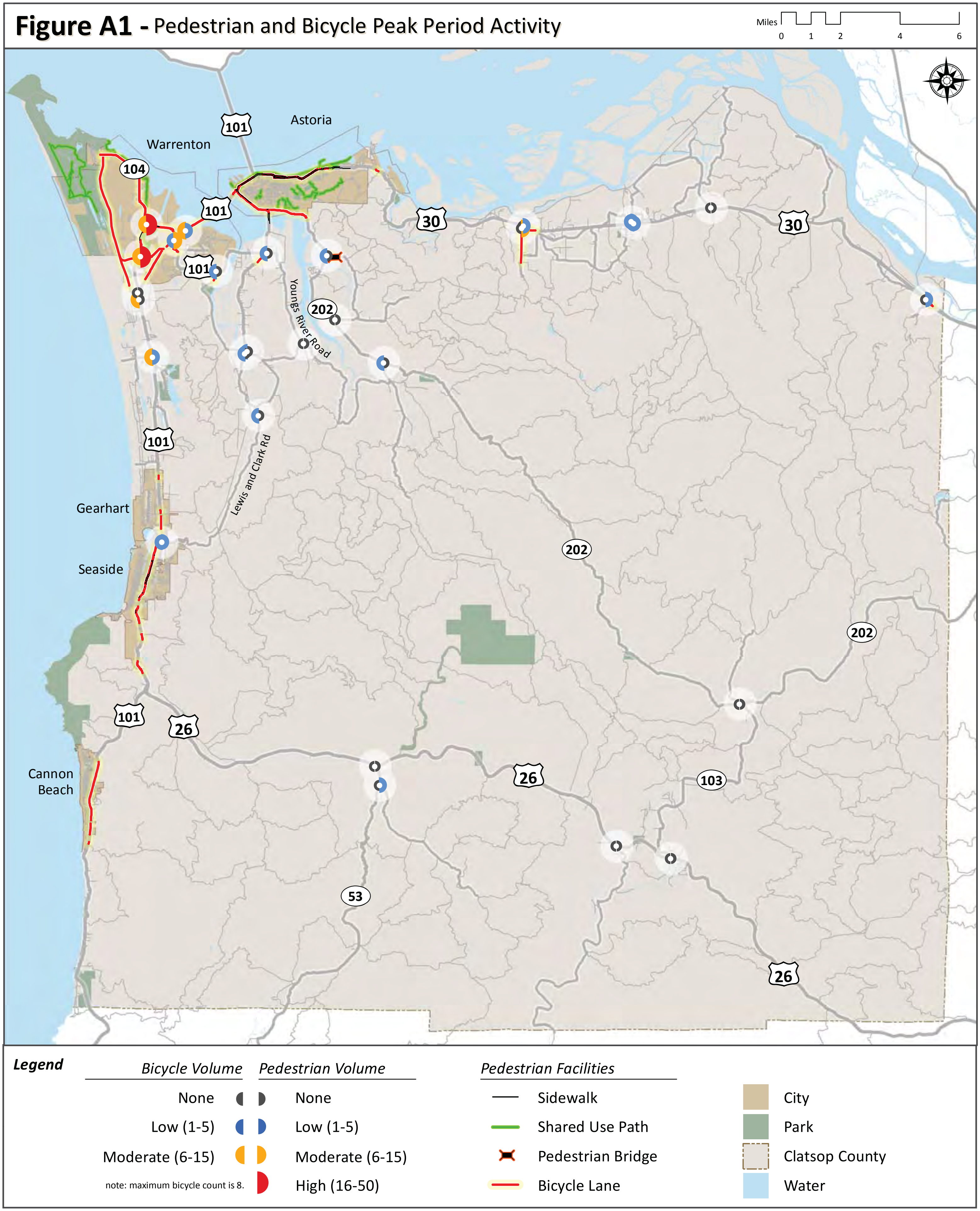
Appendix

Clatsop County TSP Update

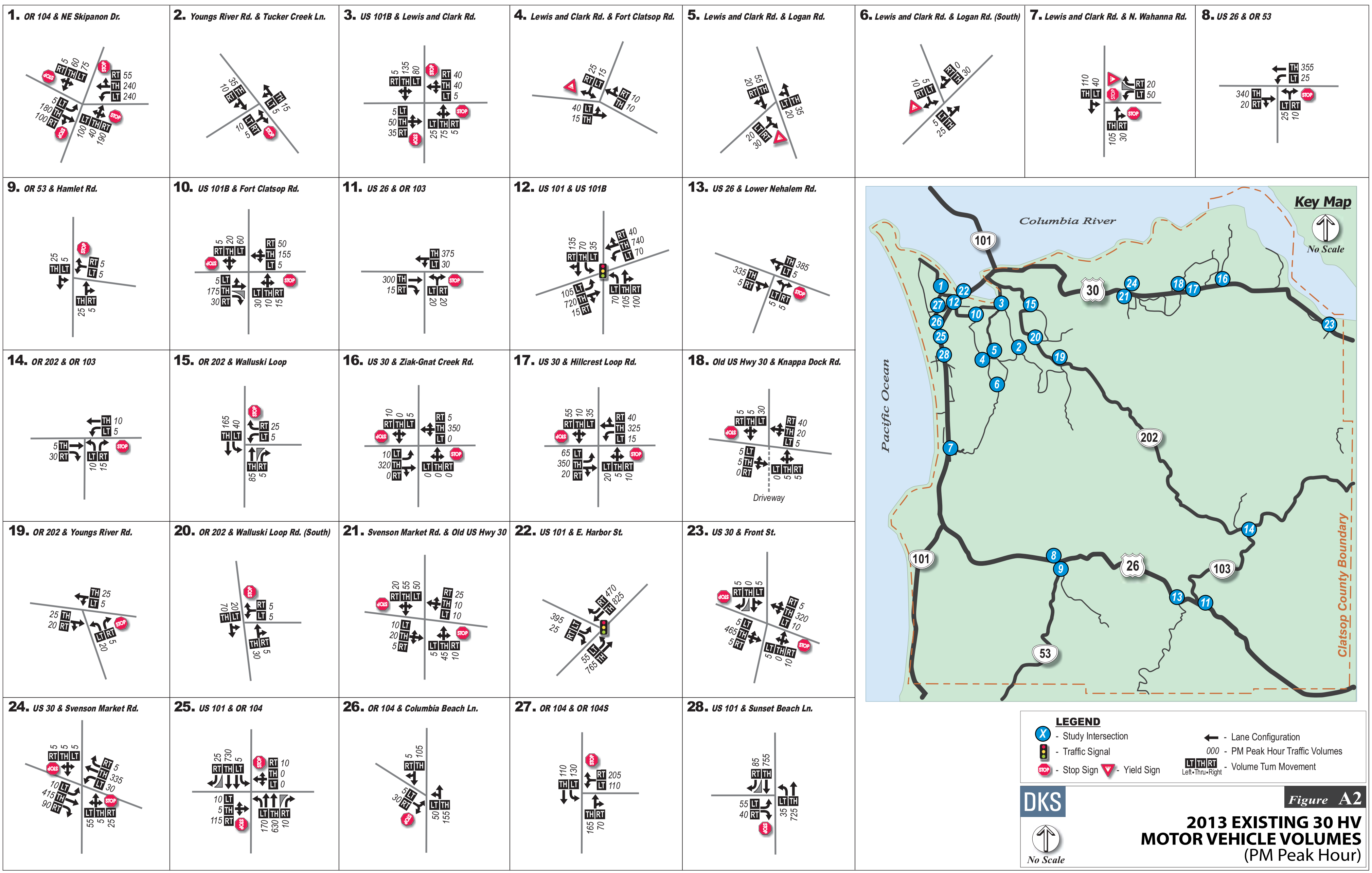
August 20, 2014

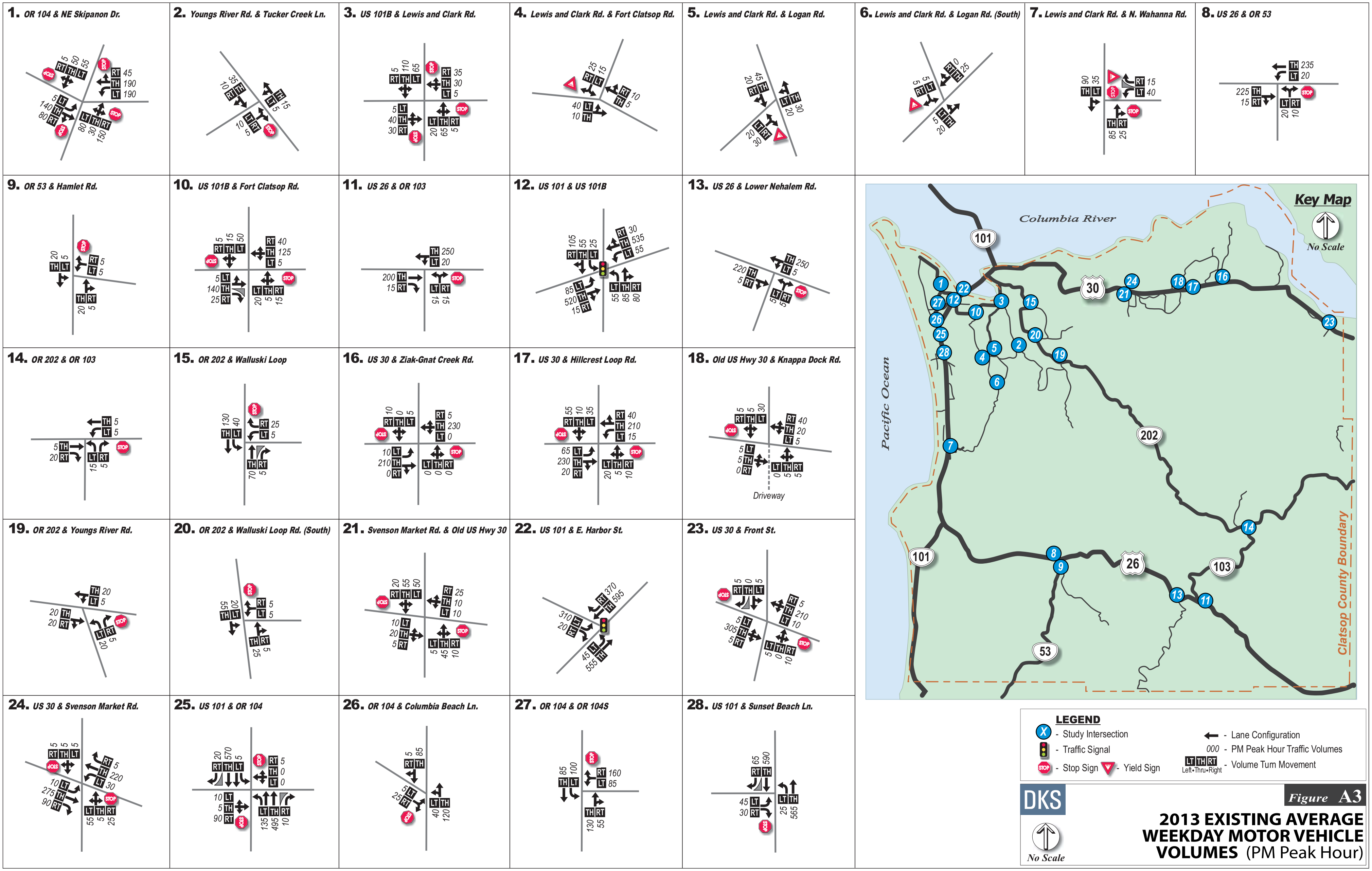
Pedestrian and Bicycle Volumes

Figure A1 - Pedestrian and Bicycle Peak Period Activity



Motor Vehicle Volumes

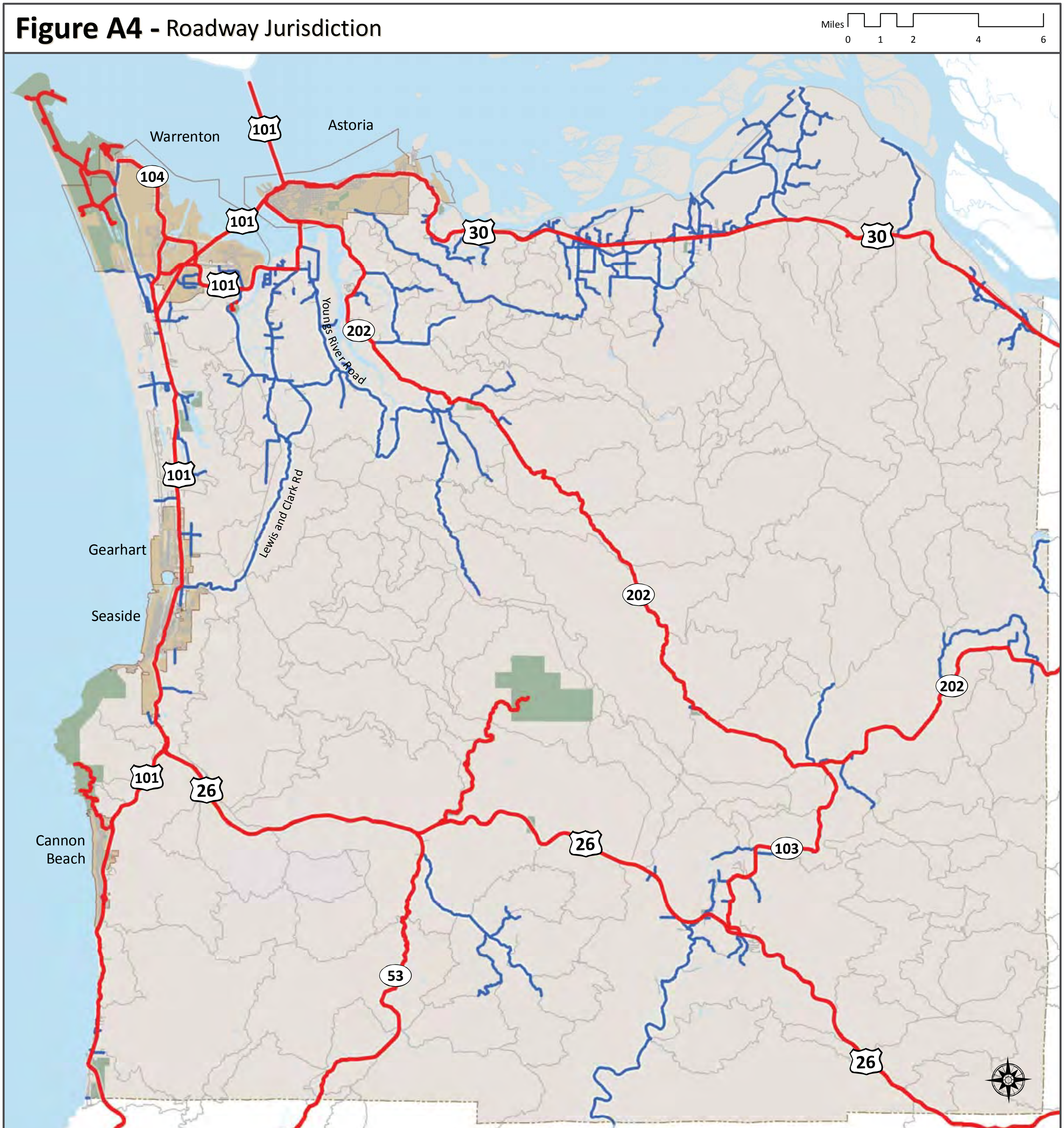

1. OR 104 & NE Skipanon Dr.
2. Youngs River Rd. & Tucker Creek Ln.
3. US 101B & Lewis and Clark Rd.
4. Lewis and Clark Rd. & Fort Clatsop Rd.
5. Lewis and Clark Rd. & Logan Rd.
6. Lewis and Clark Rd. & Logan Rd. (South)
7. Lewis and Clark Rd. & N. Wahanna Rd.
8. US 26 & OR 53
9. OR 53 & Hamlet Rd.
10. US 101B & Fort Clatsop Rd.
11. US 26 & OR 103
12. US 101 & US 101B
13. US 26 & Lower Nehalem Rd.
14. OR 202 & OR 103
15. OR 202 & Walluski Loop
16. US 30 & Ziak-Gnat Creek Rd.
17. US 30 & Hillcrest Loop Rd.
18. Old US Hwy 30 & Knappa Dock Rd.
Driveway
19. OR 202 & Youngs River Rd.
20. OR 202 & Walluski Loop Rd. (South)
21. Svenson Market Rd. & Old US Hwy 30
22. US 101 & E. Harbor St.
23. US 30 & Front St.
24. US 30 & Svenson Market Rd.
25. US 101 & OR 104
26. OR 104 & Columbia Beach Ln.
27. OR 104 & OR 104S
28. US 101 & Sunset Beach Ln.
Key Map
No Scale
Columbia River
Pacific Ocean
Clatsop County Boundary
LEGEND
X - Study Intersection
- Traffic Signal
- Stop Sign
- Yield Sign
- Lane Configuration
000 - PM Peak Hour Traffic Volumes
LT TH RT Left•Thru•Right - Volume Turn Movement
DKS
No Scale
Figure A2
2013 EXISTING 30 HV
MOTOR VEHICLE VOLUMES
(PM Peak Hour)



2013 EXISTING AVERAGE WEEKDAY MOTOR VEHICLE VOLUMES (PM Peak Hour)

Transportation Network Information

Figure A4 - Roadway Jurisdiction



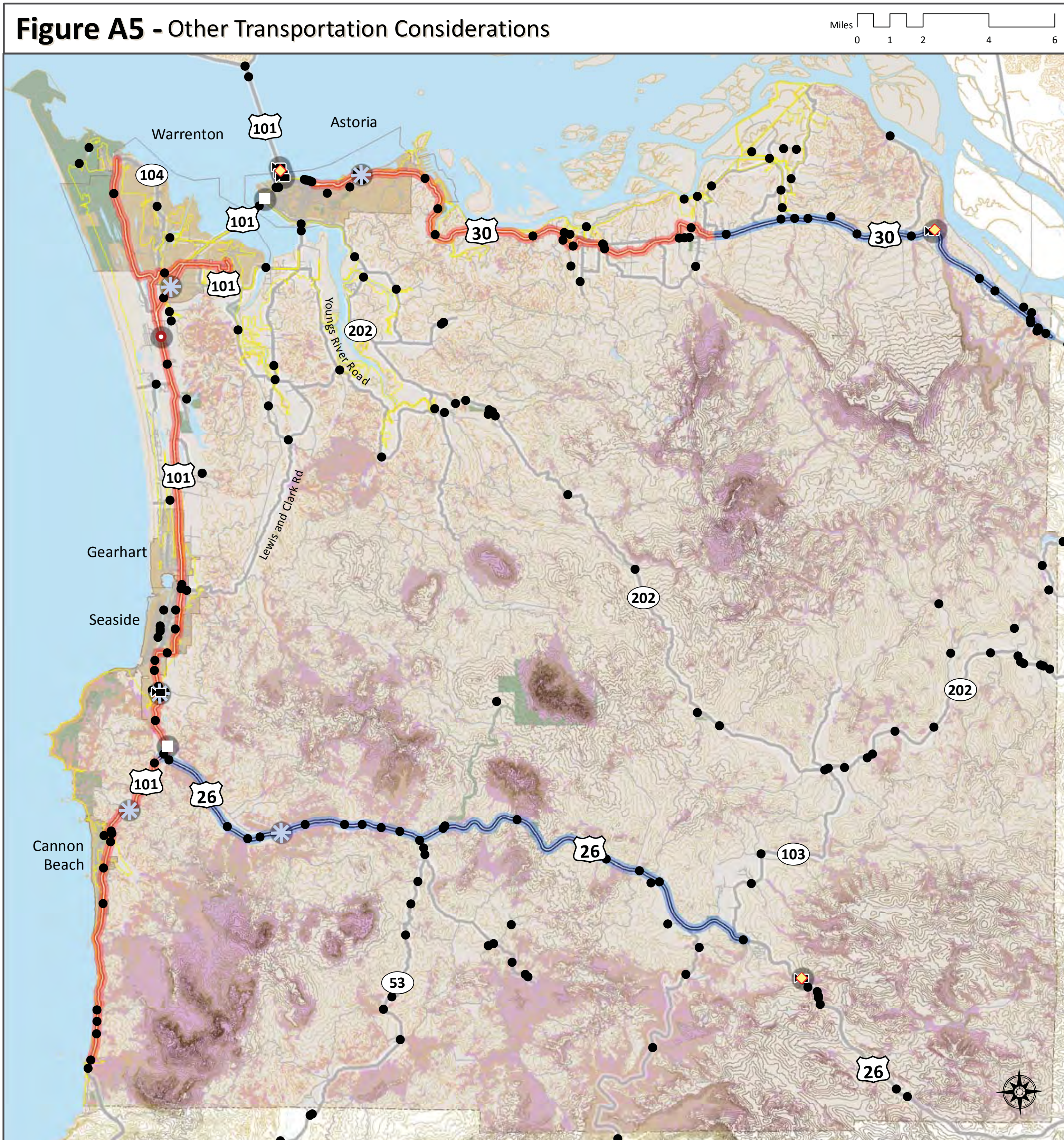
Legend

Jurisdiction

- State of Oregon
- Clatsop County
- Local Jurisdiction

- City
- Park
- Clatsop County
- Water

Figure A5 - Other Transportation Considerations



Legend

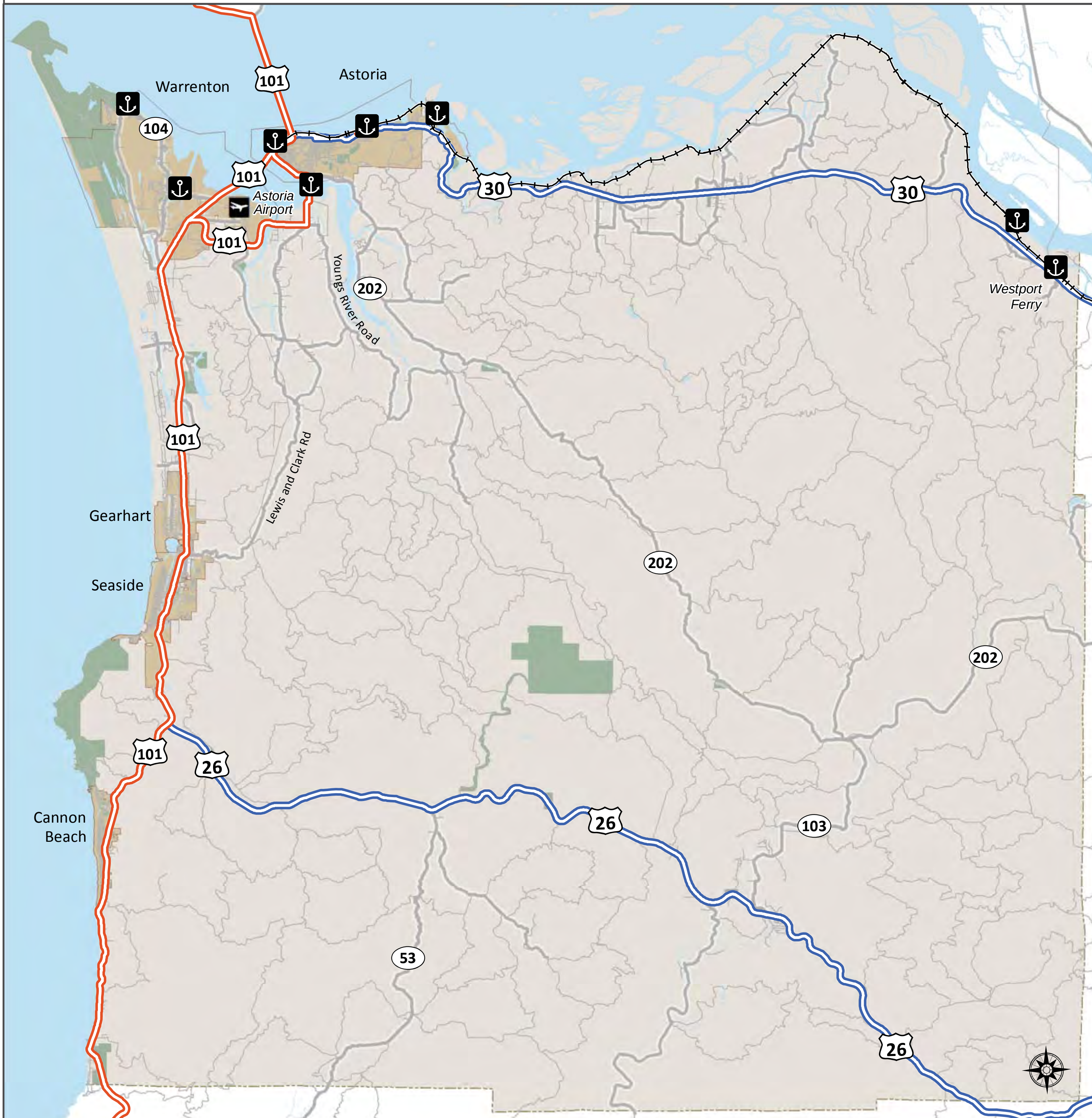
ITS Devices
- CCTV
- VMS
- RWIS
- Beacon
- HAR
- WWS

Lifeline Route
- Priority 1
- Priority 2

- Tsumani Inundation Estimate
- 100' Contours
- Bridge
- Landslide Hazard
- City
- Park
- Clatsop County
- Stream

Destination 2035

Figure A6 - Other Modes



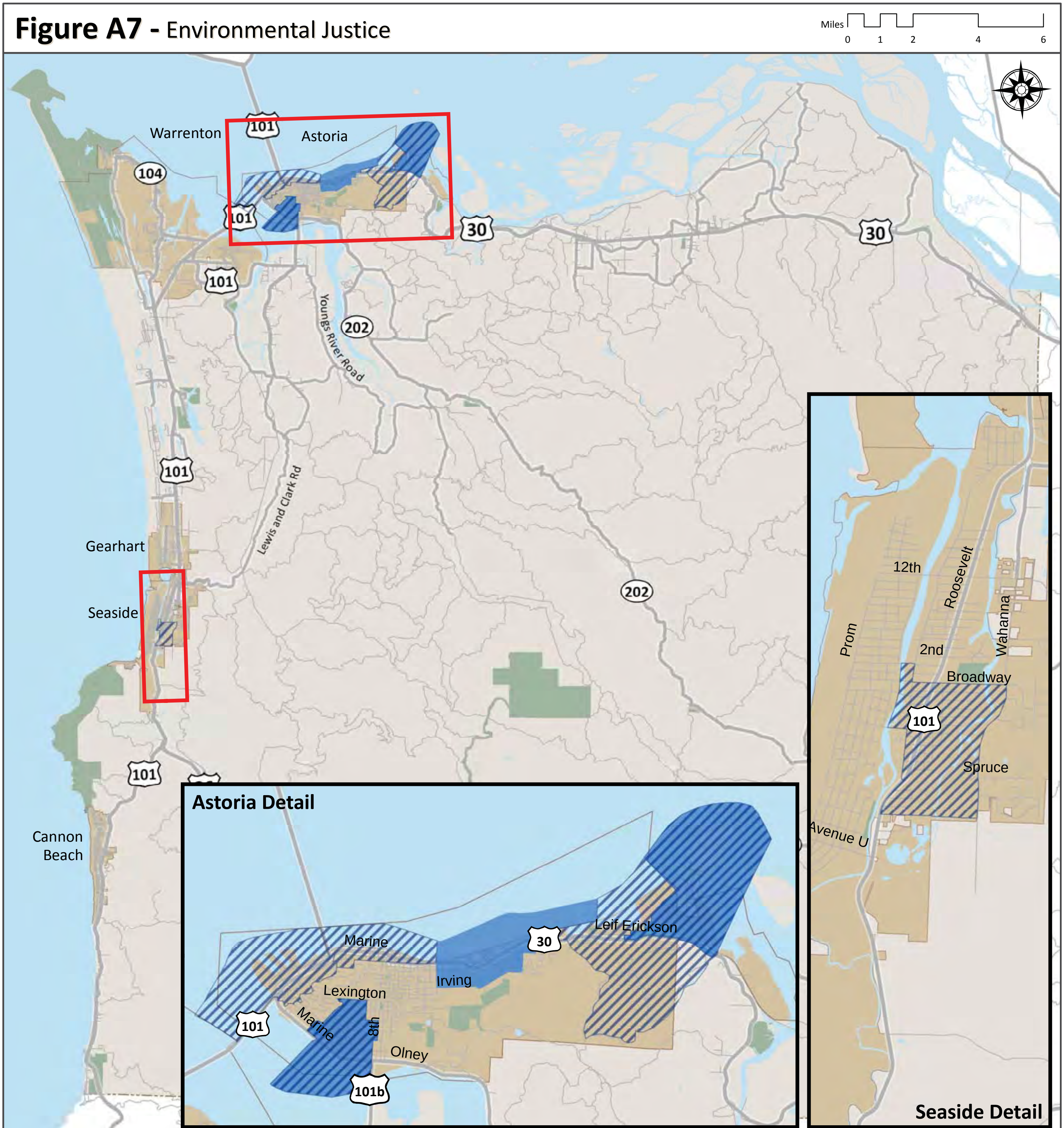
Legend

Freight Routes

- ODOT Freight Route and Federal Truck Route
- Federal Truck Route
- Harbor
- Astoria Airport
- Railroad
- City
- Park
- Clatsop County
- Stream

Environmental Justice

Figure A7 - Environmental Justice



Legend

- Significant Low Income Populations
- Significant Minority Group Populations
- City
- Park
- Clatsop County
- Water

Tsunami Evacuation Routes

TSUNAMI EVACUATION MAP

TSUNAMI EVACUATION ROUTE

ASTORIA, OREGON

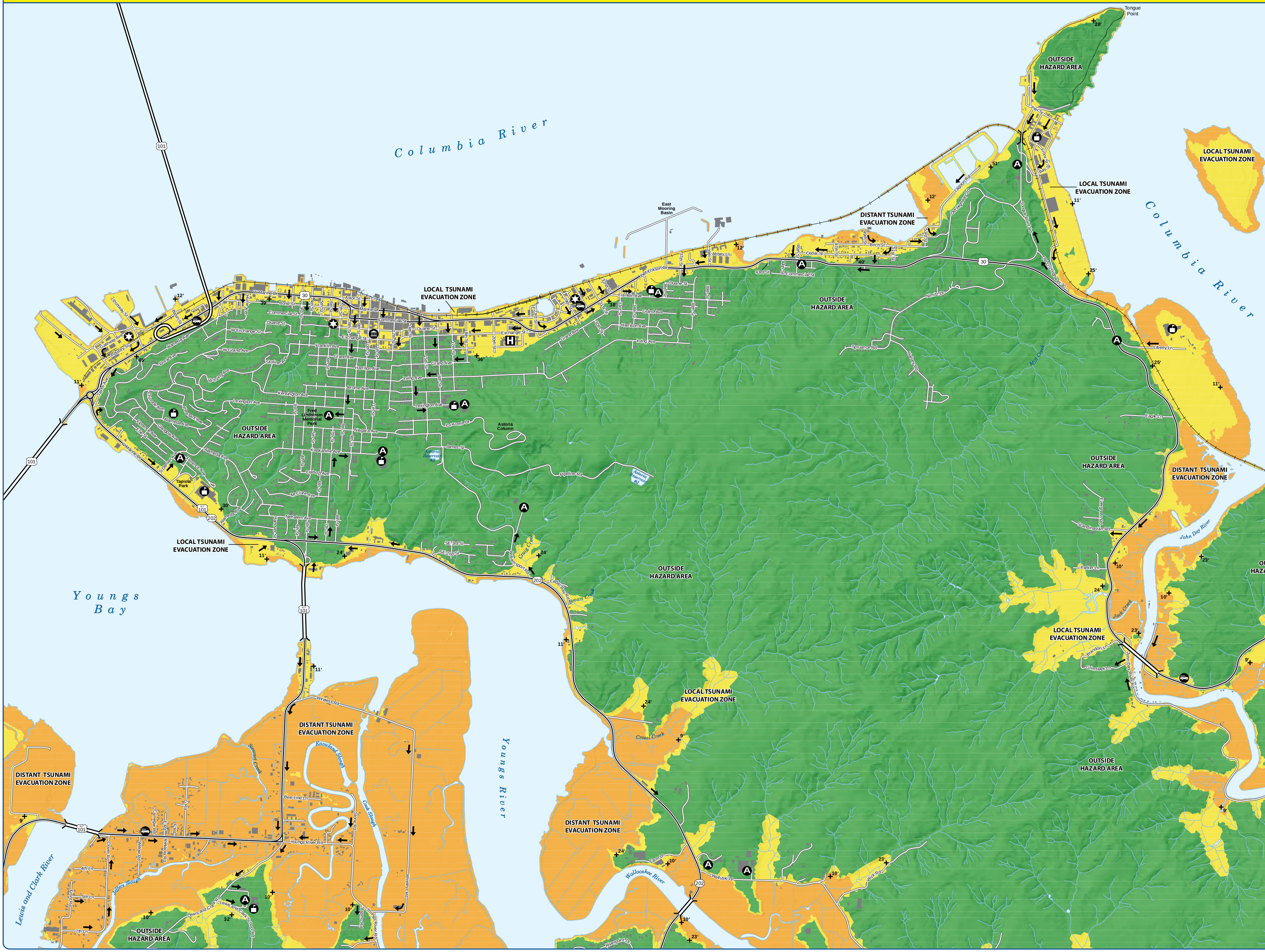
MAP LOCATION
OREGON

IF YOU FEEL AN EARTHQUAKE:
- Drop, cover, and hold
- Move immediately inland to higher ground
- Do not wait for an official warning

SI USTED SIENTE EL TEMBLOR:
- Tírese al suelo, cúbrase, y espere
- Diríjase de inmediato a un lugar más alto que el nivel del mar
- No espere por un aviso oficial

ASSEMBLY AREA / ÁREA REUNIÓN

OUTSIDE HAZARD AREA: Evacuate to this area for all tsunami warnings or if you feel an earthquake.	ZONA DE PELIGRO EXTERIOR: Evacue a esta área para todas las advertencias del maremoto o si usted siente un temblor.
LOCAL CASCADIA EARTHQUAKE AND TSUNAMI: Evacuation zone for a local tsunami from an earthquake at the Oregon coast.	MAREMOTO LOCAL (terremoto de Cascadia): Zona de evacuación para un tsunami local de un temblor cerca de la costa de Oregon.
DISTANT TSUNAMI: Evacuation zone for a distant tsunami from an earthquake far away from the Oregon coast.	MAREMOTO DISTANTE: Zona de evacuación para un tsunami distante de un temblor lejos de la costa de Oregon.



MAP SYMBOLS / SÍMBOLOS DEL MAPA

- Evacuation route / Ruta de evacuación
- Assembly area / Área reunión
- City Hall / Municipalidad
- Fire Department / Bomberos
- Law Enforcement / Policía
- School / Escuela
- Hospital / Hospital
- Bridge / Puente
- Trail / Sendero
- +35′ Elevation, in feet / Elevación, en pies

N

SCALE / ESCALA
0.25 mile
0.25 km

NOTICE

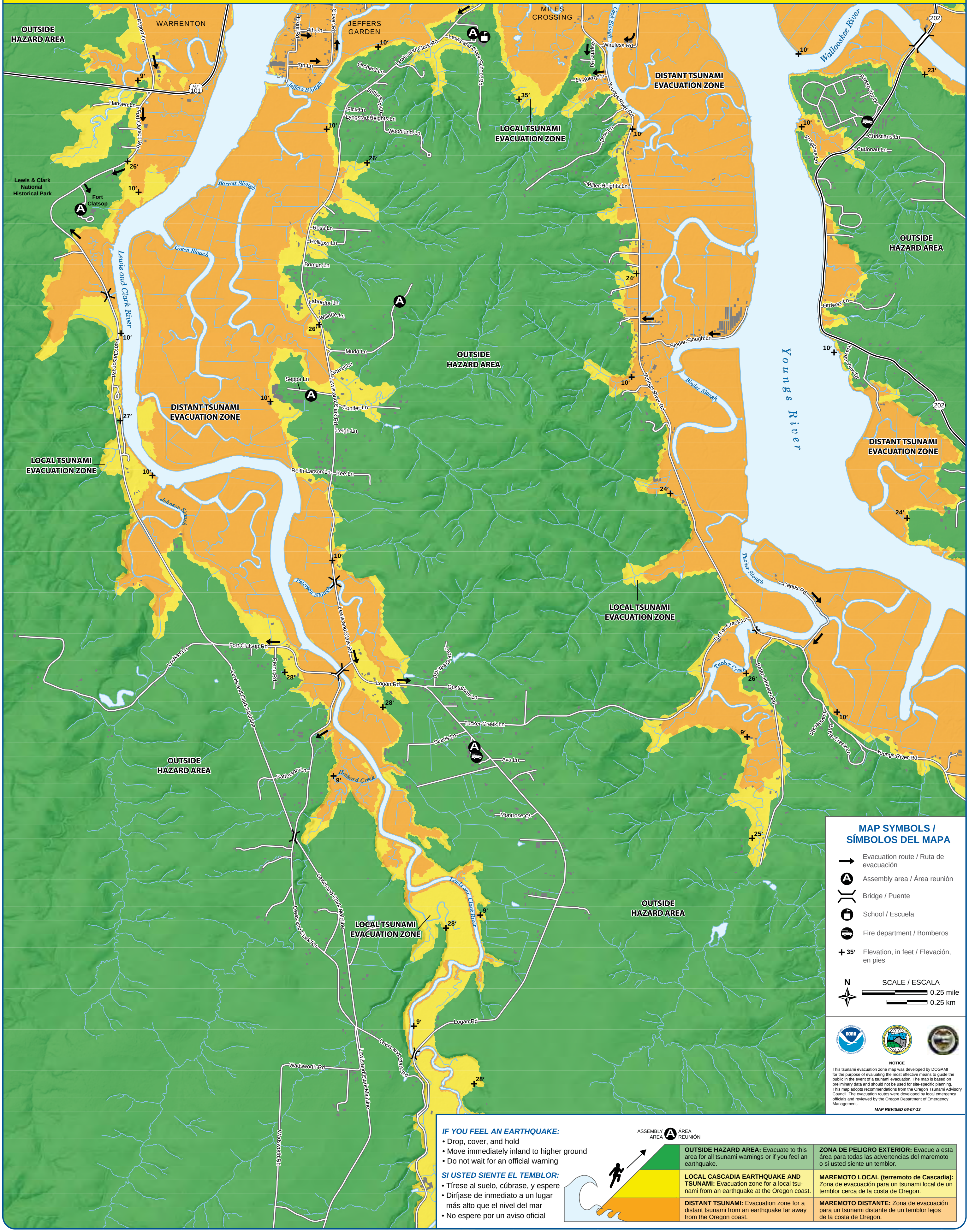
This tsunami evacuation zone map was developed by DOGAMI for the purpose of evaluating the most effective means to guide the public in the event of a tsunami evacuation. The map is based on preliminary data and should not be used for site-specific planning. This map adopts recommendations from the Oregon Tsunami Advisory Council. The evacuation routes were developed by local emergency officials and reviewed by the Oregon Department of Emergency Management.

MAP REVISED 06-06-13

TSUNAMI EVACUATION MAP YOUNGS RIVER VALLEY, OREGON

TSUNAMI EVACUATION ROUTE

MAP LOCATION OREGON



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MAP REVISED 06-07-13

IF YOU FEEL AN EARTHQUAKE:

- Drop, cover, and hold
- Move immediately inland to higher ground
- Do not wait for an official warning

SI USTED SIENTE EL TEMBLOR:

- Tírese al suelo, cúbrase, y espere
- Diríjase de inmediato a un lugar más alto que el nivel del mar
- No espere por un aviso oficial

OUTSIDE HAZARD AREA: Evacuate to this area for all tsunami warnings or if you feel an earthquake.	**ZONA DE PELIGRO EXTERIOR:** Evacue a esta área para todas las advertencias del maremoto o si usted siente un temblor.
LOCAL CASCADIA EARTHQUAKE AND TSUNAMI: Evacuation zone for a local tsunami from an earthquake at the Oregon coast.	**MAREMOTO LOCAL (terremoto de Cascadia):** Zona de evacuación para un tsunami local de un temblor cerca de la costa de Oregon.
DISTANT TSUNAMI: Evacuation zone for a distant tsunami from an earthquake far away from the Oregon coast.	**MAREMOTO DISTANTE:** Zona de evacuación para un tsunami distante de un temblor lejos de la costa de Oregon.

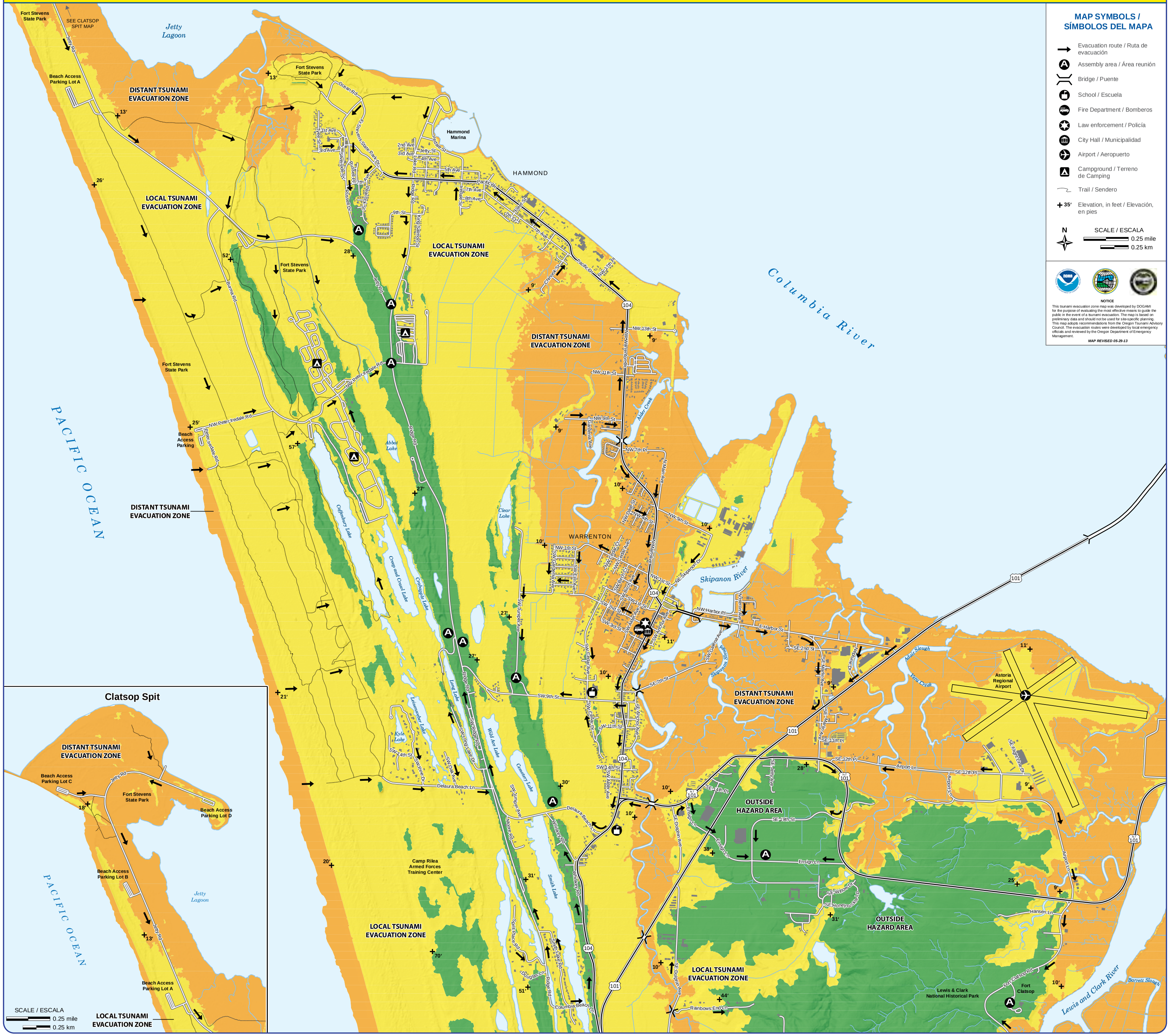
TSUNAMI EVACUATION MAP
WARRENTON, OREGON

IF YOU FEEL AN EARTHQUAKE:
- Drop, cover, and hold
- Move immediately inland to higher ground
- Do not wait for an official warning

SI USTED SIENTE EL TEMBLOR:
- Tírese al suelo, cúbrase, y espere
- Diríjase de inmediato a un lugar más alto que el nivel del mar
- No espere por un aviso oficial

ASSEMBLY AREA / ÁREA REUNIÓN

OUTSIDE HAZARD AREA: Evacuate to this area for all tsunami warnings or if you feel an earthquake.	ZONA DE PELIGRO EXTERIOR: Evacue a esta área para todas las advertencias del maremoto o si usted siente un temblor.
LOCAL CASCADIA EARTHQUAKE AND TSUNAMI: Evacuation zone for a local tsunami from an earthquake at the Oregon coast.	MAREMOTO LOCAL (terremoto de Cascadia): Zona de evacuación para un tsunami local de un temblor cerca de la costa de Oregon.
DISTANT TSUNAMI: Evacuation zone for a distant tsunami from an earthquake far away from the Oregon coast.	MAREMOTO DISTANTE: Zona de evacuación para un tsunami distante de un temblor lejos de la costa de Oregon.



MAP SYMBOLS / SÍMBOLOS DEL MAPA

- Evacuation route / Ruta de evacuación
- Assembly area / Área reunión
- Bridge / Puente
- School / Escuela
- Fire Department / Bomberos
- Law enforcement / Policía
- City Hall / Municipalidad
- Airport / Aeropuerto
- Campground / Terreno de Camping
- Trail / Sendero
- +35' Elevation, in feet / Elevación, en pies

N

SCALE / ESCALA
0.25 mile
0.25 km

NOTICE

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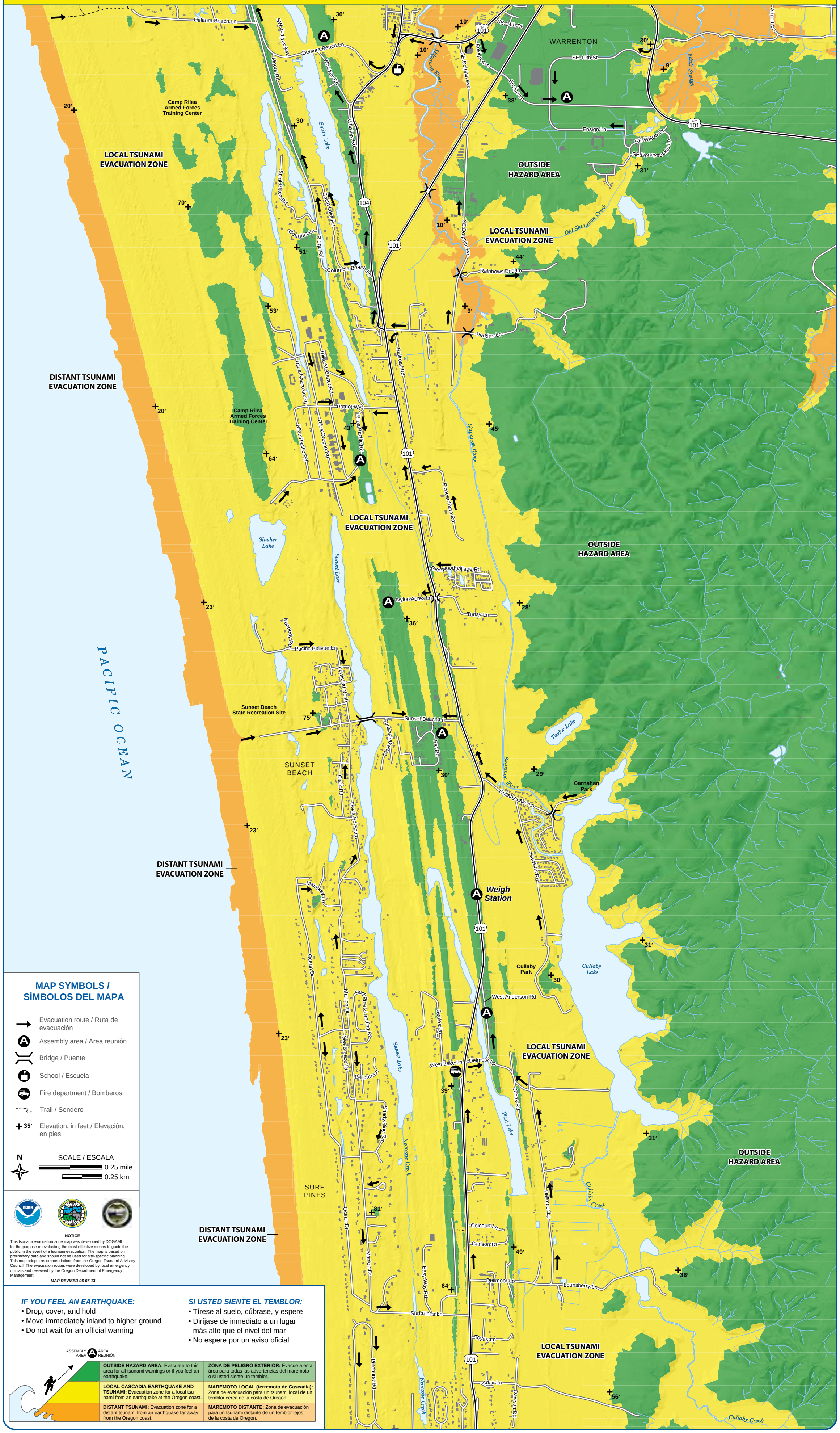
MAP REVISED 05-29-13

TSUNAMI EVACUATION MAP

SUNSET BEACH & DEL REY BEACH (CLATSOP PLAINS), OREGON



TSUNAMI EVACUATION MAP SEASIDE & GEARHART, OREGON

TSUNAMI EVACUATION ROUTE

MAP LOCATION OREGON

IF YOU FEEL AN EARTHQUAKE:

- Drop, cover, and hold
- Move immediately inland to higher ground
- Do not wait for an official warning

SI USTED SIENTE EL TEMBLOR:

- Tírese al suelo, cúbrase, y espere
- Diríjase de inmediato a un lugar más alto que el nivel del mar
- No espere por un aviso oficial

ASSEMBLY AREA / ÁREA REUNIÓN

OUTSIDE HAZARD AREA: Evacuate to this area for all tsunami warnings or if you feel an earthquake.	**ZONA DE PELIGRO EXTERIOR:** Evacue a esta área para todas las advertencias del maremoto o si usted siente un temblor.
LOCAL CASCADIA EARTHQUAKE AND TSUNAMI: Evacuation zone for a local tsunami from an earthquake at the Oregon coast.	**MAREMOTO LOCAL (terremoto de Cascadia):** Zona de evacuación para un tsunami local de un temblor cerca de la costa de Oregon.
DISTANT TSUNAMI: Evacuation zone for a distant tsunami from an earthquake far away from the Oregon coast.	**MAREMOTO DISTANTE:** Zona de evacuación para un tsunami distante de un temblor lejos de la costa de Oregon.

MAP SYMBOLS / SÍMBOLOS DEL MAPA

- Evacuation route / Ruta de evacuación
- Assembly area / Área reunión
- Bridge / Puente
- School / Escuela
- City Hall / Municipalidad
- Fire Department / Bomberos
- Law enforcement / Policía
- Hospital / Hospital
- Airport/Aeropuerto
- Trail / Sendero
- 35′ Elevation, in feet / Elevación, en pies

N

SCALE / ESCALA

0.25 mile

0.25 km

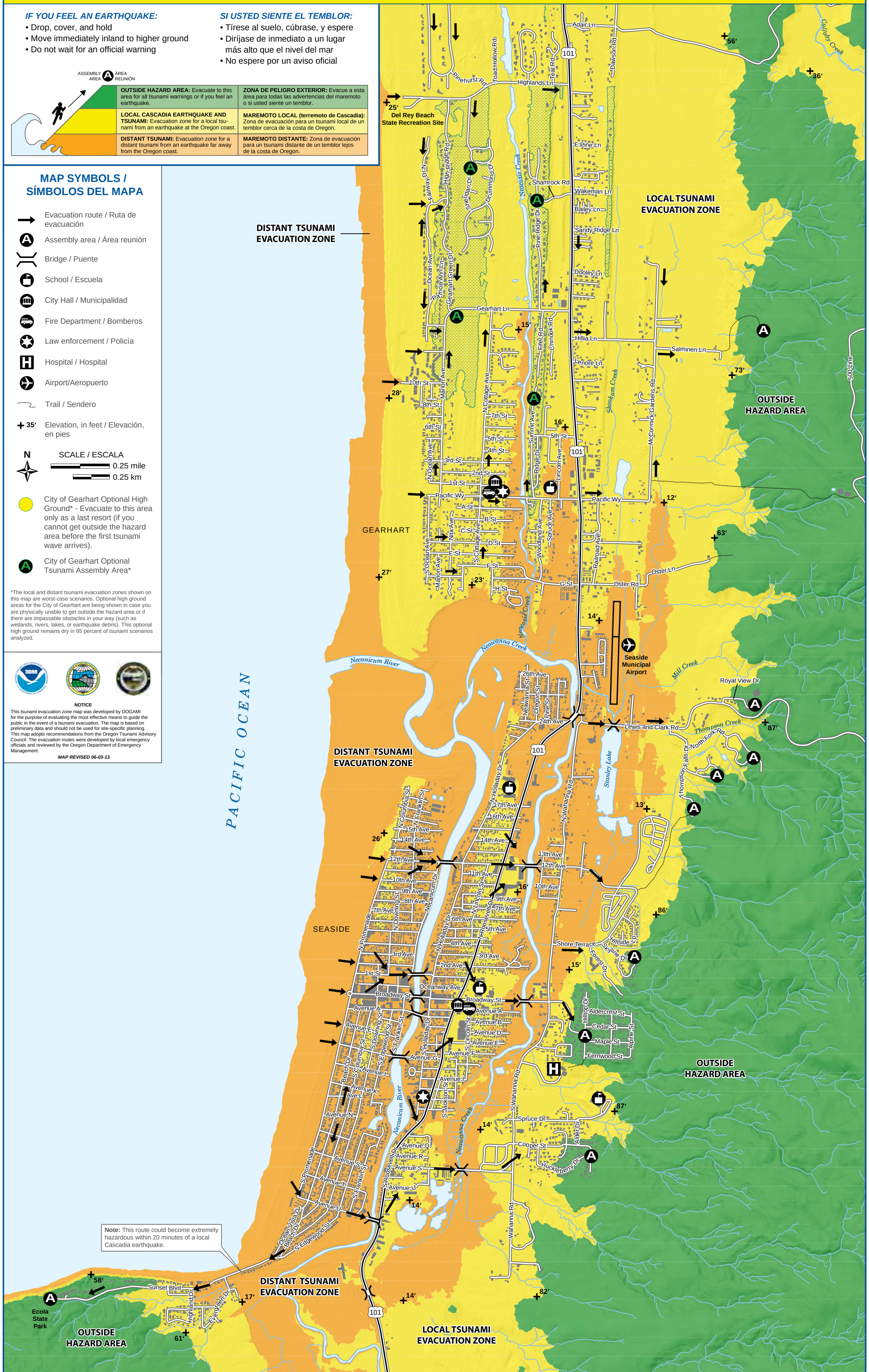
- City of Gearhart Optional High Ground* - Evacuate to this area only as a last resort (if you cannot get outside the hazard area before the first tsunami wave arrives).
- City of Gearhart Optional Tsunami Assembly Area*

*The local and distant tsunami evacuation zones shown on this map are worst-case scenarios. Optional high ground areas for the City of Gearhart are being shown in case you are physically unable to get outside the hazard area or if there are impassable obstacles in your way (such as wetlands, rivers, lakes, or earthquake debris). This optional high ground remains dry in 95 percent of tsunami scenarios analyzed.

NOTICE

This tsunami evacuation zone map was developed by DOGAMI for the purpose of evaluating the most effective means to guide the public in the event of a tsunami evacuation. The map is based on preliminary data and should not be used for site-specific planning. This map adopts recommendations from the Oregon Tsunami Advisory Council. The evacuation routes were developed by local emergency officials and reviewed by the Oregon Department of Emergency Management.

MAP REVISED 06-03-13



TSUNAMI EVACUATION MAP CANNON BEACH, OREGON

TSUNAMI EVACUATION ROUTE

MAP LOCATION OREGON

IF YOU FEEL AN EARTHQUAKE:
- Drop, cover, and hold
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- Do not wait for an official warning

SI USTED SIENTE EL TEMBLOR:
- Tírese al suelo, cúbrase, y espere
- Diríjase de inmediato a un lugar más alto que el nivel del mar
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ASSEMBLY AREA / ÁREA REUNIÓN

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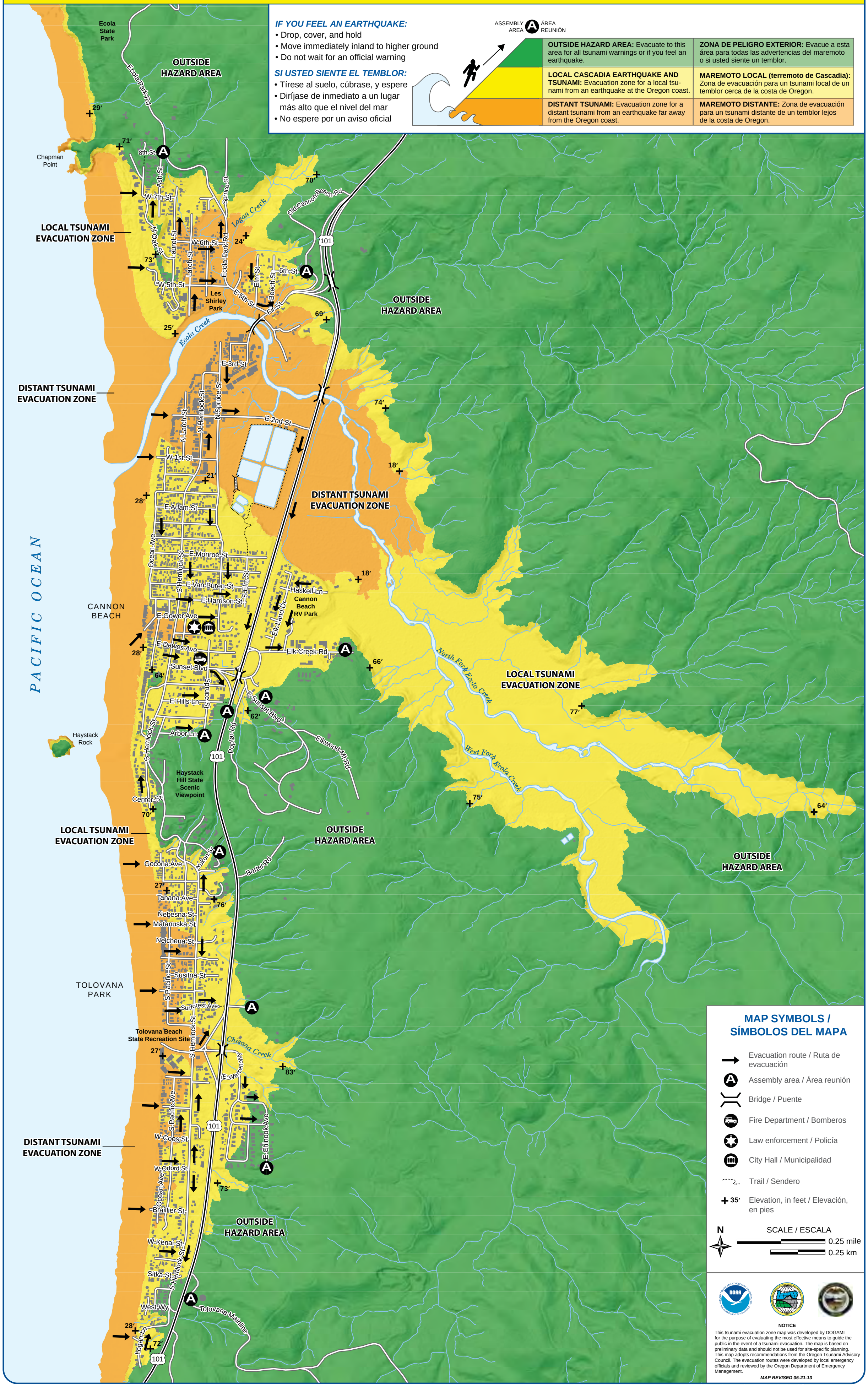

MAP SYMBOLS / SÍMBOLOS DEL MAPA

- Evacuation route / Ruta de evacuación
- Assembly area / Área reunión
- Bridge / Puente
- Fire Department / Bomberos
- Law enforcement / Policía
- City Hall / Municipalidad
- Trail / Sendero
- 35' Elevation, in feet / Elevación, en pies

N

SCALE / ESCALA

0.25 mile

0.25 km

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MAP REVISED 05-21-13

TSUNAMI EVACUATION MAP ARCH CAPE, OREGON

IF YOU FEEL AN EARTHQUAKE:
- Drop, cover, and hold
- Move immediately inland to higher ground
- Do not wait for an official warning

SI USTED SIENTE EL TEMBLOR:
- Tírese al suelo, cúbrase, y espere
- Diríjase de inmediato a un lugar más alto que el nivel del mar
- No espere por un aviso oficial

ASSEMBLY AREA / ÁREA REUNIÓN

OUTSIDE HAZARD AREA: Evacuate to this area for all tsunami warnings or if you feel an earthquake.	**ZONA DE PELIGRO EXTERIOR:** Evacue a esta área para todas las advertencias del maremoto o si usted siente un temblor.
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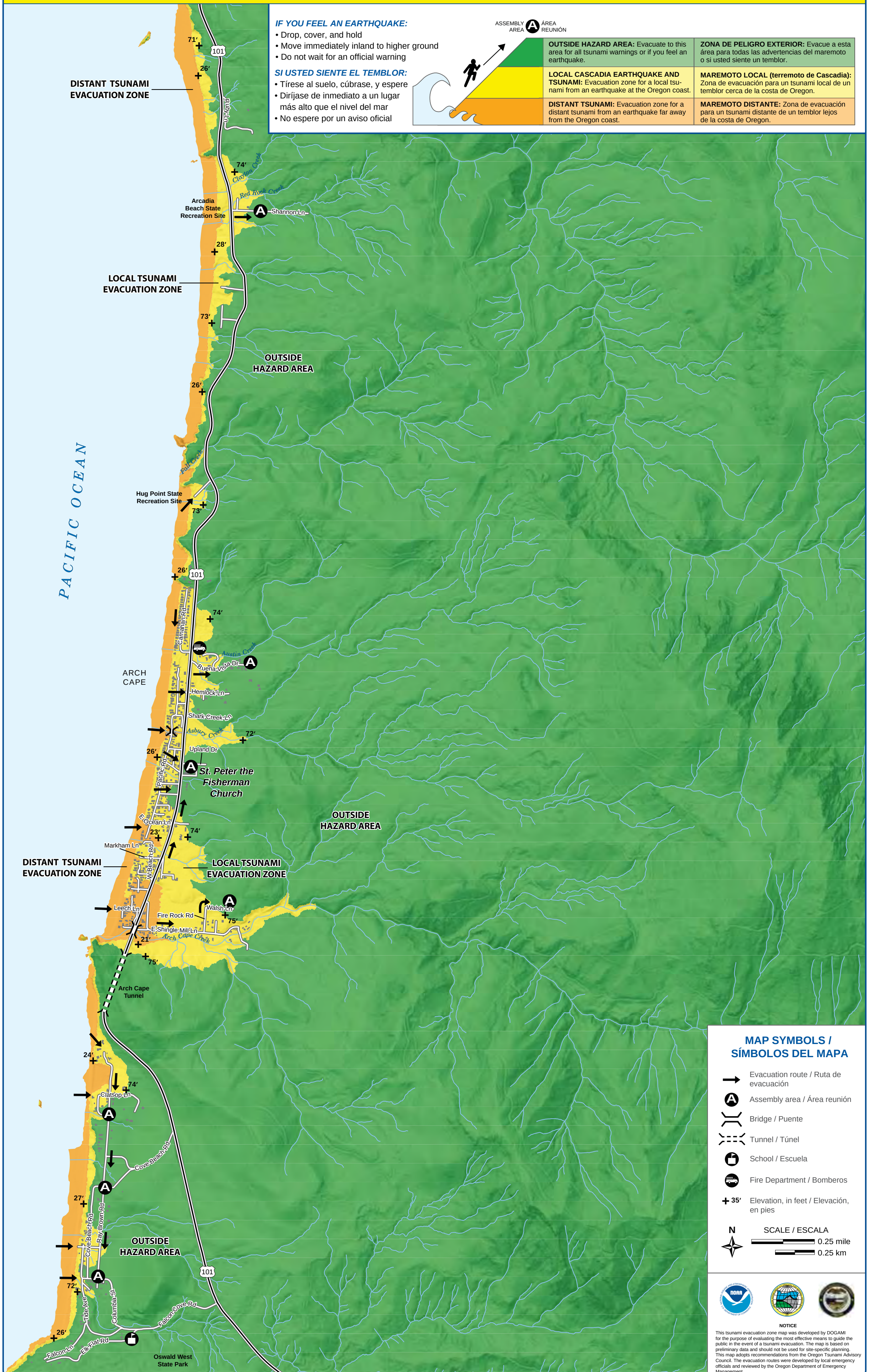

MAP SYMBOLS / SÍMBOLOS DEL MAPA

- Evacuation route / Ruta de evacuación
- Assembly area / Área reunión
- Bridge / Puente
- Tunnel / Túnel
- School / Escuela
- Fire Department / Bomberos
- 35′ Elevation, in feet / Elevación, en pies

N

SCALE / ESCALA
0.25 mile
0.25 km

NOTICE

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MAP REVISED 05-21-13

Intersection Operations Summary

Intersection Operations (2013 PM Peak)

Intersection	Mobility Target	Summer		Average Weekday	
		v/c Ratio	Delay (sec/veh)	v/c Ratio	Delay (sec/veh)
Signalized Intersections under State Jurisdiction					
US 101 / Warrenton-Astoria Hwy / Marlin Dr	0.90	0.82	32.5	0.55	24.5
US 101 / E Harbor St	0.90	**1.00**	39.5	0.67	17.8
Unsignalized Intersections under State Jurisdiction*					
US 26 / OR 53	0.80	0.12	16.7	0.07	12.5
OR 53 / Hamlet Rd	0.80	0.01	8.7	0.01	8.7
US 26 / OR 103	0.75	0.10	13.7	0.05	11.2
US 26 / Lower Nehalem Rd	0.80	0.03	13.7	0.02	11.4
OR 202 / OR 103	0.80	0.04	9.0	0.03	8.8
OR 202 / Walluski Loop	0.75	0.04	11.4	0.03	10.9
US 30 / Ziak-Gnat Creek Rd	0.75	0.05	14.9	0.03	12.0
US 30 / Hillscrest Loop Rd	0.80	0.45	29.8	0.31	19.1
OR 202 / Youngs River Rd	0.80	0.03	9.2	0.03	9.2
OR 202 / Walluski Loop Rd (south)	0.75	0.02	9.0	0.02	8.9
US 30 / Front St / Westport Ferry Rd	0.80	0.07	17.6	0.04	13.0
US 30 / Svensen Market Rd	0.80	0.61	48.3	0.36	21.6
US 101 / Fort Stevens Hwy	0.90	0.47	27.5	0.29	17.5
US 101 / Sunset Beach Rd	0.95	0.62	91.5	0.29	35.6
Fort Stevens Hwy / Warrenton-Astoria Hwy / NE Skipanon Dr	0.95	0.62	20.0	0.43	13.2
Warrenton-Astoria Hwy / Youngs River Rd / Lewis and Clark Rd***	0.80	0.15	10.8	0.12	10.3
Warrenton-Astoria Hwy / Fort Clatsop Rd / SE Airport Ln	0.90	0.21	14.3	0.15	12.5
Fort Stevens Hwy / Columbia Beach Ln	0.75	0.05	9.5	0.04	9.3
Fort Steven's Hwy / Fort Stevens Hwy Spur	0.95	0.57	18.7	0.39	13.5
Unsignalized Intersections under County Jurisdiction*					
Youngs River Rd / Tucker Creek Ln	0.75	0.02	9.0	0.02	9.0
Fort Clatsop Rd / Lewis and Clark Rd**	0.75	0.06	9.2	0.06	9.1
Lewis and Clark Rd / Logan Rd**	0.75	0.07	9.4	0.07	9.3
Lewis and Clark Rd / Logan Rd (south)**	0.75	0.02	8.7	0.02	8.7
Lewis and Clark Rd / N Wahanna Rd / Crown Camp Rd	0.75	0.16	9.6	0.13	9.3
Old US Hwy 30 / Knappa Dock Rd	0.80	0.06	9.6	0.06	9.6
Old US Hwy 30 / Svensen Market Rd	0.80	0.18	10.4	0.18	10.4

* Operations reported for worst strop-controlled movement

** Intersection configuration cannot be analyzed in Synchro--modifications made to best represent operations

*** Intersection configuration cannot be analyzed in Synchro--operations calculated manually

Bold Red and Shaded indicates intersection exceeds mobility target

Study Intersection and Segment Critical Crash Rate Analysis

Intersection Critical Crash Rate Calculations

General & Site Information	
Analyst:	BLC
Agency/Company:	DKS Associates
Date:	4/1/2014
Project Name:	Clatsop County TSP

Intersection Crash Data

	Year					
Intersection	**2008**	**2009**	**2010**	**2011**	**2012**	**Total**
Fort Stevens Hwy / Warrenton-Astoria Hwy / NE Skipanon Dr	0	0	1	0	0	1
Youngs River Rd / Tucker Creek Ln	0	0	0	0	0	0
Warrenton-Astoria Hwy / Youngs River Rd / Lewis and Clark Rd	1	0	0	0	1	2
Fort Clatsop Rd / Lewis and Clark Rd	0	0	0	1	0	1
Lewis and Clark Rd / Logan Rd	0	0	0	0	0	0
Lewis and Clark Rd / Logan Rd (south)	0	0	0	0	0	0
Lewis and Clark Rd / N Wahanna Rd / Crown Camp Rd	0	1	1	0	0	2
US 26 / OR 53	1	1	0	1	1	4
OR 53 / Hamlet Rd	0	0	0	1	0	1
Warrenton-Astoria Hwy / Fort Clatsop Rd / SE Airport Ln	1	1	1	0	0	3
US 26 / OR 103	1	2	2	0	1	6
US 101 / Warrenton-Astoria Hwy / Marlin Dr	6	2	6	8	6	28
US 26 / Lower Nehalem Rd	1	0	0	1	0	2
OR 202 / OR 103	0	0	0	0	0	0
OR 202 / Walluski Loop	0	0	0	0	1	1
US 30 / Ziak-Gnat Creek Rd	0	0	0	1	0	1
US 30 / Hillscrest Loop Rd	2	0	3	2	4	11
Old US Hwy 30 / Knappa Dock Rd	0	0	0	0	0	0
OR 202 / Youngs River Rd	0	0	0	0	0	0
OR 202 / Walluski Loop Rd (south)	0	0	0	1	0	1
Old US Hwy 30 / Svensen Market Rd	1	0	2	0	0	3
US 101 / E Harbor St	6	2	11	8	9	36
US 30 / Front St / Westport Ferry Rd	0	0	0	0	0	0
US 30 / Svensen Market Rd	0	1	2	1	2	6
US 101 / Fort Stevens Hwy	4	3	2	3	0	12
Fort Stevens Hwy / Columbia Beach Ln	0	1	1	0	0	2
Fort Steven's Hwy / Fort Stevens Hwy Spur	0	0	0	0	0	0
US 101 / Sunset Beach Rd	2	0	2	1	3	8
Total	13	7	14	16	14	64

Intersection Population Type Crash Rate Average Crash Rate per intersection type					
Intersection Pop. Type	Number	Sum of Crashes	Sum of 5-year MEV	Avg Crash Rate for Ref Pop.	
U3SG - Urban 3 Leg Signalized (n=1) *	1	36	37	0.9655	* n<5
U3ST - Urban 3 Leg Stop Controlled (n=2) *	2	2	18	0.1121	* n<5
U4SG - Urban 4 Leg Signalized (n=1) *	3	28	32	0.87	* n<5
U4ST - Urban 4 Leg Stop Controlled (n=5)	4	17	49	0.35	
R3ST - Rural 3 Leg Stop Controlled (n=13) **	5	26	80	0.33	** Pop. includes 3 yield-controlled intersectior
R4ST - Rural 4 Leg Stop Controlled (n=6)	6	22	71	0.31	

Critical Rate Calculation								
Intersection	AADT Entering Intersection	5-year MEV	Crash Total	Intersection Population Type	Intersection Crash Rate	Reference Population Crash Rate	Critical Rate	Over Critical
Fort Stevens Hwy / Warrenton-Astoria Hwy / NE Skipanon Dr	10,770	19.7	1	4	0.05	0.35	0.59	Under
Youngs River Rd / Tucker Creek Ln	810	1.5	0	5	0.00	0.33	1.44	Under
Warrenton-Astoria Hwy / Youngs River Rd / Lewis and Clark Rd	4,570	8.3	2	4	0.24	0.35	0.74	Under
Fort Clatsop Rd / Lewis and Clark Rd	1,090	2.0	1	5	0.50	0.33	1.24	Under
Lewis and Clark Rd / Logan Rd	1,740	3.2	0	5	0.00	0.33	1.01	Under
Lewis and Clark Rd / Logan Rd (south)	640	1.2	0	5	0.00	0.33	1.62	Under
Lewis and Clark Rd / N Wahanna Rd / Crown Camp Rd	3,220	5.9	2	2	0.34	0.11	0.29	**Over**
US 26 / OR 53	5,830	10.6	4	5	0.38	0.33	0.66	Under
OR 53 / Hamlet Rd	590	1.1	1	5	0.93	0.33	1.70	Under
Warrenton-Astoria Hwy / Fort Clatsop Rd / SE Airport Ln	4,900	8.9	3	6	0.34	0.31	0.67	Under
US 26 / OR 103	5,710	10.4	6	5	0.58	0.33	0.67	Under
US 101 / Warrenton-Astoria Hwy / Marlin Dr	17,720	32.3	28	3	0.87	0.87	0.86	**Over**
US 26 / Lower Nehalem Rd	5,460	10.0	2	5	0.20	0.33	0.67	Under
OR 202 / OR 103	670	1.2	0	6	0.00	0.31	1.54	Under
OR 202 / Walluski Loop	2,840	5.2	1	5	0.19	0.33	0.84	Under
US 30 / Ziak-Gnat Creek Rd	5,190	9.5	1	6	0.11	0.31	0.66	Under
US 30 / Hillscrest Loop Rd	7,630	13.9	11	4	0.79	0.35	0.64	**Over**
Old US Hwy 30 / Knappa Dock Rd	1,160	2.1	0	4	0.00	0.35	1.25	Under
OR 202 / Youngs River Rd	850	1.6	0	5	0.00	0.33	1.40	Under
OR 202 / Walluski Loop Rd (south)	1,180	2.2	1	5	0.46	0.33	1.20	Under
Old US Hwy 30 / Svensen Market Rd	2,590	4.7	3	4	0.63	0.35	0.90	Under
US 101 / E Harbor St	20,430	37.3	36	1	0.97	0.97	0.51	**Over**
US 30 / Front St / Westport Ferry Rd	6,240	11.4	0	6	0.00	0.31	0.62	Under
US 30 / Svensen Market Rd	7,880	14.4	6	6	0.42	0.31	0.58	Under
US 101 / Fort Stevens Hwy	14,140	25.8	12	6	0.47	0.31	0.51	Under
Fort Stevens Hwy / Columbia Beach Ln	2,920	5.3	2	5	0.38	0.33	0.83	Under
Fort Steven's Hwy / Fort Stevens Hwy Spur	6,560	12.0	0	2	0.00	0.11	0.29	Under
US 101 / Sunset Beach Rd	14,000	25.6	8	5	0.31	0.33	0.53	Under

* Cells with an orange highlight indicate intersections with a reference population of less than 5 intersections.
A reference population with less than 5 intersections is insufficient for a statistically significant critical rate.
Therefore, highlighted intersection critical rates use Statewide Average 90th Percentile Rates (APM Exhibit 4-1)

Exhibit 4-1 Intersection Crash Rates per MEV by Land Type and Traffic Control

	Rural				Urban			
	3SG	3ST	4SG	4ST	3SG	3ST	4SG	4ST
No. of Intersections	7	115	20	60	55	77	106	60
Mean Crash Rate	0.226	0.196	0.324	0.434	0.275	0.131	0.477	0.198
Median Crash Rate	0.163	0.092	0.320	0.267	0.252	0.105	0.420	0.145
Standard Deviation	0.185	0.314	0.223	0.534	0.155	0.121	0.273	0.176
Coefficient of Variation	0.819	1.602	0.688	1.230	0.564	0.924	0.572	0.889
90th Percentile Rate	**0.464**	**0.475**	**0.579**	**1.080**	**0.509**	**0.293**	**0.860**	**0.408**

Source: Assessment Of Statewide Intersection Safety Performance, FHWA-OR-RD-18, Portland State University and Oregon State University, June 2011, Table 4.1, p. 47.

A spreadsheet calculator has been developed that implements the critical rate calculations for intersections. For additional information see pages 4-35 through 4-39 in HSM Volume 1. Example 4-1 illustrates the use of the Critical Rate method for urban area intersections.

Segment Critical Crash Rate Calculations

Compared to Clatsop County Averages and Statewide Averages

General & Site Information	
Analyst:	BLC
Agency/Company:	DKS Associates
Date:	4/1/2014
Project Name:	Clatsop County TSP

Reference Population Type Crash Rates

Segment Reference Population Type	Population Type Number	No. of Segs in Reference Population	Sum of Crashes	Sum of MVMT	Avg Crash Rate for Ref Pop.	Statewide Avg Crash Rates (ODOT Table II)	Notes
County Arterial	1	6	17	20.3	0.84	1.05	* Rural Minor Arterial Value Used for Statewide Avg
County Collector	2	106	82	109.9	0.75	1.26	* Rural Major Collector Value Used for Statewide Avg
ODOT Rural Other Principal Arterial	3	60	785	1126.4	0.70	0.738	
ODOT Rural Major Collector	4	39	187	167.5	1.12	1.26	
ODOT Urban Other Principal Arterial	5	53	273	275.6	0.99	2.286	
ODOT Urban Minor Arterial	6	3	10	5.1	2.45	2.45	* Populations 6 and 7 include less than 5 members. "Avg Crash
ODOT Urban Collector	7	1	2	2.0	1.68	1.678	Rate for Ref Pop." uses statewide average crash rate.

	Critical Rate Calculation													Critical Rate Calculation using Statewide Avg. Crash Rates			
Road Name	Segment ID	Ref. Pop. Type	Begin Milepoint	End Milepoint	5 Year Crash Total	AADT	Segment Length**	Pop. Type Number	MVMT	Segment Crash Rate	Ref. Pop. Crash Rate	Critical Rate	Over Critical	Ref. Pop. Crash Rate	Critical Rate	Over Critical	*Over Critical and Seg. Length >= 1 Mile*
5Th Street	1	ODOT Urban Minor Arterial			0	3500	0.10	6	0.65	0.00	2.45	6.41	Under	2.45	6.41	Under	
8Th Street	2	ODOT Urban Other Principal Arterial			1	9600	0.05	5	0.83	1.20	0.99	3.39	Under	2.29	5.61	Under	
Abbott Road	3	County Collector			0	591	0.14	2	0.15	0.00	0.75	7.87	Under	1.26	9.50	Under	
Airport Lane	4	County Collector			0	330	0.15	2	0.09	0.00	0.75	11.23	Under	1.26	13.18	Under	
Airport Lane	5	County Collector			0	330	0.43	2	0.26	0.00	0.75	5.51	Under	1.26	6.86	Under	
Airport Lane	6	County Collector			0	330	0.84	2	0.50	0.00	0.75	3.74	Under	1.26	4.85	Under	
Airport Road	7	County Collector			0	330	0.12	2	0.07	0.00	0.75	12.61	Under	1.26	14.68	Under	
Airport Road	8	County Collector			0	330	0.04	2	0.02	0.00	0.75	32.92	Under	1.26	36.30	Under	
Airport Road	9	County Collector			0	330	0.29	2	0.17	0.00	0.75	7.01	Under	1.26	8.54	Under	
Airport Road	10	County Collector			0	330	0.28	2	0.17	0.00	0.75	7.18	Under	1.26	8.73	Under	
Airport Road	11	County Collector			0	330	0.10	2	0.06	0.00	0.75	15.14	Under	1.26	17.41	Under	
Airport Road	12	County Collector			0	330	0.30	2	0.18	0.00	0.75	6.93	Under	1.26	8.45	Under	
Aldrich Point Road	13	County Collector			0	199	4.29	2	1.56	0.00	0.75	2.20	Under	1.26	3.06	Under	
Avenue U	14	County Collector			0	300	0.04	2	0.02	0.00	0.75	31.46	Under	1.26	34.76	Under	
Bagley Lane	15	County Collector			0	155	0.52	2	0.15	0.00	0.75	7.84	Under	1.26	9.46	Under	
Bagley Lane	16	County Collector			0	513	0.33	2	0.31	0.00	0.75	4.89	Under	1.26	6.16	Under	
Barendse Road	17	County Collector			0	168	0.75	2	0.23	0.00	0.75	5.90	Under	1.26	7.31	Under	
Beneke Creek Road	18	County Collector			0	38	2.98	2	0.21	0.00	0.75	6.29	Under	1.26	7.74	Under	
Brownsmead Hill Road	19	County Collector			0	180	1.51	2	0.50	0.00	0.75	3.77	Under	1.26	4.88	Under	
Clifton Road	20	County Collector			1	30	3.98	2	0.22	4.59	0.75	6.09	Under	1.26	7.51	Under	
Coast Hwy Conn.	21	ODOT Rural Other Principal Arterial			5	860	0.10	3	0.15	33.14	0.70	7.55	**Over**	0.74	7.69	**Over**	
Coast Hwy Conn.	22	ODOT Rural Major Collector			3	570	0.34	4	0.36	8.44	1.12	5.44	**Over**	1.26	5.76	**Over**	
Columbia Beach Lane	23	County Collector			0	606	0.27	2	0.30	0.00	0.75	5.02	Under	1.26	6.31	Under	
Commercial Street	24	ODOT Urban Other Principal Arterial			1	8500	0.05	5	0.74	1.36	0.99	3.58	Under	2.29	5.86	Under	
Commercial Street	25	ODOT Urban Other Principal Arterial			3	8500	0.05	5	0.73	4.08	0.99	3.58	**Over**	2.29	5.87	Under	
Commercial Street	26	ODOT Urban Other Principal Arterial			7	8500	0.05	5	0.74	9.49	0.99	3.58	**Over**	2.29	5.86	**Over**	
Commercial Street	27	ODOT Urban Other Principal Arterial			4	8100	0.14	5	2.01	1.99	0.99	2.39	Under	2.29	4.29	Under	
Commercial Street	28	ODOT Urban Other Principal Arterial			12	8500	0.08	5	1.18	10.21	0.99	2.93	**Over**	2.29	5.00	**Over**	
Cullaby Lake Road	29	County Collector			0	50	0.05	2	0.00	0.00	0.75	125.44	Under	1.26	132.10	Under	
Cullaby Lake Road	30	County Collector			0	50	0.07	2	0.01	0.00	0.75	95.38	Under	1.26	101.18	Under	
Cullaby Lake Road	31	County Collector			0	870	0.20	2	0.31	0.00	0.75	4.88	Under	1.26	6.15	Under	
Cullaby Lake Road	32	County Collector			0	50	0.20	2	0.02	0.00	0.75	39.47	Under	1.26	43.17	Under	
Delaura Beach Ln	33	County Collector			3	1968	0.86	2	3.09	0.97	0.75	1.72	Under	1.26	2.47	Under	
Dellmoor Loop	34	County Collector			0	330	0.11	2	0.06	0.00	0.75	14.28	Under	1.26	16.49	Under	
Dellmoor Loop	35	County Collector			0	330	0.30	2	0.18	0.00	0.75	6.82	Under	1.26	8.33	Under	
Dellmoor Loop	36	County Collector			0	330	0.03	2	0.02	0.00	0.75	37.97	Under	1.26	41.60	Under	
Dellmoor Loop	37	County Collector			0	330	0.15	2	0.09	0.00	0.75	10.92	Under	1.26	12.84	Under	
Dellmoor Loop	38	County Collector			0	330	1.07	2	0.64	0.00	0.75	3.30	Under	1.26	4.34	Under	
Dellmoor Loop	39	County Collector			0	330	0.11	2	0.07	0.00	0.75	13.65	Under	1.26	15.80	Under	
Fishhawk Road	40	County Collector			0	154	1.24	2	0.35	0.00	0.75	4.59	Under	1.26	5.82	Under	
Fishhawk Road	41	County Collector			0	154	1.07	2	0.30	0.00	0.75	4.99	Under	1.26	6.28	Under	
Flight Line Drive	42	County Collector			0	330	0.03	2	0.02	0.00	0.75	37.07	Under	1.26	40.65	Under	
Flight Line Drive	43	County Collector			0	330	0.02	2	0.01	0.00	0.75	63.72	Under	1.26	68.45	Under	
Flight Line Drive	44	County Collector			0	330	0.02	2	0.01	0.00	0.75	55.87	Under	1.26	60.29	Under	

Road Name	Segment ID	Ref. Pop. Type	Begin Milepoint	End Milepoint	5 Year Crash Total	AADT	Segment Length**	Pop. Type Number	MVMT	Segment Crash Rate	Ref. Pop. Crash Rate	Critical Rate	Over Critical	Ref. Pop. Crash Rate	Critical Rate	Over Critical	*and Seg. Length >= 1 Mile*
Flight Line Drive	45	County Collector			0	330	0.15	2	0.09	0.00	0.75	11.05	Under	1.26	12.98	Under	
Fort Clatsop Road	46	County Collector			3	1239	3.75	2	8.48	0.35	0.75	1.29	Under	1.26	1.95	Under	
Fort Clatsop Road	47	County Collector			1	1239	0.03	2	0.08	13.25	0.75	12.54	**Over**	1.26	14.61	Under	
Fort Clatsop Road	48	County Collector			0	1239	0.04	2	0.10	0.00	0.75	10.31	Under	1.26	12.18	Under	
Fort Stevens Hwy	49	ODOT Rural Major Collector			11	5300	1.63	4	15.72	0.70	1.12	1.59	Under	1.26	1.76	Under	
Fort Stevens Hwy	50	ODOT Rural Major Collector			1	3100	0.24	4	1.34	0.75	1.12	2.99	Under	1.26	3.23	Under	
Fort Stevens Hwy	51	ODOT Rural Major Collector			3	4600	0.82	4	6.87	0.44	1.12	1.85	Under	1.26	2.04	Under	
Fort Stevens Hwy	52	ODOT Rural Major Collector			0	1100	0.09	4	0.19	0.00	1.12	7.79	Under	1.26	8.18	Under	
Fort Stevens Hwy	53	ODOT Rural Major Collector			4	6600	0.42	4	5.11	0.78	1.12	1.98	Under	1.26	2.17	Under	
Fort Stevens Hwy	54	ODOT Rural Major Collector			2	3500	0.60	4	3.85	0.52	1.12	2.13	Under	1.26	2.33	Under	
Fort Stevens Hwy	55	ODOT Rural Major Collector			0	3000	0.51	4	2.80	0.00	1.12	2.33	Under	1.26	2.54	Under	
Fort Stevens Hwy	56	ODOT Rural Major Collector			0	6600	0.07	4	0.88	0.00	1.12	3.53	Under	1.26	3.79	Under	
Fort Stevens Hwy	57	ODOT Rural Major Collector			2	4600	0.32	4	2.65	0.76	1.12	2.37	Under	1.26	2.58	Under	
Fort Stevens Spur	58	ODOT Rural Major Collector			0	2400	0.88	4	3.87	0.00	1.12	2.13	Under	1.26	2.33	Under	
G Street	59	County Collector			0	117	0.22	2	0.05	0.00	0.75	18.06	Under	1.26	20.54	Under	
Hamlet Road	60	County Collector			2	214	6.71	2	2.62	0.76	0.75	1.81	Under	1.26	2.59	Under	
Hawkins Road	61	County Collector			0	550	0.20	2	0.20	0.00	0.75	6.48	Under	1.26	7.95	Under	
Hawkins Road	62	County Collector			0	550	0.01	2	0.01	0.00	0.75	50.83	Under	1.26	55.04	Under	
Hawkins Road	63	County Collector			0	550	0.12	2	0.12	0.00	0.75	8.97	Under	1.26	10.71	Under	
Hawkins Road	64	County Collector			0	550	0.24	2	0.24	0.00	0.75	5.67	Under	1.26	7.04	Under	
Hawkins Road	65	County Collector			0	550	0.05	2	0.05	0.00	0.75	17.61	Under	1.26	20.06	Under	
Hawkins Road	66	County Collector			0	550	0.07	2	0.07	0.00	0.75	13.63	Under	1.26	15.79	Under	
Hawkins Road	67	County Collector			0	550	0.05	2	0.06	0.00	0.75	15.88	Under	1.26	18.20	Under	
Highlands Rd	68	County Collector			0	766	0.63	2	0.89	0.00	0.75	2.82	Under	1.26	3.79	Under	
Highway 101	69	ODOT Urban Other Principal Arterial			1	6900	0.11	5	1.42	0.70	0.99	2.72	Under	2.29	4.72	Under	
Highway 101	70	ODOT Rural Other Principal Arterial			5	9300	1.54	3	26.12	0.19	0.70	0.98	Under	0.74	1.03	Under	
Highway 101	71	ODOT Rural Other Principal Arterial			12	9300	1.04	3	17.71	0.68	0.70	1.05	Under	0.74	1.10	Under	
Highway 101	72	ODOT Rural Other Principal Arterial			22	3300	3.03	3	18.23	1.21	0.70	1.05	**Over**	0.74	1.10	**Over**	Yes
Highway 101	73	ODOT Rural Other Principal Arterial			33	10200	2.45	3	45.68	0.72	0.70	0.91	Under	0.74	0.96	Under	
Highway 101	74	ODOT Rural Other Principal Arterial			46	13200	3.58	3	86.26	0.53	0.70	0.85	Under	0.74	0.90	Under	
Highway 101	75	ODOT Rural Other Principal Arterial			2	4100	0.18	3	1.36	1.47	0.70	2.24	Under	0.74	2.32	Under	
Highway 101	76	ODOT Rural Other Principal Arterial			0	3500	0.07	3	0.45	0.00	0.70	3.83	Under	0.74	3.93	Under	
Highway 101	77	ODOT Rural Other Principal Arterial			0	3500	0.63	3	4.03	0.00	0.70	1.51	Under	0.74	1.57	Under	
Highway 101	78	ODOT Rural Other Principal Arterial			8	16400	0.51	3	15.25	0.52	0.70	1.08	Under	0.74	1.13	Under	
Highway 101	79	ODOT Rural Other Principal Arterial			4	9300	0.32	3	5.40	0.74	0.70	1.38	Under	0.74	1.44	Under	
Highway 101	80	ODOT Rural Other Principal Arterial			0	4600	0.14	3	1.19	0.00	0.70	2.37	Under	0.74	2.45	Under	
Highway 101	81	ODOT Rural Other Principal Arterial			1	4100	0.88	3	6.60	0.15	0.70	1.31	Under	0.74	1.36	Under	
Highway 101	82	ODOT Rural Other Principal Arterial			3	16400	0.51	3	15.23	0.20	0.70	1.08	Under	0.74	1.13	Under	
Highway 101	83	ODOT Rural Other Principal Arterial			2	4100	0.55	3	4.14	0.48	0.70	1.49	Under	0.74	1.55	Under	
Highway 101	84	ODOT Rural Other Principal Arterial			29	14400	2.59	3	68.09	0.43	0.70	0.87	Under	0.74	0.92	Under	
Highway 101	85	ODOT Rural Other Principal Arterial			8	4600	0.81	3	6.77	1.18	0.70	1.30	Under	0.74	1.35	Under	
Highway 101	86	ODOT Rural Other Principal Arterial			0	9300	0.00	3	0.02	0.00	0.70	42.78	Under	0.74	43.13	Under	
Highway 101	87	ODOT Urban Other Principal Arterial			0	6900	0.06	5	0.78	0.00	0.99	3.49	Under	2.29	5.75	Under	
Highway 101	88	ODOT Urban Other Principal Arterial			3	18500	0.07	5	2.50	1.20	0.99	2.23	Under	2.29	4.06	Under	
Highway 101	89	ODOT Urban Other Principal Arterial			4	18500	0.07	5	2.42	1.65	0.99	2.25	Under	2.29	4.09	Under	
Highway 101	90	ODOT Rural Other Principal Arterial			4	12100	0.67	3	14.77	0.27	0.70	1.09	Under	0.74	1.14	Under	
Highway 101	91	ODOT Rural Other Principal Arterial			5	13400	0.46	3	11.36	0.44	0.70	1.15	Under	0.74	1.20	Under	
Highway 101	92	ODOT Rural Other Principal Arterial			13	18500	1.23	3	41.39	0.31	0.70	0.92	Under	0.74	0.97	Under	
Highway 101	93	ODOT Rural Other Principal Arterial			25	13700	0.51	3	12.64	1.98	0.70	1.12	**Over**	0.74	1.17	**Over**	
Highway 101	94	ODOT Urban Other Principal Arterial			26	18500	0.72	5	24.28	1.07	0.99	1.34	Under	2.29	2.81	Under	
Highway 101	95	ODOT Rural Other Principal Arterial			1	9300	0.18	3	3.10	0.32	0.70	1.64	Under	0.74	1.70	Under	
Highway 101	96	ODOT Rural Other Principal Arterial			6	12100	0.75	3	16.59	0.36	0.70	1.06	Under	0.74	1.12	Under	
Highway 101	97	ODOT Rural Other Principal Arterial			6	3300	1.65	3	9.96	0.60	0.70	1.18	Under	0.74	1.24	Under	
Highway 101	98	ODOT Rural Other Principal Arterial			8	3300	1.13	3	6.78	1.18	0.70	1.30	Under	0.74	1.35	Under	
Highway 101	99	ODOT Rural Other Principal Arterial			1	12100	0.53	3	11.61	0.09	0.70	1.14	Under	0.74	1.20	Under	
Highway 101	100	ODOT Rural Other Principal Arterial			20	18500	0.22	3	7.53	2.66	0.70	1.26	**Over**	0.74	1.32	**Over**	
Highway 101	101	ODOT Rural Other Principal Arterial			4	16400	0.29	3	8.83	0.45	0.70	1.22	Under	0.74	1.27	Under	

Road Name	Segment ID	Ref. Pop. Type	Begin Milepoint	End Milepoint	5 Year Crash Total	AADT	Segment Length**	Pop. Type Number	MVMT	Segment Crash Rate	Ref. Pop. Crash Rate	Critical Rate	Over Critical	Ref. Pop. Crash Rate	Critical Rate	Over Critical	*and Seg. Length >= 1 Mile*
Highway 101	102	ODOT Rural Other Principal Arterial			4	16400	0.45	3	13.61	0.29	0.70	1.11	Under	0.74	1.16	Under	
Highway 101 Business	103	ODOT Rural Major Collector			11	4100	1.70	4	12.69	0.87	1.12	1.64	Under	1.26	1.82	Under	
Highway 101 Business	104	ODOT Rural Major Collector			0	2500	0.04	4	0.20	0.00	1.12	7.53	Under	1.26	7.91	Under	
Highway 101 Business	105	ODOT Rural Major Collector			5	2500	1.76	4	8.04	0.62	1.12	1.79	Under	1.26	1.97	Under	
Highway 101 Business	106	ODOT Urban Minor Arterial			7	4500	0.37	6	3.05	2.30	2.45	4.09	Under	2.45	4.09	Under	
Highway 101 Business	107	ODOT Rural Major Collector			2	4100	0.51	4	3.79	0.53	1.12	2.14	Under	1.26	2.34	Under	
Highway 103	108	ODOT Rural Major Collector			14	500	8.88	4	8.10	1.73	1.12	1.79	Under	1.26	1.97	Under	
Highway 104	109	ODOT Rural Major Collector			9	2200	0.58	4	2.34	3.84	1.12	2.47	**Over**	1.26	2.68	**Over**	
Highway 104	110	ODOT Rural Major Collector			1	2200	0.25	4	0.99	1.01	1.12	3.36	Under	1.26	3.62	Under	
Highway 104	111	ODOT Rural Major Collector			0	2200	0.02	4	0.10	0.00	1.12	11.90	Under	1.26	12.39	Under	
Highway 104	112	ODOT Rural Major Collector			1	2500	0.27	4	1.23	0.81	1.12	3.09	Under	1.26	3.33	Under	
Highway 104	113	ODOT Rural Major Collector			0	3100	0.23	4	1.28	0.00	1.12	3.04	Under	1.26	3.28	Under	
Highway 202	114	ODOT Rural Major Collector			4	550	9.98	4	10.02	0.40	1.12	1.72	Under	1.26	1.89	Under	
Highway 202	115	ODOT Urban Collector			2	3900	0.28	7	1.96	1.02	1.68	3.45	Under	1.68	3.45	Under	
Highway 202	116	ODOT Rural Major Collector			18	340	18.42	4	11.43	1.57	1.12	1.67	Under	1.26	1.85	Under	
Highway 202	117	ODOT Rural Major Collector			27	1900	2.79	4	9.66	2.79	1.12	1.73	**Over**	1.26	1.91	**Over**	Yes
Highway 202	118	ODOT Rural Major Collector			5	3800	1.13	4	7.86	0.64	1.12	1.80	Under	1.26	1.98	Under	
Highway 202	119	ODOT Rural Major Collector			8	450	1.03	4	0.85	9.43	1.12	3.59	**Over**	1.26	3.85	**Over**	Yes
Highway 202	120	ODOT Rural Major Collector			0	300	0.11	4	0.06	0.00	1.12	16.73	Under	1.26	17.32	Under	
Highway 202	121	ODOT Rural Major Collector			12	1200	2.29	4	5.02	2.39	1.12	1.99	**Over**	1.26	2.18	**Over**	Yes
Highway 202	122	ODOT Rural Major Collector			2	3800	0.34	4	2.34	0.85	1.12	2.47	Under	1.26	2.68	Under	
Highway 26	123	ODOT Rural Other Principal Arterial			101	6000	9.13	3	99.93	1.01	0.70	0.84	**Over**	0.74	0.88	**Over**	Yes
Highway 26	124	ODOT Rural Other Principal Arterial			89	7400	8.95	3	120.87	0.74	0.70	0.83	Under	0.74	0.87	Under	
Highway 26	125	ODOT Rural Other Principal Arterial			95	5800	9.46	3	100.16	0.95	0.70	0.84	**Over**	0.74	0.88	**Over**	Yes
Highway 26	126	ODOT Rural Other Principal Arterial			13	6400	2.11	3	24.67	0.53	0.70	0.99	Under	0.74	1.04	Under	
Highway 26	127	ODOT Rural Other Principal Arterial			9	6300	0.77	3	8.82	1.02	0.70	1.22	Under	0.74	1.27	Under	
Highway 26	128	ODOT Rural Other Principal Arterial			2	6800	0.35	3	4.36	0.46	0.70	1.47	Under	0.74	1.53	Under	
Highway 30	129	ODOT Rural Other Principal Arterial			2	6200	0.75	3	8.49	0.24	0.70	1.23	Under	0.74	1.28	Under	
Highway 30	130	ODOT Rural Other Principal Arterial			54	7400	4.72	3	63.79	0.85	0.70	0.88	Under	0.74	0.92	Under	
Highway 30	131	ODOT Rural Other Principal Arterial			17	5300	2.20	3	21.25	0.80	0.70	1.02	Under	0.74	1.07	Under	
Highway 30	132	ODOT Rural Other Principal Arterial			2	5400	0.26	3	2.61	0.77	0.70	1.74	Under	0.74	1.80	Under	
Highway 30	133	ODOT Rural Other Principal Arterial			9	6600	0.81	3	9.74	0.92	0.70	1.19	Under	0.74	1.24	Under	
Highway 30	134	ODOT Rural Other Principal Arterial			8	7400	1.30	3	17.53	0.46	0.70	1.05	Under	0.74	1.10	Under	
Highway 30	135	ODOT Rural Other Principal Arterial			1	5400	1.01	3	9.95	0.10	0.70	1.18	Under	0.74	1.24	Under	
Highway 30	136	ODOT Rural Other Principal Arterial			7	6300	0.67	3	7.66	0.91	0.70	1.26	Under	0.74	1.31	Under	
Highway 30	137	ODOT Rural Other Principal Arterial			32	5300	3.61	3	34.96	0.92	0.70	0.94	Under	0.74	0.99	Under	
Highway 30	138	ODOT Rural Other Principal Arterial			6	5400	1.12	3	11.06	0.54	0.70	1.16	Under	0.74	1.21	Under	
Highway 30	139	ODOT Rural Other Principal Arterial			17	6600	2.31	3	27.87	0.61	0.70	0.97	Under	0.74	1.02	Under	
Highway 30	140	ODOT Rural Other Principal Arterial			3	5300	0.67	3	6.45	0.47	0.70	1.32	Under	0.74	1.37	Under	
Highway 30	141	ODOT Rural Other Principal Arterial			11	6100	1.17	3	13.05	0.84	0.70	1.12	Under	0.74	1.17	Under	
Highway 30	142	ODOT Rural Other Principal Arterial			2	6100	0.37	3	4.07	0.49	0.70	1.50	Under	0.74	1.56	Under	
Highway 30	143	ODOT Rural Other Principal Arterial			1	6600	0.38	3	4.60	0.22	0.70	1.45	Under	0.74	1.51	Under	
Highway 30	144	ODOT Rural Other Principal Arterial			4	7400	0.66	3	8.86	0.45	0.70	1.21	Under	0.74	1.27	Under	
Highway 30	145	ODOT Rural Other Principal Arterial			9	7400	0.74	3	9.97	0.90	0.70	1.18	Under	0.74	1.24	Under	
Highway 30	146	ODOT Rural Other Principal Arterial			3	5400	0.27	3	2.62	1.15	0.70	1.74	Under	0.74	1.80	Under	
Highway 30	147	ODOT Rural Other Principal Arterial			2	6600	0.25	3	3.01	0.67	0.70	1.66	Under	0.74	1.72	Under	
Highway 53	148	ODOT Rural Major Collector			15	390	10.52	4	7.49	2.00	1.12	1.82	**Over**	1.26	2.00	**Over**	Yes
Highway 53	149	ODOT Rural Major Collector			1	610	0.69	4	0.77	1.30	1.12	3.75	Under	1.26	4.01	Under	
Hillcrest Loop	150	County Collector			3	927	5.07	2	8.58	0.35	0.75	1.29	Under	1.26	1.95	Under	
Knappa Dock Road	151	County Collector			0	539	0.65	2	0.64	0.00	0.75	3.30	Under	1.26	4.35	Under	
Knappa Dock Road	152	County Collector			0	838	0.28	2	0.43	0.00	0.75	4.09	Under	1.26	5.26	Under	
Koppisch Road	153	County Collector			2	800	1.46	2	2.13	0.94	0.75	1.95	Under	1.26	2.76	Under	
Labiske Lane	154	County Collector			0	199	0.05	2	0.02	0.00	0.75	36.65	Under	1.26	40.22	Under	
Labiske Lane	155	County Collector			0	199	2.28	2	0.83	0.00	0.75	2.91	Under	1.26	3.89	Under	
Labiske Lane	156	County Collector			0	199	0.05	2	0.02	0.00	0.75	41.45	Under	1.26	45.25	Under	
Leif Erickson Drive	157	ODOT Urban Other Principal Arterial			18	9900	1.10	5	19.91	0.90	0.99	1.38	Under	2.29	2.87	Under	
Leif Erickson Drive	158	ODOT Urban Other Principal Arterial			9	10900	0.83	5	16.47	0.55	0.99	1.42	Under	2.29	2.93	Under	
Lewis And Clark Road	159	County Collector			16	445	6.02	2	4.89	3.27	0.75	1.49	**Over**	1.26	2.20	**Over**	Yes
Lewis And Clark Road	160	County Collector			5	360	2.51	2	1.65	3.03	0.75	2.16	**Over**	1.26	3.00	**Over**	Yes
Lewis And Clark Road	161	County Arterial			0	2800	0.06	1	0.29	0.00	0.84	5.40	Under	1.05	5.95	Under	
Lewis And Clark Road	162	County Arterial			12	2330	3.78	1	16.08	0.75	0.84	1.24	Under	1.05	1.50	Under	
Lewis And Clark Road	163	County Arterial			0	2330	0.00	1	0.02	0.00	0.84	43.70	Under	1.05	45.35	Under	
Lewis And Clark Road	164	County Collector			0	710	0.10	2	0.13	0.00	0.75	8.32	Under	1.26	9.99	Under	
Lewis And Clark Road	165	County Arterial			0	445	0.92	1	0.75	0.00	0.84	3.25	Under	1.05	3.67	Under	
Lewis Road North	166	County Collector			0	304	0.08	2	0.04	0.00	0.75	19.43	Under	1.26	22.01	Under	
Lewis Road North	167	County Collector			0	304	0.10	2	0.06	0.00	0.75	15.32	Under	1.26	17.61	Under	
Lewis Road North	168	County Collector			0	304	0.10	2	0.05	0.00	0.75	16.38	Under	1.26	18.75	Under	

and Seg. Length >= 1 Mile

Road Name	Segment ID	Ref. Pop. Type	Begin Milepoint	End Milepoint	5 Year Crash Total	AADT	Segment Length**	Pop. Type Number	MVMT	Segment Crash Rate	Ref. Pop. Crash Rate	Critical Rate	Over Critical	Ref. Pop. Crash Rate	Critical Rate	Over Critical
Lewis Road North	169	County Collector			0	304	0.09	2	0.05	0.00	0.75	16.43	Under	1.26	18.80	Under
Lewis Road South	170	County Collector			0	627	0.09	2	0.10	0.00	0.75	10.22	Under	1.26	12.08	Under
Lewis Road South	171	County Collector			0	627	0.43	2	0.49	0.00	0.75	3.80	Under	1.26	4.92	Under
Lewis Road South	172	County Collector			0	627	0.12	2	0.13	0.00	0.75	8.41	Under	1.26	10.09	Under
Logan Road	173	County Collector			3	1050	0.64	2	1.23	2.45	0.75	2.44	**Over**	1.26	3.34	Under
Logan Road	174	County Collector			4	695	2.48	2	3.15	1.27	0.75	1.71	Under	1.26	2.46	Under
Lower Nehalem Road	175	County Collector			3	251	10.79	2	4.94	0.61	0.75	1.49	Under	1.26	2.19	Under
Marine Drive	176	ODOT Urban Other Principal Arterial			26	18400	0.59	5	19.75	1.32	0.99	1.38	Under	2.29	2.87	Under
Marine Drive	177	ODOT Urban Other Principal Arterial			10	10400	0.08	5	1.44	6.96	0.99	2.70	**Over**	2.29	4.71	**Over**
Marine Drive	178	ODOT Urban Other Principal Arterial			3	10400	0.05	5	0.90	3.33	0.99	3.27	**Over**	2.29	5.46	Under
Marine Drive	179	ODOT Urban Other Principal Arterial			13	16100	0.45	5	13.12	0.99	0.99	1.48	Under	2.29	3.01	Under
Marine Drive	180	ODOT Urban Other Principal Arterial			27	10900	0.50	5	9.89	2.73	0.99	1.56	**Over**	2.29	3.13	Under
Marine Drive	181	ODOT Urban Other Principal Arterial			0	18400	0.10	5	3.46	0.00	0.99	2.02	Under	2.29	3.77	Under
Marine Drive	182	ODOT Urban Other Principal Arterial			2	9900	0.16	5	2.87	0.70	0.99	2.13	Under	2.29	3.93	Under
Marine Drive	183	ODOT Urban Other Principal Arterial			4	10400	0.05	5	0.90	4.47	0.99	3.28	**Over**	2.29	5.47	Under
Mclean Hill Road	184	County Collector			0	219	1.27	2	0.51	0.00	0.75	3.72	Under	1.26	4.83	Under
N Cottage Avenue	185	County Collector			1	493	0.80	2	0.72	1.39	0.75	3.12	Under	1.26	4.14	Under
N Roosevelt Drive	186	ODOT Urban Other Principal Arterial			15	15900	0.50	5	14.57	1.03	0.99	1.45	Under	2.29	2.97	Under
N Roosevelt Drive	187	ODOT Urban Other Principal Arterial			18	15600	0.69	5	19.68	0.91	0.99	1.39	Under	2.29	2.87	Under
N Roosevelt Drive	188	ODOT Urban Other Principal Arterial			1	15900	0.10	5	2.99	0.33	0.99	2.10	Under	2.29	3.89	Under
N Wahanna Road	189	County Arterial			5	2800	0.58	1	2.98	1.68	0.84	1.87	Under	1.05	2.19	Under
N Wahanna Road	190	County Arterial			0	2800	0.05	1	0.23	0.00	0.84	6.07	Under	1.05	6.66	Under
Old Highway 30	191	County Collector			1	832	0.40	2	0.60	1.65	0.75	3.40	Under	1.26	4.46	Under
Old Highway 30	192	County Collector			0	786	1.90	2	2.73	0.00	0.75	1.79	Under	1.26	2.56	Under
Old Highway 30	193	County Collector			0	1102	0.70	2	1.41	0.00	0.75	2.30	Under	1.26	3.17	Under
Old Highway 30	194	County Collector			0	334	0.09	2	0.06	0.00	0.75	15.75	Under	1.26	18.07	Under
Old Highway 30	195	County Collector			0	334	0.06	2	0.04	0.00	0.75	21.18	Under	1.26	23.87	Under
Old Highway 30	196	County Collector			0	334	1.48	2	0.90	0.00	0.75	2.79	Under	1.26	3.76	Under
Old Highway 30	197	County Collector			0	334	0.04	2	0.02	0.00	0.75	30.41	Under	1.26	33.65	Under
Olney Avenue	198	ODOT Urban Other Principal Arterial			1	8100	0.09	5	1.39	0.72	0.99	2.74	Under	2.29	4.75	Under
Olney Avenue	199	ODOT Urban Other Principal Arterial			0	8100	0.12	5	1.72	0.00	0.99	2.53	Under	2.29	4.47	Under
Oregon Coast Hwy	200	ODOT Urban Other Principal Arterial			3	6900	0.47	5	5.89	0.51	0.99	1.75	Under	2.29	3.40	Under
Oregon Coast Hwy	201	ODOT Urban Other Principal Arterial			0	15900	0.07	5	2.00	0.00	0.99	2.40	Under	2.29	4.29	Under
Oregon Coast Hwy Conn No 1	202	ODOT Rural Major Collector			7	6800	0.53	4	6.56	1.07	1.12	1.87	Under	1.26	2.06	Under
Park Avenue	203	ODOT Urban Other Principal Arterial			7	17400	0.38	5	12.15	0.58	0.99	1.50	Under	2.29	3.04	Under
Park Avenue	204	ODOT Rural Other Principal Arterial			6	16200	0.36	3	10.60	0.57	0.70	1.17	Under	0.74	1.22	Under
Park Avenue	205	ODOT Rural Other Principal Arterial			2	17100	0.15	3	4.58	0.44	0.70	1.45	Under	0.74	1.51	Under
Ridge Road	206	County Collector			0	419	1.36	2	1.04	0.00	0.75	2.62	Under	1.26	3.55	Under
Ridge Road	207	County Collector			6	2211	3.42	2	13.80	0.43	0.75	1.16	Under	1.26	1.79	Under
S Cottage Avenue	208	County Collector			0	493	0.30	2	0.27	0.00	0.75	5.37	Under	1.26	6.70	Under
S Roosevelt Drive	209	ODOT Urban Other Principal Arterial			2	14200	0.09	5	2.38	0.84	0.99	2.26	Under	2.29	4.11	Under
S Roosevelt Drive	210	ODOT Urban Other Principal Arterial			2	12400	0.30	5	6.77	0.30	0.99	1.69	Under	2.29	3.32	Under
S Roosevelt Drive	211	ODOT Urban Other Principal Arterial			4	13800	0.22	5	5.66	0.71	0.99	1.77	Under	2.29	3.42	Under
S Roosevelt Drive	212	ODOT Urban Other Principal Arterial			4	13900	0.15	5	3.69	1.08	0.99	1.98	Under	2.29	3.72	Under
S Roosevelt Drive	213	ODOT Urban Other Principal Arterial			6	13900	0.30	5	7.53	0.80	0.99	1.65	Under	2.29	3.26	Under
S Roosevelt Drive	214	ODOT Urban Other Principal Arterial			5	15000	0.03	5	0.88	5.67	0.99	3.30	**Over**	2.29	5.50	**Over**
S Roosevelt Drive	215	ODOT Urban Other Principal Arterial			5	15000	0.18	5	4.93	1.01	0.99	1.83	Under	2.29	3.51	Under
S Roosevelt Drive	216	ODOT Urban Other Principal Arterial			1	15000	0.05	5	1.38	0.72	0.99	2.75	Under	2.29	4.76	Under
Saddle Mountain Road	217	County Collector			2	111	6.71	2	1.36	1.47	0.75	2.33	Under	1.26	3.21	Under
Se Front Street	218	ODOT Urban Other Principal Arterial			1	3800	1.02	5	7.07	0.14	0.99	1.68	Under	2.29	3.29	Under
Simonsen Loop Road	219	County Collector			0	800	0.13	2	0.19	0.00	0.75	6.73	Under	1.26	8.24	Under
Simonsen Loop Road	220	County Collector			0	800	0.23	2	0.34	0.00	0.75	4.69	Under	1.26	5.94	Under
Simonsen Loop Road	221	County Collector			0	800	0.02	2	0.04	0.00	0.75	21.92	Under	1.26	24.66	Under
Simonsen Loop Road	222	County Collector			0	800	1.00	2	1.46	0.00	0.75	2.26	Under	1.26	3.13	Under
Sunset Beach Ln	223	County Collector			2	1492	1.00	2	2.72	0.73	0.75	1.79	Under	1.26	2.56	Under
Sunset Hwy	224	ODOT Rural Other Principal Arterial			0	1100	0.34	3	0.67	0.00	0.70	3.11	Under	0.74	3.20	Under
Sunset Hwy	225	ODOT Rural Other Principal Arterial			1	6800	0.21	3	2.65	0.38	0.70	1.73	Under	0.74	1.79	Under
Sunset Hwy. Conn.	226	ODOT Rural Other Principal Arterial			0	1100	0.34	3	0.69	0.00	0.70	3.08	Under	0.74	3.17	Under
Svensen Market Road	227	County Collector			2	1763	0.11	2	0.36	5.53	0.75	4.49	**Over**	1.26	5.71	Under
Svensen Market Road	228	County Collector			0	1002	2.46	2	4.50	0.00	0.75	1.53	Under	1.26	2.24	Under
Taylorville Road	229	County Collector			1	125	1.58	2	0.36	2.77	0.75	4.49	Under	1.26	5.72	Under
Taylorville Road	230	County Collector			0	125	0.38	2	0.09	0.00	0.75	11.43	Under	1.26	13.40	Under
The Roundabout	231	ODOT Urban Other Principal Arterial			0	8700	0.02	5	0.25	0.00	0.99	6.20	Under	2.29	9.19	Under
Tucker Creek Lane	232	County Collector			0	247	1.72	2	0.77	0.00	0.75	3.01	Under	1.26	4.01	Under
Valley Creek Lane	233	County Collector			0	154	0.23	2	0.06	0.00	0.75	14.26	Under	1.26	16.46	Under
W Marine Drive	234	ODOT Urban Other Principal Arterial			2	8700	0.47	5	7.50	0.27	0.99	1.66	Under	2.29	3.26	Under
W Marine Drive	235	ODOT Urban Other Principal Arterial			2	7300	0.39	5	5.14	0.39	0.99	1.81	Under	2.29	3.48	Under

Road Name	Segment ID	Ref. Pop. Type	Begin Milepoint	End Milepoint	5 Year Crash Total	AADT	Segment Length**	Pop. Type Number	MVMT	Segment Crash Rate	Ref. Pop. Crash Rate	Critical Rate	Over Critical	Ref. Pop. Crash Rate	Critical Rate	Over Critical	*and Seg. Length >= 1 Mile*
W Marine Drive	236	ODOT Urban Other Principal Arterial			1	22200	0.10	5	3.85	0.26	0.99	1.95	Under	2.29	3.68	Under	
W Marine Drive	237	ODOT Urban Minor Arterial			3	4500	0.17	6	1.36	2.21	2.45	5.03	Under	2.45	5.03	Under	
W Marine Drive	238	ODOT Urban Other Principal Arterial			2	22600	0.08	5	3.16	0.63	0.99	2.07	Under	2.29	3.84	Under	
W Marine Drive	239	ODOT Urban Other Principal Arterial			4	18700	0.07	5	2.46	1.62	0.99	2.24	Under	2.29	4.07	Under	
W Marine Drive	240	ODOT Urban Other Principal Arterial			6	18700	0.22	5	7.36	0.82	0.99	1.66	Under	2.29	3.27	Under	
W Marine Drive	241	ODOT Urban Other Principal Arterial			0	11100	0.17	5	3.37	0.00	0.99	2.03	Under	2.29	3.79	Under	
W Marine Drive	242	ODOT Urban Other Principal Arterial			0	11100	0.17	5	3.37	0.00	0.99	2.03	Under	2.29	3.79	Under	
W Marine Drive	243	ODOT Urban Other Principal Arterial			0	4350	0.04	5	0.34	0.00	0.99	5.29	Under	2.29	8.05	Under	
W Marine Drive	244	ODOT Urban Other Principal Arterial			0	4350	0.04	5	0.33	0.00	0.99	5.32	Under	2.29	8.09	Under	
W Marine Drive	245	ODOT Urban Other Principal Arterial			0	22600	0.09	5	3.70	0.00	0.99	1.98	Under	2.29	3.72	Under	
W Marine Drive	246	ODOT Urban Other Principal Arterial			5	22200	0.08	5	3.29	1.52	0.99	2.05	Under	2.29	3.81	Under	
W Marine Drive	247	ODOT Urban Other Principal Arterial			0	22200	0.00	5	0.10	0.00	0.99	11.06	Under	2.29	15.02	Under	
W Marine Drive	248	ODOT Urban Other Principal Arterial			2	7300	0.32	5	4.31	0.46	0.99	1.90	Under	2.29	3.60	Under	
Walluski Loop	249	County Collector			0	609	0.06	2	0.07	0.00	0.75	13.36	Under	1.26	15.50	Under	
Walluski Loop	250	County Collector			1	609	2.88	2	3.20	0.31	0.75	1.70	Under	1.26	2.45	Under	
Walluski Loop	251	County Collector			0	609	0.00	2	0.00	0.00	0.75	561.91	Under	1.26	576.09	Under	
Walluski Loop	252	County Collector			1	209	0.74	2	0.28	3.54	0.75	5.19	Under	1.26	6.51	Under	
Warrenton-Astoria Hwy	253	ODOT Rural Major Collector			11	8300	0.72	4	10.88	1.01	1.12	1.69	Under	1.26	1.87	Under	
Warrenton-Astoria Hwy	254	ODOT Rural Major Collector			3	2600	0.99	4	4.71	0.64	1.12	2.02	Under	1.26	2.22	Under	
Warrenton-Astoria Hwy	255	ODOT Rural Major Collector			0	2500	0.11	4	0.51	0.00	1.12	4.54	Under	1.26	4.83	Under	
Warrenton-Astoria Hwy	256	ODOT Rural Major Collector			1	3400	0.30	4	1.86	0.54	1.12	2.66	Under	1.26	2.88	Under	
Warrenton-Astoria Hwy	257	ODOT Rural Major Collector			4	3800	0.45	4	3.14	1.27	1.12	2.26	Under	1.26	2.46	Under	
Warrenton-Astoria Hwy	258	ODOT Rural Major Collector			0	8300	0.10	4	1.59	0.00	1.12	2.81	Under	1.26	3.04	Under	
Warrenton-Astoria Hwy	259	ODOT Rural Major Collector			0	2500	0.07	4	0.30	0.00	1.12	5.99	Under	1.26	6.33	Under	
Westport Ferry Road	260	County Collector			0	182	0.38	2	0.13	0.00	0.75	8.73	Under	1.26	10.44	Under	
Youngs River Road	261	County Collector			6	485	6.84	2	6.06	0.99	0.75	1.41	Under	1.26	2.09	Under	
Youngs River Road	262	County Collector			11	1462	3.64	2	9.70	1.13	0.75	1.25	Under	1.26	1.90	Under	
Youngs River Road	263	County Collector			0	302	0.04	2	0.02	0.00	0.75	33.93	Under	1.26	37.36	Under	
Youngs River Road	264	County Collector			0	302	0.69	2	0.38	0.00	0.75	4.35	Under	1.26	5.55	Under	
Ziak-Gnat Creek Lane	265	County Collector			0	307	0.01	2	0.00	0.00	0.75	176.76	Under	1.26	184.68	Under	
Ziak-Gnat Creek Lane	266	County Collector			0	307	1.04	2	0.58	0.00	0.75	3.47	Under	1.26	4.54	Under	
Ziak-Gnat Creek Lane	267	County Collector			2	315	2.73	2	1.57	1.27	0.75	2.20	Under	1.26	3.05	Under	
Ziak-Gnat Creek Lane	268	County Collector			0	307	1.07	2	0.60	0.00	0.75	3.41	Under	1.26	4.48	Under	
													25			*18*	9

* Red shaded cells indicate segment lengths of less than 1 mile, which may result in artificially inflated crash rates.

** Segment lengths calculated using GIS

ODOT Table II: Five-Year Comparison of State Highway Crash Rates

Jurisdiction and Functional Classification	2012 Rate	2011 Rate	2010 Rate	2009 Rate	2008 Rate	5-Year Avg
County Arterial (using Rural Minor Arterial values)	1.14	1.13	1.02	0.97	0.99	1.05
County Collector (using Rural Major Collector values)	1.43	1.37	1.2	1.12	1.18	1.26
ODOT Rural Other Principal Arterial	0.81	0.8	0.7	0.68	0.7	0.74
ODOT Rural Major Collector	1.43	1.37	1.2	1.12	1.18	1.26
ODOT Urban Other Principal Arterial	2.56	2.52	2.23	2.03	2.09	2.29
ODOT Urban Minor Arterial	2.86	2.65	2.58	2.35	1.81	2.45
ODOT Urban Collector	2.21	1.17	1.99	1.74	1.28	1.68

Corridor Health Tool

Table A2: Corridor Health Tool Scores - Existing Conditions

Weighting Options

wt25 - "Even Weighting" - Equal weight (25%) to all 4 categories

wt35 - "Focused Weighting" - 35% weight to safety and traffic operations, 15% to others

Overall Health Score and Display Text

0.75 or higher = "Good"

From 0.50 to 0.74 = "Fair"

Less than 0.50 = "Poor"

Segment ID	Road Name	Safety Score	Geometrics Score	Access Spacing Score	Traffic Operations Score	wt25 Health Score	wt35 Health Score	Exclude from Reporting	wt25 Display Text	wt35 Display Text
1	5Th Street	0.27	0.00	1.00	1.00	0.57	0.59	1	-	-
2	8Th Street	0.33	0.00	1.00	1.00	0.58	0.61	1	-	-
3	Abbott Road	1.00	0.00	0.50	1.00	0.63	0.78	0	Fair	Good
4	Airport Lane	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
5	Airport Lane	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
6	Airport Lane	0.77	0.00	0.50	1.00	0.57	0.70	0	Fair	Fair
7	Airport Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
8	Airport Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
9	Airport Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
10	Airport Road	1.00	0.00	0.50	1.00	0.63	0.78	0	Fair	Good
11	Airport Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
12	Airport Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
13	Aldrich Point Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
14	Avenue U	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
15	Bagley Lane	1.00	0.00	0.50	1.00	0.63	0.78	0	Fair	Good
16	Bagley Lane	1.00	0.00	0.50	1.00	0.63	0.78	0	Fair	Good
17	Barendse Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
18	Beneke Creek Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
19	Brownsmead Hill Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
20	Clifton Road	0.06	0.00	1.00	1.00	0.51	0.52	0	Fair	Fair
21	Coast Hwy Conn.	0.01	0.67	1.00	1.00	0.67	0.60	0	Fair	Fair
22	Coast Hwy Conn.	0.05	0.90	1.00	1.00	0.74	0.65	1	-	-
23	Columbia Beach Lane	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
24	Commercial Street	0.19	1.00	1.00	1.00	0.80	0.72	1	-	-
25	Commercial Street	0.13	1.00	1.00	1.00	0.78	0.70	1	-	-
26	Commercial Street	0.07	0.00	1.00	1.00	0.52	0.52	1	-	-
27	Commercial Street	0.50	0.12	1.00	1.00	0.65	0.69	1	-	-
28	Commercial Street	0.08	1.00	1.00	1.00	0.77	0.68	1	-	-
29	Cullaby Lake Road	1.00	0.00	0.00	1.00	0.50	0.70	0	Fair	Fair
30	Cullaby Lake Road	1.00	0.00	0.00	1.00	0.50	0.70	0	Fair	Fair
31	Cullaby Lake Road	1.00	0.00	0.50	1.00	0.63	0.78	0	Fair	Good
32	Cullaby Lake Road	1.00	0.00	0.00	1.00	0.50	0.70	0	Fair	Fair
33	Delaura Beach Ln	0.62	0.00	1.00	1.00	0.66	0.72	0	Fair	Fair
34	Dellmoor Loop	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
35	Dellmoor Loop	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
36	Dellmoor Loop	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
37	Dellmoor Loop	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good

Table A2: Corridor Health Tool Scores - Existing Conditions

Weighting Options

wt25 - "Even Weighting" - Equal weight (25%) to all 4 categories

wt35 - "Focused Weighting" - 35% weight to safety and traffic operations, 15% to others

Overall Health Score and Display Text

0.75 or higher = "Good"

From 0.50 to 0.74 = "Fair"

Less than 0.50 = "Poor"

Segment ID	Road Name	Safety Score	Geometrics Score	Access Spacing Score	Traffic Operations Score	wt25 Health Score	wt35 Health Score	Exclude from Reporting	wt25 Display Text	wt35 Display Text
38	Dellmoor Loop	1.00	0.00	0.50	1.00	0.63	0.78	0	Fair	Good
39	Dellmoor Loop	1.00	0.00	0.50	1.00	0.63	0.78	0	Fair	Good
40	Fishhawk Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
41	Fishhawk Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
42	Flight Line Drive	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
43	Flight Line Drive	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
44	Flight Line Drive	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
45	Flight Line Drive	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
46	Fort Clatsop Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
47	Fort Clatsop Road	0.12	0.00	1.00	1.00	0.53	0.54	0	Fair	Fair
48	Fort Clatsop Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
49	Fort Stevens Hwy	1.00	0.56	0.42	1.00	0.74	0.85	1	-	-
50	Fort Stevens Hwy	1.00	0.32	0.42	1.00	0.68	0.81	1	-	-
51	Fort Stevens Hwy	0.25	0.52	0.33	1.00	0.52	0.56	1	-	-
52	Fort Stevens Hwy	1.00	0.33	1.00	1.00	0.83	0.90	1	-	-
53	Fort Stevens Hwy	1.00	0.67	0.07	1.00	0.68	0.81	1	-	-
54	Fort Stevens Hwy	1.00	0.33	0.69	1.00	0.76	0.85	1	-	-
55	Fort Stevens Hwy	1.00	0.33	0.94	1.00	0.82	0.89	1	-	-
56	Fort Stevens Hwy	1.00	0.00	0.75	1.00	0.69	0.81	1	-	-
57	Fort Stevens Hwy	1.00	0.43	0.83	1.00	0.82	0.89	1	-	-
58	Fort Stevens Spur	1.00	0.91	0.73	1.00	0.91	0.95	1	-	-
59	G Street	1.00	0.00	0.50	1.00	0.63	0.78	0	Fair	Good
60	Hamlet Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
61	Hawkins Road	1.00	0.00	0.00	1.00	0.50	0.70	0	Fair	Fair
62	Hawkins Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
63	Hawkins Road	1.00	0.00	0.00	1.00	0.50	0.70	0	Fair	Fair
64	Hawkins Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
65	Hawkins Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
66	Hawkins Road	1.00	0.00	0.00	1.00	0.50	0.70	0	Fair	Fair
67	Hawkins Road	1.00	0.00	0.00	1.00	0.50	0.70	0	Fair	Fair
68	Highlands Rd	1.00	1.00	1.00	1.00	1.00	1.00	0	Good	Good
69	Highway 101	1.00	0.00	1.00	1.00	0.75	0.85	1	-	-
70	Highway 101	1.00	1.00	1.00	1.00	1.00	1.00	0	Good	Good
71	Highway 101	0.59	1.00	1.00	1.00	0.90	0.86	0	Good	Good
72	Highway 101	0.29	0.46	1.00	1.00	0.69	0.67	0	Fair	Fair
73	Highway 101	0.48	0.75	0.79	0.94	0.74	0.73	0	Fair	Fair
74	Highway 101	0.53	0.69	0.00	0.56	0.44	0.48	0	Poor	Poor

Table A2: Corridor Health Tool Scores - Existing Conditions

Weighting Options
wt25 - "Even Weighting" - Equal weight (25%) to all 4 categories
wt35 - "Focused Weighting" - 35% weight to safety and traffic operations, 15% to others

Overall Health Score and Display Text
0.75 or higher = "Good"
From 0.50 to 0.74 = "Fair"
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Segment ID	Road Name	Safety Score	Geometrics Score	Access Spacing Score	Traffic Operations Score	wt25 Health Score	wt35 Health Score	Exclude from Reporting	wt25 Display Text	wt35 Display Text
75	Highway 101	0.27	0.84	1.00	1.00	0.78	0.72	1	-	-
76	Highway 101	1.00	0.88	1.00	1.00	0.97	0.98	1	-	-
77	Highway 101	1.00	0.76	1.00	1.00	0.94	0.96	1	-	-
78	Highway 101	0.34	0.33	0.00	1.00	0.42	0.52	0	Poor	Fair
79	Highway 101	0.82	1.00	0.75	1.00	0.89	0.90	0	Good	Good
80	Highway 101	1.00	0.72	0.75	1.00	0.87	0.92	1	-	-
81	Highway 101	1.00	1.00	1.00	1.00	1.00	1.00	1	-	-
82	Highway 101	0.96	0.19	0.00	1.00	0.54	0.71	1	-	-
83	Highway 101	0.45	0.54	1.00	1.00	0.75	0.74	0	Fair	Fair
84	Highway 101	0.47	0.95	0.32	1.00	0.68	0.70	0	Fair	Fair
85	Highway 101	0.51	0.61	1.00	1.00	0.78	0.77	1	-	-
86	Highway 101	1.00	1.00	1.00	1.00	1.00	1.00	0	Good	Good
87	Highway 101	1.00	0.00	1.00	1.00	0.75	0.85	1	-	-
88	Highway 101	0.65	0.10	1.00	1.00	0.69	0.74	1	-	-
89	Highway 101	0.63	0.33	1.00	1.00	0.74	0.77	1	-	-
90	Highway 101	1.00	0.97	1.00	1.00	0.99	1.00	1	-	-
91	Highway 101	0.32	0.87	1.00	1.00	0.80	0.74	1	-	-
92	Highway 101	1.00	0.76	1.00	1.00	0.94	0.96	1	-	-
93	Highway 101	0.12	0.93	1.00	1.00	0.76	0.68	1	-	-
94	Highway 101	0.92	0.20	1.00	1.00	0.78	0.85	1	-	-
95	Highway 101	1.00	1.00	0.50	1.00	0.88	0.93	0	Good	Good
96	Highway 101	0.52	1.00	1.00	0.61	0.78	0.69	0	Good	Fair
97	Highway 101	0.54	0.29	1.00	1.00	0.71	0.73	0	Fair	Fair
98	Highway 101	0.29	0.67	0.89	1.00	0.71	0.68	0	Fair	Fair
99	Highway 101	1.00	0.87	1.00	1.00	0.97	0.98	1	-	-
100	Highway 101	1.00	0.89	1.00	1.00	0.97	0.98	1	-	-
101	Highway 101	1.00	0.33	0.00	1.00	0.58	0.75	0	Fair	Good
102	Highway 101	1.00	0.48	0.00	0.21	0.42	0.49	0	Poor	Poor
103	Highway 101 Business	1.00	0.85	0.58	1.00	0.86	0.91	0	Good	Good
104	Highway 101 Business	0.06	1.00	1.00	1.00	0.77	0.67	0	Good	Fair
105	Highway 101 Business	0.78	0.71	1.00	1.00	0.87	0.88	0	Good	Good
106	Highway 101 Business	0.70	0.00	1.00	1.00	0.68	0.75	1	-	-
107	Highway 101 Business	1.00	0.44	1.00	1.00	0.86	0.92	0	Good	Good
108	Highway 103	0.35	0.00	1.00	1.00	0.59	0.62	0	Fair	Fair
109	Highway 104	0.24	0.00	0.50	1.00	0.44	0.51	0	Poor	Fair
110	Highway 104	0.97	0.00	0.38	1.00	0.59	0.75	0	Fair	Fair
111	Highway 104	1.00	1.00	1.00	1.00	1.00	1.00	0	Good	Good

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wt25 - "Even Weighting" - Equal weight (25%) to all 4 categories

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Overall Health Score and Display Text

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Segment ID	Road Name	Safety Score	Geometrics Score	Access Spacing Score	Traffic Operations Score	wt25 Health Score	wt35 Health Score	Exclude from Reporting	wt25 Display Text	wt35 Display Text
112	Highway 104	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
113	Highway 104	1.00	0.00	0.75	1.00	0.69	0.81	1	-	-
114	Highway 202	1.00	0.02	1.00	1.00	0.76	0.85	0	Good	Good
115	Highway 202	0.50	0.33	1.00	1.00	0.71	0.73	1	-	-
116	Highway 202	0.29	0.00	1.00	1.00	0.57	0.60	0	Fair	Fair
117	Highway 202	0.16	0.04	0.78	1.00	0.50	0.53	0	Poor	Fair
118	Highway 202	1.00	0.16	1.00	1.00	0.79	0.87	0	Good	Good
119	Highway 202	0.06	0.00	1.00	1.00	0.51	0.52	0	Fair	Fair
120	Highway 202	1.00	0.67	1.00	1.00	0.92	0.95	0	Good	Good
121	Highway 202	0.23	0.00	0.68	1.00	0.48	0.53	0	Poor	Fair
122	Highway 202	1.00	0.33	0.40	1.00	0.68	0.81	0	Fair	Good
123	Highway 26	0.43	0.45	1.00	1.00	0.72	0.72	0	Fair	Fair
124	Highway 26	0.48	0.34	0.49	1.00	0.58	0.64	0	Fair	Fair
125	Highway 26	0.38	0.13	1.00	1.00	0.63	0.65	0	Fair	Fair
126	Highway 26	0.35	0.02	1.00	1.00	0.59	0.63	0	Fair	Fair
127	Highway 26	0.34	0.30	1.00	1.00	0.66	0.66	0	Fair	Fair
128	Highway 26	0.87	0.33	1.00	1.00	0.80	0.85	0	Good	Good
129	Highway 30	0.56	0.77	1.00	0.90	0.81	0.78	0	Good	Good
130	Highway 30	0.40	0.42	0.58	0.77	0.54	0.56	0	Fair	Fair
131	Highway 30	0.47	0.33	1.00	1.00	0.70	0.71	0	Fair	Fair
132	Highway 30	0.14	0.79	1.00	1.00	0.73	0.67	0	Fair	Fair
133	Highway 30	1.00	0.97	1.00	1.00	0.99	1.00	0	Good	Good
134	Highway 30	1.00	0.94	0.92	0.77	0.91	0.90	0	Good	Good
135	Highway 30	1.00	0.52	1.00	1.00	0.88	0.93	0	Good	Good
136	Highway 30	0.38	1.00	1.00	0.92	0.82	0.75	0	Good	Good
137	Highway 30	0.49	0.38	1.00	1.00	0.72	0.73	0	Fair	Fair
138	Highway 30	0.73	0.39	1.00	1.00	0.78	0.81	0	Good	Good
139	Highway 30	0.50	0.68	1.00	1.00	0.80	0.78	0	Good	Good
140	Highway 30	1.00	0.33	1.00	1.00	0.83	0.90	0	Good	Good
141	Highway 30	0.35	1.00	1.00	0.95	0.83	0.76	0	Good	Good
142	Highway 30	0.81	0.70	1.00	0.95	0.87	0.87	0	Good	Good
143	Highway 30	0.50	0.57	1.00	1.00	0.77	0.76	0	Good	Good
144	Highway 30	0.50	0.00	1.00	0.77	0.57	0.60	0	Fair	Fair
145	Highway 30	0.34	0.82	1.00	0.77	0.73	0.66	0	Fair	Fair
146	Highway 30	0.28	0.25	0.25	1.00	0.45	0.52	0	Poor	Fair
147	Highway 30	1.00	1.00	1.00	1.00	1.00	1.00	0	Good	Good
148	Highway 53	0.36	0.00	1.00	1.00	0.59	0.62	0	Fair	Fair

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Overall Health Score and Display Text

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Segment ID	Road Name	Safety Score	Geometrics Score	Access Spacing Score	Traffic Operations Score	wt25 Health Score	wt35 Health Score	Exclude from Reporting	wt25 Display Text	wt35 Display Text
149	Highway 53	0.12	0.00	0.75	1.00	0.47	0.51	0	Poor	Fair
150	Hillcrest Loop	0.52	0.00	0.50	1.00	0.50	0.61	0	Fair	Fair
151	Knappa Dock Road	1.00	0.00	0.00	1.00	0.50	0.70	0	Fair	Fair
152	Knappa Dock Road	1.00	0.00	0.50	1.00	0.63	0.78	0	Fair	Good
153	Koppisch Road	0.29	0.00	1.00	1.00	0.57	0.60	0	Fair	Fair
154	Labiske Lane	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
155	Labiske Lane	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
156	Labiske Lane	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
157	Leif Erickson Drive	0.59	0.39	1.00	1.00	0.74	0.76	1	-	-
158	Leif Erickson Drive	0.56	0.60	1.00	1.00	0.79	0.78	1	-	-
159	Lewis And Clark Road	0.12	0.00	1.00	1.00	0.53	0.54	0	Fair	Fair
160	Lewis And Clark Road	0.17	0.00	1.00	1.00	0.54	0.56	0	Fair	Fair
161	Lewis And Clark Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
162	Lewis And Clark Road	0.72	0.00	0.00	1.00	0.43	0.60	0	Poor	Fair
163	Lewis And Clark Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
164	Lewis And Clark Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
165	Lewis And Clark Road	0.08	0.00	0.00	1.00	0.27	0.38	0	Poor	Poor
166	Lewis Road North	1.00	0.00	0.00	1.00	0.50	0.70	0	Fair	Fair
167	Lewis Road North	1.00	0.00	0.00	1.00	0.50	0.70	0	Fair	Fair
168	Lewis Road North	1.00	0.00	0.00	1.00	0.50	0.70	0	Fair	Fair
169	Lewis Road North	1.00	0.00	0.50	1.00	0.63	0.78	0	Fair	Good
170	Lewis Road South	1.00	0.00	0.00	1.00	0.50	0.70	0	Fair	Fair
171	Lewis Road South	1.00	0.00	0.00	1.00	0.50	0.70	0	Fair	Fair
172	Lewis Road South	1.00	0.00	0.00	1.00	0.50	0.70	0	Fair	Fair
173	Logan Road	0.15	0.00	1.00	1.00	0.54	0.55	0	Fair	Fair
174	Logan Road	0.27	0.00	1.00	1.00	0.57	0.59	0	Fair	Fair
175	Lower Nehalem Road	0.62	0.00	1.00	1.00	0.65	0.72	0	Fair	Fair
176	Marine Drive	0.42	0.00	1.00	1.00	0.60	0.65	1	-	-
177	Marine Drive	0.14	1.00	1.00	1.00	0.78	0.70	1	-	-
178	Marine Drive	0.32	0.00	1.00	1.00	0.58	0.61	1	-	-
179	Marine Drive	0.44	0.39	1.00	1.00	0.71	0.71	1	-	-
180	Marine Drive	0.20	0.90	1.00	1.00	0.77	0.70	1	-	-
181	Marine Drive	0.60	0.42	1.00	1.00	0.75	0.77	1	-	-
182	Marine Drive	1.00	0.09	1.00	1.00	0.77	0.86	1	-	-
183	Marine Drive	0.15	1.00	1.00	1.00	0.79	0.70	1	-	-
184	Mclean Hill Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
185	N Cottage Avenue	0.20	0.00	0.00	1.00	0.30	0.42	0	-	-

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Segment ID	Road Name	Safety Score	Geometrics Score	Access Spacing Score	Traffic Operations Score	wt25 Health Score	wt35 Health Score	Exclude from Reporting	wt25 Display Text	wt35 Display Text
186	N Roosevelt Drive	0.53	0.81	0.00	1.00	0.59	0.66	1	-	-
187	N Roosevelt Drive	0.49	0.98	0.00	1.00	0.62	0.67	1	-	-
188	N Roosevelt Drive	0.49	1.00	0.75	1.00	0.81	0.78	1	-	-
189	N Wahanna Road	0.41	0.00	0.00	1.00	0.35	0.49	0	Poor	Poor
190	N Wahanna Road	0.11	0.00	1.00	1.00	0.53	0.54	0	Fair	Fair
191	Old Highway 30	0.93	1.00	1.00	1.00	0.98	0.97	0	Good	Good
192	Old Highway 30	1.00	0.00	0.50	1.00	0.63	0.78	0	Fair	Good
193	Old Highway 30	0.38	0.00	0.50	1.00	0.47	0.56	0	Poor	Fair
194	Old Highway 30	1.00	0.00	0.50	1.00	0.63	0.78	0	Fair	Good
195	Old Highway 30	1.00	0.00	0.50	1.00	0.63	0.78	0	Fair	Good
196	Old Highway 30	0.21	0.00	0.50	1.00	0.43	0.50	0	Poor	Poor
197	Old Highway 30	1.00	0.00	0.00	1.00	0.50	0.70	0	Fair	Fair
198	Olney Avenue	1.00	1.00	1.00	1.00	1.00	1.00	1	-	-
199	Olney Avenue	0.89	0.44	1.00	1.00	0.83	0.88	1	-	-
200	Oregon Coast Hwy	0.39	0.00	1.00	1.00	0.60	0.64	1	-	-
201	Oregon Coast Hwy	1.00	1.00	0.50	1.00	0.88	0.93	1	-	-
202	Oregon Coast Hwy Conn No 1	0.17	0.70	1.00	1.00	0.72	0.66	1	-	-
203	Park Avenue	0.75	0.00	0.00	1.00	0.44	0.61	1	-	-
204	Park Avenue	0.53	0.21	0.00	1.00	0.43	0.57	1	-	-
205	Park Avenue	1.00	0.33	0.00	1.00	0.58	0.75	1	-	-
206	Ridge Road	1.00	0.00	0.50	1.00	0.63	0.78	0	Fair	Good
207	Ridge Road	0.47	0.00	1.00	1.00	0.62	0.66	0	Fair	Fair
208	S Cottage Avenue	1.00	0.00	0.50	1.00	0.63	0.78	0	Fair	Good
209	S Roosevelt Drive	0.62	0.00	0.00	0.80	0.35	0.50	0	Poor	Poor
210	S Roosevelt Drive	0.37	0.86	0.00	1.00	0.56	0.61	1	-	-
211	S Roosevelt Drive	0.55	0.10	0.00	1.00	0.41	0.56	1	-	-
212	S Roosevelt Drive	0.83	0.00	0.00	0.82	0.41	0.58	0	Poor	Fair
213	S Roosevelt Drive	1.00	0.63	0.00	0.82	0.61	0.73	0	Fair	Fair
214	S Roosevelt Drive	0.21	1.00	0.00	1.00	0.55	0.57	1	-	-
215	S Roosevelt Drive	0.34	1.00	0.00	1.00	0.58	0.62	1	-	-
216	S Roosevelt Drive	0.39	1.00	0.00	1.00	0.60	0.64	1	-	-
217	Saddle Mountain Road	0.31	0.00	1.00	1.00	0.58	0.61	0	Fair	Fair
218	Se Front Street	1.00	0.66	1.00	1.00	0.92	0.95	1	-	-
219	Simonsen Loop Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
220	Simonsen Loop Road	1.00	0.00	0.00	1.00	0.50	0.70	0	Fair	Fair
221	Simonsen Loop Road	1.00	0.00	0.00	1.00	0.50	0.70	0	Fair	Fair
222	Simonsen Loop Road	1.00	0.00	0.50	1.00	0.63	0.78	0	Fair	Good

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Segment ID	Road Name	Safety Score	Geometrics Score	Access Spacing Score	Traffic Operations Score	wt25 Health Score	wt35 Health Score	Exclude from Reporting	wt25 Display Text	wt35 Display Text
223	Sunset Beach Ln	0.63	0.00	1.00	1.00	0.66	0.72	0	Fair	Fair
224	Sunset Hwy	1.00	0.33	1.00	1.00	0.83	0.90	0	Good	Good
225	Sunset Hwy	1.00	0.49	1.00	1.00	0.87	0.92	0	Good	Good
226	Sunset Hwy. Conn.	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
227	Svensen Market Road	0.08	1.00	1.00	1.00	0.77	0.68	0	Good	Fair
228	Svensen Market Road	1.00	0.50	0.50	1.00	0.75	0.85	0	Good	Good
229	Taylorville Road	0.08	0.00	0.50	1.00	0.40	0.45	0	Poor	Poor
230	Taylorville Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
231	The Roundabout	0.08	0.00	1.00	1.00	0.52	0.53	1	-	-
232	Tucker Creek Lane	1.00	0.00	0.50	1.00	0.63	0.78	0	Fair	Good
233	Valley Creek Lane	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
234	W Marine Drive	1.00	1.00	1.00	1.00	1.00	1.00	1	-	-
235	W Marine Drive	1.00	1.00	1.00	1.00	1.00	1.00	1	-	-
236	W Marine Drive	1.00	0.00	1.00	1.00	0.75	0.85	1	-	-
237	W Marine Drive	0.40	0.91	1.00	1.00	0.83	0.78	1	-	-
238	W Marine Drive	1.00	0.00	1.00	1.00	0.75	0.85	1	-	-
239	W Marine Drive	0.48	0.50	1.00	1.00	0.74	0.74	1	-	-
240	W Marine Drive	0.27	0.00	1.00	1.00	0.57	0.60	1	-	-
241	W Marine Drive	1.00	0.67	1.00	1.00	0.92	0.95	1	-	-
242	W Marine Drive	1.00	0.62	1.00	1.00	0.90	0.94	1	-	-
243	W Marine Drive	1.00	0.33	1.00	1.00	0.83	0.90	1	-	-
244	W Marine Drive	1.00	0.50	1.00	1.00	0.88	0.93	1	-	-
245	W Marine Drive	0.57	0.00	1.00	1.00	0.64	0.70	1	-	-
246	W Marine Drive	0.49	0.67	1.00	1.00	0.79	0.77	1	-	-
247	W Marine Drive	1.00	0.00	1.00	1.00	0.75	0.85	1	-	-
248	W Marine Drive	0.89	1.00	1.00	1.00	0.97	0.96	1	-	-
249	Walluski Loop	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
250	Walluski Loop	0.87	0.00	1.00	1.00	0.72	0.81	0	Fair	Good
251	Walluski Loop	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
252	Walluski Loop	0.43	0.00	1.00	1.00	0.61	0.65	0	Fair	Fair
253	Warrenton-Astoria Hwy	0.42	0.72	0.68	1.00	0.71	0.71	1	-	-
254	Warrenton-Astoria Hwy	1.00	0.75	1.00	1.00	0.94	0.96	0	Good	Good
255	Warrenton-Astoria Hwy	1.00	1.00	1.00	1.00	1.00	1.00	1	-	-
256	Warrenton-Astoria Hwy	1.00	0.81	1.00	1.00	0.95	0.97	1	-	-
257	Warrenton-Astoria Hwy	0.47	0.44	0.80	1.00	0.68	0.70	1	-	-
258	Warrenton-Astoria Hwy	1.00	0.33	1.00	1.00	0.83	0.90	1	-	-
259	Warrenton-Astoria Hwy	0.58	1.00	1.00	1.00	0.90	0.85	1	-	-

Table A2: Corridor Health Tool Scores - Existing Conditions

Weighting Options

wt25 - "Even Weighting" - Equal weight (25%) to all 4 categories

wt35 - "Focused Weighting" - 35% weight to safety and traffic operations, 15% to others

Overall Health Score and Display Text

0.75 or higher = "Good"

From 0.50 to 0.74 = "Fair"

Less than 0.50 = "Poor"

Segment ID	Road Name	Safety Score	Geometrics Score	Access Spacing Score	Traffic Operations Score	wt25 Health Score	wt35 Health Score	Exclude from Reporting	wt25 Display Text	wt35 Display Text
260	Westport Ferry Road	1.00	0.00	0.00	1.00	0.50	0.70	0	Fair	Fair
261	Youngs River Road	0.38	0.00	1.00	1.00	0.59	0.63	0	Fair	Fair
262	Youngs River Road	0.47	0.00	0.50	1.00	0.49	0.59	0	Poor	Fair
263	Youngs River Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
264	Youngs River Road	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
265	Ziak-Gnat Creek Lane	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
266	Ziak-Gnat Creek Lane	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good
267	Ziak-Gnat Creek Lane	0.80	0.00	1.00	1.00	0.70	0.78	0	Fair	Good
268	Ziak-Gnat Creek Lane	1.00	0.00	1.00	1.00	0.75	0.85	0	Good	Good

Table A3: Corridor Health Tool Scoring Formulae

Category	Weight	Scoring Formula
Safety	Even: 0.25 Focused: 0.35	= 0.5/X if X ≥ 0.5; else 1 Where: X = 0.7*(Fatal & Injury Crash Rate for Segment/Average for Facility Category) + 0.3*(Total Crash Rate for Segment/Average for Facility Category)
Geometrics	Even: 0.25 Focused: 0.15	*State Highways:* = W*0 + X*0.33 + Y*0.66 + Z*1 Where: W = % of segment with paved shoulder < 4 feet X = % of segment with paved shoulder between 4 and 4.5 feet Y = % of segment with paved shoulder between 4.5 and 5 feet Z = % of segment with paved shoulder > 5 feet
		County Arterials: = 0 if X < 4 = 1 if X ≥ 6 = 0.33 if (4≤ X<5) = 0.66 if (5 ≤X<6) Where: X = Average shoulder width in feet
		County Collectors: = 0 if X < 4 = 1 if X ≥ 5 = 0.5 otherwise Where: X = Average shoulder width in feet
Traffic Operations	Even: 0.25 Focused: 0.35	= 1 if X ≤ 0.5 = 0 if X ≥ 1 = (1-X)/0.5 otherwise Where: X = (Segment VC / VC Standard) VC = 30HV Volume-to-capacity ratio for segment VC Standard = Mobility standard for segment
Access Spacing	Even: 0.25 Focused: 0.15	*State Highways:* = 0 if X ≥ 3 = 1 if X ≤ 1 = (3-X)/2 otherwise Where: X = (# of public and private accesses to segment / maximum allowable accesses based on ODOT standards for segment)
		County Arterials: = 1 if access spacing over 500 feet between accesses = 0.5 if access spacing near 500 feet between accesses = 0 if access spacing under 500 feet between accesses
		County Collectors: = 1 if access spacing over 150 feet between accesses = 0.5 if access spacing near 150 feet between accesses = 0 if access spacing under 150 feet between accesses

The corridor health tool evaluates all roads classified as arterials or collectors in Clatsop County. The roads are split where two or more roads meet, forming evaluation segments. Every segment is given a score from 0 to 1 for each of the four categories as detailed above. The category scores are multiplied by a weight, and added together for an overall score between 0 and 1. A score of 0.75 or more is described as "good," a score of less than 0.50 is described as "poor," and all other scores are described as "fair."

Intersection Operations Reports – Summer

Intersection	
Intersection Delay, s/veh	18.5
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	5	180	100	0	240	240	55	0	100	40	190
Peak Hour Factor	0.92	0.97	0.97	0.97	0.92	0.97	0.97	0.97	0.92	0.97	0.97	0.97
Heavy Vehicles, %	2	20	11	10	2	1	7	6	2	6	6	2
Mvmt Flow	0	5	186	103	0	247	247	57	0	103	41	196
Number of Lanes	0	1	1	0	0	1	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	2
HCM Control Delay	19.4	18.3	20
HCM LOS	C	C	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	30%	100%	0%	100%	0%	54%
Vol Thru, %	12%	0%	64%	0%	81%	43%
Vol Right, %	58%	0%	36%	0%	19%	4%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	330	5	280	240	295	140
LT Vol	40	0	180	0	240	60
Through Vol	190	0	100	0	55	5
RT Vol	100	5	0	240	0	75
Lane Flow Rate	340	5	289	247	304	144
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.623	0.012	0.578	0.51	0.581	0.308
Departure Headway (Hd)	6.591	8.138	7.209	7.417	6.875	7.676
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	548	439	499	485	523	466
Service Time	4.65	5.904	4.975	5.182	4.639	5.755
HCM Lane V/C Ratio	0.62	0.011	0.579	0.509	0.581	0.309
HCM Control Delay	20	11	19.5	17.7	18.8	14.2
HCM Lane LOS	C	B	C	C	C	B
HCM 95th-tile Q	4.2	0	3.6	2.8	3.7	1.3

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	75	60	5
Peak Hour Factor	0.92	0.97	0.97	0.97
Heavy Vehicles, %	2	13	6	33
Mvmt Flow	0	77	62	5
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	14.2
HCM LOS	B

Lane

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	10	5	5	15	35	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	17	0	33	20	3	10
Mvmt Flow	12	6	6	19	43	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	80	49	56	0	-	0
Stage 1	49	-	-	-	-	-
Stage 2	31	-	-	-	-	-
Critical Hdwy	6.57	6.2	4.43	-	-	-
Critical Hdwy Stg 1	5.57	-	-	-	-	-
Critical Hdwy Stg 2	5.57	-	-	-	-	-
Follow-up Hdwy	3.653	3.3	2.497	-	-	-
Pot Cap-1 Maneuver	887	1025	1372	-	-	-
Stage 1	936	-	-	-	-	-
Stage 2	954	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	883	1025	1372	-	-	-
Mov Cap-2 Maneuver	883	-	-	-	-	-
Stage 1	936	-	-	-	-	-
Stage 2	950	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	1.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1372	-	926	-	-
HCM Lane V/C Ratio	0.004	-	0.02	-	-
HCM Control Delay (s)	7.6	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection #3: US 101B & Lewis and Clark Rd. 2013 PM 30HV

Id	1	2	3	4	5	6	7	8	9	10	11	12							
Movement	SBL	SBT	SBR	NBL	NBT	NBR	WBL	WBT	WBR	EBL	EBT	EBR			S	N	W	E	
Vi	80	135	5	25	75	5	5	40	40	5	50	35		Peds	0	0	0	0	
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90							
vi	89	150	6	28	83	6	6	44	44	6	56	39		vi	0	0	0	0	
vc,1													0			0		0	**0**
vc,2													0		0	0			**0**
vc,3													0			0	0		**0**
vc,4		150	3				6	22			28	10	218		0		0		**218**
vc,5	178						6	22	11	6	28		250		0	0			**250**
vc,6	178										28		206		0			0	**206**
vc,7	178	150		28	42						28	10	435		0			0	**435**
vc,8	178	150	3	28	42					6			406				0	0	**406**
vc,9					42					6			47			0		0	**47**
vc,10	178	150		28	42			22	11				431			0	0		**431**
vc,11	178	150		28	42	1	6						404				0	0	**404**
vc,12		150					6						156		0		0		**156**
vc,x	0	0	0	218	250	206	435	406	47	431	404	156							
tc,base				4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1							
PHV				0.04	0.06	0	0	0.03	0.08	0	0.06	0							
tc,x				4.14	4.16	4.1	4.1	4.13	4.18	4.1	4.16	4.1							
tf,base				3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5							
tf,x				3.536	3.554	3.5	3.5	3.527	3.572	3.5	3.554	3.5							
cp,x				880.1637	856.2758	897.9196	768.7127	776.7167	976.5922	770.9155	770.0495	928.3698							

	SB	EB	WB			
vSH	117	94	100			
cp,SH	864	859	825			
p0,j,SH	0.15	0.13	0.14	d	e	f
cSH	756	742	717	g	h	i

LFS	EQ	RTS
432	=	432
429	=	429
412	=	412
756	<=	864
742	<=	859
717	<=	825

MAX	
2214.98	Objective Function
	Variable Cells
	Constraints
	Manually-Entered Values

OPERATIONS	NB	WB	EB	MAX
v/c	0.15	0.13	0.14	0.15
d	10.6	10.6	10.8	10.8
LOS	B	B	B	B

Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	40	15	10	10	15	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	68	68	68	68	68	68
Heavy Vehicles, %	3	17	0	12	0	15
Mvmt Flow	59	22	15	15	22	37

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	29	0	-	0	162	22
Stage 1	-	-	-	-	22	-
Stage 2	-	-	-	-	140	-
Critical Hdwy	4.13	-	-	-	6.4	6.35
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.227	-	-	-	3.5	3.435
Pot Cap-1 Maneuver	1578	-	-	-	834	1019
Stage 1	-	-	-	-	1006	-
Stage 2	-	-	-	-	892	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1578	-	-	-	802	1019
Mov Cap-2 Maneuver	-	-	-	-	802	-
Stage 1	-	-	-	-	1006	-
Stage 2	-	-	-	-	858	-

Approach	EB	WB	SB
HCM Control Delay, s	5.4	0	9.2
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1578	-	-	-	925
HCM Lane V/C Ratio	0.037	-	-	-	0.064
HCM Control Delay (s)	7.4	0	-	-	9.2
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	20	30	20	35	55	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	76	76	76	76
Heavy Vehicles, %	6	3	15	3	0	5
Mvmt Flow	26	39	26	46	72	26

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	185	86	99	0	-	0
Stage 1	86	-	-	-	-	-
Stage 2	99	-	-	-	-	-
Critical Hdwy	6.46	6.23	4.25	-	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.327	2.335	-	-	-
Pot Cap-1 Maneuver	795	970	1416	-	-	-
Stage 1	927	-	-	-	-	-
Stage 2	915	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	780	970	1416	-	-	-
Mov Cap-2 Maneuver	780	-	-	-	-	-
Stage 1	927	-	-	-	-	-
Stage 2	898	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	2.8	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1416	-	884	-	-
HCM Lane V/C Ratio	0.019	-	0.074	-	-
HCM Control Delay (s)	7.6	0	9.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	5	10	5	25	30	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	67	67	67	67	67	67
Heavy Vehicles, %	0	0	0	4	0	0
Mvmt Flow	7	15	7	37	45	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	97	45	45	0	-	0
Stage 1	45	-	-	-	-	-
Stage 2	52	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	907	1031	1576	-	-	-
Stage 1	983	-	-	-	-	-
Stage 2	976	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	902	1031	1576	-	-	-
Mov Cap-2 Maneuver	902	-	-	-	-	-
Stage 1	983	-	-	-	-	-
Stage 2	971	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	1.2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1576	-	984	-	-
HCM Lane V/C Ratio	0.005	-	0.023	-	-
HCM Control Delay (s)	7.3	0	8.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	3.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	50	20	105	30	40	110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Free	Free
RT Channelized	-	Yeild	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	8	5	2	0	11	3
Mvmt Flow	56	22	118	34	45	124

Major/Minor	Minor1		Minor2		Major2	
Conflicting Flow All	289	0	213	124	0	0
Stage 1	0	-	213	-	-	-
Stage 2	289	-	0	-	-	-
Critical Hdwy	6.48	-	6.52	6.2	-	-
Critical Hdwy Stg 1	-	-	5.52	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	-	4.018	3.3	-	-
Pot Cap-1 Maneuver	689	-	684	932	-	-
Stage 1	-	-	726	-	-	-
Stage 2	747	-	-	-	-	-
Platoon blocked, %						-
Mov Cap-1 Maneuver	689	-	0	932	-	-
Mov Cap-2 Maneuver	689	-	0	-	-	-
Stage 1	-	-	0	-	-	-
Stage 2	747	-	0	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s		9.6	0
HCM LOS	-	A	

Minor Lane/Major Mvmt	NBLn1	WBLn1	SBL	SBT
Capacity (veh/h)	932	-	-	-
HCM Lane V/C Ratio	0.163	-	-	-
HCM Control Delay (s)	9.6	-	-	-
HCM Lane LOS	A	-	-	-
HCM 95th %tile Q(veh)	0.6	-	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	340	20	25	355	25	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	6	22	14	7	10	9
Mvmt Flow	400	24	29	418	29	12

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	424	0	888	412
Stage 1	-	-	-	-	412	-
Stage 2	-	-	-	-	476	-
Critical Hdwy	-	-	4.24	-	6.5	6.29
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.326	-	3.59	3.381
Pot Cap-1 Maneuver	-	-	1074	-	304	625
Stage 1	-	-	-	-	652	-
Stage 2	-	-	-	-	609	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1074	-	296	625
Mov Cap-2 Maneuver	-	-	-	-	296	-
Stage 1	-	-	-	-	652	-
Stage 2	-	-	-	-	593	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	16.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	348	-	-	1074	-
HCM Lane V/C Ratio	0.118	-	-	0.027	-
HCM Control Delay (s)	16.7	-	-	8.4	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	5	5	25	5	5	25
Conflicting Peds, #/hr	1	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	0	0	13	0	43	9
Mvmt Flow	6	6	32	6	6	32

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	81	36	0	0	39	0
Stage 1	36	-	-	-	-	-
Stage 2	45	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.53	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.587	-
Pot Cap-1 Maneuver	926	1042	-	-	1344	-
Stage 1	992	-	-	-	-	-
Stage 2	983	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	921	1041	-	-	1344	-
Mov Cap-2 Maneuver	921	-	-	-	-	-
Stage 1	991	-	-	-	-	-
Stage 2	978	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.7	0	1.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	977	1344	-
HCM Lane V/C Ratio	-	-	0.013	0.005	-
HCM Control Delay (s)	-	-	8.7	7.7	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	5	175	30	5	155	50	30	10	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	Yeild	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	40	5	0	0	4	9	0	12	0
Mvmt Flow	6	213	37	6	189	61	37	12	18

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	250	0	0	213	0	0	473	488	213
Stage 1	-	-	-	-	-	-	226	226	-
Stage 2	-	-	-	-	-	-	247	262	-
Critical Hdwy	4.5	-	-	4.1	-	-	7.1	6.62	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.62	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.62	-
Follow-up Hdwy	2.56	-	-	2.2	-	-	3.5	4.108	3.3
Pot Cap-1 Maneuver	1123	-	-	1369	-	-	505	466	832
Stage 1	-	-	-	-	-	-	781	699	-
Stage 2	-	-	-	-	-	-	761	674	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1123	-	-	1369	-	-	478	461	832
Mov Cap-2 Maneuver	-	-	-	-	-	-	478	461	-
Stage 1	-	-	-	-	-	-	776	695	-
Stage 2	-	-	-	-	-	-	726	671	-

Approach	EB	WB	NB
HCM Control Delay, s	0.2	0.2	12.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	537	1123	-	-	1369	-	-	490
HCM Lane V/C Ratio	0.125	0.005	-	-	0.004	-	-	0.212
HCM Control Delay (s)	12.7	8.2	0	-	7.6	0	-	14.3
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.8

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	60	20	5
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	82	82	82
Heavy Vehicles, %	5	0	0
Mvmt Flow	73	24	6

Major/Minor	Minor2		
Conflicting Flow All	473	458	220
Stage 1	232	232	-
Stage 2	241	226	-
Critical Hdwy	7.15	6.5	6.2
Critical Hdwy Stg 1	6.15	5.5	-
Critical Hdwy Stg 2	6.15	5.5	-
Follow-up Hdwy	3.545	4	3.3
Pot Cap-1 Maneuver	497	502	825
Stage 1	764	716	-
Stage 2	756	721	-
Platoon blocked, %			
Mov Cap-1 Maneuver	472	496	825
Mov Cap-2 Maneuver	472	496	-
Stage 1	759	712	-
Stage 2	722	717	-

Approach	SB
HCM Control Delay, s	14.3
HCM LOS	B

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	300	15	30	375	20	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Free	-	None	-	None
Storage Length	-	220	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	7	7	4	9	6	0
Mvmt Flow	326	16	33	408	22	22

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	326	0	799	326
Stage 1	-	-	-	-	326	-
Stage 2	-	-	-	-	473	-
Critical Hdwy	-	-	4.14	-	6.46	6.2
Critical Hdwy Stg 1	-	-	-	-	5.46	-
Critical Hdwy Stg 2	-	-	-	-	5.46	-
Follow-up Hdwy	-	-	2.236	-	3.554	3.3
Pot Cap-1 Maneuver	-	0	1222	-	349	720
Stage 1	-	0	-	-	723	-
Stage 2	-	0	-	-	619	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	1222	-	337	720
Mov Cap-2 Maneuver	-	-	-	-	337	-
Stage 1	-	-	-	-	723	-
Stage 2	-	-	-	-	597	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	13.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	WBL	WBT
Capacity (veh/h)	459	-	1222	-
HCM Lane V/C Ratio	0.095	-	0.027	-
HCM Control Delay (s)	13.7	-	8	0
HCM Lane LOS	B	-	A	A
HCM 95th %tile Q(veh)	0.3	-	0.1	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	105	720	15	70	740	40	70	105	100	35	70	135
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	5.4		4.5	5.4		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.93		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1630	1643		1554	1671		1511	1512		1550	1461	
Flt Permitted	0.95	1.00		0.95	1.00		0.35	1.00		0.35	1.00	
Satd. Flow (perm)	1630	1643		1554	1671		558	1512		568	1461	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	113	774	16	75	796	43	75	113	108	38	75	145
RTOR Reduction (vph)	0	1	0	0	2	0	0	37	0	0	75	0
Lane Group Flow (vph)	113	789	0	75	837	0	75	184	0	38	145	0
Confl. Peds. (#/hr)									2	2		
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	2%	6%	14%	7%	4%	3%	10%	2%	10%	7%	7%	6%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	11.1	61.3		7.9	58.1		16.4	16.4		16.4	16.4	
Effective Green, g (s)	11.1	61.3		7.9	58.1		16.4	16.4		16.4	16.4	
Actuated g/C Ratio	0.11	0.61		0.08	0.58		0.16	0.16		0.16	0.16	
Clearance Time (s)	4.5	5.4		4.5	5.4		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.5	4.5		2.5	4.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	180	1007		122	970		91	247		93	239	
v/s Ratio Prot	c0.07	c0.48		0.05	c0.50			0.12			0.10	
v/s Ratio Perm							c0.13			0.07		
v/c Ratio	0.63	0.78		0.61	0.86		0.82	0.75		0.41	0.61	
Uniform Delay, d1	42.5	14.4		44.6	17.6		40.4	39.8		37.5	38.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.8	6.1		7.6	10.1		42.1	11.0		2.1	3.6	
Delay (s)	48.3	20.5		52.2	27.7		82.5	50.8		39.6	42.4	
Level of Service	D	C		D	C		F	D		D	D	
Approach Delay (s)		24.0			29.7			58.8			42.0	
Approach LOS		C			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	32.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.4
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	335	5	5	385	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	6	20	71	9	0	50
Mvmt Flow	381	6	6	438	6	6

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	386	0	833	384
Stage 1	-	-	-	-	384	-
Stage 2	-	-	-	-	449	-
Critical Hdwy	-	-	4.81	-	6.4	6.7
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.839	-	3.5	3.75
Pot Cap-1 Maneuver	-	-	878	-	341	570
Stage 1	-	-	-	-	693	-
Stage 2	-	-	-	-	647	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	878	-	338	570
Mov Cap-2 Maneuver	-	-	-	-	338	-
Stage 1	-	-	-	-	693	-
Stage 2	-	-	-	-	641	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	13.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	424	-	-	878	-
HCM Lane V/C Ratio	0.027	-	-	0.006	-
HCM Control Delay (s)	13.7	-	-	9.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	3.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	5	30	5	10	10	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	67	67	67	67	67	67
Heavy Vehicles, %	17	12	50	14	38	13
Mvmt Flow	7	45	7	15	15	22

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	52	0	60	30
Stage 1	-	-	-	-	30	-
Stage 2	-	-	-	-	30	-
Critical Hdwy	-	-	4.6	-	6.78	6.33
Critical Hdwy Stg 1	-	-	-	-	5.78	-
Critical Hdwy Stg 2	-	-	-	-	5.78	-
Follow-up Hdwy	-	-	2.65	-	3.842	3.417
Pot Cap-1 Maneuver	-	-	1296	-	864	1014
Stage 1	-	-	-	-	907	-
Stage 2	-	-	-	-	907	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1296	-	860	1014
Mov Cap-2 Maneuver	-	-	-	-	860	-
Stage 1	-	-	-	-	907	-
Stage 2	-	-	-	-	902	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	946	-	-	1296	-
HCM Lane V/C Ratio	0.039	-	-	0.006	-
HCM Control Delay (s)	9	-	-	7.8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	5	25	85	5	40	165
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	50	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	0	4	4	0	0	1
Mvmt Flow	6	32	110	6	52	214

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	428	110	0	-	110	0
Stage 1	110	-	-	-	-	-
Stage 2	318	-	-	-	-	-
Critical Hdwy	6.4	6.24	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.336	-	-	2.2	-
Pot Cap-1 Maneuver	588	938	-	0	1493	-
Stage 1	920	-	-	0	-	-
Stage 2	742	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	568	938	-	-	1493	-
Mov Cap-2 Maneuver	568	-	-	-	-	-
Stage 1	920	-	-	-	-	-
Stage 2	716	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	1.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	568	938	1493	-
HCM Lane V/C Ratio	-	0.011	0.035	0.035	-
HCM Control Delay (s)	-	11.4	9	7.5	-
HCM Lane LOS	-	B	A	A	-
HCM 95th %tile Q(veh)	-	0	0.1	0.1	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	10	320	0	0	350	5	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	230	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	11	13	0	0	11	0	0	0	0
Mvmt Flow	12	386	0	0	422	6	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	428	0	0	386	0	0	841	838	386
Stage 1	-	-	-	-	-	-	410	410	-
Stage 2	-	-	-	-	-	-	431	428	-
Critical Hdwy	4.21	-	-	4.1	-	-	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.299	-	-	2.2	-	-	3.5	4	3.3
Pot Cap-1 Maneuver	1085	-	-	1184	-	-	287	305	666
Stage 1	-	-	-	-	-	-	623	599	-
Stage 2	-	-	-	-	-	-	607	588	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1085	-	-	1184	-	-	279	302	666
Mov Cap-2 Maneuver	-	-	-	-	-	-	279	302	-
Stage 1	-	-	-	-	-	-	616	592	-
Stage 2	-	-	-	-	-	-	595	588	-

Approach	EB	WB	NB
HCM Control Delay, s	0.3	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1085	-	-	1184	-	-	380
HCM Lane V/C Ratio	-	0.011	-	-	-	-	-	0.048
HCM Control Delay (s)	0	8.4	-	-	0	-	-	14.9
HCM Lane LOS	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.1

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	0	10
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	83	83	83
Heavy Vehicles, %	67	0	22
Mvmt Flow	6	0	12

Major/Minor	Minor2		
Conflicting Flow All	835	835	425
Stage 1	425	425	-
Stage 2	410	410	-
Critical Hdwy	7.77	6.5	6.42
Critical Hdwy Stg 1	6.77	5.5	-
Critical Hdwy Stg 2	6.77	5.5	-
Follow-up Hdwy	4.103	4	3.498
Pot Cap-1 Maneuver	224	306	589
Stage 1	498	590	-
Stage 2	508	599	-
Platoon blocked, %			
Mov Cap-1 Maneuver	222	303	589
Mov Cap-2 Maneuver	222	303	-
Stage 1	492	590	-
Stage 2	502	592	-

Approach	SB
HCM Control Delay, s	14.9
HCM LOS	B

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	65	350	20	15	325	40	20	5	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	79	79	79	79	79	79
Heavy Vehicles, %	5	14	5	6	12	10	0	0	10
Mvmt Flow	82	443	25	19	411	51	25	6	13

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	463	0	0	469	0	0	1138	1122	457
Stage 1	-	-	-	-	-	-	621	621	-
Stage 2	-	-	-	-	-	-	517	501	-
Critical Hdwy	4.15	-	-	4.16	-	-	7.1	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.254	-	-	3.5	4	3.39
Pot Cap-1 Maneuver	1083	-	-	1072	-	-	180	208	587
Stage 1	-	-	-	-	-	-	478	482	-
Stage 2	-	-	-	-	-	-	545	546	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1083	-	-	1072	-	-	141	189	587
Mov Cap-2 Maneuver	-	-	-	-	-	-	141	189	-
Stage 1	-	-	-	-	-	-	441	445	-
Stage 2	-	-	-	-	-	-	463	536	-

Approach	EB	WB	NB
HCM Control Delay, s	1.3	0.3	29.8
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	189	1083	-	-	1072	-	-	280
HCM Lane V/C Ratio	0.234	0.076	-	-	0.018	-	-	0.452
HCM Control Delay (s)	29.8	8.6	-	-	8.4	-	-	28
HCM Lane LOS	D	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.9	0.2	-	-	0.1	-	-	2.2

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	35	10	55
Conflicting Peds, #/hr	1	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	79	79	79
Heavy Vehicles, %	6	0	7
Mvmt Flow	44	13	70

Major/Minor	Minor2		
Conflicting Flow All	1107	1110	438
Stage 1	476	476	-
Stage 2	631	634	-
Critical Hdwy	7.16	6.5	6.27
Critical Hdwy Stg 1	6.16	5.5	-
Critical Hdwy Stg 2	6.16	5.5	-
Follow-up Hdwy	3.554	4	3.363
Pot Cap-1 Maneuver	184	211	608
Stage 1	562	560	-
Stage 2	462	476	-
Platoon blocked, %			
Mov Cap-1 Maneuver	163	191	607
Mov Cap-2 Maneuver	163	191	-
Stage 1	519	550	-
Stage 2	412	440	-

Approach	SB
HCM Control Delay, s	28
HCM LOS	D

Minor Lane/Major Mvmt

Intersection									
Int Delay, s/veh	4.4								

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	5	5	0	5	20	40	0	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	0	17	0	50	10	2	0	100	0
Mvmt Flow	6	6	0	6	25	49	0	6	6

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	74	0	0	6	0	0	87	105	6
Stage 1	-	-	-	-	-	-	19	19	-
Stage 2	-	-	-	-	-	-	68	86	-
Critical Hdwy	4.1	-	-	4.6	-	-	7.1	7.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	6.5	-
Follow-up Hdwy	2.2	-	-	2.65	-	-	3.5	4.9	3.3
Pot Cap-1 Maneuver	1538	-	-	1351	-	-	904	634	1083
Stage 1	-	-	-	-	-	-	1005	719	-
Stage 2	-	-	-	-	-	-	947	667	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1538	-	-	1351	-	-	886	628	1083
Mov Cap-2 Maneuver	-	-	-	-	-	-	886	628	-
Stage 1	-	-	-	-	-	-	1001	716	-
Stage 2	-	-	-	-	-	-	928	664	-

Approach	EB	WB	NB
HCM Control Delay, s	3.7	0.6	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	795	1538	-	-	1351	-	-	861
HCM Lane V/C Ratio	0.016	0.004	-	-	0.005	-	-	0.057
HCM Control Delay (s)	9.6	7.4	0	-	7.7	0	-	9.4
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.2

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	30	5	5
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	81	81	81
Heavy Vehicles, %	0	100	0
Mvmt Flow	37	6	6

Major/Minor	Minor2		
Conflicting Flow All	87	81	49
Stage 1	62	62	-
Stage 2	25	19	-
Critical Hdwy	7.1	7.5	6.2
Critical Hdwy Stg 1	6.1	6.5	-
Critical Hdwy Stg 2	6.1	6.5	-
Follow-up Hdwy	3.5	4.9	3.3
Pot Cap-1 Maneuver	904	655	1025
Stage 1	954	685	-
Stage 2	998	719	-
Platoon blocked, %			
Mov Cap-1 Maneuver	886	649	1025
Mov Cap-2 Maneuver	886	649	-
Stage 1	950	682	-
Stage 2	980	716	-

Approach	SB
HCM Control Delay, s	9.4
HCM LOS	A

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	2.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	25	20	5	25	20	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	20
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	0	10	0	4	17	50
Mvmt Flow	30	24	6	30	24	6

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	55	0	86	43
Stage 1	-	-	-	-	43	-
Stage 2	-	-	-	-	43	-
Critical Hdwy	-	-	4.1	-	6.57	6.7
Critical Hdwy Stg 1	-	-	-	-	5.57	-
Critical Hdwy Stg 2	-	-	-	-	5.57	-
Follow-up Hdwy	-	-	2.2	-	3.653	3.75
Pot Cap-1 Maneuver	-	-	1563	-	880	906
Stage 1	-	-	-	-	942	-
Stage 2	-	-	-	-	942	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1563	-	876	906
Mov Cap-2 Maneuver	-	-	-	-	876	-
Stage 1	-	-	-	-	942	-
Stage 2	-	-	-	-	938	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	876	906	-	-	1563	-
HCM Lane V/C Ratio	0.028	0.007	-	-	0.004	-
HCM Control Delay (s)	9.2	9	-	-	7.3	0
HCM Lane LOS	A	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	5	5	30	5	20	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	0	7	33	0	2
Mvmt Flow	6	6	36	6	24	83

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	170	39	0	0	42	0
Stage 1	39	-	-	-	-	-
Stage 2	131	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	825	1038	-	-	1580	-
Stage 1	989	-	-	-	-	-
Stage 2	900	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	812	1038	-	-	1580	-
Mov Cap-2 Maneuver	812	-	-	-	-	-
Stage 1	989	-	-	-	-	-
Stage 2	886	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	1.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	911	1580	-
HCM Lane V/C Ratio	-	-	0.013	0.015	-
HCM Control Delay (s)	-	-	9	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	7.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	10	20	5	10	10	25	5	45	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	15	0	0	0	4	0	5	0
Mvmt Flow	11	23	6	11	11	28	6	51	11

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	40	0	0	28	0	0	139	111	26
Stage 1	-	-	-	-	-	-	48	48	-
Stage 2	-	-	-	-	-	-	91	63	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.55	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.55	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.045	3.3
Pot Cap-1 Maneuver	1583	-	-	1599	-	-	836	774	1056
Stage 1	-	-	-	-	-	-	971	849	-
Stage 2	-	-	-	-	-	-	921	837	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1583	-	-	1599	-	-	759	763	1056
Mov Cap-2 Maneuver	-	-	-	-	-	-	759	763	-
Stage 1	-	-	-	-	-	-	964	843	-
Stage 2	-	-	-	-	-	-	828	831	-

Approach	EB	WB	NB
HCM Control Delay, s	2.1	1.6	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	800	1583	-	-	1599	-	-	813
HCM Lane V/C Ratio	0.085	0.007	-	-	0.007	-	-	0.175
HCM Control Delay (s)	9.9	7.3	0	-	7.3	0	-	10.4
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.6

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	50	55	20
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	88	88	88
Heavy Vehicles, %	2	4	4
Mvmt Flow	57	62	23

Major/Minor	Minor2		
Conflicting Flow All	128	99	26
Stage 1	48	48	-
Stage 2	80	51	-
Critical Hdwy	7.12	6.54	6.24
Critical Hdwy Stg 1	6.12	5.54	-
Critical Hdwy Stg 2	6.12	5.54	-
Follow-up Hdwy	3.518	4.036	3.336
Pot Cap-1 Maneuver	845	787	1044
Stage 1	965	851	-
Stage 2	929	848	-
Platoon blocked, %			
Mov Cap-1 Maneuver	785	776	1044
Mov Cap-2 Maneuver	785	776	-
Stage 1	958	845	-
Stage 2	857	842	-

Approach	SB
HCM Control Delay, s	10.4
HCM LOS	B

Minor Lane/Major Mvmt

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	395	25	55	765	825	470
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5	4.5	5.4	5.4	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1599	1488	1662	1716	1716	1382
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1599	1488	1662	1716	1716	1382
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	425	27	59	823	887	505
RTOR Reduction (vph)	0	19	0	0	0	110
Lane Group Flow (vph)	425	8	59	823	887	395
Confl. Peds. (#/hr)			1			1
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	4%	0%	0%	2%	2%	6%
Turn Type	Prot	Perm	Prot	NA	NA	pm+ov
Protected Phases	8		1	6	2	8
Permitted Phases		8				2
Actuated Green, G (s)	28.8	28.8	7.3	61.3	49.5	78.3
Effective Green, g (s)	28.8	28.8	7.3	61.3	49.5	78.3
Actuated g/C Ratio	0.29	0.29	0.07	0.61	0.50	0.78
Clearance Time (s)	4.5	4.5	4.5	5.4	5.4	4.5
Vehicle Extension (s)	2.5	2.5	2.5	4.7	4.7	2.5
Lane Grp Cap (vph)	460	428	121	1051	849	1082
v/s Ratio Prot	c0.27		0.04	c0.48	c0.52	0.11
v/s Ratio Perm		0.01				0.18
v/c Ratio	0.92	0.02	0.49	0.78	1.04	0.37
Uniform Delay, d1	34.5	25.5	44.6	14.4	25.2	3.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	24.3	0.0	2.2	5.8	43.2	0.2
Delay (s)	58.8	25.5	46.8	20.2	68.5	3.5
Level of Service	E	C	D	C	E	A
Approach Delay (s)	56.8			22.0	44.9	
Approach LOS	E			C	D	

Intersection Summary			
HCM 2000 Control Delay	39.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.4
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	5	465	5	10	320	5	5	0	10
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	75	75	75	75	75	75
Heavy Vehicles, %	0	9	25	0	15	25	0	0	25
Mvmt Flow	7	620	7	13	427	7	7	0	13

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	433	0	0	627	0	0	1094	1097	624
Stage 1	-	-	-	-	-	-	637	637	-
Stage 2	-	-	-	-	-	-	457	460	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.525
Pot Cap-1 Maneuver	1137	-	-	965	-	-	193	215	446
Stage 1	-	-	-	-	-	-	469	475	-
Stage 2	-	-	-	-	-	-	587	569	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1136	-	-	964	-	-	187	209	446
Mov Cap-2 Maneuver	-	-	-	-	-	-	187	209	-
Stage 1	-	-	-	-	-	-	465	471	-
Stage 2	-	-	-	-	-	-	570	559	-

Approach	EB	WB	NB
HCM Control Delay, s	0.1	0.3	17.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	305	1136	-	-	964	-	-	362
HCM Lane V/C Ratio	0.066	0.006	-	-	0.014	-	-	0.037
HCM Control Delay (s)	17.6	8.2	0	-	8.8	0	-	15.3
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	0	5
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	Stop
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	75	75	75
Heavy Vehicles, %	0	0	0
Mvmt Flow	7	0	7

Major/Minor	Minor2		
Conflicting Flow All	1100	1097	431
Stage 1	457	457	-
Stage 2	643	640	-
Critical Hdwy	7.1	6.5	6.2
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.3
Pot Cap-1 Maneuver	191	215	629
Stage 1	587	571	-
Stage 2	465	473	-
Platoon blocked, %			
Mov Cap-1 Maneuver	181	209	628
Mov Cap-2 Maneuver	181	209	-
Stage 1	582	561	-
Stage 2	447	469	-

Approach	SB
HCM Control Delay, s	15.3
HCM LOS	C

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	10	415	90	30	335	5	55	5	25
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	215	-	160	190	-	120	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	72	72	72	72	72	72	72	72
Heavy Vehicles, %	0	11	8	13	9	0	9	0	4
Mvmt Flow	14	576	125	42	465	7	76	7	35

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	465	0	0	576	0	0	1160	1153	577
Stage 1	-	-	-	-	-	-	604	604	-
Stage 2	-	-	-	-	-	-	556	549	-
Critical Hdwy	4.1	-	-	4.23	-	-	7.19	6.5	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.19	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.19	5.5	-
Follow-up Hdwy	2.2	-	-	2.317	-	-	3.581	4	3.336
Pot Cap-1 Maneuver	1107	-	-	945	-	-	167	199	512
Stage 1	-	-	-	-	-	-	473	491	-
Stage 2	-	-	-	-	-	-	503	520	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1106	-	-	944	-	-	153	188	512
Mov Cap-2 Maneuver	-	-	-	-	-	-	153	188	-
Stage 1	-	-	-	-	-	-	467	485	-
Stage 2	-	-	-	-	-	-	468	497	-

Approach	EB	WB	NB
HCM Control Delay, s	0.2	0.7	48.3
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	195	1106	-	-	944	-	-	218
HCM Lane V/C Ratio	0.605	0.013	-	-	0.044	-	-	0.096
HCM Control Delay (s)	48.3	8.3	-	-	9	-	-	23.3
HCM Lane LOS	E	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	3.4	0	-	-	0.1	-	-	0.3

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	5	5
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	72	72	72
Heavy Vehicles, %	0	0	0
Mvmt Flow	7	7	7

Major/Minor	Minor2		
Conflicting Flow All	1174	1153	466
Stage 1	549	549	-
Stage 2	625	604	-
Critical Hdwy	7.1	6.5	6.2
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.3
Pot Cap-1 Maneuver	170	199	601
Stage 1	524	520	-
Stage 2	476	491	-
Platoon blocked, %			
Mov Cap-1 Maneuver	147	188	600
Mov Cap-2 Maneuver	147	188	-
Stage 1	517	497	-
Stage 2	431	485	-

Approach	SB
HCM Control Delay, s	23.3
HCM LOS	C

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	10	5	115	0	0	10	170	630	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	Free
Storage Length	-	-	-	-	-	-	340	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	10	0	0	0	11	5	20
Mvmt Flow	11	5	125	0	0	11	185	685	11

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	1516	1858	397	1464	1858	342	793	0	-
Stage 1	804	804	-	1054	1054	-	-	-	-
Stage 2	712	1054	-	410	804	-	-	-	-
Critical Hdwy	7.5	6.5	7.1	7.5	6.5	6.9	4.32	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-
Follow-up Hdwy	3.5	4	3.4	3.5	4	3.3	2.31	-	-
Pot Cap-1 Maneuver	84	74	580	91	74	660	768	-	0
Stage 1	347	398	-	245	305	-	-	-	0
Stage 2	394	305	-	595	398	-	-	-	0
Platoon blocked, %								-	
Mov Cap-1 Maneuver	67	56	580	54	56	660	768	-	-
Mov Cap-2 Maneuver	67	56	-	54	56	-	-	-	-
Stage 1	263	396	-	186	232	-	-	-	-
Stage 2	294	232	-	458	396	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	27.5	10.5	2.4
HCM LOS	D	B	

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBL	SBT
Capacity (veh/h)	768	-	298	660	918	-
HCM Lane V/C Ratio	0.241	-	0.474	0.016	0.006	-
HCM Control Delay (s)	11.2	-	27.5	10.5	8.9	-
HCM Lane LOS	B	-	D	B	A	-
HCM 95th %tile Q(veh)	0.9	-	2.4	0.1	0	-

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	730	25
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	Free
Storage Length	300	-	110
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	92	92	92
Heavy Vehicles, %	0	4	9
Mvmt Flow	5	793	27

Major/Minor	Major2		
Conflicting Flow All	685	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.1	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.2	-	-
Pot Cap-1 Maneuver	918	-	0
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %		-	
Mov Cap-1 Maneuver	918	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	SB
HCM Control Delay, s	0.1
HCM LOS	

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	5	30	50	155	105	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	4	5	12	6	0
Mvmt Flow	6	35	59	182	124	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	426	126	129	0	-	0
Stage 1	126	-	-	-	-	-
Stage 2	300	-	-	-	-	-
Critical Hdwy	6.4	6.24	4.15	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.336	2.245	-	-	-
Pot Cap-1 Maneuver	589	919	1438	-	-	-
Stage 1	905	-	-	-	-	-
Stage 2	756	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	562	919	1438	-	-	-
Mov Cap-2 Maneuver	562	-	-	-	-	-
Stage 1	905	-	-	-	-	-
Stage 2	721	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	1.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1438	-	843	-	-
HCM Lane V/C Ratio	0.041	-	0.049	-	-
HCM Control Delay (s)	7.6	0	9.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Intersection	
Int Delay, s/veh	8.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	110	205	165	70	130	110
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	2	4	5	1	5
Mvmt Flow	120	223	179	76	141	120

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	619	219	0	0	255	0
Stage 1	217	-	-	-	-	-
Stage 2	402	-	-	-	-	-
Critical Hdwy	6.44	6.22	-	-	4.11	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.318	-	-	2.209	-
Pot Cap-1 Maneuver	449	821	-	-	1316	-
Stage 1	814	-	-	-	-	-
Stage 2	671	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	400	820	-	-	1314	-
Mov Cap-2 Maneuver	400	-	-	-	-	-
Stage 1	814	-	-	-	-	-
Stage 2	598	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.7	0	4.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	600	1314	-
HCM Lane V/C Ratio	-	-	0.571	0.108	-
HCM Control Delay (s)	-	-	18.7	8.1	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	3.6	0.4	-

Intersection						
Int Delay, s/veh	3.8					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	55	40	35	725	755	85
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Free
Storage Length	0	70	230	-	-	175
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	13	6	10	4	4	4
Mvmt Flow	59	43	38	780	812	91

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1667	812	812	0	-	0
Stage 1	812	-	-	-	-	-
Stage 2	855	-	-	-	-	-
Critical Hdwy	6.53	6.26	4.2	-	-	-
Critical Hdwy Stg 1	5.53	-	-	-	-	-
Critical Hdwy Stg 2	5.53	-	-	-	-	-
Follow-up Hdwy	3.617	3.354	2.29	-	-	-
Pot Cap-1 Maneuver	100	373	781	-	-	0
Stage 1	418	-	-	-	-	0
Stage 2	399	-	-	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	95	373	781	-	-	-
Mov Cap-2 Maneuver	95	-	-	-	-	-
Stage 1	418	-	-	-	-	-
Stage 2	380	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	59.7	0.5	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	781	-	95	373	-
HCM Lane V/C Ratio	0.048	-	0.623	0.115	-
HCM Control Delay (s)	9.8	-	91.5	15.9	-
HCM Lane LOS	A	-	F	C	-
HCM 95th %tile Q(veh)	0.2	-	3	0.4	-

Intersection Operations Reports – Average Weekday

Intersection	
Intersection Delay, s/veh	12.8
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	5	140	80	0	190	190	45	0	80	30	150
Peak Hour Factor	0.92	0.97	0.97	0.97	0.92	0.97	0.97	0.97	0.92	0.97	0.97	0.97
Heavy Vehicles, %	2	20	11	10	2	1	7	6	2	6	6	2
Mvmt Flow	0	5	144	82	0	196	196	46	0	82	31	155
Number of Lanes	0	1	1	0	0	1	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	2
HCM Control Delay	13.1	12.9	13.1
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	31%	100%	0%	100%	0%	50%
Vol Thru, %	12%	0%	64%	0%	81%	45%
Vol Right, %	58%	0%	36%	0%	19%	5%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	260	5	220	190	235	110
LT Vol	30	0	140	0	190	50
Through Vol	150	0	80	0	45	5
RT Vol	80	5	0	190	0	55
Lane Flow Rate	268	5	227	196	242	113
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.429	0.01	0.396	0.358	0.406	0.207
Departure Headway (Hd)	5.766	7.209	6.284	6.578	6.037	6.578
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	622	495	569	545	594	542
Service Time	3.832	4.98	4.054	4.339	3.797	4.66
HCM Lane V/C Ratio	0.431	0.01	0.399	0.36	0.407	0.208
HCM Control Delay	13.1	10.1	13.2	13	12.9	11.4
HCM Lane LOS	B	B	B	B	B	B
HCM 95th-tile Q	2.1	0	1.9	1.6	2	0.8

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	55	50	5
Peak Hour Factor	0.92	0.97	0.97	0.97
Heavy Vehicles, %	2	13	6	33
Mvmt Flow	0	57	52	5
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	11.4
HCM LOS	B

Lane

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	10	5	5	15	35	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	17	0	33	20	3	10
Mvmt Flow	12	6	6	19	43	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	80	49	56	0	-	0
Stage 1	49	-	-	-	-	-
Stage 2	31	-	-	-	-	-
Critical Hdwy	6.57	6.2	4.43	-	-	-
Critical Hdwy Stg 1	5.57	-	-	-	-	-
Critical Hdwy Stg 2	5.57	-	-	-	-	-
Follow-up Hdwy	3.653	3.3	2.497	-	-	-
Pot Cap-1 Maneuver	887	1025	1372	-	-	-
Stage 1	936	-	-	-	-	-
Stage 2	954	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	883	1025	1372	-	-	-
Mov Cap-2 Maneuver	883	-	-	-	-	-
Stage 1	936	-	-	-	-	-
Stage 2	950	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	1.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1372	-	926	-	-
HCM Lane V/C Ratio	0.004	-	0.02	-	-
HCM Control Delay (s)	7.6	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection #3: US 101B & Lewis and Clark Rd. 2013 PM AWD

Id	1	2	3	4	5	6	7	8	9	10	11	12							
Movement	SBL	SBT	SBR	NBL	NBT	NBR	WBL	WBT	WBR	EBL	EBT	EBR			S	N	W	E	
Vi	65	110	5	20	65	5	5	30	35	5	40	30		Peds	0	0	0	0	
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90							
vi	72	122	6	22	72	6	6	33	39	6	44	33		vi	0	0	0	0	
vc,1													0			0		0	**0**
vc,2													0		0	0			**0**
vc,3													0			0	0		**0**
vc,4		122	3				6	17			22	8	178		0		0		**178**
vc,5	144						6	17	10	6	22		204		0	0			**204**
vc,6	144										22		167		0			0	**167**
vc,7	144	122		22	36						22	8	356		0			0	**356**
vc,8	144	122	3	22	36					6			333				0	0	**333**
vc,9					36					6			42			0		0	**42**
vc,10	144	122		22	36			17	10				351			0	0		**351**
vc,11	144	122		22	36	1	6						332				0	0	**332**
vc,12		122					6						128		0		0		**128**
vc,x	0	0	0	178	204	167	356	333	42	351	332	128							
tc,base				4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1							
PHV				0.04	0.06	0	0	0.03	0.08	0	0.06	0							
tc,x				4.14	4.16	4.1	4.1	4.13	4.18	4.1	4.16	4.1							
tf,base				3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5							
tf,x				3.536	3.554	3.5	3.5	3.527	3.572	3.5	3.554	3.5							
cp,x				904.4138	883.3984	921.5307	811.4749	816.2178	980.2267	813.7792	809.4994	945.6502							

	SB	EB	WB			
vSH	100	78	83			
cp,SH	890	890	859			
p0,j,SH	0.12	0.10	0.11	d	e	f
cSH	803	793	769	g	h	i

LFS	EQ	RTS		MAX	
445	=	445		2364.383	Objective Function
445	=	445			
430	=	430			Variable Cells
803	<=	890			Constraints
793	<=	890			Manually-Entered Values
769	<=	859			

OPERATIONS	**NB**	**WB**	**EB**	**MAX**
v/c	0.12	0.10	0.11	0.12
d	10.1	10.0	10.3	10.3
LOS	B	B	B	B

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	40	10	5	10	15	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	68	68	68	68	68	68
Heavy Vehicles, %	3	17	0	12	0	15
Mvmt Flow	59	15	7	15	22	37

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	22	0	-	0	147	15
Stage 1	-	-	-	-	15	-
Stage 2	-	-	-	-	132	-
Critical Hdwy	4.13	-	-	-	6.4	6.35
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.227	-	-	-	3.5	3.435
Pot Cap-1 Maneuver	1587	-	-	-	850	1028
Stage 1	-	-	-	-	1013	-
Stage 2	-	-	-	-	899	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1587	-	-	-	819	1028
Mov Cap-2 Maneuver	-	-	-	-	819	-
Stage 1	-	-	-	-	1013	-
Stage 2	-	-	-	-	866	-

Approach	EB	WB	SB
HCM Control Delay, s	5.9	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1587	-	-	-	938
HCM Lane V/C Ratio	0.037	-	-	-	0.063
HCM Control Delay (s)	7.4	0	-	-	9.1
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	20	30	20	30	45	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	76	76	76	76
Heavy Vehicles, %	6	3	15	3	0	5
Mvmt Flow	26	39	26	39	59	26

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	164	72	86	0	-	0
Stage 1	72	-	-	-	-	-
Stage 2	92	-	-	-	-	-
Critical Hdwy	6.46	6.23	4.25	-	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.327	2.335	-	-	-
Pot Cap-1 Maneuver	817	987	1432	-	-	-
Stage 1	941	-	-	-	-	-
Stage 2	922	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	801	987	1432	-	-	-
Mov Cap-2 Maneuver	801	-	-	-	-	-
Stage 1	941	-	-	-	-	-
Stage 2	904	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.3	3	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1432	-	903	-	-
HCM Lane V/C Ratio	0.018	-	0.073	-	-
HCM Control Delay (s)	7.6	0	9.3	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	5	5	5	20	25	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	67	67	67	67	67	67
Heavy Vehicles, %	0	0	0	4	0	0
Mvmt Flow	7	7	7	30	37	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	82	37	37	0	-	0
Stage 1	37	-	-	-	-	-
Stage 2	45	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	925	1041	1587	-	-	-
Stage 1	991	-	-	-	-	-
Stage 2	983	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	921	1041	1587	-	-	-
Mov Cap-2 Maneuver	921	-	-	-	-	-
Stage 1	991	-	-	-	-	-
Stage 2	979	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	1.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1587	-	977	-	-
HCM Lane V/C Ratio	0.005	-	0.015	-	-
HCM Control Delay (s)	7.3	0	8.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	3.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	40	15	85	25	35	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Free	Free
RT Channelized	-	Yeild	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	8	5	2	0	11	3
Mvmt Flow	45	17	96	28	39	101

Major/Minor	Minor1		Minor2		Major2	
Conflicting Flow All	242	0	180	101	0	0
Stage 1	0	-	180	-	-	-
Stage 2	242	-	0	-	-	-
Critical Hdwy	6.48	-	6.52	6.2	-	-
Critical Hdwy Stg 1	-	-	5.52	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	-	4.018	3.3	-	-
Pot Cap-1 Maneuver	733	-	714	960	-	-
Stage 1	-	-	750	-	-	-
Stage 2	784	-	-	-	-	-
Platoon blocked, %						-
Mov Cap-1 Maneuver	733	-	0	960	-	-
Mov Cap-2 Maneuver	733	-	0	-	-	-
Stage 1	-	-	0	-	-	-
Stage 2	784	-	0	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s		9.3	0
HCM LOS	-	A	

Minor Lane/Major Mvmt	NBLn1	WBLn1	SBL	SBT
Capacity (veh/h)	960	-	-	-
HCM Lane V/C Ratio	0.129	-	-	-
HCM Control Delay (s)	9.3	-	-	-
HCM Lane LOS	A	-	-	-
HCM 95th %tile Q(veh)	0.4	-	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	225	15	20	235	20	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	6	22	14	7	10	9
Mvmt Flow	265	18	24	276	24	12

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	282	0	598	274
Stage 1	-	-	-	-	274	-
Stage 2	-	-	-	-	324	-
Critical Hdwy	-	-	4.24	-	6.5	6.29
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.326	-	3.59	3.381
Pot Cap-1 Maneuver	-	-	1215	-	452	748
Stage 1	-	-	-	-	754	-
Stage 2	-	-	-	-	715	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1215	-	443	748
Mov Cap-2 Maneuver	-	-	-	-	443	-
Stage 1	-	-	-	-	754	-
Stage 2	-	-	-	-	701	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	12.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	513	-	-	1215	-
HCM Lane V/C Ratio	0.069	-	-	0.019	-
HCM Control Delay (s)	12.5	-	-	8	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	5	5	20	5	5	20
Conflicting Peds, #/hr	1	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	0	0	13	0	43	9
Mvmt Flow	6	6	26	6	6	26

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	68	30	0	0	33	0
Stage 1	30	-	-	-	-	-
Stage 2	38	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.53	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.587	-
Pot Cap-1 Maneuver	942	1050	-	-	1351	-
Stage 1	998	-	-	-	-	-
Stage 2	990	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	937	1049	-	-	1351	-
Mov Cap-2 Maneuver	937	-	-	-	-	-
Stage 1	997	-	-	-	-	-
Stage 2	985	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.7	0	1.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	990	1351	-
HCM Lane V/C Ratio	-	-	0.013	0.005	-
HCM Control Delay (s)	-	-	8.7	7.7	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	5	140	25	5	125	40	20	5	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	Yeild	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	40	5	0	0	4	9	0	12	0
Mvmt Flow	6	171	30	6	152	49	24	6	18

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	201	0	0	171	0	0	384	396	171
Stage 1	-	-	-	-	-	-	183	183	-
Stage 2	-	-	-	-	-	-	201	213	-
Critical Hdwy	4.5	-	-	4.1	-	-	7.1	6.62	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.62	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.62	-
Follow-up Hdwy	2.56	-	-	2.2	-	-	3.5	4.108	3.3
Pot Cap-1 Maneuver	1174	-	-	1418	-	-	578	526	878
Stage 1	-	-	-	-	-	-	823	730	-
Stage 2	-	-	-	-	-	-	805	708	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1174	-	-	1418	-	-	555	520	878
Mov Cap-2 Maneuver	-	-	-	-	-	-	555	520	-
Stage 1	-	-	-	-	-	-	818	726	-
Stage 2	-	-	-	-	-	-	776	704	-

Approach	EB	WB	NB
HCM Control Delay, s	0.2	0.2	11.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	638	1174	-	-	1418	-	-	564
HCM Lane V/C Ratio	0.076	0.005	-	-	0.004	-	-	0.151
HCM Control Delay (s)	11.1	8.1	0	-	7.5	0	-	12.5
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.5

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	50	15	5
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	82	82	82
Heavy Vehicles, %	5	0	0
Mvmt Flow	61	18	6

Major/Minor	Minor2		
Conflicting Flow All	384	372	177
Stage 1	189	189	-
Stage 2	195	183	-
Critical Hdwy	7.15	6.5	6.2
Critical Hdwy Stg 1	6.15	5.5	-
Critical Hdwy Stg 2	6.15	5.5	-
Follow-up Hdwy	3.545	4	3.3
Pot Cap-1 Maneuver	569	561	871
Stage 1	806	748	-
Stage 2	800	752	-
Platoon blocked, %			
Mov Cap-1 Maneuver	548	555	871
Mov Cap-2 Maneuver	548	555	-
Stage 1	801	744	-
Stage 2	772	747	-

Approach	SB
HCM Control Delay, s	12.5
HCM LOS	B

Minor Lane/Major Mvmt

Intersection						
Int Delay, s/veh	1					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	200	15	20	250	15	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Free	-	None	-	None
Storage Length	-	220	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	7	7	4	9	6	0
Mvmt Flow	217	16	22	272	16	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	217	0	532	217
Stage 1	-	-	-	-	217	-
Stage 2	-	-	-	-	315	-
Critical Hdwy	-	-	4.14	-	6.46	6.2
Critical Hdwy Stg 1	-	-	-	-	5.46	-
Critical Hdwy Stg 2	-	-	-	-	5.46	-
Follow-up Hdwy	-	-	2.236	-	3.554	3.3
Pot Cap-1 Maneuver	-	0	1341	-	501	828
Stage 1	-	0	-	-	810	-
Stage 2	-	0	-	-	731	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	1341	-	491	828
Mov Cap-2 Maneuver	-	-	-	-	491	-
Stage 1	-	-	-	-	810	-
Stage 2	-	-	-	-	717	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	11.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	WBL	WBT
Capacity (veh/h)	616	-	1341	-
HCM Lane V/C Ratio	0.053	-	0.016	-
HCM Control Delay (s)	11.2	-	7.7	0
HCM Lane LOS	B	-	A	A
HCM 95th %tile Q(veh)	0.2	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	520	15	55	535	30	55	85	80	25	55	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.4		4.5	5.4		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.93		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1781		1687	1813		1641	1643		1682	1588	
Flt Permitted	0.95	1.00		0.95	1.00		0.54	1.00		0.53	1.00	
Satd. Flow (perm)	1770	1781		1687	1813		937	1643		942	1588	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	91	559	16	59	575	32	59	91	86	27	59	113
RTOR Reduction (vph)	0	1	0	0	2	0	0	34	0	0	69	0
Lane Group Flow (vph)	91	574	0	59	605	0	59	143	0	27	103	0
Confl. Peds. (#/hr)									2	2		
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	2%	6%	14%	7%	4%	3%	10%	2%	10%	7%	7%	6%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	8.7	56.0		7.1	54.4		22.5	22.5		22.5	22.5	
Effective Green, g (s)	8.7	56.0		7.1	54.4		22.5	22.5		22.5	22.5	
Actuated g/C Ratio	0.09	0.56		0.07	0.54		0.22	0.22		0.22	0.22	
Clearance Time (s)	4.5	5.4		4.5	5.4		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.5	4.5		2.5	4.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	153	997		119	986		210	369		211	357	
v/s Ratio Prot	c0.05	0.32		0.03	c0.33			c0.09			0.06	
v/s Ratio Perm							0.06			0.03		
v/c Ratio	0.59	0.58		0.50	0.61		0.28	0.39		0.13	0.29	
Uniform Delay, d1	44.0	14.3		44.7	15.6		32.1	32.9		30.9	32.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.1	2.4		2.4	2.9		3.3	3.0		1.2	2.0	
Delay (s)	49.1	16.7		47.1	18.5		35.4	35.9		32.2	34.1	
Level of Service	D	B		D	B		D	D		C	C	
Approach Delay (s)		21.1			21.0			35.8			33.9	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	24.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.4
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	220	5	5	250	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	6	20	71	9	0	50
Mvmt Flow	250	6	6	284	6	6

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	256	0	548	253
Stage 1	-	-	-	-	253	-
Stage 2	-	-	-	-	295	-
Critical Hdwy	-	-	4.81	-	6.4	6.7
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.839	-	3.5	3.75
Pot Cap-1 Maneuver	-	-	995	-	501	682
Stage 1	-	-	-	-	794	-
Stage 2	-	-	-	-	760	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	995	-	497	682
Mov Cap-2 Maneuver	-	-	-	-	497	-
Stage 1	-	-	-	-	794	-
Stage 2	-	-	-	-	755	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	11.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	575	-	-	995	-
HCM Lane V/C Ratio	0.02	-	-	0.006	-
HCM Control Delay (s)	11.4	-	-	8.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	3.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	5	20	5	5	5	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	67	67	67	67	67	67
Heavy Vehicles, %	17	12	50	14	38	13
Mvmt Flow	7	30	7	7	7	22

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	37	0	44	22
Stage 1	-	-	-	-	22	-
Stage 2	-	-	-	-	22	-
Critical Hdwy	-	-	4.6	-	6.78	6.33
Critical Hdwy Stg 1	-	-	-	-	5.78	-
Critical Hdwy Stg 2	-	-	-	-	5.78	-
Follow-up Hdwy	-	-	2.65	-	3.842	3.417
Pot Cap-1 Maneuver	-	-	1313	-	883	1024
Stage 1	-	-	-	-	915	-
Stage 2	-	-	-	-	915	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1313	-	879	1024
Mov Cap-2 Maneuver	-	-	-	-	879	-
Stage 1	-	-	-	-	915	-
Stage 2	-	-	-	-	910	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.9	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	983	-	-	1313	-
HCM Lane V/C Ratio	0.03	-	-	0.006	-
HCM Control Delay (s)	8.8	-	-	7.8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	5	25	70	5	40	130
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	50	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	0	4	4	0	0	1
Mvmt Flow	6	32	91	6	52	169

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	364	91	0	-	91	0
Stage 1	91	-	-	-	-	-
Stage 2	273	-	-	-	-	-
Critical Hdwy	6.4	6.24	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.336	-	-	2.2	-
Pot Cap-1 Maneuver	639	961	-	0	1517	-
Stage 1	938	-	-	0	-	-
Stage 2	778	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	617	961	-	-	1517	-
Mov Cap-2 Maneuver	617	-	-	-	-	-
Stage 1	938	-	-	-	-	-
Stage 2	751	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.2	0	1.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	617	961	1517	-
HCM Lane V/C Ratio	-	0.011	0.034	0.034	-
HCM Control Delay (s)	-	10.9	8.9	7.5	-
HCM Lane LOS	-	B	A	A	-
HCM 95th %tile Q(veh)	-	0	0.1	0.1	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	10	210	0	0	230	5	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	230	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	11	13	0	0	11	0	0	0	0
Mvmt Flow	12	253	0	0	277	6	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	283	0	0	253	0	0	563	560	253
Stage 1	-	-	-	-	-	-	277	277	-
Stage 2	-	-	-	-	-	-	286	283	-
Critical Hdwy	4.21	-	-	4.1	-	-	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.299	-	-	2.2	-	-	3.5	4	3.3
Pot Cap-1 Maneuver	1229	-	-	1324	-	-	440	440	791
Stage 1	-	-	-	-	-	-	734	685	-
Stage 2	-	-	-	-	-	-	726	681	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1229	-	-	1324	-	-	429	436	791
Mov Cap-2 Maneuver	-	-	-	-	-	-	429	436	-
Stage 1	-	-	-	-	-	-	727	678	-
Stage 2	-	-	-	-	-	-	714	681	-

Approach	EB	WB	NB
HCM Control Delay, s	0.4	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1229	-	-	1324	-	-	532
HCM Lane V/C Ratio	-	0.01	-	-	-	-	-	0.034
HCM Control Delay (s)	0	8	-	-	0	-	-	12
HCM Lane LOS	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.1

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	0	10
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	83	83	83
Heavy Vehicles, %	67	0	22
Mvmt Flow	6	0	12

Major/Minor	Minor2		
Conflicting Flow All	557	557	280
Stage 1	280	280	-
Stage 2	277	277	-
Critical Hdwy	7.77	6.5	6.42
Critical Hdwy Stg 1	6.77	5.5	-
Critical Hdwy Stg 2	6.77	5.5	-
Follow-up Hdwy	4.103	4	3.498
Pot Cap-1 Maneuver	356	442	713
Stage 1	605	683	-
Stage 2	608	685	-
Platoon blocked, %			
Mov Cap-1 Maneuver	353	438	713
Mov Cap-2 Maneuver	353	438	-
Stage 1	599	683	-
Stage 2	602	678	-

Approach	SB
HCM Control Delay, s	12
HCM LOS	B

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	65	230	20	15	210	40	20	5	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	79	79	79	79	79	79
Heavy Vehicles, %	5	14	5	6	12	10	0	0	10
Mvmt Flow	82	291	25	19	266	51	25	6	13

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	317	0	0	317	0	0	840	824	305
Stage 1	-	-	-	-	-	-	469	469	-
Stage 2	-	-	-	-	-	-	371	355	-
Critical Hdwy	4.15	-	-	4.16	-	-	7.1	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.254	-	-	3.5	4	3.39
Pot Cap-1 Maneuver	1226	-	-	1221	-	-	287	310	716
Stage 1	-	-	-	-	-	-	579	564	-
Stage 2	-	-	-	-	-	-	653	633	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1226	-	-	1221	-	-	235	284	715
Mov Cap-2 Maneuver	-	-	-	-	-	-	235	284	-
Stage 1	-	-	-	-	-	-	540	526	-
Stage 2	-	-	-	-	-	-	570	623	-

Approach	EB	WB	NB
HCM Control Delay, s	1.7	0.5	19.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	300	1226	-	-	1221	-	-	415
HCM Lane V/C Ratio	0.148	0.067	-	-	0.016	-	-	0.305
HCM Control Delay (s)	19.1	8.1	-	-	8	-	-	17.4
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.5	0.2	-	-	0	-	-	1.3

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	35	10	55
Conflicting Peds, #/hr	1	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	79	79	79
Heavy Vehicles, %	6	0	7
Mvmt Flow	44	13	70

Major/Minor	Minor2		
Conflicting Flow All	809	812	292
Stage 1	330	330	-
Stage 2	479	482	-
Critical Hdwy	7.16	6.5	6.27
Critical Hdwy Stg 1	6.16	5.5	-
Critical Hdwy Stg 2	6.16	5.5	-
Follow-up Hdwy	3.554	4	3.363
Pot Cap-1 Maneuver	294	315	736
Stage 1	675	649	-
Stage 2	560	557	-
Platoon blocked, %			
Mov Cap-1 Maneuver	266	289	735
Mov Cap-2 Maneuver	266	289	-
Stage 1	629	638	-
Stage 2	507	519	-

Approach	SB
HCM Control Delay, s	17.4
HCM LOS	C

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	5	5	0	5	20	40	0	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	0	17	0	50	10	2	0	100	0
Mvmt Flow	6	6	0	6	25	49	0	6	6

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	74	0	0	6	0	0	87	105	6
Stage 1	-	-	-	-	-	-	19	19	-
Stage 2	-	-	-	-	-	-	68	86	-
Critical Hdwy	4.1	-	-	4.6	-	-	7.1	7.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	6.5	-
Follow-up Hdwy	2.2	-	-	2.65	-	-	3.5	4.9	3.3
Pot Cap-1 Maneuver	1538	-	-	1351	-	-	904	634	1083
Stage 1	-	-	-	-	-	-	1005	719	-
Stage 2	-	-	-	-	-	-	947	667	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1538	-	-	1351	-	-	886	628	1083
Mov Cap-2 Maneuver	-	-	-	-	-	-	886	628	-
Stage 1	-	-	-	-	-	-	1001	716	-
Stage 2	-	-	-	-	-	-	928	664	-

Approach	EB	WB	NB
HCM Control Delay, s	3.7	0.6	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	795	1538	-	-	1351	-	-	861
HCM Lane V/C Ratio	0.016	0.004	-	-	0.005	-	-	0.057
HCM Control Delay (s)	9.6	7.4	0	-	7.7	0	-	9.4
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.2

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	30	5	5
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	81	81	81
Heavy Vehicles, %	0	100	0
Mvmt Flow	37	6	6

Major/Minor	Minor2		
Conflicting Flow All	87	81	49
Stage 1	62	62	-
Stage 2	25	19	-
Critical Hdwy	7.1	7.5	6.2
Critical Hdwy Stg 1	6.1	6.5	-
Critical Hdwy Stg 2	6.1	6.5	-
Follow-up Hdwy	3.5	4.9	3.3
Pot Cap-1 Maneuver	904	655	1025
Stage 1	954	685	-
Stage 2	998	719	-
Platoon blocked, %			
Mov Cap-1 Maneuver	886	649	1025
Mov Cap-2 Maneuver	886	649	-
Stage 1	950	682	-
Stage 2	980	716	-

Approach	SB
HCM Control Delay, s	9.4
HCM LOS	A

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	20	20	5	20	20	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	20
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	0	10	0	4	17	50
Mvmt Flow	24	24	6	24	24	6

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	49	0	74	37
Stage 1	-	-	-	-	37	-
Stage 2	-	-	-	-	37	-
Critical Hdwy	-	-	4.1	-	6.57	6.7
Critical Hdwy Stg 1	-	-	-	-	5.57	-
Critical Hdwy Stg 2	-	-	-	-	5.57	-
Follow-up Hdwy	-	-	2.2	-	3.653	3.75
Pot Cap-1 Maneuver	-	-	1571	-	894	913
Stage 1	-	-	-	-	948	-
Stage 2	-	-	-	-	948	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1571	-	890	913
Mov Cap-2 Maneuver	-	-	-	-	890	-
Stage 1	-	-	-	-	948	-
Stage 2	-	-	-	-	944	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	890	913	-	-	1571	-
HCM Lane V/C Ratio	0.027	0.007	-	-	0.004	-
HCM Control Delay (s)	9.2	9	-	-	7.3	0
HCM Lane LOS	A	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-

Intersection	
Int Delay, s/veh	2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	5	5	25	5	20	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	0	7	33	0	2
Mvmt Flow	6	6	30	6	24	65

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	146	33	0	0	36	0
Stage 1	33	-	-	-	-	-
Stage 2	113	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	851	1046	-	-	1588	-
Stage 1	995	-	-	-	-	-
Stage 2	917	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	837	1046	-	-	1588	-
Mov Cap-2 Maneuver	837	-	-	-	-	-
Stage 1	995	-	-	-	-	-
Stage 2	902	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	1.9
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	930	1588	-
HCM Lane V/C Ratio	-	-	0.013	0.015	-
HCM Control Delay (s)	-	-	8.9	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	7.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	10	20	5	10	10	25	5	45	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	15	0	0	0	4	0	5	0
Mvmt Flow	11	23	6	11	11	28	6	51	11

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	40	0	0	28	0	0	139	111	26
Stage 1	-	-	-	-	-	-	48	48	-
Stage 2	-	-	-	-	-	-	91	63	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.55	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.55	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.045	3.3
Pot Cap-1 Maneuver	1583	-	-	1599	-	-	836	774	1056
Stage 1	-	-	-	-	-	-	971	849	-
Stage 2	-	-	-	-	-	-	921	837	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1583	-	-	1599	-	-	759	763	1056
Mov Cap-2 Maneuver	-	-	-	-	-	-	759	763	-
Stage 1	-	-	-	-	-	-	964	843	-
Stage 2	-	-	-	-	-	-	828	831	-

Approach	EB	WB	NB
HCM Control Delay, s	2.1	1.6	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	800	1583	-	-	1599	-	-	813
HCM Lane V/C Ratio	0.085	0.007	-	-	0.007	-	-	0.175
HCM Control Delay (s)	9.9	7.3	0	-	7.3	0	-	10.4
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.6

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	50	55	20
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	88	88	88
Heavy Vehicles, %	2	4	4
Mvmt Flow	57	62	23

Major/Minor	Minor2		
Conflicting Flow All	128	99	26
Stage 1	48	48	-
Stage 2	80	51	-
Critical Hdwy	7.12	6.54	6.24
Critical Hdwy Stg 1	6.12	5.54	-
Critical Hdwy Stg 2	6.12	5.54	-
Follow-up Hdwy	3.518	4.036	3.336
Pot Cap-1 Maneuver	845	787	1044
Stage 1	965	851	-
Stage 2	929	848	-
Platoon blocked, %			
Mov Cap-1 Maneuver	785	776	1044
Mov Cap-2 Maneuver	785	776	-
Stage 1	958	845	-
Stage 2	857	842	-

Approach	SB
HCM Control Delay, s	10.4
HCM LOS	B

Minor Lane/Major Mvmt

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	310	20	45	555	595	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	5.4	5.4	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1736	1615	1805	1863	1863	1499
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1736	1615	1805	1863	1863	1499
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	333	22	48	597	640	398
RTOR Reduction (vph)	0	17	0	0	0	78
Lane Group Flow (vph)	333	5	48	597	640	320
Confl. Peds. (#/hr)			1			1
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	4%	0%	0%	2%	2%	6%
Turn Type	Prot	Perm	Prot	NA	NA	pm+ov
Protected Phases	8		1	6	2	8
Permitted Phases		8				2
Actuated Green, G (s)	24.6	24.6	5.3	65.5	55.7	80.3
Effective Green, g (s)	24.6	24.6	5.3	65.5	55.7	80.3
Actuated g/C Ratio	0.25	0.25	0.05	0.66	0.56	0.80
Clearance Time (s)	4.5	4.5	4.5	5.4	5.4	4.5
Vehicle Extension (s)	4.0	4.0	2.5	4.7	4.7	4.0
Lane Grp Cap (vph)	427	397	95	1220	1037	1203
v/s Ratio Prot	c0.19		0.03	c0.32	c0.34	0.07
v/s Ratio Perm		0.00				0.15
v/c Ratio	0.78	0.01	0.51	0.49	0.62	0.27
Uniform Delay, d1	35.2	28.5	46.1	8.8	15.0	2.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.3	0.0	3.1	1.4	2.8	0.2
Delay (s)	44.4	28.5	49.1	10.2	17.7	2.6
Level of Service	D	C	D	B	B	A
Approach Delay (s)	43.4			13.1	11.9	
Approach LOS	D			B	B	

Intersection Summary			
HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.4
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	5	305	5	10	210	5	5	0	10
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	75	75	75	75	75	75
Heavy Vehicles, %	0	9	25	0	15	25	0	0	25
Mvmt Flow	7	407	7	13	280	7	7	0	13

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	287	0	0	413	0	0	733	736	411
Stage 1	-	-	-	-	-	-	423	423	-
Stage 2	-	-	-	-	-	-	310	313	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.525
Pot Cap-1 Maneuver	1287	-	-	1157	-	-	339	349	594
Stage 1	-	-	-	-	-	-	613	591	-
Stage 2	-	-	-	-	-	-	705	661	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1286	-	-	1156	-	-	331	342	594
Mov Cap-2 Maneuver	-	-	-	-	-	-	331	342	-
Stage 1	-	-	-	-	-	-	609	587	-
Stage 2	-	-	-	-	-	-	689	652	-

Approach	EB	WB	NB
HCM Control Delay, s	0.1	0.4	13
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	470	1286	-	-	1156	-	-	644
HCM Lane V/C Ratio	0.043	0.005	-	-	0.012	-	-	0.021
HCM Control Delay (s)	13	7.8	0	-	8.2	0	-	10.7
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	0	5
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	Stop
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	75	75	75
Heavy Vehicles, %	0	0	0
Mvmt Flow	7	0	7

Major/Minor	Minor2		
Conflicting Flow All	740	737	284
Stage 1	310	310	-
Stage 2	430	427	-
Critical Hdwy	7.1	6.5	6.2
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.3
Pot Cap-1 Maneuver	335	348	760
Stage 1	705	663	-
Stage 2	607	589	-
Platoon blocked, %			
Mov Cap-1 Maneuver	322	341	759
Mov Cap-2 Maneuver	322	341	-
Stage 1	700	654	-
Stage 2	589	585	-

Approach	SB
HCM Control Delay, s	10.7
HCM LOS	B

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	10	275	90	30	220	5	55	5	25
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	215	-	160	190	-	120	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	72	72	72	72	72	72	72	72
Heavy Vehicles, %	0	11	8	13	9	0	9	0	4
Mvmt Flow	14	382	125	42	306	7	76	7	35

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	306	0	0	382	0	0	806	799	383
Stage 1	-	-	-	-	-	-	410	410	-
Stage 2	-	-	-	-	-	-	396	389	-
Critical Hdwy	4.1	-	-	4.23	-	-	7.19	6.5	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.19	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.19	5.5	-
Follow-up Hdwy	2.2	-	-	2.317	-	-	3.581	4	3.336
Pot Cap-1 Maneuver	1266	-	-	1119	-	-	292	321	660
Stage 1	-	-	-	-	-	-	605	599	-
Stage 2	-	-	-	-	-	-	616	612	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1265	-	-	1118	-	-	274	306	659
Mov Cap-2 Maneuver	-	-	-	-	-	-	274	306	-
Stage 1	-	-	-	-	-	-	598	592	-
Stage 2	-	-	-	-	-	-	580	589	-

Approach	EB	WB	NB
HCM Control Delay, s	0.2	1	21.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	333	1265	-	-	1118	-	-	357
HCM Lane V/C Ratio	0.355	0.011	-	-	0.037	-	-	0.058
HCM Control Delay (s)	21.6	7.9	-	-	8.3	-	-	15.7
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	1.6	0	-	-	0.1	-	-	0.2

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	5	5
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	72	72	72
Heavy Vehicles, %	0	0	0
Mvmt Flow	7	7	7

Major/Minor	Minor2		
Conflicting Flow All	820	799	307
Stage 1	389	389	-
Stage 2	431	410	-
Critical Hdwy	7.1	6.5	6.2
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.3
Pot Cap-1 Maneuver	296	321	738
Stage 1	639	612	-
Stage 2	607	599	-
Platoon blocked, %			
Mov Cap-1 Maneuver	265	306	737
Mov Cap-2 Maneuver	265	306	-
Stage 1	632	589	-
Stage 2	562	592	-

Approach	SB
HCM Control Delay, s	15.7
HCM LOS	C

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	10	5	90	0	0	5	135	495	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	Free
Storage Length	-	-	-	-	-	-	340	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	10	0	0	0	11	5	20
Mvmt Flow	11	5	98	0	0	5	147	538	11

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	1193	1462	310	1155	1462	269	620	0	-
Stage 1	630	630	-	832	832	-	-	-	-
Stage 2	563	832	-	323	630	-	-	-	-
Critical Hdwy	7.5	6.5	7.1	7.5	6.5	6.9	4.32	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-
Follow-up Hdwy	3.5	4	3.4	3.5	4	3.3	2.31	-	-
Pot Cap-1 Maneuver	145	130	663	154	130	735	898	-	0
Stage 1	441	478	-	334	387	-	-	-	0
Stage 2	483	387	-	669	478	-	-	-	0
Platoon blocked, %								-	
Mov Cap-1 Maneuver	125	108	663	110	108	735	898	-	-
Mov Cap-2 Maneuver	125	108	-	110	108	-	-	-	-
Stage 1	369	476	-	279	324	-	-	-	-
Stage 2	401	324	-	561	476	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	17.5	9.9	2.1
HCM LOS	C	A	

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBL	SBT
Capacity (veh/h)	898	-	401	735	1040	-
HCM Lane V/C Ratio	0.163	-	0.285	0.007	0.005	-
HCM Control Delay (s)	9.8	-	17.5	9.9	8.5	-
HCM Lane LOS	A	-	C	A	A	-
HCM 95th %tile Q(veh)	0.6	-	1.2	0	0	-

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	570	20
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	Free
Storage Length	300	-	110
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	92	92	92
Heavy Vehicles, %	0	4	9
Mvmt Flow	5	620	22

Major/Minor	Major2		
Conflicting Flow All	538	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.1	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.2	-	-
Pot Cap-1 Maneuver	1040	-	0
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %		-	
Mov Cap-1 Maneuver	1040	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	SB
HCM Control Delay, s	0.1
HCM LOS	

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	5	25	40	120	85	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	4	5	12	6	0
Mvmt Flow	6	29	47	141	100	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	338	103	106	0	-	0
Stage 1	103	-	-	-	-	-
Stage 2	235	-	-	-	-	-
Critical Hdwy	6.4	6.24	4.15	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.336	2.245	-	-	-
Pot Cap-1 Maneuver	662	946	1467	-	-	-
Stage 1	926	-	-	-	-	-
Stage 2	809	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	639	946	1467	-	-	-
Mov Cap-2 Maneuver	639	-	-	-	-	-
Stage 1	926	-	-	-	-	-
Stage 2	781	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.3	1.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1467	-	876	-	-
HCM Lane V/C Ratio	0.032	-	0.04	-	-
HCM Control Delay (s)	7.5	0	9.3	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	6.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	85	160	130	55	100	85
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	2	4	5	1	5
Mvmt Flow	92	174	141	60	109	92

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	481	173	0	0	201	0
Stage 1	171	-	-	-	-	-
Stage 2	310	-	-	-	-	-
Critical Hdwy	6.44	6.22	-	-	4.11	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.318	-	-	2.209	-
Pot Cap-1 Maneuver	540	871	-	-	1377	-
Stage 1	854	-	-	-	-	-
Stage 2	739	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	496	870	-	-	1375	-
Mov Cap-2 Maneuver	496	-	-	-	-	-
Stage 1	854	-	-	-	-	-
Stage 2	679	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.5	0	4.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	690	1375	-
HCM Lane V/C Ratio	-	-	0.386	0.079	-
HCM Control Delay (s)	-	-	13.5	7.8	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	1.8	0.3	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	45	30	25	565	590	65
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Free
Storage Length	0	70	230	-	-	175
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	13	6	10	4	4	4
Mvmt Flow	48	32	27	608	634	70

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1295	634	634	0	-	0
Stage 1	634	-	-	-	-	-
Stage 2	661	-	-	-	-	-
Critical Hdwy	6.53	6.26	4.2	-	-	-
Critical Hdwy Stg 1	5.53	-	-	-	-	-
Critical Hdwy Stg 2	5.53	-	-	-	-	-
Follow-up Hdwy	3.617	3.354	2.29	-	-	-
Pot Cap-1 Maneuver	170	472	912	-	-	0
Stage 1	508	-	-	-	-	0
Stage 2	493	-	-	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	165	472	912	-	-	-
Mov Cap-2 Maneuver	165	-	-	-	-	-
Stage 1	508	-	-	-	-	-
Stage 2	478	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	26.6	0.4	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	912	-	165	472	-
HCM Lane V/C Ratio	0.029	-	0.293	0.068	-
HCM Control Delay (s)	9.1	-	35.6	13.2	-
HCM Lane LOS	A	-	E	B	-
HCM 95th %tile Q(veh)	0.1	-	1.2	0.2	-

ODOT District 1 Bridge Conditions Report

2013 CONDITION REPORT - DISTRICT 1

Region	District	Hwy	MP	Bridge	Structure Name	Year	Material	Deck Area (sqft)	Deck Rate	Super Rate	Sub Rate	Culv Rate	Suff Rate	Struc Cond	Other SD/OD	Deficiencies
2	1	9	0	07949A	Columbia River, Hwy 9 (Astoria-Megler Br)	1966	Steel	121347	6	6	6	N	73	FR	ND	
2	1	9	0	07949D	Columbia River, Hwy 9 (Astoria-Megler Bridge)	1965	Steel	4917	7	6	7	N	54.3	FR	OD	DG PAINT
2	1	9	0.28	07949B	Columbia River, Hwy 9 (Astoria-Megler Br)	1966	P/S Concrete	369600	6	6	5	N	67	FR	ND	
2	1	9	2.41	07949C	Columbia River & Hwy 2W & Hwy 9 (Astoria-Megler)	1966	Steel	219477	5	6	6	N	71	FR	ND	
2	1	9	4.91	8306	Youngs Bay, Hwy 9 (New Youngs Bay)	1964	Steel	146239	6	5	6	N	56.8	FR	ND	
2	1	9	8.73	8317	Skipanon River, Hwy 9	1980	P/S Concrete	4224	7	7	7	N	88.7	GD	ND	
2	1	9	12.82	1468	Hwy 9 over Glenwood Private Rd (Pooles)	1930	Concrete	910	6	6	7	N	55.4	FR	OD	DG VC
2	1	9	19.58	03079A	Mill Creek, Hwy 9	1957	Steel	0	N	N	N	6	95.1	FR	ND	
2	1	9	19.72	1305	Neawanna Creek, Hwy 9	1930	Concrete	8259	6	5	5	N	54.3	FR	OD	DG
2	1	9	22.48	3080	Shangri La Creek, Hwy 9 (Dooley)	1960	Concrete	2713	6	6	6	N	65	FR	OD	DG RAIL
2	1	9	24.1	1481	Necanicum River, Hwy 9 (Skiberene)	1930	Concrete	5217	6	6	5	N	45.2	FR	OD	LSL DG
2	1	9	25.27	16673	Hwy 9 over Hwy 47	1987	P/S Concrete	9480	7	7	6	N	83	FR	ND	
2	1	9	28.37	18658	Hwy 9 over Hwy 9 Conn to Cannon Beach	2003	P/S Concrete	5409	7	7	7	N	93.6	GD	ND	
2	1	9	28.7	6713	Ecola Creek, Hwy 9	1952	Concrete	6646	6	6	4	N	49.6	PR	SD	SD LSL RAIL
2	1	9	29.53	7226	Hwy 9 over Sunset Blvd (Cannon Beach)	1952	Concrete	4240	5	7	6	N	78.2	FR	OD	RAIL
2	1	9	30.62	7405	Hwy 9 over Warren St (Cannon Beach)	1952	Concrete	4240	7	6	5	N	79.7	FR	OD	RAIL
2	1	9	34.05	1878	Austins Point Half Viaduct, Hwy 9	1933	Timber	3824	6	7	6	N	76.9	FR	ND	
2	1	9	35.57	1797	Arch Cape Creek & Webb Ave, Hwy 9	1937	Timber	5893	6	7	6	N	64.7	FR	OD	DG
2	1	9	39.13	2312	Short Sand Beach Creek, Hwy 9	1937	Concrete	4240	6	6	6	N	57.7	FR	OD	DG
2	1	9	39.53	2311	Necarney Creek, Hwy 9 (Sam Reed)	1937	Steel	21251	6	6	6	N	64.8	FR	OD	CP DG PAINT
2	1	9	40.58	1955	Half Viaduct, Hwy 9 at MP 40.58	1940	Concrete	3384	7	7	7	N	75.7	GD	OD	RAIL
2	1	9	40.65	1954	Half Viaduct, Hwy 9 at MP 40.65	1940	Concrete	1778	7	7	7	N	75.7	GD	OD	RAIL
2	1	9	40.66	01954A	Half Viaduct, Hwy 9 at MP 40.65	1940	Concrete	1067	7	7	7	N	65.6	GD	OD	RAIL
2	1	9	40.71	2723	Neahkahnie Mountain (Chasm)	1937	Concrete	3861	6	5	6	N	41.5	FR	OD	LSL CP RAIL LC
2	1	9	40.75	1953	Half Viaduct, Hwy 9 at MP 40.75	1940	Concrete	2178	7	7	7	N	75.7	GD	OD	RAIL
2	1	9	40.78	1952	Half Viaduct, Hwy 9 at MP 40.78	1940	Concrete	1452	7	7	7	N	77.7	GD	OD	RAIL
2	1	9	40.86	1951	Half Viaduct, Hwy 9 at MP 40.86	1940	Concrete	8512	6	6	6	N	66.9	FR	OD	RAIL
2	1	9	45.68	00574F	Nehalem River, Hwy 9	1984	P/S Concrete	46197	7	6	7	N	93.5	FR	ND	
2	1	9	46.45	00714A	Gallagher Slough, Hwy 9	1984	P/S Concrete	2400	7	7	7	N	95.8	GD	ND	
2	1	9	46.6	01051A	Hwy 9 over POTB RR (Wheeler)	1984	P/S Concrete	13963	6	7	7	N	82.3	FR	ND	
2	1	9	47.52	20406	Jetty Creek, Hwy 9	2008	P/S Concrete	3340	8	8	7	N	69.3	GD	ND	
2	1	9	49.23	2349	Lake Lytle Outlet, Hwy 9	1938	Timber	5401	6	7	6	N	65.5	FR	OD	DG
2	1	9	56.99	01226A	Miami River, Hwy 9	1991	P/S Concrete	9527	7	7	6	N	83.5	FR	ND	
2	1	9	59.32	8828	Hwy 9 over POTB RR at MP 59.32	1962	Concrete	6281	6	6	7	N	50.8	FR	OD	DG RAIL
2	1	9	62.07	7481	Tidal Slough (Vaughn Cr) & Ctlps, Hwy9 at MP 62.07	1952	Concrete	2148	6	6	6	N	63.8	FR	OD	DG RAIL
2	1	9	62.25	7480	Tidal Slough & Cattlepass, Hwy 9 at MP 62.25	1952	Concrete	2148	6	6	6	N	62.4	FR	OD	DG RAIL
2	1	9	62.4	7426	Hathaway Slough, Hwy 9	1952	Concrete	5385	6	6	6	N	48.6	FR	OD	LSL DG RAIL
2	1	9	62.67	7425	Stasek Slough, Hwy 9	1952	Concrete	8055	6	6	6	N	64.3	FR	OD	RAIL
2	1	9	62.84	7456	Neilson Slough, Hwy 9	1952	Concrete	3475	6	6	6	N	48.6	FR	OD	LSL DG TS RAIL
2	1	9	62.94	7424	Kilchis River & Possetti Road, Hwy 9	1952	Concrete	9591	6	6	5	N	62.5	FR	OD	SCOUR RAIL VC
2	1	9	63.48	505	Hwy 9 over POTB RR (Juno)	1931	Concrete	6539	5	6	6	N	57.6	FR	OD	DG
2	1	9	64.14	1498	Wilson River Slough, Hwy 9	1931	Concrete	4360	6	6	6	N	63.5	FR	OD	DG
2	1	9	64.23	1499	Wilson River, Hwy 9	1931	Concrete	8610	5	5	6	N	41.3	FR	OD	LSL
2	1	9	64.99	17370	Hall Slough, Hwy 9	2000	P/S Concrete	6138	7	7	7	N	82.5	GD	ND	
2	1	9	65.12	17371	Dougherty Slough, Hwy 9	2000	P/S Concrete	12369	7	7	7	N	82.5	GD	ND	
2	1	9	65.55	1500	Hoquarten Slough, Hwy 9	1931	Concrete	5530	7	6	6	N	62.3	FR	OD	DG
2	1	9	66.36	7224	Drainage Ditch, Hwy 9 at MP 66.36	1950	Concrete	3801	6	6	6	N	68.3	FR	ND	
2	1	9	67.98	7147	Trask River, Hwy 9	1949	Concrete	13104	7	6	6	N	59.9	FR	OD	SCOUR
2	1	9	68.45	04642A	South Prairie Creek, Hwy 9	1949	Concrete	3430	7	7	6	N	77.6	FR	ND	
2	1	9	68.67	04643A	Anderson Creek, Hwy 9	1949	Concrete	2432	7	7	7	N	80.3	GD	ND	
2	1	9	71.18	7181	Fawcett Creek, Hwy 9	1950	Concrete	4364	7	7	6	N	66	FR	ND	
2	1	9	71.85	877	Simmons Creek, Hwy 9	1989	Steel	0	N	N	N	7	91.3	GD	ND	
2	1	9	76.64	4651	Tiger Creek, Hwy 9 at MP 76.64	1919	Concrete	854	7	6	6	N	64.9	FR	OD	DG
2	1	9	77.53	2202	West Beaver Creek, Hwy 9	1914	Concrete	2295	7	5	6	N	50.7	FR	ND	
2	1	9	79.61	4654	Beaver Creek, Hwy 9 at MP 79.61	1916	Concrete	3282	7	6	6	N	64.9	FR	ND	

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Region	District	Hwy	MP	Bridge	Structure Name	Year	Material	Deck Area (sqft)	Deck Rate	Super Rate	Sub Rate	Culv Rate	Suff Rate	Struc Cond	Other SD/OD	Deficiencies
2	1	9	80.32	2762	Beaver Creek, Hwy 9 at MP 80.32	1916	Concrete	4475	6	6	6	N	36.5	FR	OD	LSL DG
2	1	9	82.92	4659	Farmer Creek, Hwy 9	1916	Steel	988	4	6	5	N	42.6	PR	SD	SD LSL PAINT
2	1	9	84.08	00555B	Big Nestucca River, Hwy 9 (Condor)	1991	P/S Concrete	12391	7	7	7	N	92.7	GD	ND	
2	1	9	85.01	04660A	Three Rivers, Hwy 9	1949	Concrete	4864	6	6	6	N	39.4	FR	OD	LSL DG
2	1	9	88.68	870	Clear Creek, Hwy 9	1922	Concrete	912	6	6	6	N	62.1	FR	OD	DG
1	1	29	19.43	16129	Gales Creek Oflow # 1, Hwy 29 at MP 19.43	1975	P/S Concrete	9000	8	8	8	N	72.2	VG	ND	
1	1	29	19.54	9637	Gales Creek, Hwy 29	1975	P/S Concrete	9900	8	8	8	N	63.5	VG	ND	
1	1	29	19.72	16130	Gales Creek Oflow # 2, Hwy 29 at MP 19.72	1975	P/S Concrete	14040	7	5	7	N	71.7	FR	ND	
1	1	29	19.99	9638	Carpenter Creek, Hwy 29	1975	P/S Concrete	6301	7	6	6	N	85.7	FR	ND	
2	1	29	23.98	9494	Scoggin Creek & PNWR, Hwy 29	1967	P/S Concrete	14490	6	7	6	N	61.6	FR	ND	
2	1	29	24.59	9496	Creek, Hwy 29 at MP 24.59	1967	P/S Concrete	4692	7	6	6	N	85.5	FR	ND	
2	1	29	24.97	9497	Creek, Hwy 29 at MP 24.97	1967	P/S Concrete	4692	7	6	6	N	93.4	FR	ND	
2	1	29	25.2	9498	Creek, Hwy 29 at MP 25.30	1967	P/S Concrete	4692	7	6	7	N	85	FR	ND	
2	1	29	25.32	00810A	Tualatin River, Hwy 29 (Gaston)	1967	P/S Concrete	5775	7	8	7	N	67	GD	ND	
2	1	32	1.47	4673	Cedar Creek, Hwy 32	1920	Concrete	1017	6	6	6	N	85	FR	ND	
2	1	32	4.43	04675A	Three Rivers, Hwy 32	1986	Concrete	4946	6	6	7	N	80.3	FR	ND	
2	1	32	5.81	4677	Alder Creek, Hwy 32 at MP 5.81	1935	Concrete	804	6	6	7	N	77	FR	ND	
2	1	32	7.19	4805	Buck Creek, Hwy 32	1935	Concrete	1674	6	6	6	N	77	FR	ND	
2	1	32	7.32	4678	Alder Creek, Hwy 32 at MP 7.32	1935	Concrete	1197	5	5	7	N	63.9	FR	ND	
2	1	32	10.48	4680	Louie Creek, Hwy 32 at MP 10.49	1962	Timber	754	6	6	6	N	80.3	FR	OD	LC
2	1	37	5.78	1868	Wilson River, Hwy 37 at MP 5.78 (Mills)	1939	Steel	13175	5	6	6	N	65.2	FR	OD	DG PAINT
2	1	37	6.9	01979B	Slide Drainage, Hwy 37 at MP 6.90	1967	P/S Concrete	4180	7	7	7	N	90.6	GD	ND	
2	1	37	11.8	01869A	Wilson River, Hwy 37 at MP 11.80	1951	Concrete	11181	6	6	6	N	53.2	FR	ND	
2	1	37	13.62	19820	Fall Creek, Hwy 37 AT MP 13.62	2007	P/S Concrete	5878	6	7	7	N	88.9	FR	ND	
2	1	37	18.04	01872A	Jordan Creek, Hwy 37	1937	Concrete	5475	6	6	7	N	65.7	FR	ND	
2	1	37	23.64	01873A	Wilson River, Hwy 37 at MP 23.64	1957	Concrete	5394	6	6	5	N	49	FR	OD	LSL
2	1	37	27.69	01874A	Wilson River, Hwy 37 at MP 27.69	1947	Concrete	6334	6	6	6	N	57.7	FR	ND	
2	1	37	27.9	02654A	Wilson River, Hwy 37 at MP 27.90	1957	Concrete	5851	6	7	6	N	61	FR	ND	
2	1	37	28.38	02671A	Devils Lake Fork Wilson River, Hwy 37 at MP 28.38	1940	Concrete	5294	7	6	7	N	49.1	FR	OD	LSL
2	1	37	32.05	2472	Devils Lake Fork Wilson River, Hwy 37 at MP 32.05	1940	Steel	20389	7	6	6	N	64.8	FR	OD	DG PAINT
2	1	37	36.61	02462A	South Fork Gales Creek, Hwy 37	1956	Concrete	1166	7	7	7	N	64.9	GD	ND	
2	1	37	37.61	02676A	Gales Creek, Hwy 37 at MP 37.61	1956	Concrete	5433	6	6	6	N	58.4	FR	ND	
2	1	37	38.66	02461A	Gales Creek, Hwy 37 at MP 38.65	1956	Concrete	6060	6	6	6	N	49.4	FR	OD	LSL
2	1	37	40.87	19707	BATEMAN CREEK, HWY 037 AT MP 40.87	2006	P/S Concrete	3754	8	7	8	N	90	GD	ND	
2	1	37	42.34	7677	Gales Creek, Hwy 37 at MP 42.34	1956	Concrete	6339	7	6	5	N	51	FR	ND	
2	1	37	48	7683	West Fork Dairy Creek, Hwy 37	1954	Concrete	2612	7	7	6	N	59	FR	OD	DG
2	1	37	48.35	7684	Oflow Bridge, Hwy 37 at MP 48.35	1954	Concrete	1776	7	7	6	N	53.3	FR	OD	DG
2	1	37	48.57	7685	Oflow Bridge, Hwy 37 at MP 48.57	1954	Concrete	1741	7	7	6	N	58.9	FR	OD	DG
2	1	37	49.09	8033	Hwy 37 over Hwy 102	1956	Concrete	6340	6	6	7	N	87.1	FR	OD	VC
2	1	37	49.68	7686	Hwy 37 over PNWR & POTB RR (Wilkesboro)	1954	Concrete	10867	6	6	6	N	64.3	FR	ND	
2	1	37	51.46	7779	Hwy 37 WB over Hwy 47 EB	1954	Concrete	6060	5	7	6	N	86.6	FR	ND	
2	1	46	0.11	20732	Necanicum River, Hwy 46 at MP 0.11	2010	P/S Concrete	3002	8	8	8	N	99.8	VG	ND	
2	1	46	1.46	3086	Bergsvik Creek, Hwy 46 at MP 1.46	1956	Concrete	1178	6	6	7	N	89.7	FR	ND	
2	1	46	5.98	3088	Jack Horner Creek, Hwy 46	1951	Timber	1824	6	6	6	N	78.8	FR	OD	LC
2	1	46	6.5	1319	Soapstone Creek, Hwy 46	1928	Concrete	4154	6	7	7	N	50.8	FR	ND	
2	1	46	7.74	2319	North Fork Nehalem River, Hwy 46 at MP 7.74	1937	Steel	4959	6	6	6	N	83.7	FR	ND	
2	1	46	13.51	883	Big Rack Heap Creek, Hwy 46	1922	Concrete	1012	7	6	6	N	96.2	FR	ND	
2	1	46	17.76	1217	Nehalem River, Hwy 46	1926	Steel	7321	6	6	6	N	66.2	FR	ND	
2	1	46	17.91	01371A	Mohler Oflow, Hwy 46	1980	P/S Concrete	7392	7	7	7	N	86.1	GD	ND	
2	1	47	2.24	21188	Volmer Creek, Hwy 47 at MP 2.24	2011	P/S Concrete	1276	8	8	8	N	83	VG	ND	
2	1	47	3.99	19666	Mail Creek, Hwy 47	2004	P/S Concrete	4391	7	7	7	N	84.8	GD	ND	
2	1	47	4.4	2601	Necanicum River, Hwy 47 at MP 4.40 (Black)	1939	Concrete	6300	7	6	6	N	44.7	FR	OD	LSL DG RAIL
2	1	47	5.85	3095	Lindsley Creek, Hwy 47	1955	Concrete	1217	7	6	5	N	56.1	FR	OD	DG
2	1	47	7.07	6524	North Fork Necanicum River, Hwy 47 at MP 7.07	1942	Concrete	3620	6	6	6	N	73.5	FR	ND	
2	1	47	8.22	3099	Little Humbug Creek, Hwy 47	1956	Concrete	1210	6	6	6	N	62.7	FR	OD	DG

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2	1	47	10.23	01812A	Necanicum River, Hwy 47 at MP 10.23	1970	P/S Concrete	7055	7	7	7	N	70.1	GD	ND	
2	1	47	16.28	1831	West Humbug Creek, Hwy 47	1934	Timber	1976	6	7	6	N	53.5	FR	OD	DG
2	1	47	17.37	1832	East Fork Humbug Creek, Hwy 47	1934	Timber	2646	6	6	6	N	56.8	FR	OD	DG
2	1	47	21.73	2165	Nehalem River & Hwy 103, Hwy 47	1939	Concrete	22152	5	6	6	N	39.7	FR	OD	LSL
2	1	47	24.23	2164	North Fork Quartz Creek, Hwy 47	1939	Steel	29225	6	6	6	N	47.2	FR	OD	LSL DG
2	1	47	24.47	2166	South Fork Quartz Creek, Hwy 47 at MP 24.47	1938	Concrete	963	6	6	6	N	65.2	FR	ND	
2	1	47	28.92	02479A	South Fork Rock Creek, Hwy 47	1975	Steel	0	N	N	N	6	70	FR	ND	
2	1	47	34.93	02027A	North Fork Wolf Creek, Hwy 47	1938	P/S Concrete	5743	7	7	6	N	60.9	FR	ND	
2	1	47	37.38	2029	Wolf Creek, Hwy 47	1938	Concrete	6067	6	7	6	N	70.7	FR	ND	
2	1	47	37.88	02364A	Nehalem River, Hwy 47	1940	P/S Concrete	11721	6	7	5	N	40.6	FR	OD	LSL SCOUR LC
2	1	47	45.31	2672	W Fork Dairy Creek, Hwy 47 at MP 45.31	1940	Timber	5806	7	7	4	N	51.1	PR	SD	SD SCOUR TS
2	1	47	46.3	2673	West Fork Dairy Creek, Hwy 47 at MP 46.30	1940	Timber	4183	7	5	4	N	43.8	PR	SD	SD LSL TS
2	1	47	49.47	2363	Hwy 47 over Hwy 102 & POTB RR (Davies)	1941	Concrete	22424	7	6	6	N	71	FR	ND	
2	1	47	50.22	02362A	W Fork Dairy Creek, Hwy 47 at MP 50.22	1941	Concrete	3863	7	6	6	N	49.3	FR	OD	LSL LC
2	1	47	54.45	6999	Bledsoe Creek, Hwy 47 WB	1946	Steel	0	N	N	N	6	85	FR	ND	
2	1	47	54.45	06999A	Bledsoe Creek, Hwy 47 EB	1971	P/S Concrete	4682	7	7	6	N	91.3	FR	ND	
2	1	47	54.55	02366B	East Fork Dairy Creek, Hwy 47 EB	1971	P/S Concrete	5078	7	6	6	N	89.1	FR	ND	
2	1	47	54.55	21323	East Fork Dairy Creek HWY 047 WB at MP 54.55	2010	P/S Concrete	5783	7	7	8	N	91	GD	ND	
2	1	47	55.19	06519A	Dersham Rd over Hwy 47	1971	P/S Concrete	9039	7	6	6	N	78.4	FR	ND	
2	1	92	21.48	02670A	South Fork Scappoose River, Hwy 2W	1980	P/S Concrete	11088	7	6	7	N	89.3	FR	ND	
2	1	92	21.84	02668A	North Fork Scappoose River, Hwy 2W	1980	P/S Concrete	5040	7	7	7	N	92.9	GD	ND	
2	1	92	23.15	2667	Honeyman Creek, Hwy 2W	1919	Concrete	0	N	N	N	7	54.5	GD	ND	
2	1	92	27.53	17435	McNulty Creek, Hwy 2W	1996	P/S Concrete	2958	6	7	6	N	94.3	FR	ND	
2	1	92	28.44	17434	Milton Creek, Hwy 2W	1996	P/S Concrete	8091	6	7	7	N	94.9	FR	ND	
2	1	92	36.47	00338A	Tide Creek, Hwy 2W	1958	Concrete	7726	6	6	6	N	41.8	FR	OD	LSL
2	1	92	40.74	00191A	Goble Creek, Hwy 2W	1960	Concrete	5376	7	6	5	N	74.1	FR	OD	RAIL
2	1	92	53.05	00146A	Beaver Creek, Hwy 2W	1968	P/S Concrete	4977	7	6	6	N	87.5	FR	ND	
2	1	92	55.29	7722	Lost Creek, Hwy 2W	1953	Concrete	1733	7	6	7	N	68.8	FR	OD	DG
2	1	92	60.82	7715	Hwy 2W over Swedetown County Rd	1954	Concrete	4511	5	6	6	N	59.5	FR	OD	DG RAIL VC
2	1	92	61.21	7519	Clatskanie River, Hwy 2W	1954	Concrete	5037	7	7	4	N	43.5	PR	SD	SD LSL DG
2	1	92	67.87	21455	Eilertsen Creek, Hwy 2W	2011	P/S Concrete	1776	8	7	8	N	86.1	GD	ND	
2	1	92	70.71	00185A	Plympton Creek, Hwy 2W	1958	Concrete	3093	7	7	6	N	64	FR	OD	RAIL
2	1	92	77.25	921	Gnat Creek, Hwy 2W	1929	Concrete	5004	6	6	6	N	50.8	FR	OD	DG
2	1	92	82.52	7417	Big Creek, Hwy 2W	1951	Concrete	6084	6	6	6	N	59.1	FR	OD	DG
2	1	92	82.84	7418	Maggie Johnson Rd over Hwy 2W	1951	Concrete	3075	7	6	6	N	91.9	FR	ND	
2	1	92	85.27	9546	Ferris Creek, Hwy 2W	1967	P/S Concrete	42419	6	6	6	N	60.8	FR	OD	RAIL
2	1	92	86.21	9544	Bear Creek, Hwy 2W	1967	P/S Concrete	6900	7	7	7	N	69.8	GD	ND	
2	1	92	86.43	9543	Marys Creek, Hwy 2W	1967	P/S Concrete	23712	6	6	7	N	79.5	FR	OD	RAIL
2	1	92	92.5	01827B	John Day River, Hwy 2W	1990	P/S Concrete	47150	6	6	6	N	71.8	FR	ND	
2	1	092C	48.36	9591	Lewis & Clark Br Conn over Hwy 2W	1969	Concrete	11020	7	6	7	N	69.2	FR	ND	
2	1	092C	48.92	2046	Columbia R, Hwy 2W Conn (Lewis & Clark, Longview)	1929	Steel	197697	6	6	5	N	63	FR	ND	
2	1	092C	72.75	9598	Hwy 2W Conn over Hwy 2W (Wauna Intchg)	1967	P/S Concrete	7182	7	6	7	N	97	FR	ND	
2	1	092F	36.47	338	Tide Creek, Hwy 2W Frtg Rd Rt	1920	Concrete	2025	6	6	6	N	51.2	FR	ND	
2	1	102	4.58	02320A	Walluski River, Hwy 102	1980	Steel	17460	7	6	6	N	89.5	FR	ND	
2	1	102	11.85	03104A	North Fork Klaskanine River, Hwy 102 at MP 11.85	1921	P/S Concrete	4804	5	6	6	N	95.8	FR	ND	
2	1	102	15.76	1964	North Fork Klaskanine River, Hwy 102 at MP 15.76	1934	Steel	1080	6	6	6	N	91.3	FR	OD	PAINT
2	1	102	19.27	1963	South Fork Klaskanine River, Hwy 102 at MP 19.27	1934	Steel	2727	6	7	6	N	78	FR	ND	
2	1	102	25.43	3108	Hamilton Creek, Hwy 102	1963	P/S Concrete	2275	7	7	6	N	91.2	FR	ND	
2	1	102	29.32	1991	Beneke Creek, Hwy 102	1934	Steel	5360	6	6	4	N	54.5	PR	SD	SD TS
2	1	102	29.84	03110A	Nehalem River, Hwy 102 at MP 29.84	1966	P/S Concrete	11742	7	7	8	N	68.1	GD	ND	
2	1	102	32.06	03111A	Nehalem River, Hwy 102 at MP 32.06	1953	Concrete	9300	6	5	7	N	66.6	FR	ND	
2	1	102	33.59	18775	Squaw Creek, Hwy 102	2000	P/S Concrete	3680	8	6	8	N	97.9	FR	ND	
2	1	102	35.08	03112A	Nehalem River, Hwy 102 at MP 35.08	1953	Concrete	10482	7	5	6	N	61.1	FR	ND	
2	1	102	36.75	01707A	Sager Creek, Hwy 102	1932	P/S Concrete	3232	7	8	7	N	96.9	GD	ND	
2	1	102	38.1	01710A	Oflow Channel, Hwy 102 at MP 37.98	1990	P/S Concrete	1044	8	7	8	N	96.9	GD	ND	

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Region	District	Hwy	MP	Bridge	Structure Name	Year	Material	Deck Area (sqft)	Deck Rate	Super Rate	Sub Rate	Culv Rate	Suff Rate	Struc Cond	Other SD/OD	Deficiencies
2	1	102	38.59	03113A	Nehalem River, Hwy 102 at MP 38.59	1966	P/S Concrete	11742	6	7	7	N	94.8	FR	ND	
2	1	102	38.81	01712A	Grub Creek, Hwy 102	1990	P/S Concrete	2190	8	8	8	N	96.8	VG	ND	
2	1	102	40.62	03139A	Nehalem River, Hwy 102 at MP 40.62 (Birkenfeld)	1956	Concrete	8016	5	6	5	N	78	FR	ND	
2	1	102	43.7	20848	Nehalem River, Hwy 102 at MP (Banzer)	2010	P/S Concrete	10822	8	8	7	N	96.1	GD	ND	
2	1	102	45.45	19872	Ford Creek, Hwy 102	2006	P/S Concrete	5280	6	8	8	N	98.1	FR	ND	
2	1	102	45.63	19873	Lyons Creek, Hwy 102 AT MP 45.63	2006	P/S Concrete	3776	8	8	8	N	97.1	VG	ND	
2	1	102	48.63	19874	Battle Creek, Hwy 102 AT MP 48.63	2007	P/S Concrete	4620	7	7	8	N	95.1	GD	ND	
2	1	102	53.07	01748A	Oak Ranch Creek, Hwy 102	1978	P/S Concrete	2464	7	7	7	N	92.2	GD	ND	
2	1	102	57.14	1415	East Fork Nehalem River, Hwy 102 at MP 57.14	1929	Concrete	3300	7	7	7	N	73.1	GD	ND	
2	1	102	57.68	03145A	Nehalem River, Hwy 102 at MP 57.68	1959	Concrete	6474	6	6	7	N	75.6	FR	ND	
2	1	102	59.58	03146A	Nehalem River, Hwy 102 at MP 59.58	1958	Concrete	5642	6	6	7	N	75.5	FR	OD	SCOUR
2	1	102	61.28	2323	Nehalem River, Hwy 102 at MP 61.28	1938	Steel	9030	5	6	4	N	35.2	PR	SD	SD LSL PAINT TS
2	1	102	62.27	1508	Rock Creek, Hwy 102	1930	Concrete	5490	7	6	5	N	53.7	FR	ND	
2	1	102	63.65	02598A	Nehalem River, Hwy 102 at MP 63.65	1959	Steel	7686	5	6	7	N	81	FR	ND	
2	1	102	64.21	3148	Beaver Creek, Hwy 102 at MP 64.21	1968	P/S Concrete	2688	7	7	4	N	62.8	PR	SD	SD SCOUR TS
2	1	102	64.6	2301	Beaver Creek, Hwy 102 at MP 64.60	1936	Timber	2655	7	7	5	N	61.5	FR	ND	
2	1	102	65.22	3151	Beaver Creek, Hwy 102 at MP 65.22	1964	P/S Concrete	2646	7	6	4	N	41.6	PR	SD	SD LSL TS
2	1	102	69.03	03156A	Beaver Creek, Hwy 102 at MP 69.03	1966	P/S Concrete	2287	7	7	5	N	67.8	FR	OD	TS
2	1	102	69.79	4950	Beaver Creek, Hwy 102 at MP 69.79	1964	P/S Concrete	1165	7	7	6	N	8.3	PR	SD	SD LSL TS
2	1	102	70.51	1760	Beaver Creek, Hwy 102 at MP 70.51	1932	Timber	1296	6	7	6	N	72	FR	ND	
2	1	102	75.09	04953A	Cummings Creek, Hwy 102	1954	Concrete	630	7	7	5	N	43.9	FR	OD	LSL TS
2	1	102	81.94	20316	Oflow, Hwy 102 at MP 81.94	2006	P/S Concrete	1786	8	8	7	N	96.9	GD	ND	
2	1	102	82.65	2303	West Fork Dairy Creek, Hwy 102 at MP 82.65	1936	Timber	2236	6	6	4	N	64.3	PR	SD	SD TS RAIL
2	1	102	86.22	04960A	South Fork Dairy Creek, Hwy 102	1942	P/S Concrete	3627	7	7	6	N	80.9	FR	OD	RAIL
2	1	102	86.34	2347	West Fork Dairy Creek, Hwy 102 at MP 86.34	1937	Timber	2471	7	7	4	N	37.3	PR	SD	SD LSL DG TS
2	1	102	86.39	02067A	Dairy Creek Oflow, Hwy 102	1978	P/S Concrete	1540	7	7	7	N	80.3	GD	ND	
1	1	102	88.84	18615	Culvert, Hwy 102 at MP 88.82	2000	Concrete	0	N	N	N	8	70	VG	ND	
1	1	102	89.69	18618	Culvert, Hwy 102 at MP 89.66	2000	Concrete	0	N	N	N	8	99.6	VG	ND	
2	1	103	0.02	03103A	Fishhawk Creek, Hwy 103 (Jewell)	1989	Concrete	3790	7	7	7	N	97.3	GD	ND	
2	1	103	5.25	2074	Nehalem River, Hwy 103 at MP 5.25	1957	Concrete	11471	6	5	6	N	62	FR	ND	
2	1	103	6.32	18165	Cow Creek, Hwy 103	1997	P/S Concrete	1330	7	7	7	N	91.3	GD	ND	
2	1	104	2.32	11233B	Power Slough (Alder Creek), Hwy 104	1989	P/S Concrete	2520	7	7	7	N	94.8	GD	ND	
2	1	104Y	4.62	1400	Skipanon River, Hwy 104 Spur	1929	Steel	3548	5	5	6	N	38.7	FR	OD	LSL PAINT LC
2	1	105	0.17	11226A	Skipanon River, Hwy 105	1978	P/S Concrete	31537	6	6	6	N	95.3	FR	ND	
2	1	105	4.78	711	Lewis & Clark River, Hwy 105	1924	Steel	22446	6	5	5	N	28.7	FR	OD	LSL CP PAINT TS LC
2	1	105	6.89	330	Youngs Bay, Hwy 105 (Old Youngs Bay)	1921	Steel	61818	6	5	4	N	7	PR	SD	SD LSL CP MB PAINT TS LC
2	1	105	7.1	2418	Hwy 105 over Port of Astoria Belt Line (Abandoned)	1921	Concrete	1457	6	6	6	N	60.2	FR	ND	
2	1	110	1.25	20804	Fish Passage Culvert HWY 110 at MP 1.25	2008	Concrete	0	N	N	N	7	97	GD	ND	
2	1	130	1.27	04691A	Little Nestucca River, Hwy 130 at MP 1.27 (Meda)	1956	Concrete	8077	6	6	5	N	77.1	FR	ND	
2	1	130	3.23	1864	Panther Creek, Hwy 130	1957	Timber	1701	7	7	6	N	85	FR	OD	LC
2	1	130	3.6	1863	Squaw Creek, Hwy 130	1942	Timber	1839	7	6	6	N	78.5	FR	OD	LC
2	1	130	3.82	1862	Austin Creek, Hwy 130	1962	Timber	1373	5	6	6	N	79.6	FR	OD	LC
2	1	130	4.15	1861	Little Nestucca River, Hwy 130 at MP 4.15	1934	Steel	3951	6	5	6	N	64.3	FR	OD	PAINT LC
2	1	130	4.76	1860	Bear Creek, Hwy 130	1954	Timber	1651	5	6	6	N	78.8	FR	OD	LC
2	1	130	5.11	01859A	Little Nestucca River, Hwy 130 at MP 5.11 (Yach)	1952	Steel	3690	6	4	7	N	34	PR	SD	SD LSL PAINT
2	1	130	5.97	01858A	Little Nestucca R, Hwy 130 at MP 5.97 (Muscott)	1951	Steel	3690	6	5	7	N	46.4	FR	OD	LSL PAINT
2	1	130	7.55	01857A	Little Nestucca River, Hwy 130 at MP 7.55 (Weed)	1951	Steel	6150	6	5	6	N	48.6	FR	OD	LSL
2	1	130	8.52	02299A	Little Nestucca River, Hwy 130 at MP 8.52 (Meader)	1972	P/S Concrete	8849	7	7	7	N	93.2	GD	ND	
2	1	131	7.49	01345C	Tillamook River, Hwy 131	1962	Steel	20260	6	6	6	N	45.5	FR	OD	LSL
2	1	131	8.33	05640A	Trask River, Hwy 131 (Stillwell)	1948	Steel	11777	5	6	6	N	45.4	FR	OD	LSL

Section F:
Memorandum 6- Future Traffic Forecast

Destination 2035

MEMORANDUM

REGISTERED PROFESSIONAL ENGINEER
63019
OREGON
Jan. 11, 2005
C. S. MACIEJEWSKI
EXPIRES: 12/31/16

DATE: August 20, 2014

TO: Clatsop County TSP Project Management Team

FROM: Chris Maciejewski, PE, PTOE - DKS Associates
Kevin Chewuk, PTP - DKS Associates
Ben Fuller - DKS Associates
Ben Chaney - DKS Associates

SUBJECT: Clatsop County Transportation System Plan
Technical Memorandum #6: Forecasting Assumptions and Methodology P11086-016

Traffic forecasting is an important step in the transportation planning process because it provides estimates of future travel demand. The horizon year for Clatsop County's transportation system plan (TSP) is 2035. This memorandum describes the forecasting assumptions and methodologies that were used to estimate transportation growth and provide traffic volumes for study intersection and streets in 2035.

Methodology Overview

The forecasting methodology varies based on the forecasting tools available, as well as the location, characteristic, and jurisdiction of the facility. The following provides a summary of the forecasting tools that were used for the Clatsop County TSP:

- **For State highways and County facilities in the Astoria-Warrenton area:** Model growth rates from the Astoria-Warrenton regional travel demand model were utilized for areas within the model boundaries (primarily within the cities of Astoria and Warrenton).
- **For State highways outside of the Astoria-Warrenton area:** Growth Rates derived from the ODOT Future Volume Tables were utilized.
- **For County facilities that serve as recreational routes outside of the Astoria-Warrenton area**: Growth Rates derived from the ODOT Future Volume Tables were utilized based on the adjacent state highway.
- **For urban County facilities that do not serve as recreational routes outside of the Astoria-Warrenton area:** Growth rates derived from the ODOT Future Volume Tables for non-recreational State highways in the County were utilized (such as OR 202).
- **For rural County facilities:** A half percent annual growth rate was utilized based on historical and forecasted County population estimates.

Due to significant differences in summer volumes (e.g., a typical Friday in August) and average weekday volumes (e.g., a typical Tuesday in May) along many streets in Clatsop County, the forecast includes projections for both scenarios for the 2035 horizon year. The following sections detail the above forecasting methodologies and describe their applicability.

Astoria-Warrenton Travel Demand Model

The Astoria-Warrenton regional travel demand model[1] was utilized as the primary tool to estimate future travel demand in the Warrenton and Astoria area. The model includes all State highways in the Astoria-Warrenton area (US 30, US 101, US 101 Business, OR 202, OR 104, OR 104 Spur), and major County roadways, including Lewis and Clark Road, Youngs River Road, Ridge Road, Walluski Loop Road, Logan Road, Fort Clatsop Road, and Airport Lane (see Figure 1). Land use data within the model area is divided into transportation analysis zones (TAZs), which represent the origins and destinations for traffic trips throughout the region. Estimates of trips generated from each TAZ are based on associated land use data. In addition, regional trip growth on facilities connecting to the Astoria-Warrenton area is accounted for by extrapolating historic growth trends. The 2002 base and 2035 future scenarios of the Astoria-Warrenton model were used for this study.

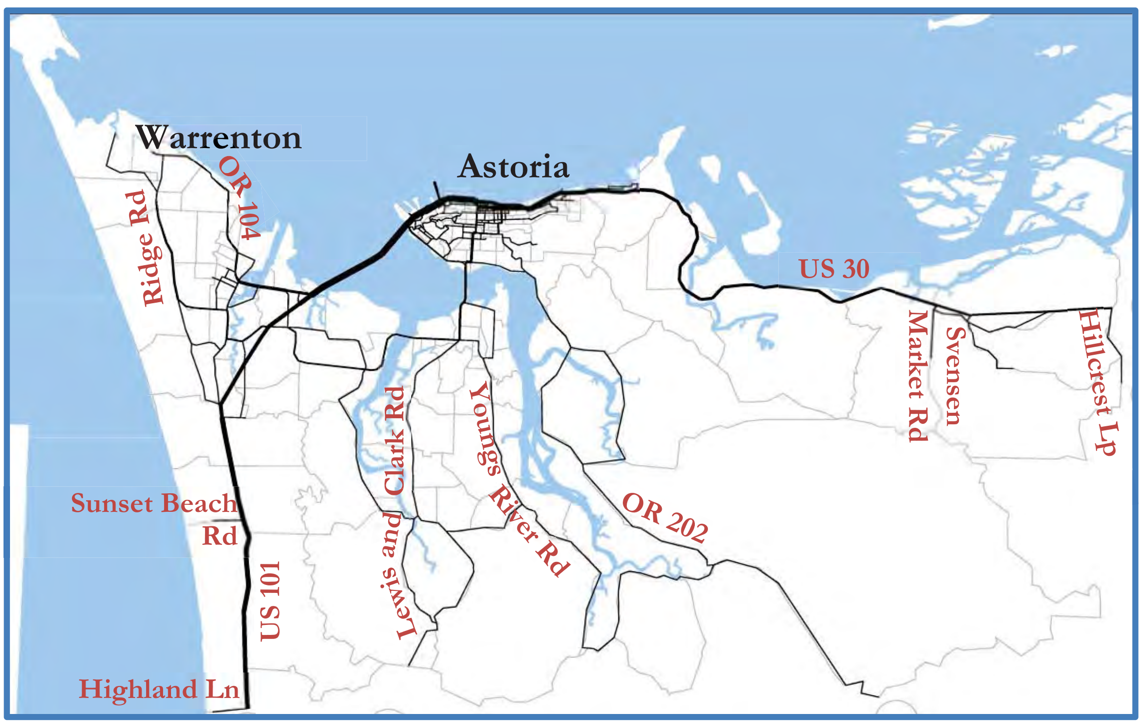

Figure 1: Astoria-Warrenton Regional Travel Demand Model Area

[1] The Astoria-Warrenton regional travel demand model is managed by the Oregon Department of Transportation (ODOT) Transportation Planning and Analysis Unit (TPAU).

Application of Regional Demand Model

As shown in Figure 1, the Astoria-Warrenton regional travel demand model has a regional scale and the roadway network includes the primary arterial and collector roadways in the model area. Many local roadways are commonly not included in regional models because they are not significant to regional travel patterns. As a result, regional models like the Astoria-Warrenton model have limited accuracy in forecasting circulation and routing on local streets and should be used carefully. Regional models also do not typically have sufficient detail to directly forecast intersection turn movements, even on roadways included in the model. Engineering judgment and manual methods (such as evaluating screen lines) are often needed to "post-process" link-based model results to estimate turn movement volumes and to account for circulation and routing at the local level.

Post-Processing

While the travel demand models were calibrated to local conditions and volumes, raw volumes from the travel demand model were not used for capacity analysis. Rather, motor vehicle turn movement volume forecasts were developed using post-processing methods consistent with the ODOT Procedures Manual[2]. This approach is derived from methodologies outlined in the National Cooperative Highway Research Program (NCHRP) Report 255, *Highway Traffic Data for Urbanized Area Project Planning and Design*.

The post-processing methodology involves estimating model growth using the difference method (i.e., volume differences between base and future models), scaling the growth by the number of forecast years (i.e., forecast years divided by difference in model years), and adding these volumes to existing traffic counts[3]. Traffic growth on links in the travel demand models were applied to individual turn movements using a Fratar method to account for growth on both inbound and outbound links. Engineering judgment is used as part of the post-processing methodology. The result of this process is future year forecasts derived from the Astoria-Warrenton regional travel demand model that are calibrated to observed data.

ODOT Future Volume Tables

For urban State highways or County facilities outside of the Warrenton-Astoria model boundaries, future traffic growth was estimated based on ODOT's 2032 future volume tables. Average daily traffic (ADT) volumes are provided for various mile points along State highways for the base year (2010, 2011, or 2012 depending on the location) and future year (2032). These volumes were utilized to determine an expected growth trend, suggesting an annual growth rate to be applied to applicable streets and intersections in Clatsop County. The annual growth rate was applied to the seasonally factored base year volumes to develop traffic volumes for 2035.

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[2] *Analysis Procedures Manual (APM)*, Oregon Department of Transportation (ODOT) Transportation Planning Analysis Unit (TPAU), Last Updated June 2010, pgs. 91-92

[3] The traffic counts for the Clatsop County TSP study intersections were collected in 2013 and adjusted to average weekday and 30th highest hour (summer peak) conditions, as documented in *Technical Memorandum #5 (Existing Conditions)*.

For State highways outside of the Astoria-Warrenton area, annual growth rates derived from the ODOT Future Volume Tables were utilized. For County facilities that serve as recreational routes outside of the Astoria-Warrenton area, growth rates derived from the ODOT Future Volume Tables were utilized based on the adjacent state highway. This methodology was applied to County facilities adjacent to US 101 between Warrenton and Seaside that serve key beach accesses and County Parks.

For urban County facilities (i.e. inside the UGB) that do not serve as recreational routes outside of the Astoria-Warrenton area, growth rates derived from the ODOT Future Volume Tables for non-recreational State highways in the County were utilized. This was based on the annual growth rate calculated for OR 202 between Astoria and Jewell, and was only applied to a portion Lewis and Clark Road on the east side of Seaside.

Table 1: Annual Growth Rate Calculations

Count Location(s)**	Annual Growth Rate*	
US 30, 0.20 mile west of Taylorville Road overcrossing (MP 72.89), and on Fertile Valley Creek Bridge (MP 81.38)	1.8%	US 30, east of Hillcrest Loop
OR 202, on Nehalem River Bridge (MP 29.84), and Clatsop-Columbia County Line (MP 39.13)	1.3%	OR 202, east of Youngs River Road; Lewis and Clark Road on the east side of Seaside
OR 103, 0.05 mile south of OR 202 (MP 0.05), on Vinemaple Bridge (MP 5.25), 0.02 mile south of Bay Road (MP 6.90), and 0.05 mile north of US 26 (MP 8.97)	1.2%	OR 103, between OR 202 and US 26
OR 53***	1.2%	OR 53, between US 26 and the Clatsop-Tillamook County Line
US 26, 0.70 mile east of US 101 (MP 0.60), and on Necanicum River Black Bridge (MP 4.40)	1.4%	US 26, between US 101 and the Clatsop-Tillamook County Line
US 101, 0.02 mile south of Pacific Way (MP 18.85), 0.02 mile north of Airport Road (MP 19.32), 0.10 mile north of Wahanna Road (MP 19.58), Neawanna Creek Bridge (MP 19.72), 0.02 mile south of Avenue "S" (MP 21.88), and 0.02 mile south of Avenue "U" (MP 22.19)	1.4%	US 101, between Highland Lane and US 26; County facilities adjacent to US 101 between Highland Lane and US 26
US 101, South city limits of Cannon Beach, 0.15 mile south of Sunset Boulevard Interchange (MP 29.68)	1.7%	US 101, between US 26 and the Clatsop-Tillamook County Line

* Source: 2032 Future Volumes Table, ODOT
** Only statistically significant locations with R-squared values above 0.50 were utilized.
*** No statistically significant count locations, utilized data from OR 103.

County Population Estimates for Rural County Facility Growth

For rural County facilities (i.e. outside of the UGB) that do not serve as recreational routes, a half percent annual growth rate was utilized. This rate was developed after reviewing historical and forecasted population estimates from Portland State University's Population Research Center[4] and the Oregon Office of Economic Analysis[5]. Both sources yielded annual growth rates just under a half percent per year. Population growth rates are not a preferred approach to forecasting traffic volume growth, as the population growth rate includes non-drivers who cannot or should not drive. They are used only as a last resort, where no other data is available. County facilities where the half percent annual growth rate was applied include Hamlet Road, Beneke Creek Road, Saddle Mountain Road, Labiske Road, Simonson Loop Road, Hillcrest Loop, Koppisch Road, Old US Highway 30 (north of US 30), Knappa Dock Road, Ziak-Gnat Creek Road, Brownsmead Hill Road, Valley Creek Road, Aldrich Point Road, Barendse Road, Clifton Road, Westport Ferry Road, McLean Hill Road, Hungry Hollow Loop, and Taylorville Road.

[4] Certified Population Estimates, Population Research Center, Portland State University
[5] Forecasts of Oregon's County Populations and Components of Change, 2010 – 2050, Office of Economic Analysis, Department of Administrative Services, State of Oregon

Section G:

Memorandum 7- Future Transportation Conditions and Needs

Destination 2035

MEMORANDUM

REGISTERED PROFESSIONAL ENGINEER
63019
OREGON
Jan. 11, 2005
C. S. MACIEJEWSKI
EXPIRES: 12/31/16

DATE: August 20, 2014

TO: Clatsop County TSP Project Management Team

FROM: Chris Maciejewski, PE, PTOE - DKS Associates
Kevin Chewuk, PTP - DKS Associates
Ben Chaney - DKS Associates

SUBJECT: Clatsop County Transportation System Plan
Technical Memorandum #7: Future Transportation Conditions and Needs P11086-016

The condition of Clatsop County's future transportation system depends on the growth in population and employment, future travel patterns (e.g., choice of modes, routes, and frequency of trips), and community investment decisions. Growth in population and the number of jobs is forecast based on trends and knowledge of the county and region. Future travel patterns are more difficult to predict as the community's investment decisions and the economy can have significant effect on choice of modes and routes. The objective of the transportation planning process is to generate information necessary for making decisions that will result in safe and efficient travel options through 2035.

METHODOLOGY FOR ESTIMATING FUTURE TRAVEL

The 2035 transportation conditions in Clatsop County were forecasted based on trips that new growth will generate, assuming:

- No new investments in infrastructure beyond what already is funded for construction,
- Continuation of the same modal distribution (i.e., private motor vehicle, transit, walking, biking) of trips, and
- Continuation of current travel behaviors, based on decisions and preferences of existing residents, employers, tourists, and institutions around the region.

It describes where the transportation system will perform satisfactorily and areas of the street network likely to be congested and in need of investments to function adequately in the future. Subsequent memos will explore solutions for addressing future transportation system needs. For more detail on the travel forecasting process, refer to Technical Memorandum #6.

Future Estimates of Walking, Biking, and Transit

Methodology for determining future needs for walking, biking, and transit in Clatsop County begins with an assessment of who is walking, biking, and taking transit now and where they are traveling.. These modes are summarized in Technical Memorandum #5 (Existing Transportation Conditions).

The existing facilities were then compared to major growth areas of the County, and in proximity to key destinations, such as schools, parks, transit stops, shopping and employment. A review of the County shows that the walking and biking infrastructure is inadequate along many streets. It is also deficient in proximity to key destinations in urban areas, which have the potential to attract significant walking and biking trips. The inadequate walking and biking infrastructure further hinders transit riders, as these users typically utilize these facilities at the beginning and end of their trip.

Baseline Street Network Improvements

The baseline condition reflects the street network performance for motor vehicles, assuming that only transportation projects that already have secured funding will be built. Funded projects include:

- **Ensign Lane Extension, Phase II:** This project will extend Ensign Lane from SE 19th Street to US 101 Business. A new "T" intersection will be created at US 101 Business/Ensign Lane.
- **US 101 and Sunset Beach Road Intersection:** A "J" turn will be installed just to the south of the intersection. The project will allow eastbound drivers on Sunset Beach Road destined for northbound US 101 to make a right onto southbound US 101, and then make a U-turn to northbound US 101.

Snapshot of Clatsop County in 2035

Aging Population

Age will likely play a key role in determining mode of transportation for Clatsop County residents. The youngest and oldest residents often account for more trips via walking, biking, and public transportation. Today, school-age children and residents over 65 make up about 40 percent of the population in the county (as shown in Figure 1).[1] By 2035, this number is expected to increase nearly

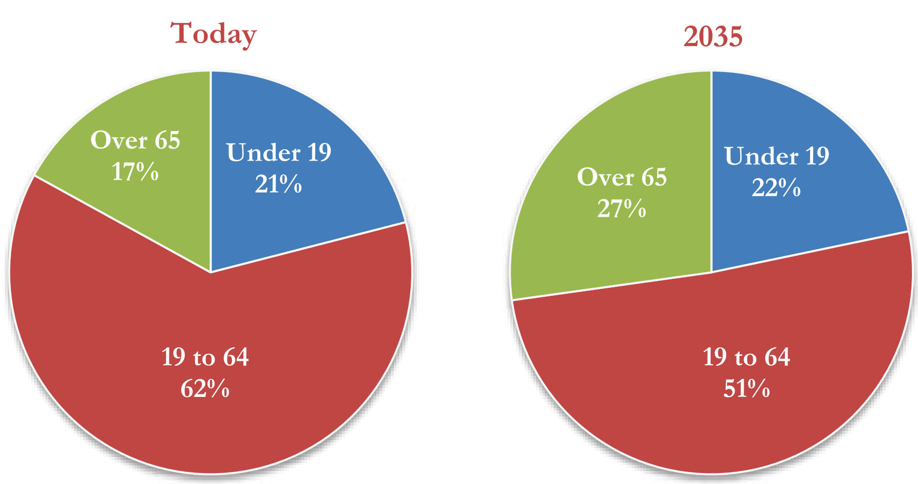

Figure 1: Aging Population

[1] Forecasts of Oregon's County Populations and Components of Change, 2010-2050. Office of Economic Analysis, Department of Administrative Services, State of Oregon. Released March 28, 2013.

10 percent, accounting for half of all county residents. The most notable change is expected to be the amount of residents over the age of 65, which is expected to increase from 17 percent to 27 percent by 2035. This could indicate that more residents in the county may become dependent on public transportation and the associated walking and biking facilities on either end of the trip (e.g. sidewalk connecting a bus stop to their neighborhood).

Rising Population and Employment

Today, Clatsop County is home to 37,250 residents[2] and accounts for over 17,000 jobs[3]. Between now and 2035, projected employment growth will increase about one percent a year, outpacing the rate of household growth over the same period, which will increase about a half percent a year. Clatsop County will have about 40,500[4] residents and about 22,000 jobs[5] by 2035, a 9 and 30 percent increase respectively from 2013. With more people and more jobs in Clatsop County, and more tourism activity on the coast, the transportation network will face increasing demand through 2035.

More Travel and Tourism

With more jobs, residents, tourists, and through travel, key highways such as US 101 and US 30 in Clatsop County must accommodate hundreds more motor vehicle trips during the summer evening peak hour. Today, the Clatsop County street network is generally able to handle the summer evening peak hour trips; however, the summer evening peak hour motor vehicle trips are likely to increase over 45 percent at intersections along portions of US 101, US 101 Business, US 30, and several streets in Warrenton by the end of 2035.

2035 motor vehicle volumes for both summer and average weekday conditions were utilized to determine areas on the baseline roadway network that will be congested and may require future investments to accommodate forecasted growth. The 2035 baseline motor vehicle volumes for study intersections in Figure A1 and A2 in the appendix show volumes are anticipated to be highest along US 101, which connects the surrounding region to the employment areas and tourist destinations in Astoria, Warrenton, and Seaside. Other roadways expected to experience significant traffic increases include US 101 Business, US 30, and US 26. Each of these roadways connects the Portland metropolitan region, or major residential and/or employment areas in the county to US 101.

Increasing Congestion

An increase in motor vehicle travel leads to an increase in congestion. Travel activity, as reflected by evening peak hour motor vehicle trips beginning or ending in Clatsop County, is expected to increase significantly through 2035. Through trips (i.e., trips that neither begin nor end in Clatsop County) are also expected to increase through 2035 and are generally representative of increased tourism activity

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[2] 2013 Certified Population Estimates, Population Research Center, Portland State University
[3] Oregon Employment Department, 2013 Employment Statistics
[4] Office of Economic Analysis, Department of Administrative Services, State of Oregon
[5] Based on annual growth rate derived from the Oregon Employment Department's 2012-2022 employment forecast for the Clatsop, Columbia and Tillamook County region. The regional employment share for Clatsop, Columbia and Tillamook Counties in 2035 is based on 2013 employment statistics.

and growth in Oregon. By 2035, approximately 13 miles of roadways in the County (all along US 101 or US 30), are expected to approach existing mobility targets during peak periods of the year (within 20 percent of the mobility target).

Figures 2a and 2b show that most future peak period congested locations are expected to be along US 101 between Seaside and Warrenton during the summer. Congestion would be expected to occur at intersections along this segment during the peak summer months (typically July through September); however, these roadways would likely be uncongested during an average weekday or non-summer months.

2035 Baseline Summer p.m. peak hour intersection operations, summarized in Figure 2a and shown in Table A1 in the appendix, show that with the increased street network congestion, one signalized intersections and two unsignalized intersections along US 101 will fail to meet Oregon Highway Plan (OHP) mobility targets during the summer evening peak period (see appendix for more detail). At unsignalized intersections, infrequent gaps in the steady volumes of highway traffic will result in long delays for travelers on these side streets. The following intersections are expected to not meet mobility targets:

- US 101 / E Harbor Street (Signalized)
- US 101 / Fort Stevens Highway (Unsignalized)
- US 101 / Sunset Beach Road (Unsignalized)

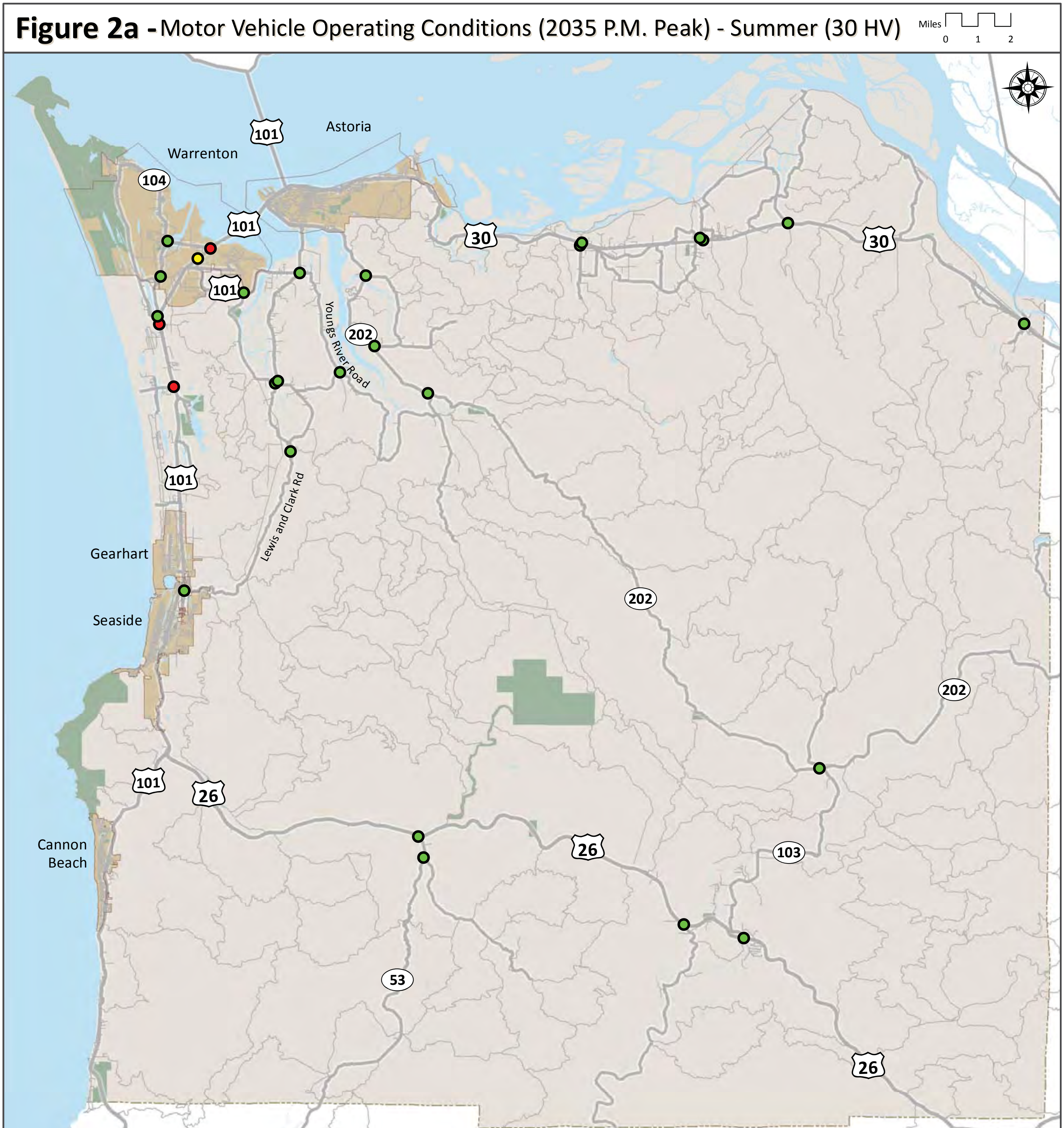
Forecasts indicate the US 101/Warrenton-Astoria Highway/Marlin Drive signalized intersection is expected to operate at a v/c ratio of 0.85, which is approaching its 0.90 mobility target.[6]

2035 Baseline Average weekday p.m. peak hour intersection operations, summarized in Figure 2b and shown in Table A1 in the appendix, show the average weekday operations are better than the summer condition. All intersections are expected to meet existing OHP mobility targets.

Forecasts indicate the US 101 / Sunset Beach Road intersection is expected to meet its existing OHP mobility target for overall intersection performance; however, its side street will experience a high level of delay (equal to a level of service of 'F').

[6] "Approaching mobility target" for intersections here is defined as a v/c ratio within 10% of mobility targets.

Figure 2a - Motor Vehicle Operating Conditions (2035 P.M. Peak) - Summer (30 HV)



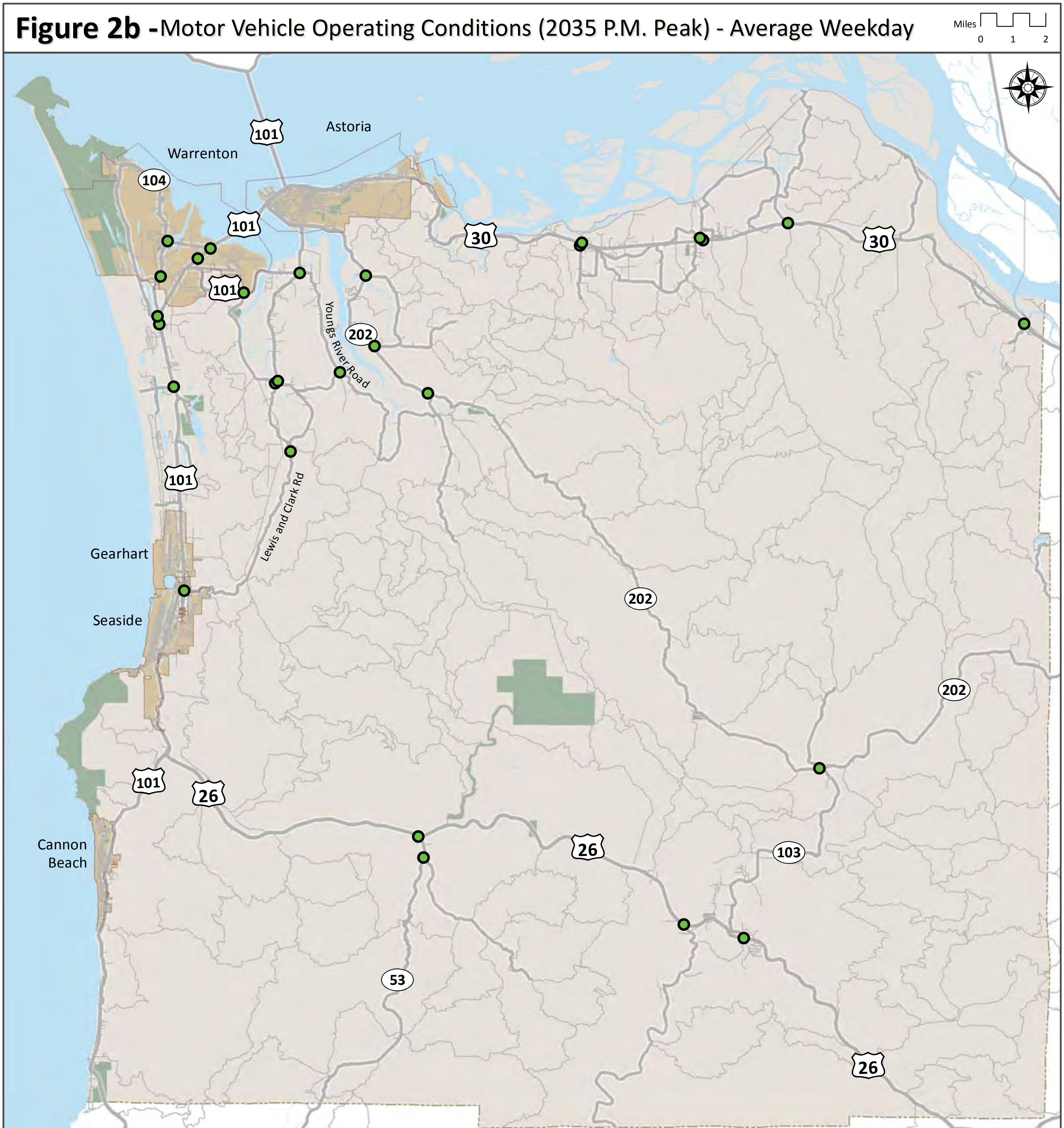
Legend

Peak Seasonal Intersections Operations

- Good
- Approaching Target
- Does Not Meet Target

- City
- Park
- Clatsop County
- Water

Figure 2b - Motor Vehicle Operating Conditions (2035 P.M. Peak) - Average Weekday



Legend

Peak Seasonal Intersections Operations

- Good
- Approaching Target
- Does Not Meet Target

- City
- Park
- Clatsop County
- Water

Declining Corridor Health

An increase in congestion along roadways is expected to lead to declining health of the corridors. The corridor health concept is based on the idea of measuring the "health" of a corridor for several different categories of performance, and then combining the measurements to provide a picture of overall corridor health. For more information on the Corridor Health Tool, see Technical Memorandum #5.

Of the four evaluation categories used for the Corridor Health Tool, only traffic operations was modified to reflect 2035 conditions. Using the annual growth rates documented in Technical Memorandum #6, traffic volumes were forecasted through 2035 along roadways in the county. The forecasted traffic volumes were utilized to update v/c ratios, and compared to existing mobility targets to establish a health score for 2035.

The three remaining categories (safety, geometrics, and access spacing) would not be expected to change and maintained scores based on 2013 conditions. Scores for each of the four categories were then weighted under two scenarios, one which places equal importance on each evaluation category (25 percent each) and one which places more value on traffic operations and safety (35 percent each) and less on geometrics and access spacing (15 percent each). The results are summarized below.

2035 Corridor Health (Even Weighting) scores, summarized in Figure 2a and shown in Table A2 in the appendix, show that with the increased street network congestion, 19 roadway segments totaling nearly 29.5 miles would be expected to have "poor" corridor health scores overall. This includes nearly 17 miles worth of state highways and over 12.5 miles of county roadways and represents an increase of about five miles over two street segments from existing 2013 conditions. Overall, ten street segments totaling over 11.5 miles would be expected to have overall corridor health scores decline a category (i.e., "Good" to "Fair") from existing 2013 conditions.

2035 Corridor Health (Focused Weighting) scores, summarized in Figure 2b and shown in Table A2 in the appendix, show that fewer roadway segments would be expected to have "poor" corridor health scores overall under this weighting scenario. Seven roadway segments, totaling about 14.5 miles, would no longer receive "poor" corridor health scores overall. These roadway segments generally scored better on the traffic operations and safety evaluation categories, and lower on the geometrics and access spacing evaluation categories, thus when less emphasis is placed on the later categories the corridor health scores improve overall.

With the focused weighting, nearly 10.5 miles worth of state highways and 4.5 miles of county roadways would be expected to have "poor" corridor health scores overall. This represents an increase of about 6 miles over five street segments from existing 2013 conditions (assuming the same focused weighting). Overall, 13 street segments totaling over 12 miles would be expected to have overall corridor health scores decline a category (i.e. "Good" to "Fair") from existing 2013 conditions.

Figure 3a - Corridor Health (2035) - Even Weighting

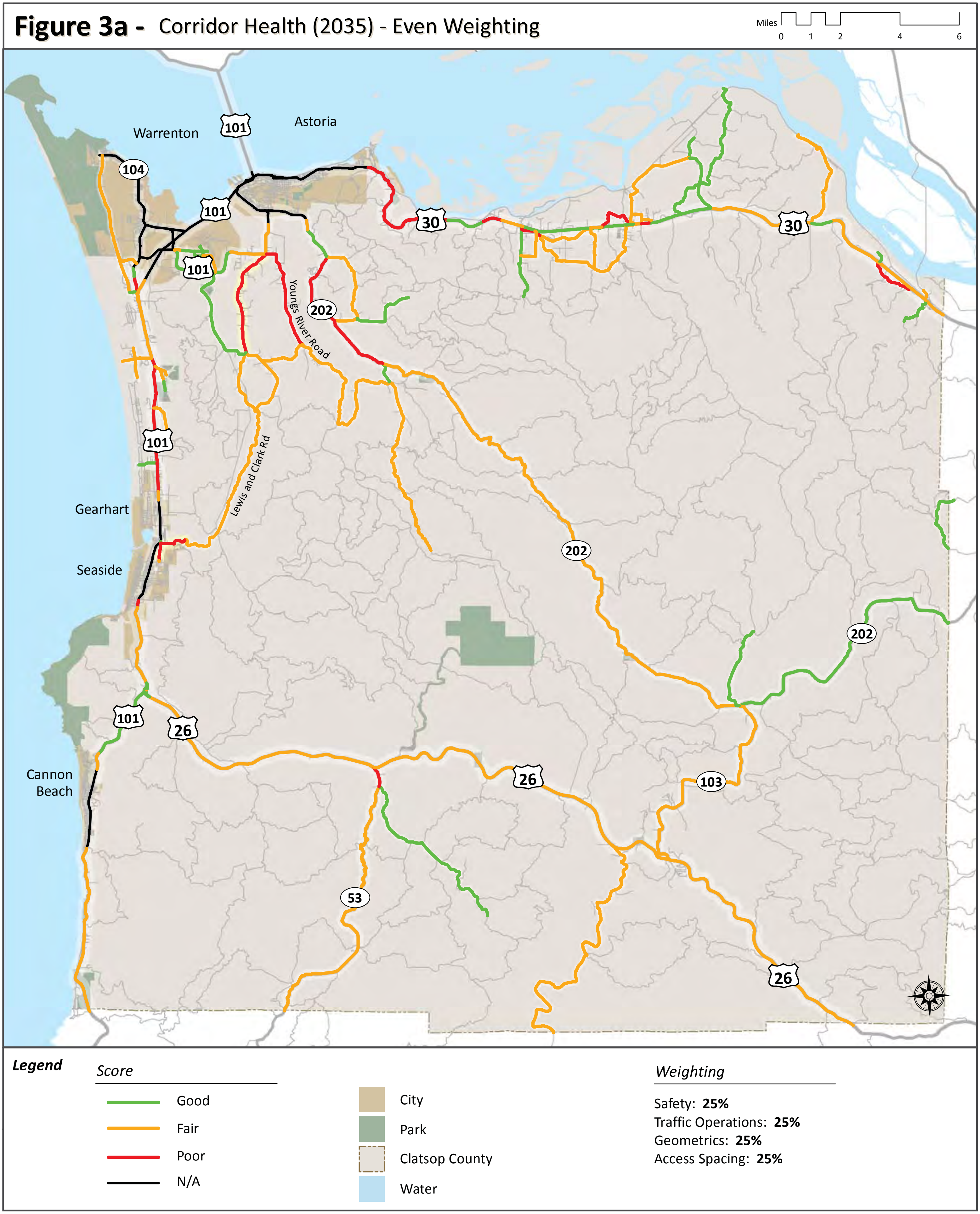
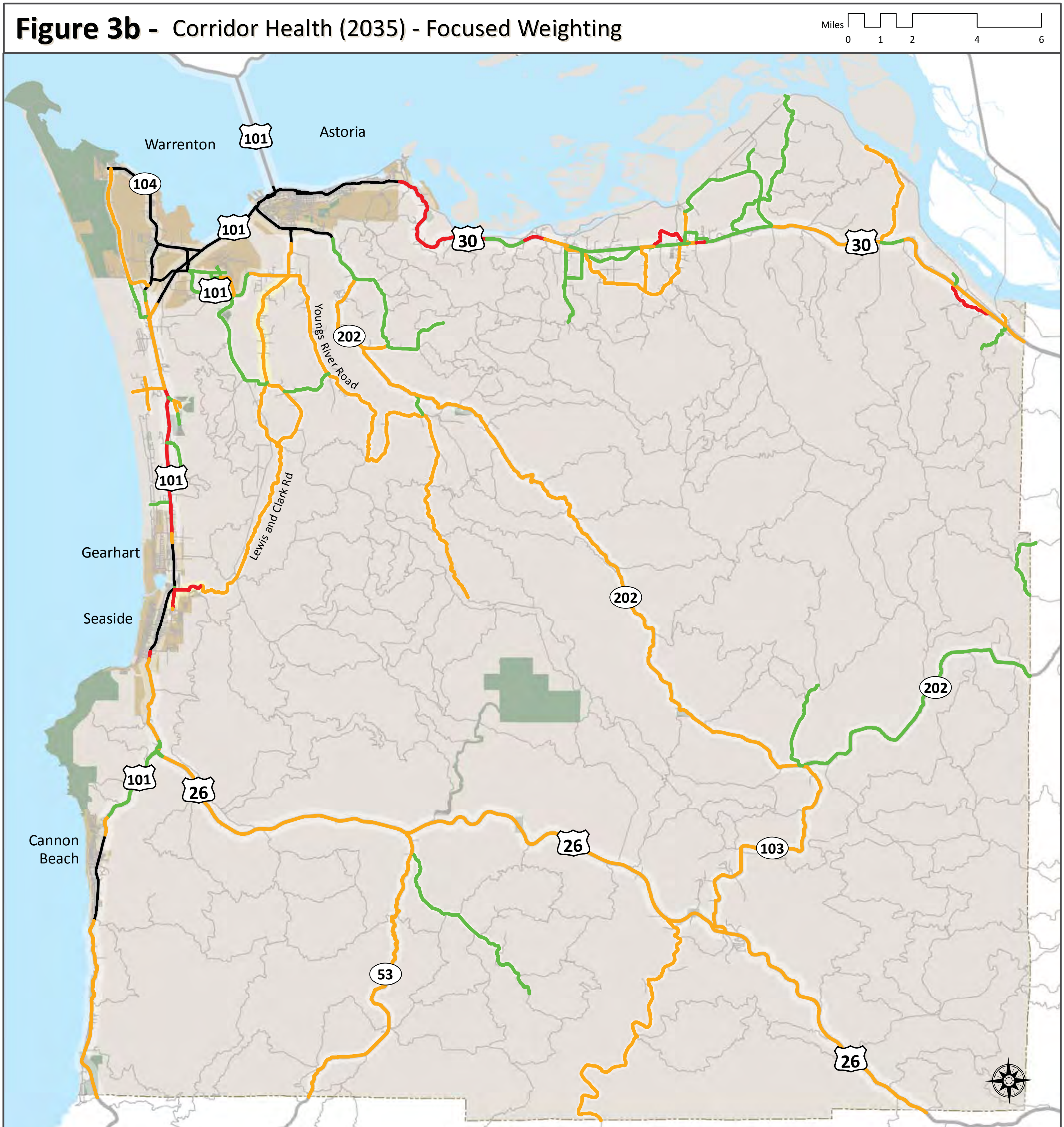


Figure 3b - Corridor Health (2035) - Focused Weighting



Legend

Score

- Good
- Fair
- Poor
- N/A

- City
- Park
- Clatsop County
- Water

Weighting

Safety: **35%**
Traffic Operations: **35%**
Geometrics: **15%**
Access Spacing: **15%**

Where Transportation Improvements may be Needed

Review of the expected growth throughout the County and existing gaps and deficiencies of the transportation system identified the following locations as possible candidates for improvements.

Walking Needs

Pedestrian network deficiencies are present throughout the county and will become more evident as the county's population, employment and tourism continues to increase through 2035. Placing more walking demand on an underbuilt existing walking network could potentially put more users in vulnerable situations, and discourage non-motorized travel in urban areas of the county. For an inventory of walking facilities, refer to Technical Memorandum #5. Key transportation system needs for pedestrians in Clatsop County include:

- **Sidewalks and enhanced pedestrian crossings along urban portions of US 101, US 30 and OR 202:** With as many as five travel lanes and high traffic volumes and travel speeds, US 101, US 30, and OR 202 are major barriers to pedestrians. With housing, shopping and employment growth expected to occur on both sides of the highways in urban areas, providing safe walking accommodations will be crucial for the safety of those walking along and across the street. Key gaps in the sidewalk network along US 101, US 30, and OR 202 occur in Arch Cape, Seaside, Gearhart, Warrenton, and Astoria.

  Those walking along the highway will also face increased motor vehicle traffic, creating more potential conflicts in areas with inadequate facilities or highway crossings. Placing additional demand on some of the existing highway crossings may necessitate enhanced elements such as pedestrian refuge islands, curb extensions, high visibility markings, increased signage or lighting, or pedestrian activated signals

An example of an enhanced pedestrian crossing with a Rectangular Rapid Flashing Beacon

- **Pedestrian facilities/crossings along routes that provide access to schools, parks, open space, and beaches:** The increased tourism, housing and shopping opportunities through 2035 means more people will be within walking distance of their destination. Much of the growth will require those walking to travel down streets with existing pedestrian facility gaps and inconvenient street crossing opportunities. These streets, including OR 202 near the Clatsop County Fairgrounds, Sunset Beach Road and Highland Road near major beach accesses, Ridge Road near Fort Stevens State Park, Old US Highway 30 near Knappa High School and Hilda Lahti Elementary/Middle School, and Lewis and Clark Road near Lewis and Clark Elementary School, will need pedestrian facilities and enhanced street crossings (such as high visibility markings or increased street lighting) to encourage walking to these destinations.
- **Inadequate shoulders along rural roadways:** Many high speed or limited visibility roadways throughout rural areas of the county lack shoulders with adequate width for safe pedestrian travel. These streets, including portions of OR 103 and OR 202 through Jewell, Fort Clatsop

Road, Lewis and Clark Road, Logan Road, Youngs River Road, and Knappa Dock Road, will need widened shoulders or sidewalk infill to allow for safe walking and provide connections to regional pedestrian facilities or public transportation.

Biking Needs

The existing bicycle network is limited in the county. With increased motor vehicle volumes along major biking routes in the county through 2035, designating separate spaces for bicycle and motor vehicle travel will become more critical to ensuring the safety of cyclists and encouraging biking in the county. For an inventory of bicycle facilities, refer to Technical Memorandum #5. Key transportation system needs for bicyclists in Clatsop County include:

- **Bike accommodations along portions of US 101, US 30 and other major streets connecting to urban areas:** Bicycle facilities are limited along US 101, US 30 and other major streets throughout the county including portions of OR 202, US 101 Business, Lewis and Clark Road, Fort Clatsop Road, and Old US Highway 30. These streets form the backbone of the biking network in the county, linking much of the residential areas with major destinations. With increased motor vehicle traffic expected along these streets through 2035, providing accommodations for bicycle travel will be critical to ensuring a safe and complete transportation system. Accommodations should be provided via on-street bike lanes, wide shoulders, off-street shared-use paths, or with facilities on adjacent streets.
- **Bikeways off US 101 and US 30:** Many residents or visitors may feel increasingly uncomfortable biking on the major streets in the county with the expected motor vehicle volumes by 2035. Bike routes that are parallel to major streets in the county provide these users an option with lower motor vehicle travel speeds and volumes. These bike routes can be enhanced with shared-lane markings. Shared-lane markings or "sharrows" are designed to inform motorists to expect cyclists to be in the middle of the travel lane, and to inform cyclists that they should be in the travel lane and away from parked cars. An uphill bike lane and downhill shared lane markings can be used on hilly routes that do not have room to accommodate bike lanes in both directions. 'Share the Road' signage can also be used to raise awareness and legitimize the presence of bicycles on the roadways.

  These routes can further be enhanced with pavement markings guiding cyclists to and along the route, and with traffic calming and intersection improvements to optimize the streets for bicycle travel.
- **Bicycle wayfinding signage:** Biking routes can be enhanced in the county with signage to orient users and direct them to major destinations like parks, schools, or major beach access points. Residents or visitors may be unaware that they are within a reasonable bike ride to key destinations in the county or that a local biking route is nearby. Directional signage indicating locations of destinations and travel time/distance to those destinations increases users' comfort and accessibility to the pedestrian and bicycle systems.

Transit Needs

The existing transit routes serve the coastal communities along US 101 and US 30, including Cannon Beach, Seaside, Gearhart, Warrenton, Hammond, Astoria, Knappa, and Westport. However, inland residents, such as those in Jewell, do not have feasible transit options. In addition, service is infrequent through the county with one to five hour waits between buses. While transit service is provided every day and serves the typical business hour employee, the existing hours of service is not convenient for those making trips outside of typical business hours. To prevent degradation of the existing transit system, transit in Clatsop County may need to expand service to accommodate the county's growth. Other transit needs include:

- **Sidewalk connections to transit stops:** With an aging population and increased motor vehicle congestion, more residents and visitors will likely turn to the transit system as a means of traveling in the county. The inadequate walking infrastructure connecting much of these potential users to transit stops will make this travel mode more inconvenient, as these users typically utilize these facilities at the beginning and end of their trip. Sidewalk infill or other pedestrian facilities along these routes, including portions of US 101, US 30, OR 202, Sunset Beach Road, Highland Road, Svensen Market Road, Hillcrest Loop, is needed to encourage more ridership.
- **Pedestrian crossings near bus stops:** Many bus stops in the county lack convenient and safe street crossings nearby. Pedestrians will generally not walk significantly out of direction to cross a street. They will likely either avoid the area, or cross illegally at mid-block locations. With an expected increase in transit ridership, more street crossing demand will likely occur near bus stops. New or enhanced street crossings will be needed, especially near bus stops along US 101, US 30, and OR 202. Enhancements may include pedestrian refuge islands, curb extensions, high visibility markings, increased signage or lighting, or pedestrian activated signals. Development of additional pedestrian crossings near bus stops should be done in consultation with Sunset Empire Transit.
- **Bus stops with shelters and other amenities:** Many bus stops in Clatsop County consist of a pole indicating the bus route serving the stop. Provision of passenger amenities at bus stops creates a more pleasant and attractive environment for bus riders and may encourage people to use the transit system. Common amenities include: shelters, benches, trash cans, and bus route information. Shelters should be placed at least 2 feet from the curb when facing away from the street and at least 4 feet away when facing toward it. The adjacent sidewalk must still have a 5-foot clear passage. Orientation of the shelter should consider prevailing winter winds.

Intersection and Corridor Needs

With the previously stated assumptions (i.e., the projected population, employment, and tourism growth in Clatsop County, baseline street improvements, and the same split of travel modes), three intersections during the summer peak travel periods will not meet existing OHP Mobility Targets by 2035 during the evening peak period.

Conditions will not be as congested during an average weekday as in summer. All intersections are expected to meet existing OHP mobility targets. However, forecasts indicate the US 101 / Sunset Beach Road intersection is expected to meet its existing OHP mobility target for overall intersection performance; however, its side street will experience a high level of delay (equal to a level of service of 'F').

2035 Intersection capacity deficiencies during the summer (see appendix for more detail) are expected at the following intersections (see Figure 2a):

- US 101 / E Harbor Street (signalized)
- US 101 / Fort Stevens Highway (unsignalized)
- US 101 / Sunset Beach Road (unsignalized)

In addition, several street segments would be expected to have "poor" corridor health scores overall. With the even weighting, nearly 29.5 miles of roadway segments would be expected to have "poor" corridor health scores overall (see Figure 3a). This includes 17 miles worth of state highways and over 12.5 miles of county roadways. With the focused weighting, about 15 miles of roadway segments would be expected to have "poor" corridor health scores overall (see Figure 3b). This includes nearly 10.5 miles worth of state highways and 4.5 miles of county roadways. The segments with "poor" corridor health scores overall include:

"Poor" Corridors with Even Weighting

- US 101, from Avenue S to Avenue U
- US 101, Sunset Beach Lane to Gearhart Loop Road
- US 30, Nimitz Drive to Claremont Road
- US 30, Twilight Creek Road to Old Highway 30
- US 30, Abbott Road to Valley Creek Lane
- OR 202, Walluski Loop (north) to Youngs River Road
- OR 104, US 101 to Whiskey Road
- OR 53, US 26 to Hamlet Road
- Old Highway 30, Svensen Market Road to Hillcrest Loop
- Old Highway 30, US 30 to Knappa Dock Road
- Taylorville Road, US 30 to US 30
- Youngs River Road, US 101 Business to Tucker Creek Lane
- Lewis and Clark Road, US 101 Business to Logan Road
- Lewis and Clark Road, Wahanna Road to Royal View Drive
- Wahanna Road, Lewis and Clark Road to 13th Avenue

"Poor" Corridors with Focused Weighting

- US 101, from Avenue S to Avenue U
- US 101, Sunset Beach Lane to Gearhart Loop Road
- US 30, Nimitz Drive to Claremont Road
- US 30, Twilight Creek Road to Old Highway 30
- US 30, Abbott Road to Valley Creek Lane
- Old Highway 30, US 30 to Knappa Dock Road
- Taylorville Road, US 30 to US 30
- Lewis and Clark Road, Wahanna Road to Royal View Drive
- Wahanna Road, Lewis and Clark Road to 13th Avenue

Safety Needs

Several locations were identified in Technical Memorandum #5 as high collision locations using the critical crash rate method. For more details, refer to the Safety Evaluation section of Technical Memorandum #5, including the map shown there in Figure 9. With growing traffic volumes, these problematic areas likely will persist, and may even become progressively worse. Identified high collision locations include the four intersections and 25 roadway segments below:

Intersection Locations:

- Lewis and Clark Road/N Wahanna Road/Crown Camp Road (Unsignalized)
- US 101/US 101 Business/Marlin Drive (Signalized)
- US 30/Hillcrest Loop Road (Unsignalized)
- US 101/E Harbor Street (Signalized)

Roadway Segment Locations:

- US 101, at the US 101/OR 104 intersection
- US 30, between 33rd Street and 34th Street
- US 30, from the US 101/Astoria-Megler Bridge intersection to just east of the US 30/Basin Street
- OR 103, just south of Bay Road
- Fort Clatsop Road, at US 101 Business
- Lewis and Clark Road, Seaside City limits to Logan Road (south)
- Lewis and Clark Road, Logan Road (south) to Fort Clatsop Road
- Logan Road, Lewis and Clark Road (south) to Tucker Creek Lane
- Svensen Market Road, Highway 30 to Old Highway 30
- US 101 Connector, US 26 West to US 101 South Connector
- US 101 Business, US 101 to Marlin Drive
- Commercial Street, 8th Street to 9th Street
- Marine Drive, 11th Street to 14th Street
- Commercial Street, 11th Street to 14th Street
- US 101, Carnahan Road to South Hemlock Street (just south of Cannon Beach)
- US 101, OR 105/SE Marlin Drive to OR 105 Spur / E Harbor Street
- US 101, OR 105 Spur / E Harbor Street to US 101 Bridge
- US 101, Avenue A to Avenue B
- OR 104, Columbia Beach Lane to Whiskey Road (south)
- OR 202, Olney Cutoff Road to Youngs River Road
- OR 202, Youngs River Road to Walluski Loop (south)
- OR 202, Walluski Loop (south) to Walluski Loop (north)
- US 26, South Clatsop County Limits to OR 103
- US 26, Lower Nehalem Road to Saddle Mountain Road
- OR 53, South Clatsop County Limits to Hamlet Road

Freight Needs

Highways designated at truck routes by the federal government include US 26, US 30, and US 101. ODOT also classifies US 26 and US 30 as state freight routes. The signalized intersection along US 101 that will be over capacity during the summer of 2035 potentially will increase travel times for freight movement along the facility. Freight activity, currently about five to ten percent of traffic along US 101 and US 30, could increase by 2035 as much of the employment growth areas are adjacent to these highways.

Bridge Needs

Three bridges were identified in Technical Memorandum #5 as being structurally deficient. With growing traffic volumes, these problematic areas likely will persist, and may even become progressively worse. Of particular concern is the lack of alternate routes for motor vehicles, pedestrians and bicyclists should these structures fail in a seismic or other event. Structurally deficient bridges include:

- Ecola Creek Bridge; located along US 101 at the north end of Cannon Beach. This is a Priority 1 lifeline route.
- Beneke Creek Bridge; located along OR 202 just east of the OR 103 intersection in Jewell
- Young Bay Bridge (Old Youngs Bay); located along US 101 Business at the south end of Astoria, crossing Youngs Bay

Rail Needs

A landslide has caused a segment of rail between Knappa and Westport (near Aldrich Point Road) to be inoperable. While there is desire to reintroduce freight rail service to Tongue Point in Astoria, it would require improvements to the tracks, siding for loading and unloading of the rail cars, and a possible engine front/back or engine turnaround. Rail service is currently provided to the industrial site in Taylorville (west of Westport).

Air, Pipeline, and Water Needs

No system investment needs have been identified for Clatsop County's air, waterway, or pipeline system through 2035. Clatsop County is replacing the Westport Ferry ramp during the winter of 2014/2015; however, no additional system investments for these systems are anticipated in the foreseeable future.

Developing Transportation Solutions

Investments to address the needs of the transportation system through 2035 will be proposed in Technical Memorandum #11. The transportation solutions will be of two types. Those likely to be funded by 2035 will be in the Financially Constrained Transportation System. Projects not likely to be funded by 2035 will be in the Aspirational Transportation System. Clatsop County must make investment decisions to develop a set of transportation improvements that will likely be funded to best meet identified needs through 2035.

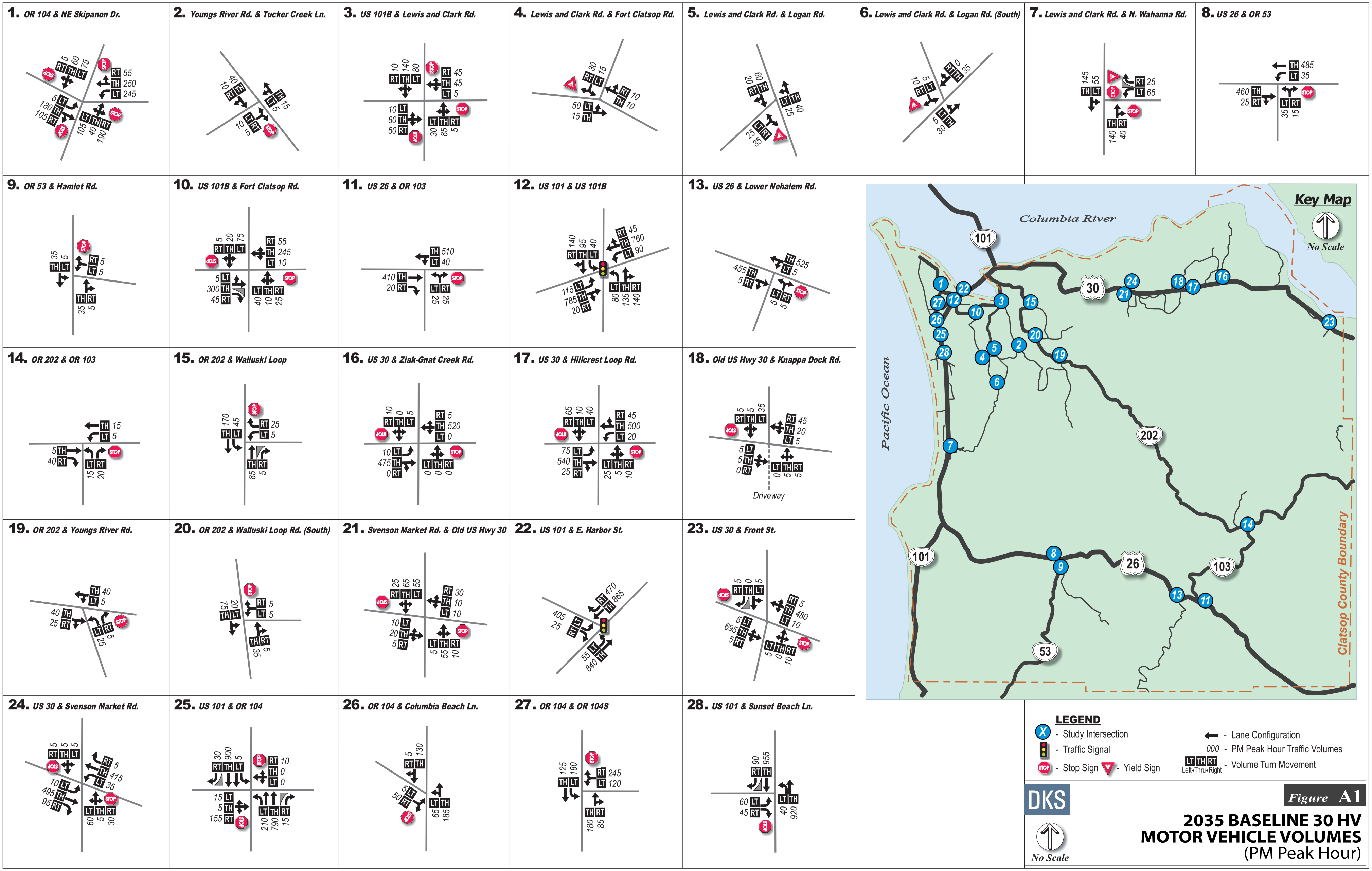
Technical Memo #7:

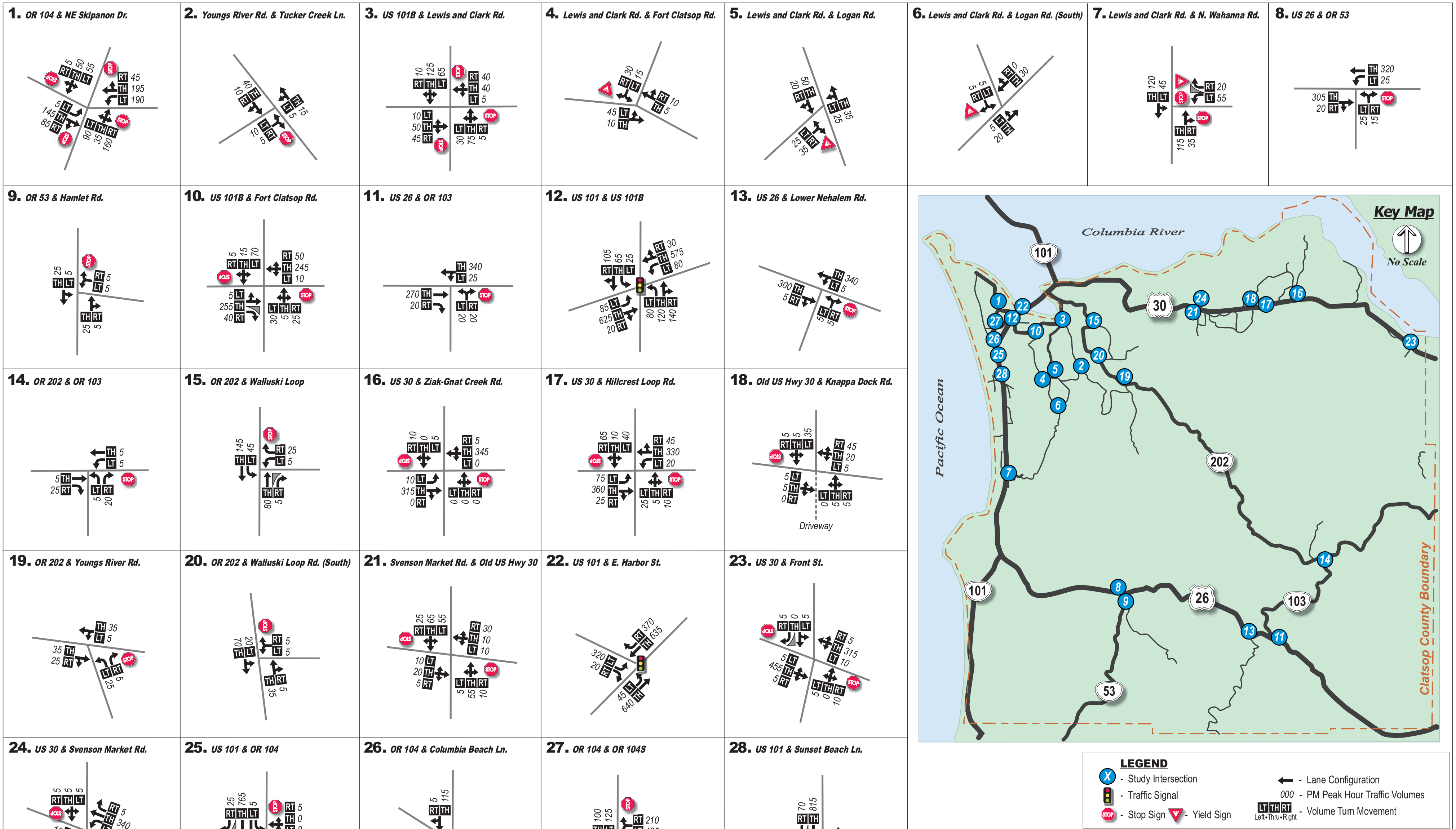
Future Transportation Conditions and Needs

Appendix

Clatsop County TSP Update

Motor Vehicle Volumes


1. OR 104 & NE Skipanon Dr.
2. Youngs River Rd. & Tucker Creek Ln.
3. US 101B & Lewis and Clark Rd.
4. Lewis and Clark Rd. & Fort Clatsop Rd.
5. Lewis and Clark Rd. & Logan Rd.
6. Lewis and Clark Rd. & Logan Rd. (South)
7. Lewis and Clark Rd. & N. Wahanna Rd.
8. US 26 & OR 53
9. OR 53 & Hamlet Rd.
10. US 101B & Fort Clatsop Rd.
11. US 26 & OR 103
12. US 101 & US 101B
13. US 26 & Lower Nehalem Rd.
14. OR 202 & OR 103
15. OR 202 & Walluski Loop
16. US 30 & Ziak-Gnat Creek Rd.
17. US 30 & Hillcrest Loop Rd.
18. Old US Hwy 30 & Knappa Dock Rd.
Driveway
19. OR 202 & Youngs River Rd.
20. OR 202 & Walluski Loop Rd. (South)
21. Svenson Market Rd. & Old US Hwy 30
22. US 101 & E. Harbor St.
23. US 30 & Front St.
24. US 30 & Svenson Market Rd.
25. US 101 & OR 104
26. OR 104 & Columbia Beach Ln.
27. OR 104 & OR 104S
28. US 101 & Sunset Beach Ln.
Key Map
No Scale
Columbia River
Pacific Ocean
Clatsop County Boundary
101
30
202
26
103
53
LEGEND
X - Study Intersection
- Traffic Signal
- Stop Sign
- Yield Sign
- Lane Configuration
000 - PM Peak Hour Traffic Volumes
LT TH RT - Volume Turn Movement
Left•Thru•Right
DKS
No Scale
Figure A1
2035 BASELINE 30 HV
MOTOR VEHICLE VOLUMES
(PM Peak Hour)



DKS

No Scale

Figure A2

2035 BASELINE AVERAGE WEEKDAY MOTOR VEHICLE VOLUMES (PM Peak Hour)

Intersection Operations Summary

Table A1: Intersection Operations (2035 PM Peak)

Intersection	Mobility Target	Summer (30 HV)		Average Weekday	
		v/c Ratio	Delay (sec/veh)	v/c Ratio	Delay (sec/veh)
Signalized Intersections under State Jurisdiction					
US 101 / Warrenton-Astoria Hwy / Marlin Dr	0.90	0.85	39.8	0.70	29.1
US 101 / E Harbor St	0.90	**1.00**	35.4	0.74	18.5
Unsignalized Intersections under State Jurisdiction*					
US 26 / OR 53	0.80	0.04 / 0.19	8.8 / 21.3	0.02 / 0.09	8.2 / 13.8
OR 53 / Hamlet Rd	0.80	0.01 / 0.01	7.7 / 8.7	0.01 / 0.01	7.7 / 8.7
US 26 / OR 103	0.75	0.04 / 0.16	8.3 / 17.5	0.02 / 0.08	7.9 / 12.6
US 26 / Lower Nehalem Rd	0.80	0.01 / 0.03	9.5 / 16.1	0.01 / 0.02	8.9 / 12.4
OR 202 / OR 103	0.80	0.01 / 0.04	7.8 / 8.9	0.01 / 0.03	7.7 / 8.7
OR 202 / Walluski Loop	0.75	0.03 / 0.03	7.4 / 10.9	0.03 / 0.03	7.4 / 10.6
US 30 / Ziak-Gnat Creek Rd	0.75	0.01 / 0.06	8.7 / 18.6	0.01 / 0.04	8.2 / 13.5
US 30 / Hillscrest Loop Rd	0.80	0.08 / 0.59	9.0 / 48.3	0.07 / 0.35	8.4 / 24.5
OR 202 / Youngs River Rd	0.80	0.01 / 0.03	7.3 / 9.4	0.01 / 0.03	7.3 / 9.3
OR 202 / Walluski Loop Rd (south)	0.75	0.01 / 0.01	7.3 / 9.0	0.01 / 0.01	7.3 / 9.0
US 30 / Front St / Westport Ferry Rd	0.80	0.01 / 0.07	9.2 / 20.8	0.01 / 0.04	8.3 / 14.1
US 30 / Svensen Market Rd	0.80	0.04 / 0.43	8.8 / 31.2	0.03 / 0.32	8.4 / 22.0
US 101 / Fort Stevens Hwy	0.90	**0.33 / 0.94**	13.0 / 97.6	0.24 / 0.57	11.2 / 34.8
US 101 / Sunset Beach Rd	0.95	**0.06 / 1.22**	10.8 / >150	0.04 / 0.62	10.0 / 100.0
Fort Stevens Hwy / Warrenton-Astoria Hwy / NE Skipanon Dr	0.95	0.61 / 0.64	20.2 / 20.9	0.43 / 0.48	13.5 / 14.2
Warrenton-Astoria Hwy / Youngs River Rd / Lewis and Clark Rd***	0.80	0.18 / 0.19	10.8 / 11.2	0.15 / 0.15	10.3 / 10.5
Warrenton-Astoria Hwy / Fort Clatsop Rd / SE Airport Ln	0.90	0.01 / 0.29	8.4 / 18.7	0.01 / 0.24	8.4 / 16.7
Fort Stevens Hwy / Columbia Beach Ln	0.75	0.05 / 0.07	7.7 / 9.6	0.04 / 0.05	7.6 / 9.4
Fort Steven's Hwy / Fort Stevens Hwy Spur	0.95	0.15 / 0.71	8.3 / 26.5	0.10 / 0.52	8.0 / 16.5
Unsignalized Intersections under County Jurisdiction*					
Youngs River Rd / Tucker Creek Ln	0.75	0.01 / 0.02	7.6 / 9.0	0.01 / 0.02	7.6 / 9.0
Fort Clatsop Rd / Lewis and Clark Rd**	0.75	0.04 / 0.05	7.4 / 9.0	0.03 / 0.05	7.3 / 8.9
Lewis and Clark Rd / Logan Rd**	0.75	0.02 / 0.08	7.6 / 9.4	0.02 / 0.07	7.5 / 9.3
Lewis and Clark Rd / Logan Rd (south)**	0.75	0.01 / 0.02	7.3 / 8.7	0.01 / 0.01	7.3 / 8.7
Lewis and Clark Rd / N Wahanna Rd / Crown Camp Rd**	0.75	0.05 / 0.06	7.8 / 9.2	0.05 / 0.04	7.8 / 9.0
Old US Hwy 30 / Knappa Dock Rd	0.80	0.01 / 0.06	7.7 / 9.6	0.01 / 0.06	7.7 / 9.6
Old US Hwy 30 / Svensen Market Rd	0.80	0.01 / 0.20	7.3 / 10.6	0.01 / 0.20	7.3 / 10.6

* Operations reported as major approach / minor approach critical movement
** Intersection configuration cannot be analyzed in Synchro--modifications made to best represent operations
*** Intersection configuration cannot be analyzed in Synchro--operations calculated manually
Bold Red and Shaded indicates intersection exceeds mobility target

Corridor Health Tool

Table A2: Corridor Health Tool Scores - Existing Conditions and Future Conditions

Weighting Options
wt25 - "Even Weighting" - Equal weight to all 4 categories
wt35 - "Focused Weighting" - 35% weight to safety and traffic operations
15% weight to geometrics and access spacing

Overall Health Score and Display Text
0.75 or higher = "Good"
From 0.50 to 0.74 = "Fair"
Less than 0.50 = "Poor"

Segment ID	Road Name	Safety Score	Geometrics Score	Access Spacing Score	Existing Conditions Traffic Operations Score	Future Traffic Operations Score	wt25 EC Health Score	wt35 EC Health Score	wt25 Future Health Score	wt35 Future Health Score	Exclude from Reporting	wt25 EC Display Text	wt35 EC Display Text	wt25 Future Display Text	wt35 Future Display Text
1	5Th Street	0.27	0.00	1.00	1.00	1.00	0.57	0.59	0.57	0.59	1	-	-	-	-
2	8Th Street	0.33	0.00	1.00	1.00	1.00	0.58	0.61	0.58	0.61	1	-	-	-	-
3	Abbott Road	1.00	0.00	0.50	1.00	1.00	0.63	0.78	0.63	0.78	0	Fair	Good	Fair	Good
4	Airport Lane	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
5	Airport Lane	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
6	Airport Lane	0.77	0.00	0.50	1.00	1.00	0.57	0.70	0.57	0.70	0	Fair	Fair	Fair	Fair
7	Airport Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
8	Airport Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
9	Airport Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
10	Airport Road	1.00	0.00	0.50	1.00	1.00	0.63	0.78	0.63	0.78	0	Fair	Good	Fair	Good
11	Airport Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
12	Airport Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
13	Aldrich Point Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
14	Avenue U	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
15	Bagley Lane	1.00	0.00	0.50	1.00	1.00	0.63	0.78	0.63	0.78	0	Fair	Good	Fair	Good
16	Bagley Lane	1.00	0.00	0.50	1.00	1.00	0.63	0.78	0.63	0.78	0	Fair	Good	Fair	Good
17	Barendse Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
18	Beneke Creek Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
19	Brownsmead Hill Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
20	Clifton Road	0.06	0.00	1.00	1.00	1.00	0.51	0.52	0.51	0.52	0	Fair	Fair	Fair	Fair
21	Coast Hwy Conn.	0.01	0.67	1.00	1.00	1.00	0.67	0.60	0.67	0.60	0	Fair	Fair	Fair	Fair
22	Coast Hwy Conn.	0.05	0.90	1.00	1.00	1.00	0.74	0.65	0.74	0.65	1	-	-	-	-
23	Columbia Beach Lane	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
24	Commercial Street	0.19	1.00	1.00	1.00	1.00	0.80	0.72	0.80	0.72	1	-	-	-	-
25	Commercial Street	0.13	1.00	1.00	1.00	1.00	0.78	0.70	0.78	0.70	1	-	-	-	-
26	Commercial Street	0.07	0.00	1.00	1.00	1.00	0.52	0.52	0.52	0.52	1	-	-	-	-
27	Commercial Street	0.50	0.12	1.00	1.00	1.00	0.65	0.69	0.65	0.69	1	-	-	-	-
28	Commercial Street	0.08	1.00	1.00	1.00	1.00	0.77	0.68	0.77	0.68	1	-	-	-	-
29	Cullaby Lake Road	1.00	0.00	0.00	1.00	1.00	0.50	0.70	0.50	0.70	0	Fair	Fair	Fair	Fair
30	Cullaby Lake Road	1.00	0.00	0.00	1.00	1.00	0.50	0.70	0.50	0.70	0	Fair	Fair	Fair	Fair
31	Cullaby Lake Road	1.00	0.00	0.50	1.00	1.00	0.63	0.78	0.63	0.78	0	Fair	Good	Fair	Good
32	Cullaby Lake Road	1.00	0.00	0.00	1.00	1.00	0.50	0.70	0.50	0.70	0	Fair	Fair	Fair	Fair
33	Delaura Beach Ln	0.62	0.00	1.00	1.00	1.00	0.66	0.72	0.66	0.72	0	Fair	Fair	Fair	Fair
34	Dellmoor Loop	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
35	Dellmoor Loop	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
36	Dellmoor Loop	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
37	Dellmoor Loop	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
38	Dellmoor Loop	1.00	0.00	0.50	1.00	1.00	0.63	0.78	0.63	0.78	0	Fair	Good	Fair	Good
39	Dellmoor Loop	1.00	0.00	0.50	1.00	1.00	0.63	0.78	0.63	0.78	0	Fair	Good	Fair	Good
40	Fishhawk Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
41	Fishhawk Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
42	Flight Line Drive	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
43	Flight Line Drive	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
44	Flight Line Drive	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
45	Flight Line Drive	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
46	Fort Clatsop Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
47	Fort Clatsop Road	0.12	0.00	1.00	1.00	1.00	0.53	0.54	0.53	0.54	0	Fair	Fair	Fair	Fair
48	Fort Clatsop Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
49	Fort Stevens Hwy	1.00	0.56	0.42	1.00	1.00	0.74	0.85	0.74	0.85	1	-	-	-	-
50	Fort Stevens Hwy	1.00	0.32	0.42	1.00	1.00	0.68	0.81	0.68	0.81	1	-	-	-	-
51	Fort Stevens Hwy	0.25	0.52	0.33	1.00	1.00	0.52	0.56	0.52	0.56	1	-	-	-	-
52	Fort Stevens Hwy	1.00	0.33	1.00	1.00	1.00	0.83	0.90	0.83	0.90	1	-	-	-	-
53	Fort Stevens Hwy	1.00	0.67	0.07	1.00	1.00	0.68	0.81	0.68	0.81	1	-	-	-	-
54	Fort Stevens Hwy	1.00	0.33	0.69	1.00	1.00	0.76	0.85	0.76	0.85	1	-	-	-	-
55	Fort Stevens Hwy	1.00	0.33	0.94	1.00	1.00	0.82	0.89	0.82	0.89	1	-	-	-	-
56	Fort Stevens Hwy	1.00	0.00	0.75	1.00	1.00	0.69	0.81	0.69	0.81	1	-	-	-	-

Table A2: Corridor Health Tool Scores - Existing Conditions and Future Conditions

Weighting Options
wt25 - "Even Weighting" - Equal weight to all 4 categories
wt35 - "Focused Weighting" - 35% weight to safety and traffic operations
15% weight to geometrics and access spacing

Overall Health Score and Display Text
0.75 or higher = "Good"
From 0.50 to 0.74 = "Fair"
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Segment ID	Road Name	Safety Score	Geometrics Score	Access Spacing Score	Existing Conditions Traffic Operations Score	Future Traffic Operations Score	wt25 EC Health Score	wt35 EC Health Score	wt25 Future Health Score	wt35 Future Health Score	Exclude from Reporting	wt25 EC Display Text	wt35 EC Display Text	wt25 Future Display Text	wt35 Future Display Text
57	Fort Stevens Hwy	1.00	0.43	0.83	1.00	1.00	0.82	0.89	0.82	0.89	1	-	-	-	-
58	Fort Stevens Spur	1.00	0.91	0.73	1.00	1.00	0.91	0.95	0.91	0.95	1	-	-	-	-
59	G Street	1.00	0.00	0.50	1.00	1.00	0.63	0.78	0.63	0.78	0	Fair	Good	Fair	Good
60	Hamlet Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
61	Hawkins Road	1.00	0.00	0.00	1.00	1.00	0.50	0.70	0.50	0.70	0	Fair	Fair	Fair	Fair
62	Hawkins Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
63	Hawkins Road	1.00	0.00	0.00	1.00	1.00	0.50	0.70	0.50	0.70	0	Fair	Fair	Fair	Fair
64	Hawkins Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
65	Hawkins Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
66	Hawkins Road	1.00	0.00	0.00	1.00	1.00	0.50	0.70	0.50	0.70	0	Fair	Fair	Fair	Fair
67	Hawkins Road	1.00	0.00	0.00	1.00	1.00	0.50	0.70	0.50	0.70	0	Fair	Fair	Fair	Fair
68	Highlands Rd	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	Good	Good	Good	Good
69	Highway 101	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	1	-	-	-	-
70	Highway 101	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	Good	Good	Good	Good
71	Highway 101	0.59	1.00	1.00	1.00	1.00	0.90	0.86	0.90	0.86	0	Good	Good	Good	Good
72	Highway 101	0.29	0.46	1.00	1.00	1.00	0.69	0.67	0.69	0.67	0	Fair	Fair	Fair	Fair
73	Highway 101	0.48	0.75	0.79	0.94	0.56	0.74	0.73	0.64	0.60	0	Fair	Fair	Fair	Fair
74	Highway 101	0.53	0.69	0.00	0.56	0.18	0.44	0.48	0.35	0.35	0	Poor	Poor	Poor	Poor
75	Highway 101	0.27	0.84	1.00	1.00	1.00	0.78	0.72	0.78	0.72	1	-	-	-	-
76	Highway 101	1.00	0.88	1.00	1.00	1.00	0.97	0.98	0.97	0.98	1	-	-	-	-
77	Highway 101	1.00	0.76	1.00	1.00	1.00	0.94	0.96	0.94	0.96	1	-	-	-	-
78	Highway 101	0.34	0.33	0.00	1.00	0.75	0.42	0.52	0.36	0.43	0	Poor	Fair	Poor	Poor
79	Highway 101	0.82	1.00	0.75	1.00	1.00	0.89	0.90	0.89	0.90	0	Good	Good	Good	Good
80	Highway 101	1.00	0.72	0.75	1.00	1.00	0.87	0.92	0.87	0.92	1	-	-	-	-
81	Highway 101	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	-	-	-	-
82	Highway 101	0.96	0.19	0.00	1.00	1.00	0.54	0.71	0.54	0.71	1	-	-	-	-
83	Highway 101	0.45	0.54	1.00	1.00	1.00	0.75	0.74	0.75	0.74	0	Fair	Fair	Fair	Fair
84	Highway 101	0.47	0.95	0.32	1.00	1.00	0.68	0.70	0.68	0.70	0	Fair	Fair	Fair	Fair
85	Highway 101	0.51	0.61	1.00	1.00	1.00	0.78	0.77	0.78	0.77	1	-	-	-	-
86	Highway 101	1.00	1.00	1.00	1.00	0.69	1.00	1.00	0.92	0.89	0	Good	Good	Good	Good
87	Highway 101	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	1	-	-	-	-
88	Highway 101	0.65	0.10	1.00	1.00	1.00	0.69	0.74	0.69	0.74	1	-	-	-	-
89	Highway 101	0.63	0.33	1.00	1.00	1.00	0.74	0.77	0.74	0.77	1	-	-	-	-
90	Highway 101	1.00	0.97	1.00	1.00	1.00	0.99	1.00	0.99	1.00	1	-	-	-	-
91	Highway 101	0.32	0.87	1.00	1.00	1.00	0.80	0.74	0.80	0.74	1	-	-	-	-
92	Highway 101	1.00	0.76	1.00	1.00	1.00	0.94	0.96	0.94	0.96	1	-	-	-	-
93	Highway 101	0.12	0.93	1.00	1.00	1.00	0.76	0.68	0.76	0.68	1	-	-	-	-
94	Highway 101	0.92	0.20	1.00	1.00	1.00	0.78	0.85	0.78	0.85	1	-	-	-	-
95	Highway 101	1.00	1.00	0.50	1.00	0.69	0.88	0.93	0.80	0.82	0	Good	Good	Good	Good
96	Highway 101	0.52	1.00	1.00	0.61	0.25	0.78	0.69	0.69	0.57	0	Good	Fair	Fair	Fair
97	Highway 101	0.54	0.29	1.00	1.00	1.00	0.71	0.73	0.71	0.73	0	Fair	Fair	Fair	Fair
98	Highway 101	0.29	0.67	0.89	1.00	1.00	0.71	0.68	0.71	0.68	0	Fair	Fair	Fair	Fair
99	Highway 101	1.00	0.87	1.00	1.00	1.00	0.97	0.98	0.97	0.98	1	-	-	-	-
100	Highway 101	1.00	0.89	1.00	1.00	1.00	0.97	0.98	0.97	0.98	1	-	-	-	-
101	Highway 101	1.00	0.33	0.00	1.00	0.75	0.58	0.75	0.52	0.66	0	Fair	Good	Fair	Fair
102	Highway 101	1.00	0.48	0.00	0.21	0.00	0.42	0.49	0.37	0.42	0	Poor	Poor	Poor	Poor
103	Highway 101 Business	1.00	0.85	0.58	1.00	0.46	0.86	0.91	0.72	0.72	0	Good	Good	Fair	Fair
104	Highway 101 Business	0.06	1.00	1.00	1.00	1.00	0.77	0.67	0.77	0.67	0	Good	Fair	Good	Fair
105	Highway 101 Business	0.78	0.71	1.00	1.00	1.00	0.87	0.88	0.87	0.88	0	Good	Good	Good	Good
106	Highway 101 Business	0.70	0.00	1.00	1.00	1.00	0.68	0.75	0.68	0.75	1	-	-	-	-
107	Highway 101 Business	1.00	0.44	1.00	1.00	0.46	0.86	0.92	0.72	0.73	0	Good	Good	Fair	Fair
108	Highway 103	0.35	0.00	1.00	1.00	1.00	0.59	0.62	0.59	0.62	0	Fair	Fair	Fair	Fair
109	Highway 104	0.24	0.00	0.50	1.00	1.00	0.44	0.51	0.44	0.51	0	Poor	Fair	Poor	Fair
110	Highway 104	0.97	0.00	0.38	1.00	1.00	0.59	0.75	0.59	0.75	0	Fair	Fair	Fair	Fair
111	Highway 104	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	Good	Good	Good	Good
112	Highway 104	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good

Table A2: Corridor Health Tool Scores - Existing Conditions and Future Conditions

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Segment ID	Road Name	Safety Score	Geometrics Score	Access Spacing Score	Existing Conditions Traffic Operations Score	Future Traffic Operations Score	wt25 EC Health Score	wt35 EC Health Score	wt25 Future Health Score	wt35 Future Health Score	Exclude from Reporting	wt25 EC Display Text	wt35 EC Display Text	wt25 Future Display Text	wt35 Future Display Text
113	Highway 104	1.00	0.00	0.75	1.00	1.00	0.69	0.81	0.69	0.81	1	-	-	-	-
114	Highway 202	1.00	0.02	1.00	1.00	1.00	0.76	0.85	0.76	0.85	0	Good	Good	Good	Good
115	Highway 202	0.50	0.33	1.00	1.00	1.00	0.71	0.73	0.71	0.73	1	-	-	-	-
116	Highway 202	0.29	0.00	1.00	1.00	1.00	0.57	0.60	0.57	0.60	0	Fair	Fair	Fair	Fair
117	Highway 202	0.16	0.04	0.78	1.00	1.00	0.50	0.53	0.50	0.53	0	Poor	Fair	Poor	Fair
118	Highway 202	1.00	0.16	1.00	1.00	1.00	0.79	0.87	0.79	0.87	0	Good	Good	Good	Good
119	Highway 202	0.06	0.00	1.00	1.00	1.00	0.51	0.52	0.51	0.52	0	Fair	Fair	Fair	Fair
120	Highway 202	1.00	0.67	1.00	1.00	1.00	0.92	0.95	0.92	0.95	0	Good	Good	Good	Good
121	Highway 202	0.23	0.00	0.68	1.00	1.00	0.48	0.53	0.48	0.53	0	Poor	Fair	Poor	Fair
122	Highway 202	1.00	0.33	0.40	1.00	1.00	0.68	0.81	0.68	0.81	0	Fair	Good	Fair	Good
123	Highway 26	0.43	0.45	1.00	1.00	1.00	0.72	0.72	0.72	0.72	0	Fair	Fair	Fair	Fair
124	Highway 26	0.48	0.34	0.49	1.00	0.96	0.58	0.64	0.57	0.63	0	Fair	Fair	Fair	Fair
125	Highway 26	0.38	0.13	1.00	1.00	1.00	0.63	0.65	0.63	0.65	0	Fair	Fair	Fair	Fair
126	Highway 26	0.35	0.02	1.00	1.00	1.00	0.59	0.63	0.59	0.63	0	Fair	Fair	Fair	Fair
127	Highway 26	0.34	0.30	1.00	1.00	1.00	0.66	0.66	0.66	0.66	0	Fair	Fair	Fair	Fair
128	Highway 26	0.87	0.33	1.00	1.00	1.00	0.80	0.85	0.80	0.85	0	Good	Good	Good	Good
129	Highway 30	0.56	0.77	1.00	0.90	0.38	0.81	0.78	0.68	0.59	0	Good	Good	Fair	Fair
130	Highway 30	0.40	0.42	0.58	0.77	0.39	0.54	0.56	0.45	0.43	0	Fair	Fair	Poor	Poor
131	Highway 30	0.47	0.33	1.00	1.00	1.00	0.70	0.71	0.70	0.71	0	Fair	Fair	Fair	Fair
132	Highway 30	0.14	0.79	1.00	1.00	0.72	0.73	0.67	0.66	0.57	0	Fair	Fair	Fair	Fair
133	Highway 30	1.00	0.97	1.00	1.00	0.85	0.99	1.00	0.96	0.94	0	Good	Good	Good	Good
134	Highway 30	1.00	0.94	0.92	0.77	0.39	0.91	0.90	0.81	0.76	0	Good	Good	Good	Good
135	Highway 30	1.00	0.52	1.00	1.00	1.00	0.88	0.93	0.88	0.93	0	Good	Good	Good	Good
136	Highway 30	0.38	1.00	1.00	0.92	0.40	0.82	0.75	0.69	0.57	0	Good	Good	Fair	Fair
137	Highway 30	0.49	0.38	1.00	1.00	0.91	0.72	0.73	0.70	0.70	0	Fair	Fair	Fair	Fair
138	Highway 30	0.73	0.39	1.00	1.00	1.00	0.78	0.81	0.78	0.81	0	Good	Good	Good	Good
139	Highway 30	0.50	0.68	1.00	1.00	1.00	0.80	0.78	0.80	0.78	0	Good	Good	Good	Good
140	Highway 30	1.00	0.33	1.00	1.00	1.00	0.83	0.90	0.83	0.90	0	Good	Good	Good	Good
141	Highway 30	0.35	1.00	1.00	0.95	0.45	0.83	0.76	0.70	0.58	0	Good	Good	Fair	Fair
142	Highway 30	0.81	0.70	1.00	0.95	0.45	0.87	0.87	0.74	0.70	0	Good	Good	Fair	Fair
143	Highway 30	0.50	0.57	1.00	1.00	0.85	0.77	0.76	0.73	0.71	0	Good	Good	Fair	Fair
144	Highway 30	0.50	0.00	1.00	0.77	0.39	0.57	0.60	0.47	0.46	0	Fair	Fair	Poor	Poor
145	Highway 30	0.34	0.82	1.00	0.77	0.53	0.73	0.66	0.67	0.58	0	Fair	Fair	Fair	Fair
146	Highway 30	0.28	0.25	0.25	1.00	0.72	0.45	0.52	0.38	0.43	0	Poor	Fair	Poor	Poor
147	Highway 30	1.00	1.00	1.00	1.00	0.85	1.00	1.00	0.96	0.95	0	Good	Good	Good	Good
148	Highway 53	0.36	0.00	1.00	1.00	1.00	0.59	0.62	0.59	0.62	0	Fair	Fair	Fair	Fair
149	Highway 53	0.12	0.00	0.75	1.00	1.00	0.47	0.51	0.47	0.51	0	Poor	Fair	Poor	Fair
150	Hillcrest Loop	0.52	0.00	0.50	1.00	1.00	0.50	0.61	0.50	0.61	0	Fair	Fair	Fair	Fair
151	Knappa Dock Road	1.00	0.00	0.00	1.00	1.00	0.50	0.70	0.50	0.70	0	Fair	Fair	Fair	Fair
152	Knappa Dock Road	1.00	0.00	0.50	1.00	1.00	0.63	0.78	0.63	0.78	0	Fair	Good	Fair	Good
153	Koppisch Road	0.29	0.00	1.00	1.00	1.00	0.57	0.60	0.57	0.60	0	Fair	Fair	Fair	Fair
154	Labiske Lane	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
155	Labiske Lane	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
156	Labiske Lane	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
157	Leif Erickson Drive	0.59	0.39	1.00	1.00	1.00	0.74	0.76	0.74	0.76	1	-	-	-	-
158	Leif Erickson Drive	0.56	0.60	1.00	1.00	1.00	0.79	0.78	0.79	0.78	1	-	-	-	-
159	Lewis And Clark Road	0.12	0.00	1.00	1.00	1.00	0.53	0.54	0.53	0.54	0	Fair	Fair	Fair	Fair
160	Lewis And Clark Road	0.17	0.00	1.00	1.00	1.00	0.54	0.56	0.54	0.56	0	Fair	Fair	Fair	Fair
161	Lewis And Clark Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
162	Lewis And Clark Road	0.72	0.00	0.00	1.00	1.00	0.43	0.60	0.43	0.60	0	Poor	Fair	Poor	Fair
163	Lewis And Clark Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
164	Lewis And Clark Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
165	Lewis And Clark Road	0.08	0.00	0.00	1.00	1.00	0.27	0.38	0.27	0.38	0	Poor	Poor	Poor	Poor
166	Lewis Road North	1.00	0.00	0.00	1.00	1.00	0.50	0.70	0.50	0.70	0	Fair	Fair	Fair	Fair
167	Lewis Road North	1.00	0.00	0.00	1.00	1.00	0.50	0.70	0.50	0.70	0	Fair	Fair	Fair	Fair
168	Lewis Road North	1.00	0.00	0.00	1.00	1.00	0.50	0.70	0.50	0.70	0	Fair	Fair	Fair	Fair

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Segment ID	Road Name	Safety Score	Geometrics Score	Access Spacing Score	Existing Conditions Traffic Operations Score	Future Traffic Operations Score	wt25 EC Health Score	wt35 EC Health Score	wt25 Future Health Score	wt35 Future Health Score	Exclude from Reporting	wt25 EC Display Text	wt35 EC Display Text	wt25 Future Display Text	wt35 Future Display Text
169	Lewis Road North	1.00	0.00	0.50	1.00	1.00	0.63	0.78	0.63	0.78	0	Fair	Good	Fair	Good
170	Lewis Road South	1.00	0.00	0.00	1.00	1.00	0.50	0.70	0.50	0.70	0	Fair	Fair	Fair	Fair
171	Lewis Road South	1.00	0.00	0.00	1.00	1.00	0.50	0.70	0.50	0.70	0	Fair	Fair	Fair	Fair
172	Lewis Road South	1.00	0.00	0.00	1.00	1.00	0.50	0.70	0.50	0.70	0	Fair	Fair	Fair	Fair
173	Logan Road	0.15	0.00	1.00	1.00	1.00	0.54	0.55	0.54	0.55	0	Fair	Fair	Fair	Fair
174	Logan Road	0.27	0.00	1.00	1.00	1.00	0.57	0.59	0.57	0.59	0	Fair	Fair	Fair	Fair
175	Lower Nehalem Road	0.62	0.00	1.00	1.00	1.00	0.65	0.72	0.65	0.72	0	Fair	Fair	Fair	Fair
176	Marine Drive	0.42	0.00	1.00	1.00	1.00	0.60	0.65	0.60	0.65	1	-	-	-	-
177	Marine Drive	0.14	1.00	1.00	1.00	1.00	0.78	0.70	0.78	0.70	1	-	-	-	-
178	Marine Drive	0.32	0.00	1.00	1.00	1.00	0.58	0.61	0.58	0.61	1	-	-	-	-
179	Marine Drive	0.44	0.39	1.00	1.00	1.00	0.71	0.71	0.71	0.71	1	-	-	-	-
180	Marine Drive	0.20	0.90	1.00	1.00	1.00	0.77	0.70	0.77	0.70	1	-	-	-	-
181	Marine Drive	0.60	0.42	1.00	1.00	1.00	0.75	0.77	0.75	0.77	1	-	-	-	-
182	Marine Drive	1.00	0.09	1.00	1.00	1.00	0.77	0.86	0.77	0.86	1	-	-	-	-
183	Marine Drive	0.15	1.00	1.00	1.00	1.00	0.79	0.70	0.79	0.70	1	-	-	-	-
184	Mclean Hill Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
185	N Cottage Avenue	0.20	0.00	0.00	1.00	1.00	0.30	0.42	0.30	0.42	0	-	-	-	-
186	N Roosevelt Drive	0.53	0.81	0.00	1.00	1.00	0.59	0.66	0.59	0.66	1	-	-	-	-
187	N Roosevelt Drive	0.49	0.98	0.00	1.00	1.00	0.62	0.67	0.62	0.67	1	-	-	-	-
188	N Roosevelt Drive	0.49	1.00	0.75	1.00	1.00	0.81	0.78	0.81	0.78	1	-	-	-	-
189	N Wahanna Road	0.41	0.00	0.00	1.00	1.00	0.35	0.49	0.35	0.49	0	Poor	Poor	Poor	Poor
190	N Wahanna Road	0.11	0.00	1.00	1.00	1.00	0.53	0.54	0.53	0.54	0	Fair	Fair	Fair	Fair
191	Old Highway 30	0.93	1.00	1.00	1.00	1.00	0.98	0.97	0.98	0.97	0	Good	Good	Good	Good
192	Old Highway 30	1.00	0.00	0.50	1.00	1.00	0.63	0.78	0.63	0.78	0	Fair	Good	Fair	Good
193	Old Highway 30	0.38	0.00	0.50	1.00	1.00	0.47	0.56	0.47	0.56	0	Poor	Fair	Poor	Fair
194	Old Highway 30	1.00	0.00	0.50	1.00	1.00	0.63	0.78	0.63	0.78	0	Fair	Good	Fair	Good
195	Old Highway 30	1.00	0.00	0.50	1.00	1.00	0.63	0.78	0.63	0.78	0	Fair	Good	Fair	Good
196	Old Highway 30	0.21	0.00	0.50	1.00	1.00	0.43	0.50	0.43	0.50	0	Poor	Poor	Poor	Poor
197	Old Highway 30	1.00	0.00	0.00	1.00	1.00	0.50	0.70	0.50	0.70	0	Fair	Fair	Fair	Fair
198	Olney Avenue	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	-	-	-	-
199	Olney Avenue	0.89	0.44	1.00	1.00	1.00	0.83	0.88	0.83	0.88	1	-	-	-	-
200	Oregon Coast Hwy	0.39	0.00	1.00	1.00	1.00	0.60	0.64	0.60	0.64	1	-	-	-	-
201	Oregon Coast Hwy	1.00	1.00	0.50	1.00	1.00	0.88	0.93	0.88	0.93	1	-	-	-	-
202	Oregon Coast Hwy Conn No 1	0.17	0.70	1.00	1.00	1.00	0.72	0.66	0.72	0.66	1	-	-	-	-
203	Park Avenue	0.75	0.00	0.00	1.00	1.00	0.44	0.61	0.44	0.61	1	-	-	-	-
204	Park Avenue	0.53	0.21	0.00	1.00	1.00	0.43	0.57	0.43	0.57	1	-	-	-	-
205	Park Avenue	1.00	0.33	0.00	1.00	1.00	0.58	0.75	0.58	0.75	1	-	-	-	-
206	Ridge Road	1.00	0.00	0.50	1.00	1.00	0.63	0.78	0.63	0.78	0	Fair	Good	Fair	Good
207	Ridge Road	0.47	0.00	1.00	1.00	1.00	0.62	0.66	0.62	0.66	0	Fair	Fair	Fair	Fair
208	S Cottage Avenue	1.00	0.00	0.50	1.00	1.00	0.63	0.78	0.63	0.78	0	Fair	Good	Fair	Good
209	S Roosevelt Drive	0.62	0.00	0.00	0.80	0.36	0.35	0.50	0.25	0.34	0	Poor	Poor	Poor	Poor
210	S Roosevelt Drive	0.37	0.86	0.00	1.00	1.00	0.56	0.61	0.56	0.61	1	-	-	-	-
211	S Roosevelt Drive	0.55	0.10	0.00	1.00	1.00	0.41	0.56	0.41	0.56	1	-	-	-	-
212	S Roosevelt Drive	0.83	0.00	0.00	0.82	0.40	0.41	0.58	0.31	0.43	0	Poor	Fair	Poor	Poor
213	S Roosevelt Drive	1.00	0.63	0.00	0.82	0.40	0.61	0.73	0.51	0.58	0	Fair	Fair	Fair	Fair
214	S Roosevelt Drive	0.21	1.00	0.00	1.00	1.00	0.55	0.57	0.55	0.57	1	-	-	-	-
215	S Roosevelt Drive	0.34	1.00	0.00	1.00	1.00	0.58	0.62	0.58	0.62	1	-	-	-	-
216	S Roosevelt Drive	0.39	1.00	0.00	1.00	1.00	0.60	0.64	0.60	0.64	1	-	-	-	-
217	Saddle Mountain Road	0.31	0.00	1.00	1.00	1.00	0.58	0.61	0.58	0.61	0	Fair	Fair	Fair	Fair
218	Se Front Street	1.00	0.66	1.00	1.00	1.00	0.92	0.95	0.92	0.95	1	-	-	-	-
219	Simonsen Loop Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
220	Simonsen Loop Road	1.00	0.00	0.00	1.00	1.00	0.50	0.70	0.50	0.70	0	Fair	Fair	Fair	Fair
221	Simonsen Loop Road	1.00	0.00	0.00	1.00	1.00	0.50	0.70	0.50	0.70	0	Fair	Fair	Fair	Fair
222	Simonsen Loop Road	1.00	0.00	0.50	1.00	1.00	0.63	0.78	0.63	0.78	0	Fair	Good	Fair	Good
223	Sunset Beach Ln	0.63	0.00	1.00	1.00	1.00	0.66	0.72	0.66	0.72	0	Fair	Fair	Fair	Fair
224	Sunset Hwy	1.00	0.33	1.00	1.00	1.00	0.83	0.90	0.83	0.90	0	Good	Good	Good	Good

Table A2: Corridor Health Tool Scores - Existing Conditions and Future Conditions

Weighting Options
wt25 - "Even Weighting" - Equal weight to all 4 categories
wt35 - "Focused Weighting" - 35% weight to safety and traffic operations
15% weight to geometrics and access spacing

Overall Health Score and Display Text
0.75 or higher = "Good"
From 0.50 to 0.74 = "Fair"
Less than 0.50 = "Poor"

Segment ID	Road Name	Safety Score	Geometrics Score	Access Spacing Score	Existing Conditions Traffic Operations Score	Future Traffic Operations Score	wt25 EC Health Score	wt35 EC Health Score	wt25 Future Health Score	wt35 Future Health Score	Exclude from Reporting	wt25 EC Display Text	wt35 EC Display Text	wt25 Future Display Text	wt35 Future Display Text
225	Sunset Hwy	1.00	0.49	1.00	1.00	1.00	0.87	0.92	0.87	0.92	0	Good	Good	Good	Good
226	Sunset Hwy. Conn.	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
227	Svensen Market Road	0.08	1.00	1.00	1.00	1.00	0.77	0.68	0.77	0.68	0	Good	Fair	Good	Fair
228	Svensen Market Road	1.00	0.50	0.50	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
229	Taylorville Road	0.08	0.00	0.50	1.00	1.00	0.40	0.45	0.40	0.45	0	Poor	Poor	Poor	Poor
230	Taylorville Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
231	The Roundabout	0.08	0.00	1.00	1.00	1.00	0.52	0.53	0.52	0.53	1	-	-	-	-
232	Tucker Creek Lane	1.00	0.00	0.50	1.00	1.00	0.63	0.78	0.63	0.78	0	Fair	Good	Fair	Good
233	Valley Creek Lane	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
234	W Marine Drive	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	-	-	-	-
235	W Marine Drive	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	-	-	-	-
236	W Marine Drive	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	1	-	-	-	-
237	W Marine Drive	0.40	0.91	1.00	1.00	1.00	0.83	0.78	0.83	0.78	1	-	-	-	-
238	W Marine Drive	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	1	-	-	-	-
239	W Marine Drive	0.48	0.50	1.00	1.00	1.00	0.74	0.74	0.74	0.74	1	-	-	-	-
240	W Marine Drive	0.27	0.00	1.00	1.00	1.00	0.57	0.60	0.57	0.60	1	-	-	-	-
241	W Marine Drive	1.00	0.67	1.00	1.00	1.00	0.92	0.95	0.92	0.95	1	-	-	-	-
242	W Marine Drive	1.00	0.62	1.00	1.00	1.00	0.90	0.94	0.90	0.94	1	-	-	-	-
243	W Marine Drive	1.00	0.33	1.00	1.00	1.00	0.83	0.90	0.83	0.90	1	-	-	-	-
244	W Marine Drive	1.00	0.50	1.00	1.00	1.00	0.88	0.93	0.88	0.93	1	-	-	-	-
245	W Marine Drive	0.57	0.00	1.00	1.00	1.00	0.64	0.70	0.64	0.70	1	-	-	-	-
246	W Marine Drive	0.49	0.67	1.00	1.00	1.00	0.79	0.77	0.79	0.77	1	-	-	-	-
247	W Marine Drive	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	1	-	-	-	-
248	W Marine Drive	0.89	1.00	1.00	1.00	1.00	0.97	0.96	0.97	0.96	1	-	-	-	-
249	Walluski Loop	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
250	Walluski Loop	0.87	0.00	1.00	1.00	1.00	0.72	0.81	0.72	0.81	0	Fair	Good	Fair	Good
251	Walluski Loop	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
252	Walluski Loop	0.43	0.00	1.00	1.00	1.00	0.61	0.65	0.61	0.65	0	Fair	Fair	Fair	Fair
253	Warrenton-Astoria Hwy	0.42	0.72	0.68	1.00	1.00	0.71	0.71	0.71	0.71	1	-	-	-	-
254	Warrenton-Astoria Hwy	1.00	0.75	1.00	1.00	0.94	0.94	0.96	0.92	0.94	0	Good	Good	Good	Good
255	Warrenton-Astoria Hwy	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1	-	-	-	-
256	Warrenton-Astoria Hwy	1.00	0.81	1.00	1.00	1.00	0.95	0.97	0.95	0.97	1	-	-	-	-
257	Warrenton-Astoria Hwy	0.47	0.44	0.80	1.00	1.00	0.68	0.70	0.68	0.70	1	-	-	-	-
258	Warrenton-Astoria Hwy	1.00	0.33	1.00	1.00	1.00	0.83	0.90	0.83	0.90	1	-	-	-	-
259	Warrenton-Astoria Hwy	0.58	1.00	1.00	1.00	1.00	0.90	0.85	0.90	0.85	1	-	-	-	-
260	Westport Ferry Road	1.00	0.00	0.00	1.00	1.00	0.50	0.70	0.50	0.70	0	Fair	Fair	Fair	Fair
261	Youngs River Road	0.38	0.00	1.00	1.00	1.00	0.59	0.63	0.59	0.63	0	Fair	Fair	Fair	Fair
262	Youngs River Road	0.47	0.00	0.50	1.00	1.00	0.49	0.59	0.49	0.59	0	Poor	Fair	Poor	Fair
263	Youngs River Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
264	Youngs River Road	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
265	Ziak-Gnat Creek Lane	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
266	Ziak-Gnat Creek Lane	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good
267	Ziak-Gnat Creek Lane	0.80	0.00	1.00	1.00	1.00	0.70	0.78	0.70	0.78	0	Fair	Good	Fair	Good
268	Ziak-Gnat Creek Lane	1.00	0.00	1.00	1.00	1.00	0.75	0.85	0.75	0.85	0	Good	Good	Good	Good

Table A3: Corridor Health Tool Scoring Formulae

Category	Weight	Scoring Formula
Safety	Even: 0.25 Focused: 0.35	= 0.5/X if X ≥ 0.5; else 1 Where: X = 0.7*(Fatal & Injury Crash Rate for Segment/Average for Facility Category) + 0.3*(Total Crash Rate for Segment/Average for Facility Category)
Geometrics	Even: 0.25 Focused: 0.15	*State Highways:* = W*0 + X*0.33 + Y*0.66 + Z*1 Where: W = % of segment with paved shoulder < 4 feet X = % of segment with paved shoulder between 4 and 4.5 feet Y = % of segment with paved shoulder between 4.5 and 5 feet Z = % of segment with paved shoulder > 5 feet
		County Arterials: = 0 if X < 4 = 1 if X ≥ 6 = 0.33 if (4≤ X<5) = 0.66 if (5 ≤X<6) Where: X = Average shoulder width in feet
		County Collectors: = 0 if X < 4 = 1 if X ≥ 5 = 0.5 otherwise Where: X = Average shoulder width in feet
Traffic Operations	Even: 0.25 Focused: 0.35	= 1 if X ≤ 0.5 = 0 if X ≥ 1 = (1-X)/0.5 otherwise Where: X = (Segment VC / VC Standard) VC = 30HV Volume-to-capacity ratio for segment VC Standard = Mobility standard for segment
Access Spacing	Even: 0.25 Focused: 0.15	*State Highways:* = 0 if X ≥ 3 = 1 if X ≤ 1 = (3-X)/2 otherwise Where: X = (# of public and private accesses to segment / maximum allowable accesses based on ODOT standards for segment)
		County Arterials: = 1 if access spacing over 500 feet between accesses = 0.5 if access spacing near 500 feet between accesses = 0 if access spacing under 500 feet between accesses
		County Collectors: = 1 if access spacing over 150 feet between accesses = 0.5 if access spacing near 150 feet between accesses = 0 if access spacing under 150 feet between accesses

The corridor health tool evaluates all roads classified as arterials or collectors in Clatsop County. The roads are split where two or more roads meet, forming evaluation segments. Every segment is given a score from 0 to 1 for each of the four categories as detailed above. The category scores are multiplied by a weight, and added together for an overall score between 0 and 1. A score of 0.75 or more is described as "good," a score of less than 0.50 is described as "poor," and all other scores are described as "fair."

Intersection Operations Reports – Summer

Intersection	
Intersection Delay, s/veh	19.3
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	5	180	105	0	245	250	55	0	105	40	190
Peak Hour Factor	0.92	0.97	0.97	0.97	0.92	0.97	0.97	0.97	0.92	0.97	0.97	0.97
Heavy Vehicles, %	2	20	11	10	2	1	7	6	2	6	6	2
Mvmt Flow	0	5	186	108	0	253	258	57	0	108	41	196
Number of Lanes	0	1	1	0	0	1	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	2
HCM Control Delay	20	19.2	20.9
HCM LOS	C	C	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	31%	100%	0%	100%	0%	54%
Vol Thru, %	12%	0%	63%	0%	82%	43%
Vol Right, %	57%	0%	37%	0%	18%	4%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	335	5	285	245	305	140
LT Vol	40	0	180	0	250	60
Through Vol	190	0	105	0	55	5
RT Vol	105	5	0	245	0	75
Lane Flow Rate	345	5	294	253	314	144
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.64	0.012	0.594	0.525	0.606	0.312
Departure Headway (Hd)	6.667	8.213	7.275	7.48	6.942	7.778
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	539	435	494	480	519	460
Service Time	4.728	5.983	5.044	5.248	4.71	5.862
HCM Lane V/C Ratio	0.64	0.011	0.595	0.527	0.605	0.313
HCM Control Delay	20.9	11.1	20.2	18.3	19.9	14.4
HCM Lane LOS	C	B	C	C	C	B
HCM 95th-tile Q	4.5	0	3.8	3	4	1.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	75	60	5
Peak Hour Factor	0.92	0.97	0.97	0.97
Heavy Vehicles, %	2	13	6	33
Mvmt Flow	0	77	62	5
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	14.4
HCM LOS	B

Lane

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	10	5	5	15	40	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	17	0	33	20	3	10
Mvmt Flow	11	6	6	17	44	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	78	50	56	0	-	0
Stage 1	50	-	-	-	-	-
Stage 2	28	-	-	-	-	-
Critical Hdwy	6.57	6.2	4.43	-	-	-
Critical Hdwy Stg 1	5.57	-	-	-	-	-
Critical Hdwy Stg 2	5.57	-	-	-	-	-
Follow-up Hdwy	3.653	3.3	2.497	-	-	-
Pot Cap-1 Maneuver	889	1024	1372	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	957	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	885	1024	1372	-	-	-
Mov Cap-2 Maneuver	885	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	953	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	1.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1372	-	927	-	-
HCM Lane V/C Ratio	0.004	-	0.018	-	-
HCM Control Delay (s)	7.6	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection 3: 101 - Lewis & Clark Intersection. 3-Stop Approach Calculations. Future 2035 30HV.

Id	1	2	3	4	5	6	7	8	9	10	11	12							
Movement	SBL	SBT	SBR	NBL	NBT	NBR	WBL	WBT	WBR	EBL	EBT	EBR			S	N	W	E	
Vi	80	140	10	30	85	5	5	45	45	10	60	50		Peds	0	0	0	0	
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90							
vi	89	156	11	33	94	6	6	50	50	11	67	56		vi	0	0	0	0	
vc,1													0			0		0	**0**
vc,2													0		0	0			**0**
vc,3													0			0	0		**0**
vc,4		156	6				6	25			33	14	239		0		0		**239**
vc,5	178						6	25	13	11	33		265		0	0			**265**
vc,6	178										33		211		0			0	**211**
vc,7	178	156		33	47						33	14	461		0			0	**461**
vc,8	178	156	6	33	47					11			431				0	0	**431**
vc,9					47					11			58			0		0	**58**
vc,10	178	156		33	47			25	13				451			0	0		**451**
vc,11	178	156		33	47	1	6						421				0	0	**421**
vc,12		156					6						161		0		0		**161**
vc,x	0	0	0	239	265	211	461	431	58	451	421	161							
tc,base				4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1							
PHV				0.04	0.06	0	0	0.03	0.08	0	0.06	0							
tc,x				4.14	4.16	4.1	4.1	4.13	4.18	4.1	4.16	4.1							
tf,base				3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5							
tf,x				3.536	3.554	3.5	3.5	3.527	3.572	3.5	3.554	3.5							
cp,x				867.8325	847.3892	894.5876	754.8832	763.4197	969.3563	759.9539	761.1768	924.945							

	SB	EB	WB			
vSH	133	106	133			
cp,SH	854	848	822			
p0,j,SH	0.18	0.14	0.19	d	e	f
cSH	756	742	717	g	h	i

LFS	EQ	RTS
458	=	427
458	=	424
427	=	411
756	<=	854
742	<=	848
717	<=	822

MAX

2214.98 Objective Function

Variable Cells

Constraints

Manually-Entered Values

OPERATIONS	**NB**	**WB**	**EB**	**MAX**
v/c	0.18	0.14	0.19	0.19
d	10.8	10.7	11.2	11.2
LOS	B	B	B	B

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	50	15	10	10	15	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	17	0	12	0	15
Mvmt Flow	56	17	11	11	17	33

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	22	0	-	0	145	17
Stage 1	-	-	-	-	17	-
Stage 2	-	-	-	-	128	-
Critical Hdwy	4.13	-	-	-	6.4	6.35
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.227	-	-	-	3.5	3.435
Pot Cap-1 Maneuver	1587	-	-	-	852	1025
Stage 1	-	-	-	-	1011	-
Stage 2	-	-	-	-	903	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1587	-	-	-	821	1025
Mov Cap-2 Maneuver	-	-	-	-	821	-
Stage 1	-	-	-	-	1011	-
Stage 2	-	-	-	-	870	-

Approach	EB	WB	SB
HCM Control Delay, s	5.7	0	9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1587	-	-	-	947
HCM Lane V/C Ratio	0.035	-	-	-	0.053
HCM Control Delay (s)	7.4	0	-	-	9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection						
Int Delay, s/veh	3.7					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	25	35	25	40	60	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	6	3	15	3	0	5
Mvmt Flow	28	39	28	44	67	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	178	78	89	0	-	0
Stage 1	78	-	-	-	-	-
Stage 2	100	-	-	-	-	-
Critical Hdwy	6.46	6.23	4.25	-	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.327	2.335	-	-	-
Pot Cap-1 Maneuver	803	980	1428	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	914	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	787	980	1428	-	-	-
Mov Cap-2 Maneuver	787	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	896	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	2.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1428	-	889	-	-
HCM Lane V/C Ratio	0.019	-	0.075	-	-
HCM Control Delay (s)	7.6	0	9.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	5	10	5	30	35	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	4	0	0
Mvmt Flow	6	11	6	33	39	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	83	39	39	0	-	0
Stage 1	39	-	-	-	-	-
Stage 2	44	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	924	1038	1584	-	-	-
Stage 1	989	-	-	-	-	-
Stage 2	984	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	920	1038	1584	-	-	-
Mov Cap-2 Maneuver	920	-	-	-	-	-
Stage 1	989	-	-	-	-	-
Stage 2	980	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1584	-	995	-	-
HCM Lane V/C Ratio	0.004	-	0.017	-	-
HCM Control Delay (s)	7.3	0	8.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	140	40	65	25	55	145
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	0	8	5	11	3
Mvmt Flow	156	44	72	28	61	161

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	314	142	222	0	-	0
Stage 1	142	-	-	-	-	-
Stage 2	172	-	-	-	-	-
Critical Hdwy	6.42	6.2	4.18	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.3	2.272	-	-	-
Pot Cap-1 Maneuver	679	911	1312	-	-	-
Stage 1	885	-	-	-	-	-
Stage 2	858	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	641	911	1312	-	-	-
Mov Cap-2 Maneuver	641	-	-	-	-	-
Stage 1	885	-	-	-	-	-
Stage 2	810	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.2	5.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1312	-	911	-	-
HCM Lane V/C Ratio	0.055	-	0.049	-	-
HCM Control Delay (s)	7.9	0	9.2	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	0.2	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	460	25	35	485	35	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	6	22	14	7	10	9
Mvmt Flow	484	26	37	511	37	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	511	0	1081	497
Stage 1	-	-	-	-	497	-
Stage 2	-	-	-	-	584	-
Critical Hdwy	-	-	4.24	-	6.5	6.29
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.326	-	3.59	3.381
Pot Cap-1 Maneuver	-	-	995	-	233	559
Stage 1	-	-	-	-	595	-
Stage 2	-	-	-	-	542	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	995	-	224	559
Mov Cap-2 Maneuver	-	-	-	-	224	-
Stage 1	-	-	-	-	595	-
Stage 2	-	-	-	-	522	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	21.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	273	-	-	995	-
HCM Lane V/C Ratio	0.193	-	-	0.037	-
HCM Control Delay (s)	21.3	-	-	8.8	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.7	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	5	5	35	5	5	35
Conflicting Peds, #/hr	1	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	13	0	43	9
Mvmt Flow	5	5	37	5	5	37

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	87	40	0	0	43	0
Stage 1	40	-	-	-	-	-
Stage 2	47	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.53	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.587	-
Pot Cap-1 Maneuver	919	1037	-	-	1339	-
Stage 1	988	-	-	-	-	-
Stage 2	981	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	915	1036	-	-	1339	-
Mov Cap-2 Maneuver	915	-	-	-	-	-
Stage 1	987	-	-	-	-	-
Stage 2	977	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.7	0	1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	972	1339	-
HCM Lane V/C Ratio	-	-	0.011	0.004	-
HCM Control Delay (s)	-	-	8.7	7.7	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	5	300	45	10	245	55	40	10	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	Yeild	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	40	5	0	0	4	9	0	12	0
Mvmt Flow	5	316	47	11	258	58	42	11	26

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	316	0	0	316	0	0	647	663	316
Stage 1	-	-	-	-	-	-	326	326	-
Stage 2	-	-	-	-	-	-	321	337	-
Critical Hdwy	4.5	-	-	4.1	-	-	7.1	6.62	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.62	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.62	-
Follow-up Hdwy	2.56	-	-	2.2	-	-	3.5	4.108	3.3
Pot Cap-1 Maneuver	1058	-	-	1256	-	-	387	369	729
Stage 1	-	-	-	-	-	-	691	631	-
Stage 2	-	-	-	-	-	-	695	624	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1058	-	-	1256	-	-	364	363	729
Mov Cap-2 Maneuver	-	-	-	-	-	-	364	363	-
Stage 1	-	-	-	-	-	-	687	627	-
Stage 2	-	-	-	-	-	-	661	617	-

Approach	EB	WB	NB
HCM Control Delay, s	0.1	0.3	15
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	437	1058	-	-	1256	-	-	368
HCM Lane V/C Ratio	0.181	0.005	-	-	0.008	-	-	0.286
HCM Control Delay (s)	15	8.4	0	-	7.9	0	-	18.7
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.7	0	-	-	0	-	-	1.2

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	75	20	5
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	5	0	0
Mvmt Flow	79	21	5

Major/Minor	Minor2		
Conflicting Flow All	653	634	287
Stage 1	308	308	-
Stage 2	345	326	-
Critical Hdwy	7.15	6.5	6.2
Critical Hdwy Stg 1	6.15	5.5	-
Critical Hdwy Stg 2	6.15	5.5	-
Follow-up Hdwy	3.545	4	3.3
Pot Cap-1 Maneuver	376	399	757
Stage 1	696	664	-
Stage 2	664	652	-
Platoon blocked, %			
Mov Cap-1 Maneuver	350	392	757
Mov Cap-2 Maneuver	350	392	-
Stage 1	692	657	-
Stage 2	626	648	-

Approach	SB
HCM Control Delay, s	18.7
HCM LOS	C

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	410	20	40	510	25	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Free	-	None	-	None
Storage Length	-	220	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	7	7	4	9	6	0
Mvmt Flow	432	21	42	537	26	26

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	432	0	1053	432
Stage 1	-	-	-	-	432	-
Stage 2	-	-	-	-	621	-
Critical Hdwy	-	-	4.14	-	6.46	6.2
Critical Hdwy Stg 1	-	-	-	-	5.46	-
Critical Hdwy Stg 2	-	-	-	-	5.46	-
Follow-up Hdwy	-	-	2.236	-	3.554	3.3
Pot Cap-1 Maneuver	-	0	1117	-	246	628
Stage 1	-	0	-	-	646	-
Stage 2	-	0	-	-	528	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	1117	-	233	628
Mov Cap-2 Maneuver	-	-	-	-	233	-
Stage 1	-	-	-	-	646	-
Stage 2	-	-	-	-	499	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	17.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	WBL	WBT
Capacity (veh/h)	340	-	1117	-
HCM Lane V/C Ratio	0.155	-	0.038	-
HCM Control Delay (s)	17.5	-	8.3	0
HCM Lane LOS	C	-	A	A
HCM 95th %tile Q(veh)	0.5	-	0.1	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	785	20	90	760	45	80	135	140	40	95	140
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.92		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1630	1642		1554	1670		1511	1505		1551	1478	
Flt Permitted	0.95	1.00		0.95	1.00		0.35	1.00		0.27	1.00	
Satd. Flow (perm)	1630	1642		1554	1670		565	1505		435	1478	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	121	826	21	95	800	47	84	142	147	42	100	147
RTOR Reduction (vph)	0	1	0	0	2	0	0	53	0	0	75	0
Lane Group Flow (vph)	121	846	0	95	845	0	84	236	0	42	172	0
Confl. Peds. (#/hr)									2	2		
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	2%	6%	14%	7%	4%	3%	10%	2%	10%	7%	7%	6%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	11.8	49.3		9.3	46.8		17.5	17.5		17.5	17.5	
Effective Green, g (s)	11.8	50.7		9.3	48.2		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.13	0.56		0.10	0.54		0.20	0.20		0.20	0.20	
Clearance Time (s)	4.0	5.4		4.0	5.4		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.5	4.5		2.5	4.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	213	924		160	894		113	301		87	295	
v/s Ratio Prot	c0.07	c0.52		0.06	0.51			c0.16			0.12	
v/s Ratio Perm							0.15			0.10		
v/c Ratio	0.57	0.92		0.59	0.95		0.74	0.78		0.48	0.58	
Uniform Delay, d1	36.7	17.7		38.5	19.7		33.8	34.2		31.9	32.6	
Progression Factor	1.00	1.00		0.70	1.58		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.8	15.1		3.2	14.4		21.9	12.2		3.0	2.4	
Delay (s)	39.5	32.9		30.4	45.5		55.7	46.3		34.9	35.0	
Level of Service	D	C		C	D		E	D		C	D	
Approach Delay (s)		33.7			44.0			48.4			35.0	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	39.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	455	5	5	525	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	6	20	71	9	0	50
Mvmt Flow	479	5	5	553	5	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	484	0	1045	482
Stage 1	-	-	-	-	482	-
Stage 2	-	-	-	-	563	-
Critical Hdwy	-	-	4.81	-	6.4	6.7
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.839	-	3.5	3.75
Pot Cap-1 Maneuver	-	-	799	-	256	498
Stage 1	-	-	-	-	625	-
Stage 2	-	-	-	-	574	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	799	-	254	498
Mov Cap-2 Maneuver	-	-	-	-	254	-
Stage 1	-	-	-	-	625	-
Stage 2	-	-	-	-	569	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	16.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	336	-	-	799	-
HCM Lane V/C Ratio	0.031	-	-	0.007	-
HCM Control Delay (s)	16.1	-	-	9.5	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	3.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	5	40	5	15	15	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	17	12	50	14	38	13
Mvmt Flow	5	42	5	16	16	21

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	47	0	52	26
Stage 1	-	-	-	-	26	-
Stage 2	-	-	-	-	26	-
Critical Hdwy	-	-	4.6	-	6.78	6.33
Critical Hdwy Stg 1	-	-	-	-	5.78	-
Critical Hdwy Stg 2	-	-	-	-	5.78	-
Follow-up Hdwy	-	-	2.65	-	3.842	3.417
Pot Cap-1 Maneuver	-	-	1302	-	873	1019
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	911	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1302	-	870	1019
Mov Cap-2 Maneuver	-	-	-	-	870	-
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	907	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.9	8.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	949	-	-	1302	-
HCM Lane V/C Ratio	0.039	-	-	0.004	-
HCM Control Delay (s)	8.9	-	-	7.8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	5	25	85	5	45	170
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	50	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	4	4	0	0	1
Mvmt Flow	5	26	89	5	47	179

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	363	89	0	-	89	0
Stage 1	89	-	-	-	-	-
Stage 2	274	-	-	-	-	-
Critical Hdwy	6.4	6.24	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.336	-	-	2.2	-
Pot Cap-1 Maneuver	640	964	-	0	1519	-
Stage 1	940	-	-	0	-	-
Stage 2	777	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	620	964	-	-	1519	-
Mov Cap-2 Maneuver	620	-	-	-	-	-
Stage 1	940	-	-	-	-	-
Stage 2	753	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.2	0	1.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	620	964	1519	-
HCM Lane V/C Ratio	-	0.008	0.027	0.031	-
HCM Control Delay (s)	-	10.9	8.8	7.4	-
HCM Lane LOS	-	B	A	A	-
HCM 95th %tile Q(veh)	-	0	0.1	0.1	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	10	475	0	0	520	5	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	230	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	11	13	0	0	11	0	0	0	0
Mvmt Flow	11	500	0	0	547	5	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	553	0	0	500	0	0	1076	1074	500
Stage 1	-	-	-	-	-	-	521	521	-
Stage 2	-	-	-	-	-	-	555	553	-
Critical Hdwy	4.21	-	-	4.1	-	-	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.299	-	-	2.2	-	-	3.5	4	3.3
Pot Cap-1 Maneuver	973	-	-	1075	-	-	199	222	575
Stage 1	-	-	-	-	-	-	542	535	-
Stage 2	-	-	-	-	-	-	520	518	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	973	-	-	1075	-	-	193	219	575
Mov Cap-2 Maneuver	-	-	-	-	-	-	193	219	-
Stage 1	-	-	-	-	-	-	536	529	-
Stage 2	-	-	-	-	-	-	509	518	-

Approach	EB	WB	NB
HCM Control Delay, s	0.2	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	973	-	-	1075	-	-	281
HCM Lane V/C Ratio	-	0.011	-	-	-	-	-	0.056
HCM Control Delay (s)	0	8.7	-	-	0	-	-	18.6
HCM Lane LOS	A	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.2

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	0	10
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	67	0	22
Mvmt Flow	5	0	11

Major/Minor	Minor2		
Conflicting Flow All	1071	1071	550
Stage 1	550	550	-
Stage 2	521	521	-
Critical Hdwy	7.77	6.5	6.42
Critical Hdwy Stg 1	6.77	5.5	-
Critical Hdwy Stg 2	6.77	5.5	-
Follow-up Hdwy	4.103	4	3.498
Pot Cap-1 Maneuver	151	223	498
Stage 1	420	519	-
Stage 2	437	535	-
Platoon blocked, %			
Mov Cap-1 Maneuver	150	220	498
Mov Cap-2 Maneuver	150	220	-
Stage 1	415	519	-
Stage 2	432	529	-

Approach	SB
HCM Control Delay, s	18.6
HCM LOS	C

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	75	540	25	20	500	45	25	5	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	14	5	6	12	10	0	0	10
Mvmt Flow	79	568	26	21	526	47	26	5	11

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	575	0	0	596	0	0	1373	1357	583
Stage 1	-	-	-	-	-	-	740	740	-
Stage 2	-	-	-	-	-	-	633	617	-
Critical Hdwy	4.15	-	-	4.16	-	-	7.1	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.254	-	-	3.5	4	3.39
Pot Cap-1 Maneuver	983	-	-	961	-	-	124	150	497
Stage 1	-	-	-	-	-	-	412	426	-
Stage 2	-	-	-	-	-	-	471	484	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	983	-	-	961	-	-	94	135	497
Mov Cap-2 Maneuver	-	-	-	-	-	-	94	135	-
Stage 1	-	-	-	-	-	-	379	391	-
Stage 2	-	-	-	-	-	-	392	473	-

Approach	EB	WB	NB
HCM Control Delay, s	1.1	0.3	48.3
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	124	983	-	-	961	-	-	206
HCM Lane V/C Ratio	0.34	0.08	-	-	0.022	-	-	0.588
HCM Control Delay (s)	48.3	9	-	-	8.8	-	-	44.7
HCM Lane LOS	E	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	1.4	0.3	-	-	0.1	-	-	3.3

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	40	10	65
Conflicting Peds, #/hr	1	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	6	0	7
Mvmt Flow	42	11	68

Major/Minor	Minor2		
Conflicting Flow All	1341	1347	551
Stage 1	593	593	-
Stage 2	748	754	-
Critical Hdwy	7.16	6.5	6.27
Critical Hdwy Stg 1	6.16	5.5	-
Critical Hdwy Stg 2	6.16	5.5	-
Follow-up Hdwy	3.554	4	3.363
Pot Cap-1 Maneuver	127	152	525
Stage 1	485	497	-
Stage 2	398	420	-
Platoon blocked, %			
Mov Cap-1 Maneuver	111	137	525
Mov Cap-2 Maneuver	111	137	-
Stage 1	446	486	-
Stage 2	353	386	-

Approach	SB
HCM Control Delay, s	44.7
HCM LOS	E

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	5	5	0	5	20	45	0	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	17	0	50	10	2	0	100	0
Mvmt Flow	6	6	0	6	22	50	0	6	6

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	72	0	0	6	0	0	81	100	6
Stage 1	-	-	-	-	-	-	17	17	-
Stage 2	-	-	-	-	-	-	64	83	-
Critical Hdwy	4.1	-	-	4.6	-	-	7.1	7.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	6.5	-
Follow-up Hdwy	2.2	-	-	2.65	-	-	3.5	4.9	3.3
Pot Cap-1 Maneuver	1541	-	-	1351	-	-	912	638	1083
Stage 1	-	-	-	-	-	-	1008	721	-
Stage 2	-	-	-	-	-	-	952	669	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1541	-	-	1351	-	-	895	632	1083
Mov Cap-2 Maneuver	-	-	-	-	-	-	895	632	-
Stage 1	-	-	-	-	-	-	1004	718	-
Stage 2	-	-	-	-	-	-	934	666	-

Approach	EB	WB	NB
HCM Control Delay, s	3.7	0.5	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	798	1541	-	-	1351	-	-	873
HCM Lane V/C Ratio	0.014	0.004	-	-	0.004	-	-	0.057
HCM Control Delay (s)	9.6	7.3	0	-	7.7	0	-	9.4
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.2

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	35	5	5
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	90	90	90
Heavy Vehicles, %	0	100	0
Mvmt Flow	39	6	6

Major/Minor	Minor2		
Conflicting Flow All	80	75	47
Stage 1	58	58	-
Stage 2	22	17	-
Critical Hdwy	7.1	7.5	6.2
Critical Hdwy Stg 1	6.1	6.5	-
Critical Hdwy Stg 2	6.1	6.5	-
Follow-up Hdwy	3.5	4.9	3.3
Pot Cap-1 Maneuver	913	661	1028
Stage 1	959	688	-
Stage 2	1002	721	-
Platoon blocked, %			
Mov Cap-1 Maneuver	896	655	1028
Mov Cap-2 Maneuver	896	655	-
Stage 1	955	685	-
Stage 2	985	718	-

Approach	SB
HCM Control Delay, s	9.4
HCM LOS	A

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	2.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	40	25	5	40	25	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	20
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	10	0	4	17	50
Mvmt Flow	42	26	5	42	26	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	68	0	108	55
Stage 1	-	-	-	-	55	-
Stage 2	-	-	-	-	53	-
Critical Hdwy	-	-	4.1	-	6.57	6.7
Critical Hdwy Stg 1	-	-	-	-	5.57	-
Critical Hdwy Stg 2	-	-	-	-	5.57	-
Follow-up Hdwy	-	-	2.2	-	3.653	3.75
Pot Cap-1 Maneuver	-	-	1546	-	854	892
Stage 1	-	-	-	-	931	-
Stage 2	-	-	-	-	933	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1546	-	851	892
Mov Cap-2 Maneuver	-	-	-	-	851	-
Stage 1	-	-	-	-	931	-
Stage 2	-	-	-	-	930	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	851	892	-	-	1546	-
HCM Lane V/C Ratio	0.031	0.006	-	-	0.003	-
HCM Control Delay (s)	9.4	9.1	-	-	7.3	0
HCM Lane LOS	A	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	5	5	35	5	20	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	7	33	0	2
Mvmt Flow	5	5	37	5	21	79

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	160	39	0	0	42	0
Stage 1	39	-	-	-	-	-
Stage 2	121	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	836	1038	-	-	1580	-
Stage 1	989	-	-	-	-	-
Stage 2	909	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	824	1038	-	-	1580	-
Mov Cap-2 Maneuver	824	-	-	-	-	-
Stage 1	989	-	-	-	-	-
Stage 2	896	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	1.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	919	1580	-
HCM Lane V/C Ratio	-	-	0.011	0.013	-
HCM Control Delay (s)	-	-	9	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection									
Int Delay, s/veh	8								

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	10	20	5	10	10	30	5	55	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	15	0	0	0	4	0	5	0
Mvmt Flow	11	22	6	11	11	33	6	61	11

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	44	0	0	28	0	0	147	114	25
Stage 1	-	-	-	-	-	-	47	47	-
Stage 2	-	-	-	-	-	-	100	67	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.55	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.55	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.045	3.3
Pot Cap-1 Maneuver	1577	-	-	1599	-	-	826	771	1057
Stage 1	-	-	-	-	-	-	972	850	-
Stage 2	-	-	-	-	-	-	911	833	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1577	-	-	1599	-	-	739	760	1057
Mov Cap-2 Maneuver	-	-	-	-	-	-	739	760	-
Stage 1	-	-	-	-	-	-	965	844	-
Stage 2	-	-	-	-	-	-	805	827	-

Approach	EB	WB	NB
HCM Control Delay, s	2.1	1.5	10.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	790	1577	-	-	1599	-	-	809
HCM Lane V/C Ratio	0.098	0.007	-	-	0.007	-	-	0.199
HCM Control Delay (s)	10.1	7.3	0	-	7.3	0	-	10.6
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.7

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	55	65	25
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	90	90	90
Heavy Vehicles, %	2	4	4
Mvmt Flow	61	72	28

Major/Minor	Minor2		
Conflicting Flow All	133	100	28
Stage 1	50	50	-
Stage 2	83	50	-
Critical Hdwy	7.12	6.54	6.24
Critical Hdwy Stg 1	6.12	5.54	-
Critical Hdwy Stg 2	6.12	5.54	-
Follow-up Hdwy	3.518	4.036	3.336
Pot Cap-1 Maneuver	839	786	1041
Stage 1	963	849	-
Stage 2	925	849	-
Platoon blocked, %			
Mov Cap-1 Maneuver	771	775	1041
Mov Cap-2 Maneuver	771	775	-
Stage 1	956	843	-
Stage 2	843	843	-

Approach	SB
HCM Control Delay, s	10.6
HCM LOS	B

Minor Lane/Major Mvmt

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	405	25	55	840	865	470
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1599	1488	1662	1716	1716	1382
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1599	1488	1662	1716	1716	1382
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	426	26	58	884	911	495
RTOR Reduction (vph)	0	19	0	0	0	109
Lane Group Flow (vph)	426	7	58	884	911	386
Confl. Peds. (#/hr)			1			1
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	4%	0%	0%	2%	2%	6%
Turn Type	Prot	Perm	Prot	NA	NA	pm+ov
Protected Phases	8		1	6	2	8
Permitted Phases		8				2
Actuated Green, G (s)	23.0	23.0	6.5	57.6	47.1	70.1
Effective Green, g (s)	23.0	23.0	6.5	59.0	48.5	70.1
Actuated g/C Ratio	0.26	0.26	0.07	0.66	0.54	0.78
Clearance Time (s)	4.0	4.0	4.0	5.4	5.4	4.0
Vehicle Extension (s)	2.5	2.5	2.5	4.7	4.7	2.5
Lane Grp Cap (vph)	408	380	120	1124	924	1076
v/s Ratio Prot	c0.27		0.03	c0.52	c0.53	0.09
v/s Ratio Perm		0.00				0.19
v/c Ratio	1.04	0.02	0.48	0.79	0.99	0.36
Uniform Delay, d1	33.5	25.1	40.1	11.0	20.4	3.1
Progression Factor	1.00	1.00	1.00	0.95	1.00	1.00
Incremental Delay, d2	56.5	0.0	1.9	4.7	26.4	0.1
Delay (s)	90.0	25.1	41.9	15.2	46.8	3.2
Level of Service	F	C	D	B	D	A
Approach Delay (s)	86.3			16.8	31.5	
Approach LOS	F			B	C	

Intersection Summary			
HCM 2000 Control Delay	35.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	5	695	5	10	480	5	5	0	10
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	9	25	0	15	25	0	0	25
Mvmt Flow	5	732	5	11	505	5	5	0	11

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	511	0	0	737	0	0	1274	1277	735
Stage 1	-	-	-	-	-	-	745	745	-
Stage 2	-	-	-	-	-	-	529	532	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.525
Pot Cap-1 Maneuver	1065	-	-	878	-	-	145	168	384
Stage 1	-	-	-	-	-	-	409	424	-
Stage 2	-	-	-	-	-	-	537	529	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1064	-	-	877	-	-	141	164	384
Mov Cap-2 Maneuver	-	-	-	-	-	-	141	164	-
Stage 1	-	-	-	-	-	-	406	421	-
Stage 2	-	-	-	-	-	-	522	519	-

Approach	EB	WB	NB
HCM Control Delay, s	0.1	0.2	20.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	244	1064	-	-	877	-	-	274
HCM Lane V/C Ratio	0.065	0.005	-	-	0.012	-	-	0.038
HCM Control Delay (s)	20.8	8.4	0	-	9.2	0	-	18.7
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	0	5
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	Stop
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	0	0	0
Mvmt Flow	5	0	5

Major/Minor	Minor2		
Conflicting Flow All	1279	1276	509
Stage 1	529	529	-
Stage 2	750	747	-
Critical Hdwy	7.1	6.5	6.2
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.3
Pot Cap-1 Maneuver	144	168	568
Stage 1	537	530	-
Stage 2	407	423	-
Platoon blocked, %			
Mov Cap-1 Maneuver	137	164	568
Mov Cap-2 Maneuver	137	164	-
Stage 1	533	520	-
Stage 2	392	420	-

Approach	SB
HCM Control Delay, s	18.7
HCM LOS	C

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	10	495	95	35	415	5	60	5	30
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	215	-	160	190	-	120	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	11	8	13	9	0	9	0	4
Mvmt Flow	11	521	100	37	437	5	63	5	32

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	437	0	0	521	0	0	1058	1053	522
Stage 1	-	-	-	-	-	-	542	542	-
Stage 2	-	-	-	-	-	-	516	511	-
Critical Hdwy	4.1	-	-	4.23	-	-	7.19	6.5	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.19	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.19	5.5	-
Follow-up Hdwy	2.2	-	-	2.317	-	-	3.581	4	3.336
Pot Cap-1 Maneuver	1134	-	-	992	-	-	196	228	551
Stage 1	-	-	-	-	-	-	512	523	-
Stage 2	-	-	-	-	-	-	529	540	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1133	-	-	991	-	-	184	217	551
Mov Cap-2 Maneuver	-	-	-	-	-	-	184	217	-
Stage 1	-	-	-	-	-	-	507	518	-
Stage 2	-	-	-	-	-	-	499	520	-

Approach	EB	WB	NB
HCM Control Delay, s	0.1	0.7	31.2
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	235	1133	-	-	991	-	-	254
HCM Lane V/C Ratio	0.426	0.009	-	-	0.037	-	-	0.062
HCM Control Delay (s)	31.2	8.2	-	-	8.8	-	-	20.1
HCM Lane LOS	D	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	2	0	-	-	0.1	-	-	0.2

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	5	5
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	0	0	0
Mvmt Flow	5	5	5

Major/Minor	Minor2		
Conflicting Flow All	1072	1053	438
Stage 1	511	511	-
Stage 2	561	542	-
Critical Hdwy	7.1	6.5	6.2
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.3
Pot Cap-1 Maneuver	200	228	623
Stage 1	549	540	-
Stage 2	516	523	-
Platoon blocked, %			
Mov Cap-1 Maneuver	178	217	622
Mov Cap-2 Maneuver	178	217	-
Stage 1	544	520	-
Stage 2	476	518	-

Approach	SB
HCM Control Delay, s	20.1
HCM LOS	C

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	9.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	15	5	155	0	0	10	210	790	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	Free
Storage Length	-	-	-	-	-	-	340	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	10	0	0	0	11	5	20
Mvmt Flow	16	5	163	0	0	11	221	832	16

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	1816	2232	474	1761	2232	416	947	0	-
Stage 1	958	958	-	1274	1274	-	-	-	-
Stage 2	858	1274	-	487	958	-	-	-	-
Critical Hdwy	7.5	6.5	7.1	7.5	6.5	6.9	4.32	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-
Follow-up Hdwy	3.5	4	3.4	3.5	4	3.3	2.31	-	-
Pot Cap-1 Maneuver	50	43	516	55	43	591	667	-	0
Stage 1	280	338	-	180	240	-	-	-	0
Stage 2	322	240	-	536	338	-	-	-	0
Platoon blocked, %								-	
Mov Cap-1 Maneuver	36	29	516	24	29	591	667	-	-
Mov Cap-2 Maneuver	36	29	-	24	29	-	-	-	-
Stage 1	187	336	-	120	160	-	-	-	-
Stage 2	211	160	-	359	336	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	97.6	11.2	2.7
HCM LOS	F	B	

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBL	SBT
Capacity (veh/h)	667	-	197	591	809	-
HCM Lane V/C Ratio	0.331	-	0.935	0.018	0.007	-
HCM Control Delay (s)	13	-	97.6	11.2	9.5	-
HCM Lane LOS	B	-	F	B	A	-
HCM 95th %tile Q(veh)	1.4	-	7.5	0.1	0	-

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	900	30
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	Free
Storage Length	300	-	110
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	0	4	9
Mvmt Flow	5	947	32

Major/Minor	Major2		
Conflicting Flow All	832	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.1	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.2	-	-
Pot Cap-1 Maneuver	809	-	0
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %		-	
Mov Cap-1 Maneuver	809	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	SB
HCM Control Delay, s	0.1
HCM LOS	

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	5	50	65	185	130	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	4	5	12	6	0
Mvmt Flow	5	53	68	195	137	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	471	139	142	0	-	0
Stage 1	139	-	-	-	-	-
Stage 2	332	-	-	-	-	-
Critical Hdwy	6.4	6.24	4.15	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.336	2.245	-	-	-
Pot Cap-1 Maneuver	555	904	1423	-	-	-
Stage 1	893	-	-	-	-	-
Stage 2	731	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	525	904	1423	-	-	-
Mov Cap-2 Maneuver	525	-	-	-	-	-
Stage 1	893	-	-	-	-	-
Stage 2	692	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.6	2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1423	-	848	-	-
HCM Lane V/C Ratio	0.048	-	0.068	-	-
HCM Control Delay (s)	7.7	0	9.6	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	0.2	-	-

Intersection	
Int Delay, s/veh	11.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	120	245	180	85	180	125
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	4	2	4	5	1	5
Mvmt Flow	126	258	189	89	189	132

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	745	236	0	0	279	0
Stage 1	234	-	-	-	-	-
Stage 2	511	-	-	-	-	-
Critical Hdwy	6.44	6.22	-	-	4.11	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.318	-	-	2.209	-
Pot Cap-1 Maneuver	379	803	-	-	1289	-
Stage 1	800	-	-	-	-	-
Stage 2	598	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	323	802	-	-	1287	-
Mov Cap-2 Maneuver	323	-	-	-	-	-
Stage 1	800	-	-	-	-	-
Stage 2	509	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	26.5	0	4.9
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	539	1287	-
HCM Lane V/C Ratio	-	-	0.713	0.147	-
HCM Control Delay (s)	-	-	26.5	8.3	-
HCM Lane LOS	-	-	D	A	-
HCM 95th %tile Q(veh)	-	-	5.7	0.5	-

Intersection	
Int Delay, s/veh	10.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	60	45	40	920	955	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Free
Storage Length	0	70	230	-	-	175
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	13	6	10	4	4	4
Mvmt Flow	63	47	42	968	1005	95

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2058	1005	1005	0	-	0
Stage 1	1005	-	-	-	-	-
Stage 2	1053	-	-	-	-	-
Critical Hdwy	6.53	6.26	4.2	-	-	-
Critical Hdwy Stg 1	5.53	-	-	-	-	-
Critical Hdwy Stg 2	5.53	-	-	-	-	-
Follow-up Hdwy	3.617	3.354	2.29	-	-	-
Pot Cap-1 Maneuver	~ 56	288	659	-	-	0
Stage 1	338	-	-	-	-	0
Stage 2	320	-	-	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	~ 52	288	659	-	-	-
Mov Cap-2 Maneuver	~ 52	-	-	-	-	-
Stage 1	338	-	-	-	-	-
Stage 2	300	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	193	0.5	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	659	-	52	288	-
HCM Lane V/C Ratio	0.064	-	1.215	0.164	-
HCM Control Delay (s)	10.8	-	$ 322.9	19.9	-
HCM Lane LOS	B	-	F	C	-
HCM 95th %tile Q(veh)	0.2	-	5.6	0.6	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection Operations Reports – Average Weekday

Intersection	
Intersection Delay, s/veh	13.5
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	5	145	85	0	190	195	45	0	90	35	160
Peak Hour Factor	0.92	0.97	0.97	0.97	0.92	0.97	0.97	0.97	0.92	0.97	0.97	0.97
Heavy Vehicles, %	2	20	11	10	2	1	7	6	2	6	6	2
Mvmt Flow	0	5	149	88	0	196	201	46	0	93	36	165
Number of Lanes	0	1	1	0	0	1	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	2
HCM Control Delay	13.7	13.4	14.2
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	32%	100%	0%	100%	0%	50%
Vol Thru, %	12%	0%	63%	0%	81%	45%
Vol Right, %	56%	0%	37%	0%	19%	5%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	285	5	230	190	240	110
LT Vol	35	0	145	0	195	50
Through Vol	160	0	85	0	45	5
RT Vol	90	5	0	190	0	55
Lane Flow Rate	294	5	237	196	247	113
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.477	0.011	0.422	0.365	0.424	0.212
Departure Headway (Hd)	5.848	7.34	6.409	6.709	6.171	6.722
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	611	485	557	535	581	530
Service Time	3.925	5.12	4.189	4.481	3.942	4.82
HCM Lane V/C Ratio	0.481	0.01	0.425	0.366	0.425	0.213
HCM Control Delay	14.2	10.2	13.8	13.3	13.5	11.6
HCM Lane LOS	B	B	B	B	B	B
HCM 95th-tile Q	2.6	0	2.1	1.7	2.1	0.8

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	55	50	5
Peak Hour Factor	0.92	0.97	0.97	0.97
Heavy Vehicles, %	2	13	6	33
Mvmt Flow	0	57	52	5
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	11.6
HCM LOS	B

Lane

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	10	5	5	15	40	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	17	0	33	20	3	10
Mvmt Flow	11	6	6	17	44	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	78	50	56	0	-	0
Stage 1	50	-	-	-	-	-
Stage 2	28	-	-	-	-	-
Critical Hdwy	6.57	6.2	4.43	-	-	-
Critical Hdwy Stg 1	5.57	-	-	-	-	-
Critical Hdwy Stg 2	5.57	-	-	-	-	-
Follow-up Hdwy	3.653	3.3	2.497	-	-	-
Pot Cap-1 Maneuver	889	1024	1372	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	957	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	885	1024	1372	-	-	-
Mov Cap-2 Maneuver	885	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	953	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	1.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1372	-	927	-	-
HCM Lane V/C Ratio	0.004	-	0.018	-	-
HCM Control Delay (s)	7.6	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection 3: 101 - Lewis & Clark Intersection. 3-Stop Approach Calculations. Future 2035 Average Weekday.

Id	1	2	3	4	5	6	7	8	9	10	11	12							
Movement	SBL	SBT	SBR	NBL	NBT	NBR	WBL	WBT	WBR	EBL	EBT	EBR			S	N	W	E	
Vi	65	125	10	30	75	5	5	40	40	10	50	45		Peds	0	0	0	0	
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90							
vi	72	139	11	33	83	6	6	44	44	11	56	50		vi	0	0	0	0	
vc,1													0			0		0	**0**
vc,2													0		0	0			**0**
vc,3													0			0	0		**0**
vc,4		139	6				6	22			28	13	213		0		0		**213**
vc,5	144						6	22	11	11	28		222		0	0			**222**
vc,6	144										28		172		0			0	**172**
vc,7	144	139		33	42						28	13	399		0			0	**399**
vc,8	144	139	6	33	42					11			375				0	0	**375**
vc,9					42					11			53			0		0	**53**
vc,10	144	139		33	42			22	11				392			0	0		**392**
vc,11	144	139		33	42	1	6						365				0	0	**365**
vc,12		139					6						144		0		0		**144**
vc,x	0	0	0	213	222	172	399	375	53	392	365	144							
tc,base				4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1							
PHV				0.04	0.06	0	0	0.03	0.08	0	0.06	0							
tc,x				4.14	4.16	4.1	4.1	4.13	4.18	4.1	4.16	4.1							
tf,base				3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5							
tf,x				3.536	3.554	3.5	3.5	3.527	3.572	3.5	3.554	3.5							
cp,x				883.4764	872.6304	918.1267	787.9792	793.23	972.9688	791.7301	791.0881	935.2505							

	SB	EB	WB			
vSH	122	94	117			
cp,SH	878	868	847			
p0,j,SH	0.15	0.12	0.15	d	e	f
cSH	803	793	769	g	h	i

LFS	EQ	RTS
475	=	439
480	=	434
453	=	424
803	<=	878
793	<=	868
769	<=	847

MAX	
2364.383	Objective Function
	Variable Cells
	Constraints
	Manually-Entered Values

OPERATIONS	NB	WB	EB	MAX
v/c	0.15	0.12	0.15	0.15
d	10.3	10.2	10.5	10.5
LOS	B	B	B	B

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	45	10	5	10	15	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	17	0	12	0	15
Mvmt Flow	50	11	6	11	17	33

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	17	0	-	0	122	11
Stage 1	-	-	-	-	11	-
Stage 2	-	-	-	-	111	-
Critical Hdwy	4.13	-	-	-	6.4	6.35
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.227	-	-	-	3.5	3.435
Pot Cap-1 Maneuver	1594	-	-	-	878	1033
Stage 1	-	-	-	-	1017	-
Stage 2	-	-	-	-	919	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1594	-	-	-	850	1033
Mov Cap-2 Maneuver	-	-	-	-	850	-
Stage 1	-	-	-	-	1017	-
Stage 2	-	-	-	-	890	-

Approach	EB	WB	SB
HCM Control Delay, s	6	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1594	-	-	-	964
HCM Lane V/C Ratio	0.031	-	-	-	0.052
HCM Control Delay (s)	7.3	0	-	-	8.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	25	35	25	35	50	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	6	3	15	3	0	5
Mvmt Flow	28	39	28	39	56	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	161	67	78	0	-	0
Stage 1	67	-	-	-	-	-
Stage 2	94	-	-	-	-	-
Critical Hdwy	6.46	6.23	4.25	-	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.327	2.335	-	-	-
Pot Cap-1 Maneuver	821	994	1442	-	-	-
Stage 1	946	-	-	-	-	-
Stage 2	920	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	805	994	1442	-	-	-
Mov Cap-2 Maneuver	805	-	-	-	-	-
Stage 1	946	-	-	-	-	-
Stage 2	902	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.3	3.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1442	-	905	-	-
HCM Lane V/C Ratio	0.019	-	0.074	-	-
HCM Control Delay (s)	7.5	0	9.3	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

HCM 2010 TWSC
6: Lewis and Clark Rd & Logan Rd (South)

8/4/2014

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	5	5	5	20	30	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	4	0	0
Mvmt Flow	6	6	6	22	33	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	66	33	33	0	-	0
Stage 1	33	-	-	-	-	-
Stage 2	33	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	944	1046	1592	-	-	-
Stage 1	995	-	-	-	-	-
Stage 2	995	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	940	1046	1592	-	-	-
Mov Cap-2 Maneuver	940	-	-	-	-	-
Stage 1	995	-	-	-	-	-
Stage 2	991	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	1.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1592	-	990	-	-
HCM Lane V/C Ratio	0.003	-	0.011	-	-
HCM Control Delay (s)	7.3	0	8.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	4.6					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	115	35	55	20	45	120
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	0	8	5	11	3
Mvmt Flow	128	39	61	22	50	133

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	261	117	183	0	-	0
Stage 1	117	-	-	-	-	-
Stage 2	144	-	-	-	-	-
Critical Hdwy	6.42	6.2	4.18	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.3	2.272	-	-	-
Pot Cap-1 Maneuver	728	941	1357	-	-	-
Stage 1	908	-	-	-	-	-
Stage 2	883	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	695	941	1357	-	-	-
Mov Cap-2 Maneuver	695	-	-	-	-	-
Stage 1	908	-	-	-	-	-
Stage 2	842	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	5.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1357	-	941	-	-
HCM Lane V/C Ratio	0.045	-	0.041	-	-
HCM Control Delay (s)	7.8	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	305	20	25	320	25	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	6	22	14	7	10	9
Mvmt Flow	321	21	26	337	26	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	342	0	721	332
Stage 1	-	-	-	-	332	-
Stage 2	-	-	-	-	389	-
Critical Hdwy	-	-	4.24	-	6.5	6.29
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.326	-	3.59	3.381
Pot Cap-1 Maneuver	-	-	1153	-	383	694
Stage 1	-	-	-	-	709	-
Stage 2	-	-	-	-	668	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1153	-	374	694
Mov Cap-2 Maneuver	-	-	-	-	374	-
Stage 1	-	-	-	-	709	-
Stage 2	-	-	-	-	653	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	13.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	452	-	-	1153	-
HCM Lane V/C Ratio	0.093	-	-	0.023	-
HCM Control Delay (s)	13.8	-	-	8.2	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	5	5	25	5	5	25
Conflicting Peds, #/hr	1	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	13	0	43	9
Mvmt Flow	5	5	26	5	5	26

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	67	30	0	0	33	0
Stage 1	30	-	-	-	-	-
Stage 2	37	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.53	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.587	-
Pot Cap-1 Maneuver	943	1050	-	-	1351	-
Stage 1	998	-	-	-	-	-
Stage 2	991	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	938	1049	-	-	1351	-
Mov Cap-2 Maneuver	938	-	-	-	-	-
Stage 1	997	-	-	-	-	-
Stage 2	987	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.7	0	1.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	990	1351	-
HCM Lane V/C Ratio	-	-	0.011	0.004	-
HCM Control Delay (s)	-	-	8.7	7.7	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	5	255	40	10	245	50	30	5	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	Yeild	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	40	5	0	0	4	9	0	12	0
Mvmt Flow	5	268	42	11	258	53	32	5	26

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	311	0	0	268	0	0	595	611	268
Stage 1	-	-	-	-	-	-	279	279	-
Stage 2	-	-	-	-	-	-	316	332	-
Critical Hdwy	4.5	-	-	4.1	-	-	7.1	6.62	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.62	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.62	-
Follow-up Hdwy	2.56	-	-	2.2	-	-	3.5	4.108	3.3
Pot Cap-1 Maneuver	1063	-	-	1307	-	-	419	396	776
Stage 1	-	-	-	-	-	-	732	662	-
Stage 2	-	-	-	-	-	-	699	627	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1063	-	-	1307	-	-	399	390	776
Mov Cap-2 Maneuver	-	-	-	-	-	-	399	390	-
Stage 1	-	-	-	-	-	-	728	658	-
Stage 2	-	-	-	-	-	-	671	621	-

Approach	EB	WB	NB
HCM Control Delay, s	0.1	0.3	13.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	499	1063	-	-	1307	-	-	401
HCM Lane V/C Ratio	0.127	0.005	-	-	0.008	-	-	0.236
HCM Control Delay (s)	13.3	8.4	0	-	7.8	0	-	16.7
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.9

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	70	15	5
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	5	0	0
Mvmt Flow	74	16	5

Major/Minor	Minor2		
Conflicting Flow All	600	584	284
Stage 1	305	305	-
Stage 2	295	279	-
Critical Hdwy	7.15	6.5	6.2
Critical Hdwy Stg 1	6.15	5.5	-
Critical Hdwy Stg 2	6.15	5.5	-
Follow-up Hdwy	3.545	4	3.3
Pot Cap-1 Maneuver	408	426	760
Stage 1	698	666	-
Stage 2	707	683	-
Platoon blocked, %			
Mov Cap-1 Maneuver	385	419	760
Mov Cap-2 Maneuver	385	419	-
Stage 1	694	659	-
Stage 2	673	679	-

Approach	SB
HCM Control Delay, s	16.7
HCM LOS	C

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	270	20	25	340	20	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Free	-	None	-	None
Storage Length	-	220	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	7	7	4	9	6	0
Mvmt Flow	284	21	26	358	21	21

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	284	0	695	284
Stage 1	-	-	-	-	284	-
Stage 2	-	-	-	-	411	-
Critical Hdwy	-	-	4.14	-	6.46	6.2
Critical Hdwy Stg 1	-	-	-	-	5.46	-
Critical Hdwy Stg 2	-	-	-	-	5.46	-
Follow-up Hdwy	-	-	2.236	-	3.554	3.3
Pot Cap-1 Maneuver	-	0	1267	-	402	760
Stage 1	-	0	-	-	755	-
Stage 2	-	0	-	-	661	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	1267	-	392	760
Mov Cap-2 Maneuver	-	-	-	-	392	-
Stage 1	-	-	-	-	755	-
Stage 2	-	-	-	-	644	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	12.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	WBL	WBT
Capacity (veh/h)	517	-	1267	-
HCM Lane V/C Ratio	0.081	-	0.021	-
HCM Control Delay (s)	12.6	-	7.9	0
HCM Lane LOS	B	-	A	A
HCM 95th %tile Q(veh)	0.3	-	0.1	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	625	20	80	575	30	80	120	140	25	65	105
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.92		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1630	1639		1554	1671		1511	1493		1551	1472	
Flt Permitted	0.95	1.00		0.95	1.00		0.48	1.00		0.26	1.00	
Satd. Flow (perm)	1630	1639		1554	1671		769	1493		431	1472	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	89	658	21	84	605	32	84	126	147	26	68	111
RTOR Reduction (vph)	0	1	0	0	1	0	0	60	0	0	85	0
Lane Group Flow (vph)	89	678	0	84	636	0	84	213	0	26	94	0
Confl. Peds. (#/hr)									2	2		
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	2%	6%	14%	7%	4%	3%	10%	2%	10%	7%	7%	6%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	8.6	51.5		8.6	51.5		16.0	16.0		16.0	16.0	
Effective Green, g (s)	8.6	52.9		8.6	52.9		16.5	16.5		16.5	16.5	
Actuated g/C Ratio	0.10	0.59		0.10	0.59		0.18	0.18		0.18	0.18	
Clearance Time (s)	4.0	5.4		4.0	5.4		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.5	4.5		2.5	4.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	155	963		148	982		140	273		79	269	
v/s Ratio Prot	c0.05	c0.41		0.05	0.38			c0.14			0.06	
v/s Ratio Perm							0.11			0.06		
v/c Ratio	0.57	0.70		0.57	0.65		0.60	0.78		0.33	0.35	
Uniform Delay, d1	38.9	13.0		38.9	12.3		33.7	35.0		31.9	32.1	
Progression Factor	1.00	1.00		0.64	1.61		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.2	4.3		3.5	2.8		5.7	12.6		1.8	0.6	
Delay (s)	43.1	17.4		28.3	22.8		39.4	47.6		33.7	32.6	
Level of Service	D	B		C	C		D	D		C	C	
Approach Delay (s)		20.3			23.4			45.7			32.8	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection							
Int Delay, s/veh	0.2						

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	300	5	5	340	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	6	20	71	9	0	50
Mvmt Flow	316	5	5	358	5	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	321	0	686	318
Stage 1	-	-	-	-	318	-
Stage 2	-	-	-	-	368	-
Critical Hdwy	-	-	4.81	-	6.4	6.7
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.839	-	3.5	3.75
Pot Cap-1 Maneuver	-	-	935	-	416	624
Stage 1	-	-	-	-	742	-
Stage 2	-	-	-	-	704	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	935	-	413	624
Mov Cap-2 Maneuver	-	-	-	-	413	-
Stage 1	-	-	-	-	742	-
Stage 2	-	-	-	-	699	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	12.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	497	-	-	935	-
HCM Lane V/C Ratio	0.021	-	-	0.006	-
HCM Control Delay (s)	12.4	-	-	8.9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	3.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	5	25	5	5	5	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	17	12	50	14	38	13
Mvmt Flow	5	26	5	5	5	21

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	32	0	34	18
Stage 1	-	-	-	-	18	-
Stage 2	-	-	-	-	16	-
Critical Hdwy	-	-	4.6	-	6.78	6.33
Critical Hdwy Stg 1	-	-	-	-	5.78	-
Critical Hdwy Stg 2	-	-	-	-	5.78	-
Follow-up Hdwy	-	-	2.65	-	3.842	3.417
Pot Cap-1 Maneuver	-	-	1319	-	895	1029
Stage 1	-	-	-	-	919	-
Stage 2	-	-	-	-	921	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1319	-	891	1029
Mov Cap-2 Maneuver	-	-	-	-	891	-
Stage 1	-	-	-	-	919	-
Stage 2	-	-	-	-	917	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.9	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	998	-	-	1319	-
HCM Lane V/C Ratio	0.026	-	-	0.004	-
HCM Control Delay (s)	8.7	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	2.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	5	25	80	5	45	145
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	50	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	4	4	0	0	1
Mvmt Flow	5	26	84	5	47	153

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	331	84	0	-	84	0
Stage 1	84	-	-	-	-	-
Stage 2	247	-	-	-	-	-
Critical Hdwy	6.4	6.24	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.336	-	-	2.2	-
Pot Cap-1 Maneuver	668	970	-	0	1526	-
Stage 1	944	-	-	0	-	-
Stage 2	799	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	647	970	-	-	1526	-
Mov Cap-2 Maneuver	647	-	-	-	-	-
Stage 1	944	-	-	-	-	-
Stage 2	774	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	1.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	647	970	1526	-
HCM Lane V/C Ratio	-	0.008	0.027	0.031	-
HCM Control Delay (s)	-	10.6	8.8	7.4	-
HCM Lane LOS	-	B	A	A	-
HCM 95th %tile Q(veh)	-	0	0.1	0.1	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	10	315	0	0	345	5	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	230	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	11	13	0	0	11	0	0	0	0
Mvmt Flow	11	332	0	0	363	5	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	368	0	0	332	0	0	724	721	332
Stage 1	-	-	-	-	-	-	353	353	-
Stage 2	-	-	-	-	-	-	371	368	-
Critical Hdwy	4.21	-	-	4.1	-	-	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.299	-	-	2.2	-	-	3.5	4	3.3
Pot Cap-1 Maneuver	1143	-	-	1239	-	-	344	356	714
Stage 1	-	-	-	-	-	-	668	634	-
Stage 2	-	-	-	-	-	-	653	625	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1143	-	-	1239	-	-	336	353	714
Mov Cap-2 Maneuver	-	-	-	-	-	-	336	353	-
Stage 1	-	-	-	-	-	-	662	628	-
Stage 2	-	-	-	-	-	-	642	625	-

Approach	EB	WB	NB
HCM Control Delay, s	0.3	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1143	-	-	1239	-	-	438
HCM Lane V/C Ratio	-	0.009	-	-	-	-	-	0.036
HCM Control Delay (s)	0	8.2	-	-	0	-	-	13.5
HCM Lane LOS	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.1

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	0	10
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	67	0	22
Mvmt Flow	5	0	11

Major/Minor	Minor2		
Conflicting Flow All	719	719	366
Stage 1	366	366	-
Stage 2	353	353	-
Critical Hdwy	7.77	6.5	6.42
Critical Hdwy Stg 1	6.77	5.5	-
Critical Hdwy Stg 2	6.77	5.5	-
Follow-up Hdwy	4.103	4	3.498
Pot Cap-1 Maneuver	272	357	637
Stage 1	539	626	-
Stage 2	549	634	-
Platoon blocked, %			
Mov Cap-1 Maneuver	270	354	637
Mov Cap-2 Maneuver	270	354	-
Stage 1	534	626	-
Stage 2	544	628	-

Approach	SB
HCM Control Delay, s	13.5
HCM LOS	B

Minor Lane/Major Mvmt

Intersection									
Int Delay, s/veh	4.2								

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	75	360	25	20	330	45	25	5	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	14	5	6	12	10	0	0	10
Mvmt Flow	79	379	26	21	347	47	26	5	11

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	396	0	0	406	0	0	1005	989	393
Stage 1	-	-	-	-	-	-	551	551	-
Stage 2	-	-	-	-	-	-	454	438	-
Critical Hdwy	4.15	-	-	4.16	-	-	7.1	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.254	-	-	3.5	4	3.39
Pot Cap-1 Maneuver	1146	-	-	1131	-	-	222	249	639
Stage 1	-	-	-	-	-	-	522	519	-
Stage 2	-	-	-	-	-	-	589	582	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1146	-	-	1131	-	-	179	227	638
Mov Cap-2 Maneuver	-	-	-	-	-	-	179	227	-
Stage 1	-	-	-	-	-	-	486	483	-
Stage 2	-	-	-	-	-	-	509	571	-

Approach	EB	WB	NB
HCM Control Delay, s	1.4	0.4	24.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	226	1146	-	-	1131	-	-	342
HCM Lane V/C Ratio	0.186	0.069	-	-	0.019	-	-	0.354
HCM Control Delay (s)	24.5	8.4	-	-	8.2	-	-	21.2
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.7	0.2	-	-	0.1	-	-	1.6

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	40	10	65
Conflicting Peds, #/hr	1	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	6	0	7
Mvmt Flow	42	11	68

Major/Minor	Minor2		
Conflicting Flow All	973	978	372
Stage 1	414	414	-
Stage 2	559	564	-
Critical Hdwy	7.16	6.5	6.27
Critical Hdwy Stg 1	6.16	5.5	-
Critical Hdwy Stg 2	6.16	5.5	-
Follow-up Hdwy	3.554	4	3.363
Pot Cap-1 Maneuver	228	252	663
Stage 1	608	597	-
Stage 2	506	512	-
Platoon blocked, %			
Mov Cap-1 Maneuver	206	230	662
Mov Cap-2 Maneuver	206	230	-
Stage 1	566	585	-
Stage 2	458	476	-

Approach	SB
HCM Control Delay, s	21.2
HCM LOS	C

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	5	5	0	5	20	45	0	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	17	0	50	10	2	0	100	0
Mvmt Flow	6	6	0	6	22	50	0	6	6

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	72	0	0	6	0	0	81	100	6
Stage 1	-	-	-	-	-	-	17	17	-
Stage 2	-	-	-	-	-	-	64	83	-
Critical Hdwy	4.1	-	-	4.6	-	-	7.1	7.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	6.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	6.5	-
Follow-up Hdwy	2.2	-	-	2.65	-	-	3.5	4.9	3.3
Pot Cap-1 Maneuver	1541	-	-	1351	-	-	912	638	1083
Stage 1	-	-	-	-	-	-	1008	721	-
Stage 2	-	-	-	-	-	-	952	669	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1541	-	-	1351	-	-	895	632	1083
Mov Cap-2 Maneuver	-	-	-	-	-	-	895	632	-
Stage 1	-	-	-	-	-	-	1004	718	-
Stage 2	-	-	-	-	-	-	934	666	-

Approach	EB	WB	NB
HCM Control Delay, s	3.7	0.5	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	798	1541	-	-	1351	-	-	873
HCM Lane V/C Ratio	0.014	0.004	-	-	0.004	-	-	0.057
HCM Control Delay (s)	9.6	7.3	0	-	7.7	0	-	9.4
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.2

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	35	5	5
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	90	90	90
Heavy Vehicles, %	0	100	0
Mvmt Flow	39	6	6

Major/Minor	Minor2		
Conflicting Flow All	80	75	47
Stage 1	58	58	-
Stage 2	22	17	-
Critical Hdwy	7.1	7.5	6.2
Critical Hdwy Stg 1	6.1	6.5	-
Critical Hdwy Stg 2	6.1	6.5	-
Follow-up Hdwy	3.5	4.9	3.3
Pot Cap-1 Maneuver	913	661	1028
Stage 1	959	688	-
Stage 2	1002	721	-
Platoon blocked, %			
Mov Cap-1 Maneuver	896	655	1028
Mov Cap-2 Maneuver	896	655	-
Stage 1	955	685	-
Stage 2	985	718	-

Approach	SB
HCM Control Delay, s	9.4
HCM LOS	A

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	2.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	35	25	5	35	25	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	20
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	10	0	4	17	50
Mvmt Flow	37	26	5	37	26	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	63	0	97	50
Stage 1	-	-	-	-	50	-
Stage 2	-	-	-	-	47	-
Critical Hdwy	-	-	4.1	-	6.57	6.7
Critical Hdwy Stg 1	-	-	-	-	5.57	-
Critical Hdwy Stg 2	-	-	-	-	5.57	-
Follow-up Hdwy	-	-	2.2	-	3.653	3.75
Pot Cap-1 Maneuver	-	-	1553	-	867	898
Stage 1	-	-	-	-	935	-
Stage 2	-	-	-	-	938	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1553	-	864	898
Mov Cap-2 Maneuver	-	-	-	-	864	-
Stage 1	-	-	-	-	935	-
Stage 2	-	-	-	-	935	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	864	898	-	-	1553	-
HCM Lane V/C Ratio	0.03	0.006	-	-	0.003	-
HCM Control Delay (s)	9.3	9	-	-	7.3	0
HCM Lane LOS	A	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	5	5	35	5	20	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	7	33	0	2
Mvmt Flow	5	5	37	5	21	74

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	155	39	0	0	42	0
Stage 1	39	-	-	-	-	-
Stage 2	116	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	841	1038	-	-	1580	-
Stage 1	989	-	-	-	-	-
Stage 2	914	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	829	1038	-	-	1580	-
Mov Cap-2 Maneuver	829	-	-	-	-	-
Stage 1	989	-	-	-	-	-
Stage 2	901	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	1.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	922	1580	-
HCM Lane V/C Ratio	-	-	0.011	0.013	-
HCM Control Delay (s)	-	-	9	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	10	20	5	10	10	30	5	55	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	15	0	0	0	4	0	5	0
Mvmt Flow	11	22	6	11	11	33	6	61	11

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	44	0	0	28	0	0	147	114	25
Stage 1	-	-	-	-	-	-	47	47	-
Stage 2	-	-	-	-	-	-	100	67	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.55	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.55	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.045	3.3
Pot Cap-1 Maneuver	1577	-	-	1599	-	-	826	771	1057
Stage 1	-	-	-	-	-	-	972	850	-
Stage 2	-	-	-	-	-	-	911	833	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1577	-	-	1599	-	-	739	760	1057
Mov Cap-2 Maneuver	-	-	-	-	-	-	739	760	-
Stage 1	-	-	-	-	-	-	965	844	-
Stage 2	-	-	-	-	-	-	805	827	-

Approach	EB	WB	NB
HCM Control Delay, s	2.1	1.5	10.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	790	1577	-	-	1599	-	-	809
HCM Lane V/C Ratio	0.098	0.007	-	-	0.007	-	-	0.199
HCM Control Delay (s)	10.1	7.3	0	-	7.3	0	-	10.6
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.7

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	55	65	25
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	90	90	90
Heavy Vehicles, %	2	4	4
Mvmt Flow	61	72	28

Major/Minor	Minor2		
Conflicting Flow All	133	100	28
Stage 1	50	50	-
Stage 2	83	50	-
Critical Hdwy	7.12	6.54	6.24
Critical Hdwy Stg 1	6.12	5.54	-
Critical Hdwy Stg 2	6.12	5.54	-
Follow-up Hdwy	3.518	4.036	3.336
Pot Cap-1 Maneuver	839	786	1041
Stage 1	963	849	-
Stage 2	925	849	-
Platoon blocked, %			
Mov Cap-1 Maneuver	771	775	1041
Mov Cap-2 Maneuver	771	775	-
Stage 1	956	843	-
Stage 2	843	843	-

Approach	SB
HCM Control Delay, s	10.6
HCM LOS	B

Minor Lane/Major Mvmt

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	320	20	45	640	635	370
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1599	1488	1662	1716	1716	1381
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1599	1488	1662	1716	1716	1381
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	337	21	47	674	668	389
RTOR Reduction (vph)	0	16	0	0	0	80
Lane Group Flow (vph)	337	5	47	674	668	309
Confl. Peds. (#/hr)			1			1
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	4%	0%	0%	2%	2%	6%
Turn Type	Prot	Perm	Prot	NA	NA	pm+ov
Protected Phases	8		1	6	2	8
Permitted Phases		8				2
Actuated Green, G (s)	21.8	21.8	5.0	58.8	49.8	71.6
Effective Green, g (s)	21.8	21.8	5.0	60.2	51.2	71.6
Actuated g/C Ratio	0.24	0.24	0.06	0.67	0.57	0.80
Clearance Time (s)	4.0	4.0	4.0	5.4	5.4	4.0
Vehicle Extension (s)	2.5	2.5	2.5	4.7	4.7	2.5
Lane Grp Cap (vph)	387	360	92	1147	976	1098
v/s Ratio Prot	c0.21		0.03	c0.39	c0.39	0.07
v/s Ratio Perm		0.00				0.16
v/c Ratio	0.87	0.01	0.51	0.59	0.68	0.28
Uniform Delay, d1	32.7	25.9	41.3	8.1	13.7	2.4
Progression Factor	1.00	1.00	0.95	1.02	1.00	1.00
Incremental Delay, d2	18.7	0.0	3.3	2.0	3.9	0.1
Delay (s)	51.4	25.9	42.7	10.3	17.6	2.5
Level of Service	D	C	D	B	B	A
Approach Delay (s)	49.9			12.4	12.0	
Approach LOS	D			B	B	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	5	455	5	10	315	5	5	0	10
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	9	25	0	15	25	0	0	25
Mvmt Flow	5	479	5	11	332	5	5	0	11

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	337	0	0	484	0	0	847	850	483
Stage 1	-	-	-	-	-	-	492	492	-
Stage 2	-	-	-	-	-	-	355	358	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.525
Pot Cap-1 Maneuver	1234	-	-	1089	-	-	284	300	539
Stage 1	-	-	-	-	-	-	562	551	-
Stage 2	-	-	-	-	-	-	666	631	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1233	-	-	1088	-	-	278	295	539
Mov Cap-2 Maneuver	-	-	-	-	-	-	278	295	-
Stage 1	-	-	-	-	-	-	559	548	-
Stage 2	-	-	-	-	-	-	653	623	-

Approach	EB	WB	NB
HCM Control Delay, s	0.1	0.3	14.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	411	1233	-	-	1088	-	-	544
HCM Lane V/C Ratio	0.038	0.004	-	-	0.01	-	-	0.019
HCM Control Delay (s)	14.1	7.9	0	-	8.3	0	-	11.7
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	0	5
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	Stop
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	0	0	0
Mvmt Flow	5	0	5

Major/Minor	Minor2		
Conflicting Flow All	852	850	335
Stage 1	355	355	-
Stage 2	497	495	-
Critical Hdwy	7.1	6.5	6.2
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.3
Pot Cap-1 Maneuver	282	300	712
Stage 1	666	633	-
Stage 2	559	549	-
Platoon blocked, %			
Mov Cap-1 Maneuver	272	295	711
Mov Cap-2 Maneuver	272	295	-
Stage 1	662	625	-
Stage 2	544	546	-

Approach	SB
HCM Control Delay, s	11.7
HCM LOS	B

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	10	395	95	35	340	5	60	5	30
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	215	-	160	190	-	120	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	11	8	13	9	0	9	0	4
Mvmt Flow	11	416	100	37	358	5	63	5	32

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	358	0	0	416	0	0	874	869	417
Stage 1	-	-	-	-	-	-	437	437	-
Stage 2	-	-	-	-	-	-	437	432	-
Critical Hdwy	4.1	-	-	4.23	-	-	7.19	6.5	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.19	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.19	5.5	-
Follow-up Hdwy	2.2	-	-	2.317	-	-	3.581	4	3.336
Pot Cap-1 Maneuver	1212	-	-	1086	-	-	263	292	632
Stage 1	-	-	-	-	-	-	585	583	-
Stage 2	-	-	-	-	-	-	585	586	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1211	-	-	1085	-	-	249	279	631
Mov Cap-2 Maneuver	-	-	-	-	-	-	249	279	-
Stage 1	-	-	-	-	-	-	580	578	-
Stage 2	-	-	-	-	-	-	555	566	-

Approach	EB	WB	NB
HCM Control Delay, s	0.2	0.8	22
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	310	1211	-	-	1085	-	-	327
HCM Lane V/C Ratio	0.323	0.009	-	-	0.034	-	-	0.048
HCM Control Delay (s)	22	8	-	-	8.4	-	-	16.6
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	1.4	0	-	-	0.1	-	-	0.2

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	5	5
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	0	0	0
Mvmt Flow	5	5	5

Major/Minor	Minor2		
Conflicting Flow All	887	869	359
Stage 1	432	432	-
Stage 2	455	437	-
Critical Hdwy	7.1	6.5	6.2
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.3
Pot Cap-1 Maneuver	267	292	690
Stage 1	606	586	-
Stage 2	589	583	-
Platoon blocked, %			
Mov Cap-1 Maneuver	242	279	689
Mov Cap-2 Maneuver	242	279	-
Stage 1	600	566	-
Stage 2	549	578	-

Approach	SB
HCM Control Delay, s	16.6
HCM LOS	C

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	15	5	125	0	0	5	170	680	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	Free
Storage Length	-	-	-	-	-	-	340	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	10	0	0	0	11	5	20
Mvmt Flow	16	5	132	0	0	5	179	716	16

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	1532	1890	403	1490	1890	358	805	0	-
Stage 1	816	816	-	1074	1074	-	-	-	-
Stage 2	716	1074	-	416	816	-	-	-	-
Critical Hdwy	7.5	6.5	7.1	7.5	6.5	6.9	4.32	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-
Follow-up Hdwy	3.5	4	3.4	3.5	4	3.3	2.31	-	-
Pot Cap-1 Maneuver	81	71	575	87	71	644	759	-	0
Stage 1	341	393	-	238	299	-	-	-	0
Stage 2	392	299	-	590	393	-	-	-	0
Platoon blocked, %								-	
Mov Cap-1 Maneuver	65	54	575	51	54	644	759	-	-
Mov Cap-2 Maneuver	65	54	-	51	54	-	-	-	-
Stage 1	261	391	-	182	228	-	-	-	-
Stage 2	297	228	-	446	391	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	34.8	10.6	2.2
HCM LOS	D	B	

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBL	SBT
Capacity (veh/h)	759	-	268	644	894	-
HCM Lane V/C Ratio	0.236	-	0.57	0.008	0.006	-
HCM Control Delay (s)	11.2	-	34.8	10.6	9.1	-
HCM Lane LOS	B	-	D	B	A	-
HCM 95th %tile Q(veh)	0.9	-	3.2	0	0	-

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	765	25
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	Free
Storage Length	300	-	110
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	0	4	9
Mvmt Flow	5	805	26

Major/Minor	Major2		
Conflicting Flow All	716	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.1	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.2	-	-
Pot Cap-1 Maneuver	894	-	0
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %		-	
Mov Cap-1 Maneuver	894	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	SB
HCM Control Delay, s	0.1
HCM LOS	

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	5	35	50	150	115	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	4	5	12	6	0
Mvmt Flow	5	37	53	158	121	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	387	124	126	0	-	0
Stage 1	124	-	-	-	-	-
Stage 2	263	-	-	-	-	-
Critical Hdwy	6.4	6.24	4.15	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.336	2.245	-	-	-
Pot Cap-1 Maneuver	620	921	1442	-	-	-
Stage 1	907	-	-	-	-	-
Stage 2	786	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	595	921	1442	-	-	-
Mov Cap-2 Maneuver	595	-	-	-	-	-
Stage 1	907	-	-	-	-	-
Stage 2	755	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	1.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1442	-	862	-	-
HCM Lane V/C Ratio	0.036	-	0.049	-	-
HCM Control Delay (s)	7.6	0	9.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Intersection	
Int Delay, s/veh	8.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	105	210	155	65	125	100
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	4	2	4	5	1	5
Mvmt Flow	111	221	163	68	132	105

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	565	199	0	0	232	0
Stage 1	197	-	-	-	-	-
Stage 2	368	-	-	-	-	-
Critical Hdwy	6.44	6.22	-	-	4.11	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.318	-	-	2.209	-
Pot Cap-1 Maneuver	483	842	-	-	1342	-
Stage 1	831	-	-	-	-	-
Stage 2	696	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	435	841	-	-	1340	-
Mov Cap-2 Maneuver	435	-	-	-	-	-
Stage 1	831	-	-	-	-	-
Stage 2	626	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.5	0	4.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	641	1340	-
HCM Lane V/C Ratio	-	-	0.517	0.098	-
HCM Control Delay (s)	-	-	16.5	8	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	3	0.3	-

Intersection						
Int Delay, s/veh	3.4					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	50	35	30	785	815	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Free
Storage Length	0	70	230	-	-	175
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	13	6	10	4	4	4
Mvmt Flow	53	37	32	826	858	74

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1747	858	858	0	-	0
Stage 1	858	-	-	-	-	-
Stage 2	889	-	-	-	-	-
Critical Hdwy	6.53	6.26	4.2	-	-	-
Critical Hdwy Stg 1	5.53	-	-	-	-	-
Critical Hdwy Stg 2	5.53	-	-	-	-	-
Follow-up Hdwy	3.617	3.354	2.29	-	-	-
Pot Cap-1 Maneuver	89	351	750	-	-	0
Stage 1	398	-	-	-	-	0
Stage 2	384	-	-	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	85	351	750	-	-	-
Mov Cap-2 Maneuver	85	-	-	-	-	-
Stage 1	398	-	-	-	-	-
Stage 2	368	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	65.6	0.4	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	750	-	85	351	-
HCM Lane V/C Ratio	0.042	-	0.619	0.105	-
HCM Control Delay (s)	10	-	100	16.5	-
HCM Lane LOS	B	-	F	C	-
HCM 95th %tile Q(veh)	0.1	-	2.9	0.3	-

Section H:

Memorandum 8-Transportation Solutions Identification Process

MEMORANDUM

DATE: June 19, 2014

TO: Clatsop County TSP Project Management Team

FROM: Chris Maciejewski, PE, PTOE - DKS Associates
Kevin Chewuk, PTP - DKS Associates

SUBJECT: Clatsop County Transportation System Plan
Technical Memorandum #8: Transportation Solutions Identification Process P11086-016

This memorandum describes the recommended process for creating a prioritized list of transportation improvements that best achieves Clatsop County's objectives with the funding that is expected to be available. The outcome of this process will result in "Aspirational" and "Financially Constrained" lists of projects. The Aspirational list includes all projects that the County would implement if funding was not a constraint. The Financially Constrained list is a subset of the Aspirational list including high-priority projects that fit within the level of anticipated funding.

Developing the Financially Constrained Plan

The following process will be utilized to develop the Financially Constrained Transportation System Plan:

Step 1. Identify Expected Funding: The first step is to identify the expected amount of funding the County will have available through 2035 to build transportation system improvements. The estimates will be broken out by funding responsibility (County, State, or developer) and will be based on historic revenue and expenditure data and an assumption that past trends will continue into the future. State funding estimates will be determined in coordination with ODOT Region 2 staff.

Step 2. Develop Set of Aspirational Projects: This step involves developing an Aspirational list of projects to address the needs of the future transportation system for all modes, as identified in Technical Memorandum #7. At this point, the list of projects will not be constrained by funding.

The recommended approach for the TSP update will identify solutions by following a four-step process, considering solutions from top to bottom until finding a viable solution is identified. The process will first consider a solution for a particular transportation need that would manage the performance of congested or unsafe locations with strategies that reduce traffic conflicts, increase safety, and encourage more efficient usage of the transportation system. Next, a solution to reduce the driving demand at congested locations by improving walking, biking and transit options will be considered. Street extensions to create parallel routes and reduce the driving demand on congested facilities will be considered next. Finally, a solution that would expand existing streets or intersections to increase the driving capacity of the facility will be considered. This final category also includes new streets in developing areas.

Step 3. **Develop Cost Estimates:** Cost estimates will be developed for each Aspirational project and compared to expected funding for projects through 2035 (from Step 1). Each project will be assigned a primary funding responsibility (County, State, or developer).

Step 4. **Alternatives Evaluation:** Each project from the Aspirational project list will be scored based on the evaluation criteria that was developed in Technical Memorandum #4. In situations where multiple project alternatives are available to address the same or conflicting transportation system needs, the evaluation criteria will be used to identify the project that will best meet the goals of the TSP. The project scoring highest will be retained on the Aspirational project list.

Step 5. **Group Projects into Reasonably Fundable Packages:** Projects will then be grouped into packages of solutions that could reasonably be expected to be funded and implemented through 2035. The packages will include a prioritized list of County responsible projects, and a prioritized list of State responsible projects that the County could use to make decisions for applying for grants or other funding mechanisms. Developer responsible projects will be built in coordination with land use actions and future development. Only projects associated with new development on vacant parcels will be assumed to occur within the planning horizon of the TSP. While projects related to property re-development may occur within the TSP planning horizon, no funding will be assumed.

Step 6. **Develop Hybrid Package of Solutions:** The packages will be compared and discussed, which may lead to further refinement of the evaluation criteria or the emergence of a hybrid package to be included as the “Financially Constrained Transportation System.” Projects that do not make the Financially Constrained list will be assigned a priority for implementation beyond the funded list of projects based on individual project scores.

Section I:

Memorandum 9- Funding Assumptions

MEMORANDUM

DATE: August 18, 2014

TO: Clatsop County TSP Project Management Team

FROM: Chris Maciejewski, PE, PTOE - DKS Associates
Kevin Chewuk, PTP - DKS Associates

**SUBJECT: Clatsop County Transportation System Plan
Technical Memorandum #9: Funding Assumptions** P11086-016

This document details the transportation funding that is expected to be available through 2035. The funding assumptions will help prioritize the investments the County can make in the transportation system, and will be utilized to develop reasonable budgeting assumptions when selecting a set of transportation improvements to meet identified needs through 2035.

Current Funding Sources

The County uses three general funding sources for transportation, including funds from the Surface Transportation Program (STP), State Highway Trust Fund, and a Road District. Federal Highway Trust Funds are received from federal motor vehicle fuel tax and truck-related weight mile charges. The six-year Federal Transportation Authorization Act allocates funds through various programs. Federal Highway Trust Funds from the Surface Transportation Program (STP) flow to the states that use them primarily for safety, highway, and bridge projects. Clatsop County receives a portion of these funds based upon actual population.

The State Highway Trust Fund makes distributions from the state motor vehicle fuel tax, vehicle registration fees, and truck weight-mile fees on a per capita basis. Cities and counties receive a share of State Highway Trust Fund monies, and by statute may use the money for any road-related purpose, including walking, biking, bridge, street, signal, and safety improvements.

The state gas tax funds previously have failed to keep up with cost increases and inflation. With increased fuel efficiency of vehicles and the State's emphasis on reducing vehicle miles traveled, the real revenue collected gradually has eroded over time. In an effort to offset the relative decline in contribution of state funds, the 2009 legislature recently passed the Oregon Jobs and Transportation Act (Oregon House Bill 2001). It increases transportation-related fees including the state gas tax and vehicle registration fees as a fixed amount at the time a vehicle is registered with the Department of Motor Vehicles. Vehicle registration fees in Oregon increased from $27 to $43 per vehicle per year for passenger cars, with similar increases for other vehicle types. The gas tax in Oregon increased on January 1, 2011 by six cents, to 30 cents per gallon, the first increase in the state gas tax since 1993.

Clatsop County also has a road taxing district that was formed by public vote in the late 1980s. Road District #1 is governed by the Clatsop County Board of Commissioners. The road district funds may be used for the maintenance and improvements, personnel, and equipment for the county roads within Clatsop County.

Revenues: The TSP projects current revenue sources to provide over $119.0 million through 2035 (see Table 1). Over the past five years, Clatsop County averaged annually $155,000 in Surface Transportation Program revenue, $2.1 million in State gas tax and vehicle registration fee revenue, and $1.8 million in Road District tax revenue. Assuming, as a conservative estimate,[1] the same levels in the future, Clatsop County can expect to receive through 2035, nearly $86 million in Surface Transportation Program, State gas tax and license fee, Road District tax revenue.

State law requires that the County must set aside a minimum of one percent of the State gas tax and vehicle registration funds received for construction and maintenance of walking and bicycling facilities. In Clatsop County, this represents approximately $20,000 per year and over $420,000 through 2035.

The County received approximately $1.5 million in other revenues over the past five years. Keeping this revenue level consistent, this represents about $33.0 million through 2035.

Expenditures: Expenditures will top $118.0 million through 2035, assuming an annual escalation rate of 3.2 percent on the average expenditures over the past five years. [2] The County will spend the majority of the funds (nearly $112 million through 2035) on materials and services and personnel services. In addition, the County will spend over $6 million on capital outlay and other expenditures.

[1] This assumes the population growth rate in Clatsop County will be roughly the same as the cost inflation rate, therefore, maintaining existing revenues through 2035.

[2] Escalation rate of 3.2 percent, based on the Construction Cost Index during August 2014.

Table 1: Clatsop County Funding (2014 Dollars)

Revenue Source	Average Annual Amount	Estimated Amount Through 2035
Surface Transportation Program (STP)	$155,000	$3,255,000
State Gas Tax and License Fees	$2,105,000	$44,205,000
Bikeway/Walkway (1% of State Gas Tax and License Fees)	$20,000	$420,000
Road District Tax	$1,830,000	$38,430,000
Other	$1,570,000	$32,970,000
Total Revenue (5-year Average)	***$5,680,000***	***$119,280,000***
Expenditures	**Average Annual Amount**	**Estimated Amount Through 2035**
Personnel Services	$2,585,000	$54,285,000.00
Materials and Services	$2,745,000	$57,645,000.00
Capital Outlay	$15,000	$315,000.00
Other	$280,000	$5,880,000.00
Total Expenditures (5-year Average)	***$5,625,000***	***$118,125,000***
Expected Funds for Capital Improvements	**Average Annual Amount**	**Estimated Amount Through 2035**
Net Revenue (Revenues – Expenditures)	$230,000	$1,155,000
Existing Fund Balances (2013-14 Fiscal Year)*		$2,585,000
Total Funds for County Street Improvement Needs (Net Revenue + Existing Balance)		**$3,740,000**

*Includes beginning fund balance of $2,295,000 from the Road Maintenance and Construction Fund and $290,000 from the Bike Path Fund.

Funding Summary

Based on current funding levels, the County expects to have $3.7 million to fund projects in the TSP. In addition, the County expects to receive between $8 and $10 million from the state to cover investments along state highways over the next 20 years. The County may wish to consider expanding its funding options in order to fund more of the desired improvements in a timely manner.

Potential Additional Funding Sources

New transportation funding options include local taxes, assessments and charges, and state and federal appropriations, grants, and loans. Factors that constrain these resources, include the willingness of local leadership and the electorate to burden citizens and businesses with taxes and fees; the portion of available local funds dedicated or diverted to transportation issues from other competing County programs; and the availability of state and federal funds. The County must consider all opportunities for providing or enhancing funding for the transportation improvements included in the TSP.

Counties and cities have used the following sources to fund the capital and maintenance aspects of their transportation programs. As described below, they may help to address existing or new needs identified in Clatsop County's TSP.

Local Fuel Tax

Fourteen cities (including Newport and Astoria) and two counties in Oregon have adopted local gas taxes ranging from one to five cents per gallon. The fuel distributers pay collected taxes to the jurisdictions monthly. Newport increases its local gas tax during the summer months to place more of a burden on visitors than on year-round residents. Clatsop County also may want to implement a local gas tax. The process for presenting such a tax to voters would need to be consistent with Oregon State law as well as the laws of the City.

System Development Charges

System development charges (SDC) are fees collected from new development and used as a funding source for all capacity adding projects for the transportation system. The funds collected can be used to construct or improve portions of roadways impacted by applicable development. The SDC is collected from new development and is a one-time fee. The fee is based on the proposed land use and size, and is proportional to each land use's potential PM peak hour vehicle trip generation. The Clatsop County does not currently collect SDCs. The County may wish to pursue vehicle and/or pedestrian and bicycle SDC's to fund transportation projects for new developments. Many of the transportation improvements in the TSP would be 100 percent fundable through SDC's. If an SDC rate program is desired, a rate study would be required to determine appropriate fees based on capacity projects costs, growth potential, and local preferences.

ODOT Statewide Transportation Improvement Program (STIP) Enhance Funding

ODOT has modified the process for selecting projects that receive STIP funding to allow local agencies to receive funding for projects off the state system. Projects that enhance system connectivity and improve multi-modal travel options are the focus. The updated TSP prepares the city to apply for STIP funding.

ODOT Highway Safety Improvement Program (HSIP) Funding

With significantly more funding under the HSIP and direction from the Federal Highway Administration to address safety challenges on all public roads, ODOT will increase the amount of funding available for safety projects on local roads. ODOT will distribute safety funding to each

ODOT region, which will collaborate with local governments to select projects that can reduce fatalities and serious injuries, regardless of whether they lie on a local road or a state highway.

ODOT expects to start its jurisdictionally blind safety approach in 2017 for the 2019-2021 STIP. Meanwhile, ODOT intends to implement a transition plan for 2013-2016 to bridge the gap by allocating funding for local roads primarily focused on a few systemic low cost fixes implemented in the shorter timeframe.[3]

Local Improvement Districts

Local Improvement Districts (LIDs) can fund capital transportation projects that benefit a specific group of property owners. LIDs require owner/voter approval and a specific project definition. Assessments against benefiting properties pay for improvements. LIDs can supply match for other funds where a project has system wide benefit beyond benefiting the adjacent properties. LIDs are often used for sidewalks and pedestrian amenities that provide local benefit to residents along the subject street. Property owners pay fees through property tax bills over a specified number of years.

Fee in Lieu of Improvements

As infill development occurs along existing streets, cities and counties often defers improvements, such as sidewalks, curbs, gutters, stormwater conveyance, and in cases where the existing street is gravel, paving. The agency chooses to defer improvements for many reasons. For example, deferrals avoid sidewalk installation where unnecessary, avoids isolated sections of sidewalk " to nowhere", and avoids sidewalk sections that do not match adjoining sections in alignment and slope. When applying for a building permit, the property owner signs a "Deferred Improvement Agreement" (DIA) that allows the development to occur without construction of the public improvements. For many residential properties developed after 1990, deeds include a DIA in which the property owner agrees to construct frontage improvements or participate in a local improvement district to enact the DIAs whenever the agency determines improvements are needed. As an alternative to collecting DIAs, the County could at the time of construction collect a fee that would go into a fund designated for improvements in the neighborhood of the property, as identified in the TSP. A fee would be easier to administer and more quickly put to use.

Debt Financing

A community can use debt financing to pay for significant capital improvement projects and spread costs over the useful life of a project. This equitable funding strategy spreads the burden of repayment over existing and future customers who will benefit from the projects. Debt service must have a funding source to fulfill annual interest and repayment obligations.

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[3] ODOT Jurisdictionally Blind Safety Program

Section J:
Memorandum 10-
Transportation Standards

MEMORANDUM

DATE: July 15, 2014

TO: Clatsop County TSP Project Management Team

FROM: Chris Maciejewski, PE, PTOE - DKS Associates
Kevin Chewuk, PTP - DKS Associates

SUBJECT: Clatsop County Transportation System Plan
Technical Memorandum #10: Transportation Standards P11086-016

This document provides an overview of the street system standards for Clatsop County. Included is a detail of the multi-modal street system hierarchy, an overview of street design types and documentation of standards and regulations developed to ensure future development or redevelopment of property is consistent with the vision of the transportation system in Clatsop County.

Functional Classification

Traditionally, roadways are classified based on the type of vehicular travel they are intended to serve (local versus through traffic). In Clatsop County, the functional classification of a roadway (shown in Figure 1) determines the level of mobility for all travel modes, defining its level of access and usage within the County. The street functional classification system recognizes that individual streets do not act independently of one another but instead form a network that works together to serve travel needs on a local and regional level. From highest to lowest intended usage, the classifications are: principal arterial, minor arterial, major collector, minor collector, and local streets. Roadways with a higher intended usage generally provide more efficient motor vehicle traffic movement (or mobility) through the County, while roadways with lower intended usage (local streets) provide greater access for shorter trips to local destinations.

- **Principal Arterials** are state roadways. These roadways serve the highest volume of motor vehicle traffic and are primarily utilized for longer distance regional trips.
- **Minor Arterials** are intended to move traffic between principal arterials and major collector roadways. These roadways generally experience higher traffic volumes and often act as a corridor connecting many parts of the County.
- **Major Collectors** are intended to serve local traffic traveling to and from principal arterial or minor arterial roadways. These roadways provide greater accessibility to neighborhoods, often connecting to major activity generators and provide efficient through movement for local traffic.

- **Minor Collectors** often connect the neighborhoods to the major collector roadways. These roadways serve as major neighborhood routes and generally provide more direct property access or driveways than arterial or major collector roadways.
- **Locals** provide more direct access to residences in Clatsop County. These roadways are often lined with residences and are designed to serve lower volumes of traffic.

Functional Classification Changes

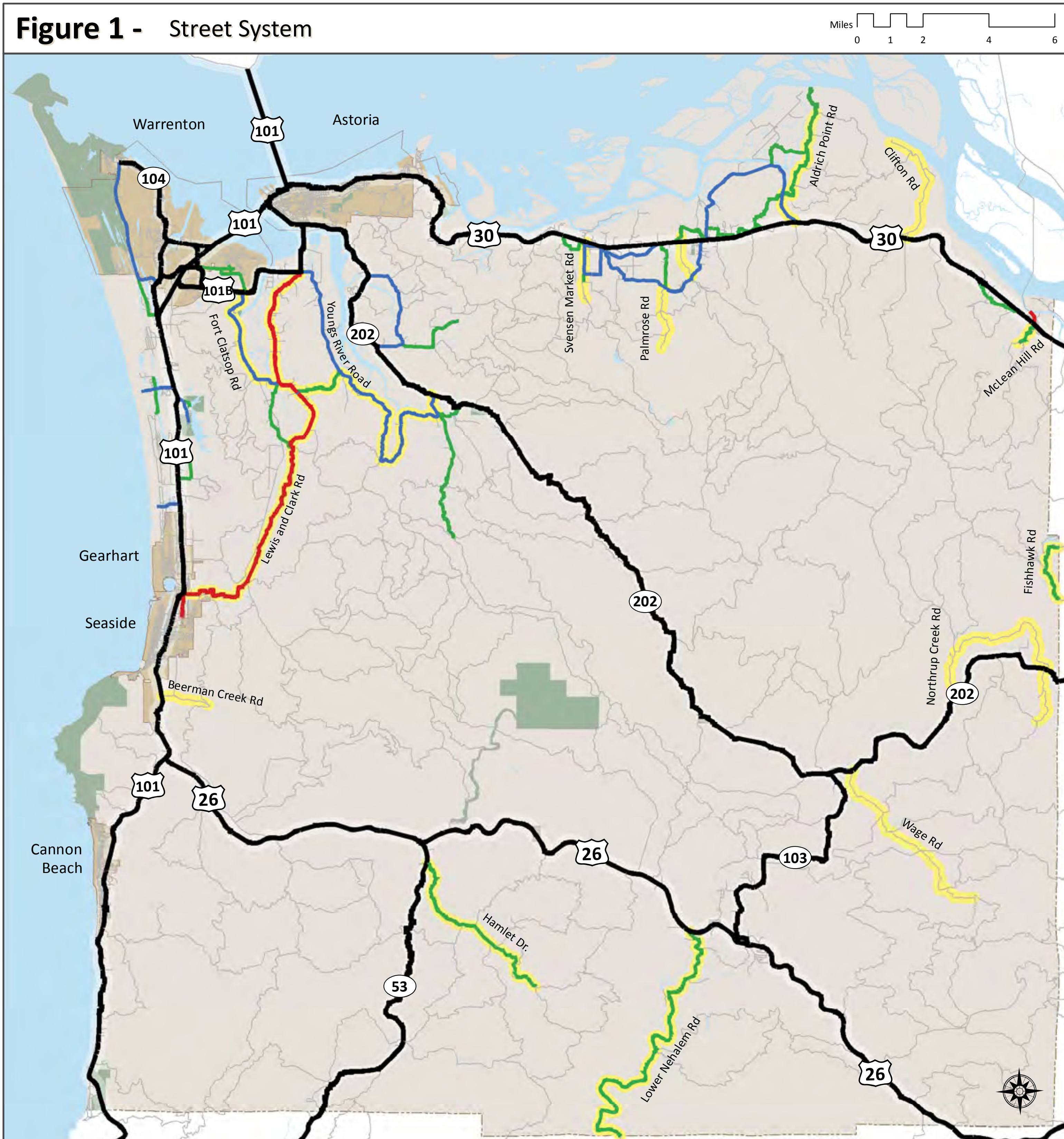
The existing functional classifications of streets in Clatsop County were reviewed to determine consistency with the intended use. Since state highways serve regional travel through the County, they were designated as principal arterial streets. Streets providing primary access to principal arterial streets are minor arterials. Streets providing primary access to neighborhoods and activity generators in Clatsop County are major or minor collectors. All other streets were classified as locals. The updated functional classifications can be seen in Figure 1, while the classification changes are shown in Table A1 of the Appendix.

Street Design

The typical design of streets in Clatsop County can be seen in Figures 2a to 2e. Overall, the TSP includes 4 standard design types for streets, and a design for Minor Arterial or Major Collector streets along local resource routes (see Figure 1). Resource routes are streets under county jurisdiction that facilitate the movement of local resources. These streets require 12 foot travel lanes and five foot shoulders with two foot buffers. Note that the TSP does not include design types for principal arterials since they are state highways and therefore subject to the design criteria in the state's Highway Design Manual.

Any street located in a steep, environmentally sensitive, rural, historic, or developed area of the county may be considered a constrained street. Streets located in constrained areas may need to reduce or eliminate lower priority elements of the street. A constrained design should require a variance to the County's standard design prior to construction approval.

Figure 1 - Street System



Legend *County Functional Classification*

- Principal Arterial
- Minor Arterial
- Major Collector
- Minor Collector
- Resource Route
- City
- Park
- Clatsop County

Figure 2a: Minor Arterial Street

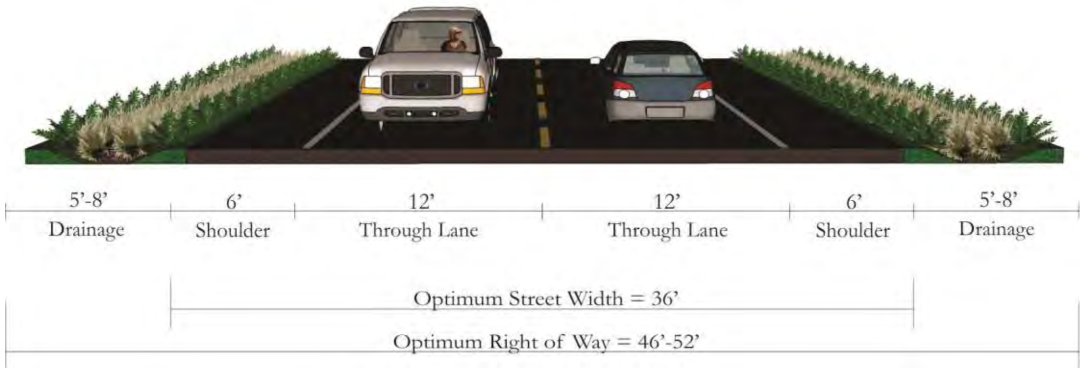
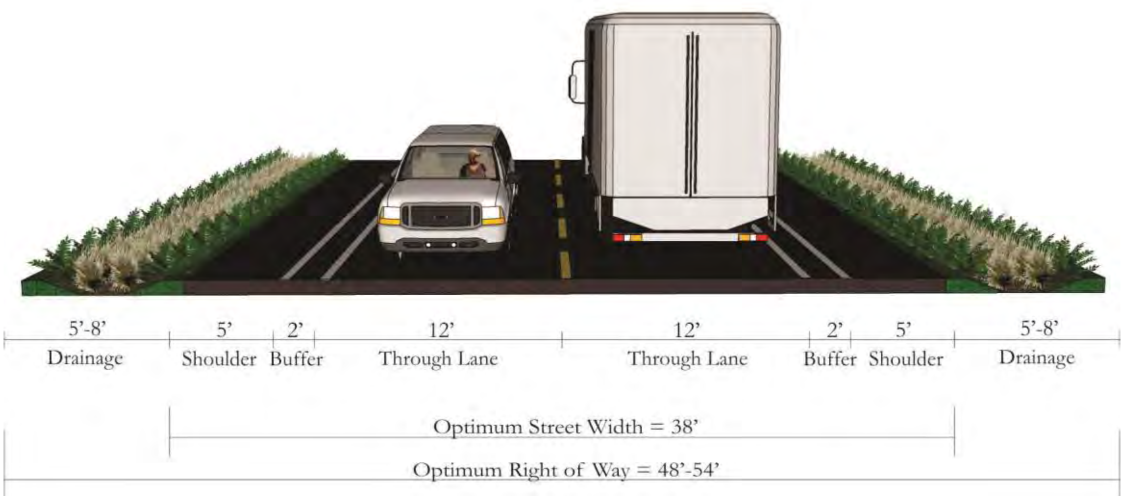


Figure 2b: Major Collector Street

Figure 2c: Minor Collector Street

Figure 2d: Local Street

Figure 2e: Resource Route on Minor Arterial or Major Collector



Spacing Standards

Access management is a broad set of techniques that balance the need to provide efficient, safe, and timely travel with the ability to allow access to individual destinations. Proper access management standards and techniques will promote reduced congestion and accident rates, and may lessen the need for additional roadway capacity.

Table 1 identifies the minimum and maximum public street intersection and minimum private access spacing standards for streets in Clatsop County. New streets or redeveloping properties must comply with these standards to the extent practical (as determined by the County). As the opportunity arises through redevelopment, streets not complying with these standards could improve with strategies such as shared access points, access restrictions (through the use of a median or channelization islands) or closed access points as feasible.

Table 1: Spacing Standards

	Principal Arterial	Minor Arterial	Major Collector	Minor Collector	Local Street
Minimum Block Size (Public Street to Public Street)	See Oregon Highway Plan	265 ft.	265 ft.	265 ft.	265 ft.
Minimum Driveway Spacing (Public Street to Driveway and Driveway to Driveway)		265 ft.	130 ft.	65 ft.	None

Traffic Calming

Traffic calming refers to street design techniques that slow traffic and make streets safer (primarily in residential and mixed-use areas) without significantly changing vehicle capacity. They mitigate the impacts of traffic on neighborhoods and business districts that need a greater balance between safety and mobility.

Traffic calming measures must balance the need to manage vehicle speeds and volumes with the need to maintain mobility, circulation, and function for service providers (e.g., emergency response). Table 2 lists common traffic calming applications and suggests which devices may be appropriate along various streets in the County. Images of the measures are shown in the Appendix. Any traffic calming project should include coordination with emergency service providers to ensure the project does not compromise public safety.

Traffic calming seeks to influence driver behavior through physical and psychological means, resulting in lower vehicle speeds or through traffic volumes. Physical traffic calming techniques include:

- Narrowing the street by providing curb extensions or bulbouts, or mid-block pedestrian refuge islands
- Deflecting the vehicle path vertically by installing speed humps, speed tables, or raised intersections
- Deflecting the vehicle path horizontally with chicanes, roundabouts, and mini-roundabouts

Narrowing travel lanes and providing visual cues such as placing buildings, street trees, on-street parking, and landscaping next to the street also creates a sense of enclosure that prompts drivers to reduce vehicle speeds.

Mobility Targets

Establishing mobility standards for streets and intersections in Clatsop County will encourage a sustainable transportation system (consistent with the TSP Goal 6) by providing a metric to assess the impacts of new development on the existing transportation system.

Table 2: Traffic Calming Measures by Street Functional Classification

Traffic Calming Measure***	Is Measure Appropriate? (per Roadway Classification)**				
	Minor Arterial or Major Collector*		Minor Collector*		Local Street*
	Urban	Rural	Urban	Rural	
Driver Speed Feedback Signs	Yes	Yes	Yes	Yes	Calming measures are generally appropriate on local streets that are infrequent emergency response routes and have more than one way in and out.
Narrowing travel lanes	Yes	No	Yes	No	
Placing buildings, street trees, on-street parking, and landscaping next to the street	Yes	No	Yes	No	
Curb Extensions or Bulbouts	Yes	No	Yes	No	
Roundabouts	Yes	Yes	Yes	Yes	
Mini-Roundabouts	No	No	Yes	No	
Medians and Pedestrian Islands	Yes	Yes	Yes	Yes	
Pavement Texture	Yes	Yes	Yes	Yes	
Speed Hump or Speed Table	No	No	No	No	
Raised Intersection or Crosswalk	No	No	No	No	
Speed Cushion (provides emergency pass-through with no vertical deflection)	No	No	Yes	Yes	
Choker	No	No	No	No	
Traffic Circle	No	No	No	No	
Diverter (with emergency vehicle pass through)	No	No	Yes	Yes	
Chicanes	No	No	No	No	

* Any traffic calming project should include coordination with emergency service providers to ensure public safety.
** Traffic calming on Principal Arterials would require ODOT approval.
*** See the Appendix for images of these measures

The TSP update recommends the following mobility standards for streets under the County's jurisdiction. State-owned streets must comply with the mobility targets included in the Oregon Highway Plan. City-owned streets must comply with the mobility targets included in local TSP's.

- **Signalized, All-way Stop, or Roundabout Controlled Intersections:** During the highest one-hour period on an average weekday (typically, but not always the evening peak period between 4 p.m. and 6 p.m. during the spring or fall): The intersection as a whole must meet Level of Service (LOS) "E" or better and a volume to capacity (v/c) ratio not higher than 0.85.
- **Two-way Stop and Yield Controlled Intersections:** During the highest one-hour period on an average weekday (typically, but not always the evening peak period between 4 p.m. and 6 p.m.

during the spring or fall): All movements serving more than 20 vehicles shall be maintained at LOS “E” or better and a v/c ratio not higher than 0.90. LOS “F” is acceptable at movements serving no more than 20 vehicles during the peak hour.

Traffic Impact Analysis (TIA)

The County or other road authority with jurisdiction may require a Traffic Impact Analysis (TIA) as part of an application for development, a change in use, or a change in access. Based on information provided by the applicant about the proposed development, the County will determine when a TIA is required and will consider the following when making that determination.

- Changes in zoning or a plan amendment designation;
- Changes in use or intensity of use;
- The road authority indicates in writing that the proposal may have operational or safety concerns along its facility(ies);
- An increase in site traffic volume generation by 400 Average Daily Trips (ADT) or more;
- Potential impact to residential or mixed-use areas;
- Potential impacts to key walking and biking routes, including, but not limited to school routes and multimodal street improvements identified in the Transportation System Plan;
- Location of existing or proposed driveways or access connections;
- An increase in peak hour volume of a particular movement to and from a street or highway by 20 percent or more;
- An increase in use of adjacent streets by vehicles exceeding the 20,000 pound gross vehicle weights by 10 vehicles or more per day;
- Potential degradation of intersection level of service (LOS);
- The location of an existing or proposed approach or access connection does not meet minimum spacing or sight distance requirements or is located where vehicles entering or leaving the property are restricted, or such vehicles are likely to queue or hesitate at an approach or access connection, creating a safety hazard;
- A change in internal traffic patterns may cause safety concerns; or
- A TIA is required by ODOT pursuant with OAR 734-051.

It is the responsibility of the applicant to provide enough detailed information for the County Engineer, for existing plats, or Community Development Director, for proposed land divisions, to make a Traffic Impact Analysis determination.

Freight Routes

Freight routes were designated in Clatsop County to ensure trucks can efficiently travel through and access major destinations in the County. Efficient truck movement plays a vital role in the economical movement of raw materials and finished products. The designation of through truck routes provides for this efficient movement, while at the same time maintaining neighborhood livability, public safety, and minimizing maintenance costs of the roadway system. ODOT has identified US 26 and US 30 as freight routes through Clatsop County. While US 101 is not classified by ODOT as a freight route, it is designated as a truck route by the federal government. The designated Clatsop County freight routes can be seen in Figure 3.

Evacuation Routes

The Oregon Highway Plan (OHP) Goal 1, Policy 1E designates routes for emergency response in the event of an earthquake, categorized as Tier 1, 2 and 3. The routes identified as Tier 1 are considered to be the most significant and necessary to ensure a functioning statewide transportation network. A functioning Tier 1 lifeline system provides traffic flow through the state and to each region. The Tier 2 lifeline routes provide additional connectivity and redundancy to the Tier 1 lifeline system. The Tier 2 system allows for direct access to more locations and increased traffic volume capacity, and it provides alternate routes in high-population regions in the event of outages on the Tier 1 system. The Tier 3 lifeline routes provide additional connectivity and redundancy to the lifeline systems provided by Tiers 1 and 2.

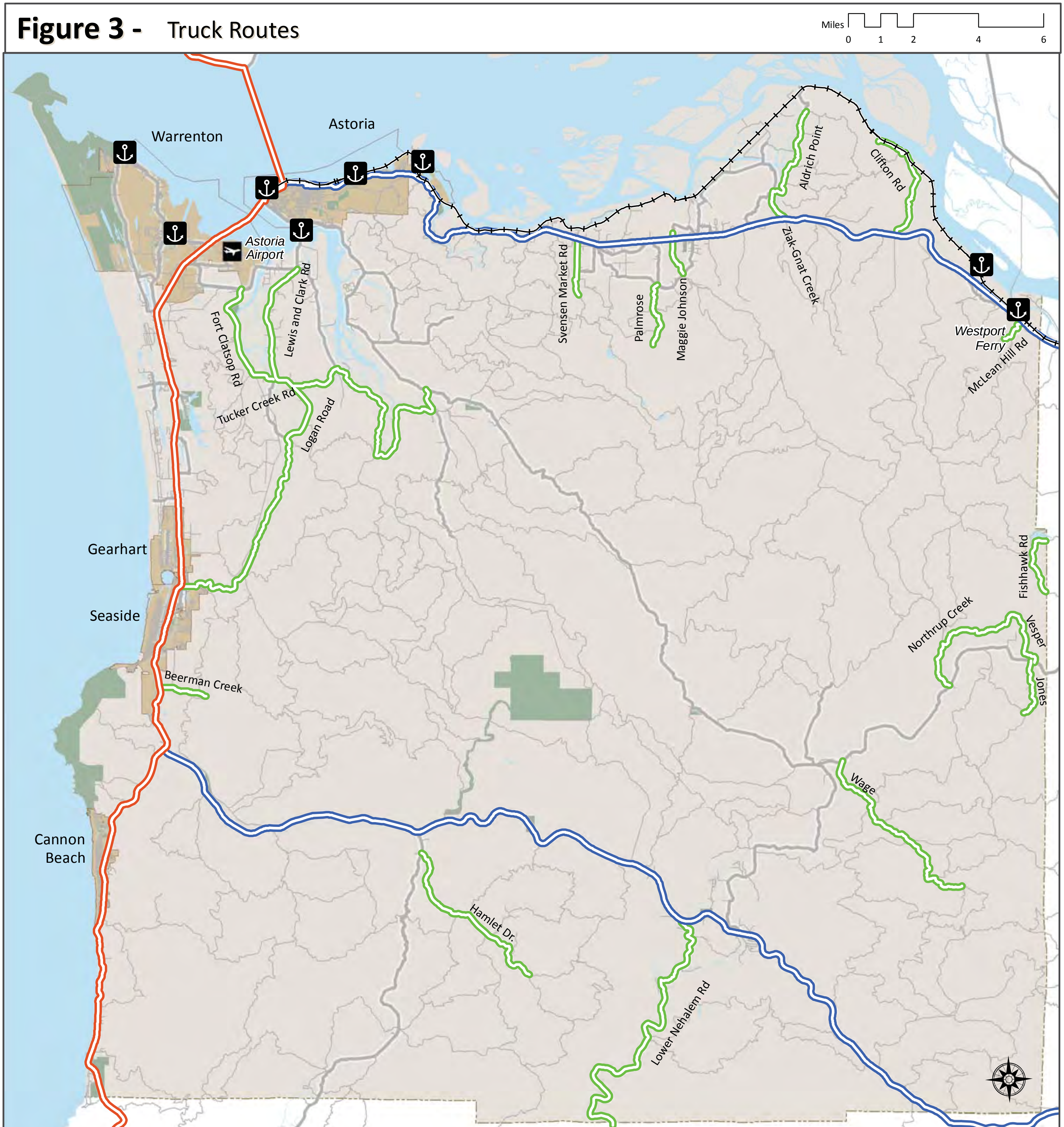
Lifelines routes in Clatsop County are shown in Figure 4, along with the tsunami inundation zones and bridges. US 30 is the only Tier 1 route in Clatsop County, while US 26 and US 101, south of US 26, are classified as Tier 2 routes. US 101, north of US 26, is classified as a Tier 3 route.

Tsunami Evacuation Routes: The Oregon Department of Geology and Mineral Industries developed tsunami evacuation plans for several developed coastal communities including: Arch Cape, Astoria, Cannon Beach, Seaside and Gearhart, Sunset Beach and Del Rey Beach, Warrenton, and Youngs River Valley. These plans detail evacuation routes, evacuations sites, shelters, and evacuation areas (see the appendix). Evacuation signs have been installed along roadways to indicate the direction inland or to higher ground.

Transportation System Management (TSM)

Clatsop County has several regional roadway facilities that serve the County (US 26, US 101, US 101B, US 30, OR 202, OR 103, OR 104, OR 104S, and OR 53) that could benefit from transportation system management (TSM) infrastructure. Before future investments are made along these roadways, designs should be reviewed with County and ODOT staff to determine if communications or other ITS infrastructure should be addressed as part of the street design/construction.

Figure 3 - Truck Routes



Legend

Freight Routes

- ODOT Freight Route and Federal Truck Route
- Federal Truck Route
- County Resource Route
- Harbor
- Astoria Airport
- Railroad
- City
- Park
- Clatsop County
- Stream

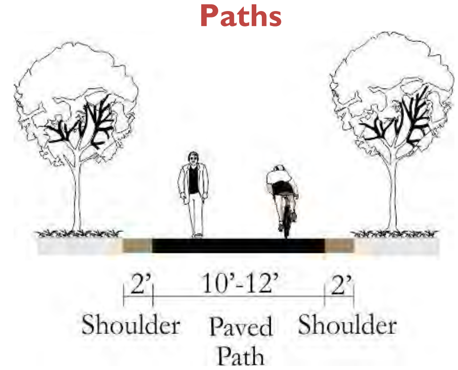
Figure 4 - Emergency Response

Walking and Biking Treatment Guidelines

The following sections detail various walking and biking standards and treatment guidelines.

Shared Use Paths

Figure 5: Typical Cross-Section for Shared-Use Paths



Shared-use paths provide off-roadway facilities for walking and biking travel. Depending on their location, they can serve both recreational and general travel needs. Shared-use path designs vary in surface types and widths. Harder surfaces are generally better for bicycle travel. Widths should provide ample space for both walking and biking and should also be able to accommodate maintenance vehicles. The typical cross-section for shared-use paths can be seen in Figure 5. The County may reduce the width of the paved shared-use path to a minimum of eight feet in constrained areas located in steep, environmentally sensitive, rural, historic, or developed areas of the County. In areas with significant walking or biking demand, the paved shared-use path should be 12 feet, otherwise it should be 10 feet wide.

In addition, a variety of amenities can make a path inviting to the user. These could include features such as interpretive signs, water fountains, benches, lighting, maps, art, and shelters.

Street Crossings

Roadways with high traffic volumes and/or speeds in areas with nearby transit stops, residential uses, schools, parks, shopping and employment destinations generally require enhanced street crossings. These crossings should include treatments such as marked crosswalks, high visibility crossings, and curb extensions to improve the safety and convenience of street crossings.

Blocks longer than 500 feet in urban and rural community areas should have mid-block pedestrian and bicycle access ways at spacing no more than 330 feet. Exceptions include where the connection is impractical due to inadequate sight distance, high vehicle travel speeds, or other factors that may prevent the crossing (as determined by the County).

Section K:
Memorandum 11- Transportation System Solutions

MEMORANDUM

REGISTERED PROFESSIONAL ENGINEER
63019
OREGON
Jan. 11, 2005
C. S. MACIEJEWSKI
EXPIRES: 12/31/16

DATE: December 16, 2014

TO: Clatsop County TSP Project Management Team

FROM: Chris Maciejewski, PE, PTOE - DKS Associates
Kevin Chewuk, PTP - DKS Associates
Ben Chaney - DKS Associates

SUBJECT: Clatsop County Transportation System Plan
Technical Memorandum #11: Transportation System Solutions P11086-016

This document details the transportation system investment options to accommodate future travel in Clatsop County. Included is a summary of the process utilized to develop and analyze the solutions for the transportation system, as well as and a description of the projects identified.

Clatsop County understands that transportation funding is limited and recognizes the importance in being fiscally responsible in its approach to enhancing the transportation system. The recommended approach for the TSP update places more value on investments in smaller cost-effective solutions for the transportation system, where practical, rather than larger, more costly ones. The multi-modal network wide approach identifies solutions to accommodate future travel demand by following a four-step process (as shown in Figure 1), considering solutions from top to bottom until finding a viable one is identified.

1. **Manage** the performance of congested or unsafe locations with strategies that reduce traffic conflicts, increase safety, and encourage more efficient usage of the transportation system.
2. **Reduce** the driving demand at congested locations by improving walking, biking and transit options.
3. **Extend** streets to create parallel routes that will reduce the driving demand on congested facilities.
4. **Expand** existing streets or intersections to increase the driving capacity of the facility. This category also includes new streets in developing areas.

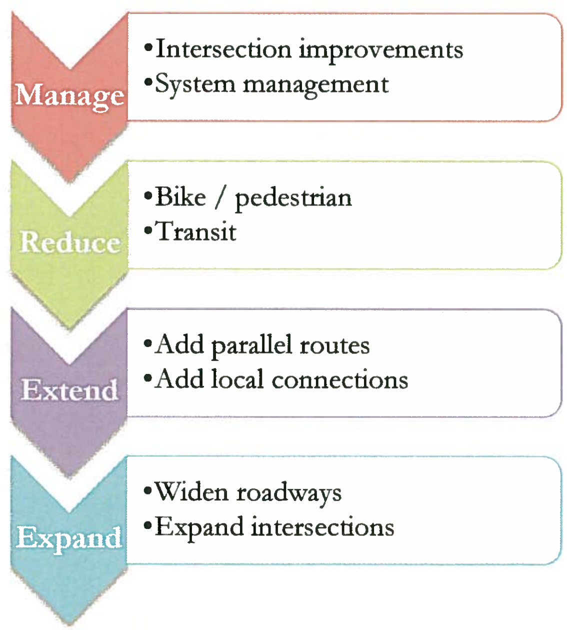


Figure 1: Solutions Identification Process

The approach favors more cost-effective solutions to improve transportation system operations and helps to encourage multiple travel options, increase street connectivity, and promote a more sustainable transportation system.

Community Priorities

The TSP update evaluated each proposed transportation solution (whether included in a previous plan or new) to see how it matched the community priorities (based on the project goals and objectives in Technical Memorandum #4) and the evaluation criteria established for Clatsop County in Technical Memorandum #4. Table 1 illustrates the relative benefit of each transportation solution category in relation to the Clatsop County TSP goals.

Overall, as shown in Table 1, solution categories that "Manage" and "Reduce" are most important to emphasizing a livable, sustainable, and fiscally responsible transportation system. The "Extend" and "Expand" categories are most important to supporting travel choices and ensuring economic vitality.

Table 1: Relationship between TSP Goals and Solution Categories

TSP Goals	Manage	Reduce	Extend	Expand
Goal 1: Provide for efficient motor vehicle travel to and through the county.	✓✓	✓	✓✓	✓✓
Goal 2: Increase the convenience and availability of pedestrian and bicycle modes.	✓	✓✓	✓✓	
Goal 3: Provide transit service and amenities that encourage a higher level of ridership.	✓	✓✓	✓	
Goal 4: Provide an equitable, balanced and connected multi-modal transportation system.	✓✓	✓✓	✓✓	✓
Goal 5: Enhance the health and safety of residents.	✓	✓✓	✓	✓
Goal 6: Foster a sustainable transportation system.	✓✓	✓✓		
Goal 7: Ensure the transportation system supports a prosperous and competitive economy.	✓	✓	✓✓	✓✓
Goal 8: Coordinate with local and state agencies and transportation plans.	✓	✓	✓	✓

✓ Beneficial ✓✓ Most Beneficial

Previous Ideas for Transportation Solutions

Consultants and staff compared all transportation projects previously envisioned, but not necessarily adopted, with the known gaps and deficiencies of the transportation system. The previous ideas that complement the goals and policies of the Clatsop County TSP Update appear in the following sections, along with other previous projects modified to provide a better fit, and new ideas.

Aspirational Projects

Aspirational projects (projects to which the county aspires) include all identified projects for improving Clatsop County's transportation system, regardless of their priority or their likelihood to be funded. The TSP planning process eliminates any project that may not be feasible for reasons other than financial (such as environmental or existing development limitations). The preliminary set of aspirational transportation projects were developed following the four-step solution identification process detailed earlier in this document. The set includes projects for all of the major modes of travel in the county (motor vehicle, pedestrian, bicycle, and transit).

Walking, biking, transit, and demand management projects are described in Table 2 and appear in Figure 2. Driving, freight, and waterway projects are described in Table 3 and appear in Figure 3. The projects are a combination of new and previous ideas for the transportation system that attempt to address the gaps and deficiencies identified in Technical Memorandum #5 (Existing Transportation Conditions) and in Technical Memorandum #7 (Future Transportation Conditions and Needs). Based on the evaluation criteria identified in Technical Memorandum #4, each project was scored and assigned a ranking of high, medium, or low. Projects with a score in the top 10 percent of projects were ranked as high, projects with a score in the top 40 percent of projects were ranked as medium, and the remaining projects were ranked as low.

Each project was assigned a primary source of funding for planning purposes (County, State, SETD, or private), although such designations do not create any obligation for funding. The TSP will provide a prioritized list of "County" projects (where the County is assumed to be the primary contributor of funding) that is constrained to a 20 year funding estimate. The TSP will also provide a prioritized list of "State" projects that the County could use to make decisions for applying for grants or other funding mechanisms. The County can, however, choose to provide funds to help support State projects—thus, expediting the timeline on those projects the County would like prioritized. "Private" projects will likely be built in coordination with private entities during land use actions and future development.

All projects that are located on State facilities will require approval of the ODOT and will be subject to the design criteria in the state's Highway Design Manual.

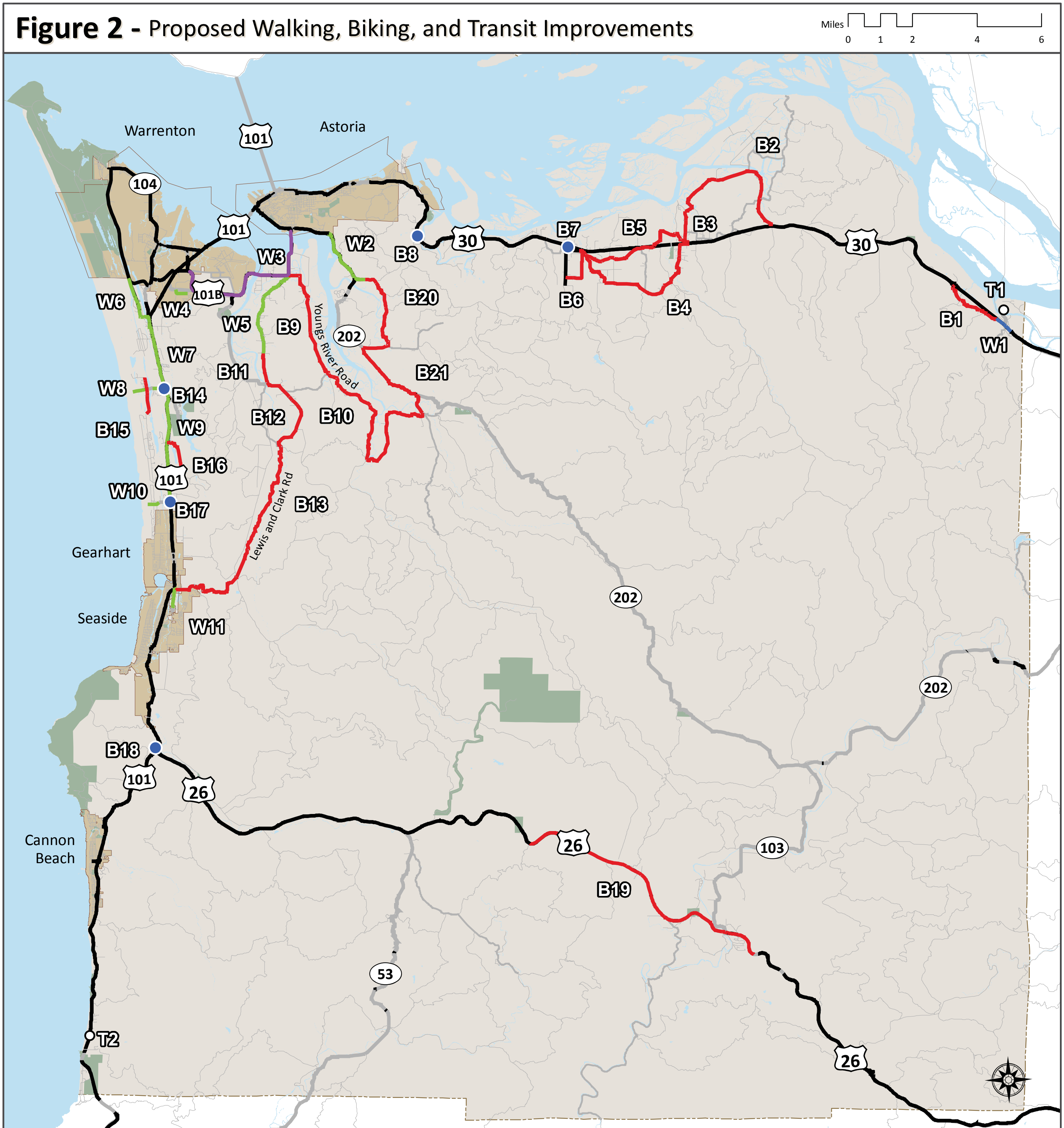
Table 2: Walking, Biking, Transit, and Demand Management

Project Number	Project Name	Project Location	Project Summary	Project Category	Evaluation Rank	Primary Funding Source
Walking Projects						
W01	Westport Pedestrian Improvements on US 30	US 30, between Old US 30 and Old Mill Town Rd.	Construct sidewalks and landscaping, add bike facilities. Implement parking management. Reduce speed limit to 35 mph, and add driver speed feedback signs.	Walking and Biking Facilities	**High**	State
W02	OR 202 Shared Use Path	OR 202 between Astoria UGB and Clatsop County Fairgrounds	Add shared use path following road alignment.	Walking and Biking Facilities	**Medium**	County
W03	Warrenton-Astoria Off-Highway Shared Use Path Study	Connecting Warrenton and Astoria with an alternative to Warrenton-Astoria Hwy. (US 101B).	Study for an off-highway shared use path. Study will determine potential alignments, width, security, wayfinding details, construction materials, costs, and funding sources.	Walking and Biking Facilities	**High**	County
W04	SE 19th St. Shared Use Path	SE 19th St from SE Ensign Ln to Animal Shelter Near SE Willow Dr.	Extends shared use path to connect with SE Ensign Ln. The animal shelter is a popular destination to walk to that is just off the pedestrian network.	Walking and Biking Facilities	**High**	County
W05	Lewis and Clark Rd. Shared Use Path	Lewis and Clark Rd. between Warrenton-Astoria Hwy. (US 101B) and Kee Ln.	Add shared use path following road alignment.	Walking and Biking Facilities	**Medium**	County
W06	Camp Rilea East Bypass Trail - Ridge Rd. Improvements	Ridge Rd. between Delaura Beach Ln. and Columbia Beach Ln.	Add an additional three feet of gravel pathway along the west shoulder.	Walking and Biking Facilities	**Low**	County
W07	Camp Rilea East Bypass Trail - North Segment	Between Ridge Rd. and the Fort to Sea Trail, by way of Columbia Beach Ln., OR 104, and US 101.	Add a shared use path south/west of the road within road right of way. Includes a boardwalk over wetlands at Columbia Beach Ln.	Walking and Biking Facilities	**Medium**	County
W08	Camp Rilea East Bypass Trail - South Extension	US 101, between the Fort to Sea Trail and Sunset Beach Road	Add a shared use path west of the road within road right of way.	Walking and Biking Facilities	**Medium**	County
W09	Sunset Beach Rd. Shared Use Path	Sunset Beach Rd. between US 101 and the coast	Add a shared use path following road alignment.	Walking and Biking Facilities	**High**	County
W10	Highland Ln. Shared Use Path	Highland Ln., along entire County facility between US 101 and the coast.	Add shared use path following road alignment.	Walking and Biking Facilities	**High**	County
W11	N. Wahanna Rd. Improvements	Wahanna Rd. from Lewis and Clark Rd. south to the end of County facility.	Change road cross section to include a multimodal path on the west side and two 10 ft. travel lanes, as detailed in the Seaside TSP.	Walking and Biking Facilities	**Medium**	County
Biking Projects						
B01	Old US Highway 30 Improvements - Wauna-Westport	Old US Highway 30 (Taylorville Rd.) near Wauna and Westport	Stripe fog lines and center lines, expand shoulders as needed.	Corridor Safety Improvements	**Low**	County
B02	Ziak-Gnat Creek Rd. Improvements	Ziak-Gnat Creek Rd. between US 30 and Knappa Dock Rd.	Improve shoulders to Major Collector standards.	Walking and Biking Facilities	**Medium**	County

B03	Knappa Dock Rd. Improvements	Knappa Dock Rd.	Improve shoulders to Major Collector standards and include bike symbols in shoulders at intersections.	Walking and Biking Facilities	**Low**	County
B04	Hillcrest Loop Rd. Improvements	Hillcrest Loop Rd. between US 30 (M.P. 82.01) and Old US Highway 30	Improve shoulders to Major Collector standards and include bike symbols in shoulders at intersections.	Walking and Biking Facilities	**Low**	County
B05	Old US Highway 30 Improvements - Svensen-Knappa	Old US Highway 30, between US 30 intersection (M.P. 82.01) and Svensen Market Rd.	Improve shoulders to Major or Minor Collector standards (as appropriate).	Walking and Biking Facilities	**Low**	County
B06	Simonson Loop Rd. Improvements	Simonson Loop Rd. between Svensen Market Rd. and Old US Highway 30	Improve shoulders to Major Collector standards, including striping shoulders and include bike symbols in shoulders at intersections.	Walking and Biking Facilities	**Low**	County
B07	US 30 / Svensen Market Rd. Intersection Improvements	US 30 / Svensen Market Rd. intersection	Improve bike shoulder striping through the intersection, placing the through bike movement to the left of the dedicated right turn lanes.	Intersection Safety Improvements	**Low**	State
B08	US 30 / John Day River Rd. Intersection Improvements	US 30 / John Day River Rd. intersection	Improve bike shoulder striping through the intersection, placing the through bike movement to the left of the dedicated right turn lane.	Intersection Safety Improvements	**Low**	State
B09	Youngs River Rd. Shoulder Improvements - North Segment	Youngs River Rd. between Lewis and Clark Rd. and Tucker Creek Ln.	Improve paved shoulders to County standard for major collectors.	Walking and Biking Facilities	**Low**	County
B10	Youngs River Rd. Shoulder improvements - South Segment	Youngs River Rd. between Tucker Creek Ln. and OR 202	Improve paved shoulders to County standard for major collectors.	Walking and Biking Facilities	**Low**	County
B11	Lewis and Clark Rd. Shoulder Improvement - North Segment	Lewis and Clark Rd. between Kee Ln. and Logan Rd. (north intersection)	Improve paved shoulders to County standard for minor arterials/major collectors (as appropriate), including rumble strips and bike symbols. Avoid installing rumble strips adjacent to residential areas and provide gaps for bicyclists.	Walking and Biking Facilities	**Medium**	County
B12	Logan Rd. Shoulder Improvement	Logan Rd. between Lewis and Clark Rd. intersections	Improve paved shoulders to County standard for minor arterials, including rumble strips and bike symbols. Avoid installing rumble strips adjacent to residential areas and provide gaps for bicyclists.	Walking and Biking Facilities	**Medium**	County
B13	Lewis and Clark Rd. Shoulder Improvement - South Segment	Lewis and Clark Rd. between Logan Rd. (south intersection) and Seaside city limits.	Improve paved shoulders to County standard for minor arterials, including rumble strips and bike symbols. Avoid installing rumble strips adjacent to residential areas and provide gaps for bicyclists.	Walking and Biking Facilities	**Low**	County
B14	US 101/ Sunset Beach Rd. Bike Improvements	US 101/Sunset Beach Rd.	Improve bike shoulder striping through the intersection, placing the through bike movement to the left of the dedicated right turn lane.	Intersection Safety Improvements	**Medium**	State
B15	Lewis Rd. Shoulder Improvements	Lewis Rd., along entire County facility in Sunset Beach.	Improve shoulders to Minor Collector standards.	Walking and Biking Facilities	**Medium**	County
B16	Dellmoor Loop Shoulder Improvements	Dellmoor Loop, along entire County facility from US 101 to US 101.	Improve shoulders to Minor Collector standards, including striping shoulders	Walking and Biking Facilities	**Low**	County

B17	US 101/ Highland Ln. Bike Improvements	US 101/Highland Ln.	Improve bike shoulder striping through the intersection, placing the through bike movement to the left of the dedicated right turn lane.	Intersection Safety Improvements	**Low**	State
B18	US 101/ US 26 Southbound Interchange Bike Bypass	West side of US 101 through the US 26 interchange.	Off-highway shared use path for bypassing the US 101/US 26 interchange in the southbound direction. Beginning at M.P. 24.9, follows the local road, then continues as a new path until merging back onto the US 101 shoulder, around M.P. 25.7	Walking and Biking Facilities	**Medium**	County
B19	US 26 Shoulder Improvements	US 26 at all locations where paved shoulder width is less than four feet.	Improve paved shoulders to a minimum of four feet width.	Walking and Biking Facilities	**Low**	State
B20	Walluski Loop Shoulder Improvements	Walluski Loop	Improve shoulders to Major Collector standards and stripe.	Walking and Biking Facilities	**Low**	County
B21	OR 202 Shoulder Improvements	OR 202 between Walluski Loop (north) and Youngs River Rd.	Improve shoulders to ODOT standards and stripe.	Walking and Biking Facilities	**Medium**	State
B22	Bike Wayfinding Signs	Bike facility intersections throughout the county.	Provide bike wayfinding signage at key junctions throughout the county to help bicyclists navigate bike routes and access major destinations.	System Management Projects	**Low**	County
B23	Bike Parking	Major destinations throughout the county.	Directly provide or encourage bike parking at major destinations throughout the county.	Walking and Biking Facilities	**Low**	County
B24	Coast Bike Trail Designation	Lewis and Clark Rd. and US 101	Change Coast Bike Trail designation from Lewis and Clark Rd. to US 101	Walking and Biking Facilities	**Medium**	County
Transit Projects						
T01	New Westport Transit Stop	Near the planned County park adjacent to the ferry landing, at the former GP industrial site.	New transit stop in Westport as detailed in the Westport Corridor and Community Plan.	Transit Access and Amenities	**Medium**	SETD
T02	New Arch Cape Transit Stop	Arch Cape - exact location to be determined in consultation with SETD.	New transit stop including amenities such as route and schedule information, seating, shelters with concrete landing pads, and trash cans.	Transit Access and Amenities	**High**	SETD
T03	Transit Stop Improvements	Transit stops throughout the county.	Improve transit stops with amenities such as route and schedule information, seating, shelters with concrete landing pads, and trash cans. Priority locations should be developed in consultation with SETD considering locations with high demonstrated or potential ridership, near major destinations, and at transfer and NW Connector locations.	Transit Access and Amenities	**Medium**	SETD
T04	Improve Transit Headways	US 101 and US 30	Coordinate with Sunset Empire Transit District to reduce transit headways. Consider establishing a frequent service line designation, if appropriate.	Transit Access and Amenities	**Medium**	SETD
T05	Extend Transit Service Hours	US 101 and US 30	Coordinate with Sunset Empire Transit District to extend transit service hours. Match transit hours with Clatsop Community College hours, where possible.	Transit Access and Amenities	**Medium**	SETD
T06	Provide Real-Time Transit Arrivals and AVL	Transit Stops throughout the county	Together with SETD, implement an automatic vehicle location (AVL) system that provides real-time transit arrival times to riders. Provide this information to customers at transit stops.	Transit Access and Amenities	**Medium**	SETD

Figure 2 - Proposed Walking, Biking, and Transit Improvements



Legend *Walking, Biking, and Transit Facilities*

- A1 Project Number
- City
- Park
- Clatsop County
- Proposed Shoulder Widening
- Proposed Sidewalk and Bike Lane
- Proposed Shared Use Path
- Proposed Planning Study
- Transit Project
- Bicycle Intersection Project
- Existing Shoulder or Bike Lane
- Road with Shoulder < 4'

Table 3: Driving, Freight, and Waterway Projects

Project Number	Project Name	Project Location	Project Summary	Project Category	Evaluation Rank	Primary Funding Source
Driving Projects						
D01	Westport Intersections Improvement	US 30/Old Mill Town Rd. and US30/Westport Ferry Rd.	Realign intersections to reduce skew, construct bulb-outs, improve illumination at intersections, mark crosswalks, provide pedestrian signing and Rectangular Rapid Flash Beacons (RRFBs) near crossing locations.*	Intersection Safety Improvements	**High**	State
D02	Westport Ferry New Collector to US 30	Connects US 30/Old US Highway 30 to Westport Ferry Rd.	New collector to connect US 30 with the interstate ferry in Westport. Includes bike/ped facilities, left turn lanes off US 30 in both directions, and a right turn lane from US 30 westbound. Requires a new rail crossing and would close or make emergency-only the existing at-grade crossing.	Corridor Capacity Improvements	**High**	County
D03	US 30 / Hillcrest Loop Intersection Improvements	US 30 / Hillcrest Loop intersection in Knappa	Better delineate the operational area of the intersection. Add enhanced pedestrian crossing on the east leg of the intersection.*	Intersection Safety Improvements	**High**	State
D04	US 30 Shoulder Rumble Strips - Knappa to Astoria	US 30 between Old US Highway 30 (east of Abbot Rd) in Knappa and Astoria City Limits	Add rumble strips to highway shoulders and centerline in do-not-pass zones.	Corridor Safety Improvements	**Low**	State
D05	US 30 Climbing Lane	US 30, between Fern Hill Rd. and John Day River Bridge	Add an eastbound climbing lane on US 30.	Corridor Capacity Improvements	**Low**	State
D06	Astoria Bypass Feasibility Study	Between OR 202 south of Astoria and US 30, east of Astoria	Project to study the feasibility of creating a 2-lane county road to bypass Astoria.	Local Street Connectivity	**High**	County
D07	US 30/Liberty Ln. Intersection Improvements	US 30/Liberty Ln.	Realign intersection and provide a southbound left turn pocket on US 30.	Intersection Safety Improvements	**Low**	State
D08	Irving Ave Extension	Irving Ave., between the existing east terminus and Nimitz Dr.	Extension of Irving Ave. to connect with Nimitz Dr. Implement in coordination with Astoria as project includes portions inside and outside the Astoria Urban Growth Boundary.	Local Street Connectivity	**Low**	County
D09	Highway 202 Flood Improvements	OR 202, just east of Williamsport Rd.	Raise the pavement just east of Williamsport Rd. (around the curve) to reduce recurring flooding.	System Management Projects	**Low**	State
D10	OR 202 Shoulder Rumble Strips	OR 202 from M.P. 4.63 to M.P. 6.44	Add rumble strips to highway shoulders and to centerline in do-not-pass zones.	Corridor Safety Improvements	**Low**	State
D11	US 101 Southbound Turn Lane to US 26 Easbound	US 101 Southbound at US 26 Easbound	Extend the turn lane to US 26 from southbound US 101.	Intersection Safety Improvements	**Low**	State
D12	Warrenton-Astoria Hwy. (US 101B) Cross Section Improvements	Warrenton-Astoria Hwy. (US 101B) between Lewis and Clark River Bridge and Old Youngs Bay Bridge	Improve cross section to three lanes with one 12' travel lane in each direction, a 14' center left turn lane, two 6' sidewalks, and two 6' bike lanes,	Walking and Biking Facilities	**Medium**	State

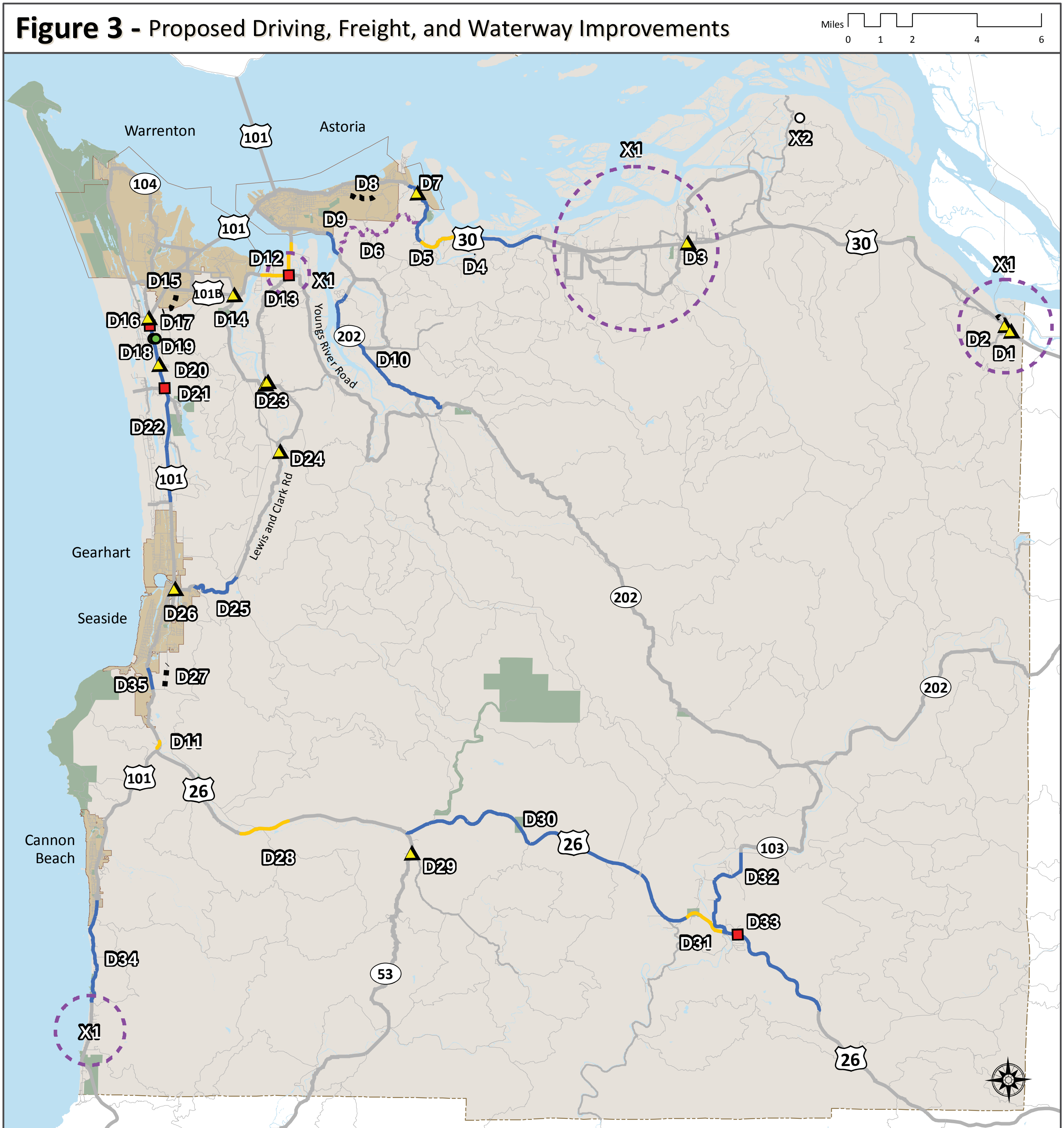
D13	Miles Crossing Intersection Improvements	Warrenton-Astoria Hwy. (US 101B)/Lewis and Clark Rd./Youngs River Rd. intersection	Construct a roundabout at the intersection, with enhanced navigational signage on the approaches. This roundabout includes a southbound right-turn bypass lane, similar to the existing geometry, that allows US 101B southbound traffic to pass through the intersection unimpeded.	Intersection Safety Improvements	**Medium**	State
D14	Warrenton-Astoria Hwy. (US 101B)/Fort Clatsop Rd. Intersection Improvements	Warrenton-Astoria Hwy. (US 101B)/Fort Clatsop Rd.	Addition of westbound right turn deceleration lane on Warrenton-Astoria Hwy. (US 101B) and southbound left turn lane on SE Airport Ln.	Intersection Safety Improvements	**Low**	State
D15	19th St. Extension	Extends the north-south alignment of 19th St. south to meet with Dolphin Rd. near Rainbows End Ln.	Extend 19th St. to create an alternative route to US 101. Close existing Dolphin Rd. access to US 101. Implemented in coordination with Warrenton.	Local Street Connectivity	**High**	County
D16	US 101/Fort Stevens Highway (OR 104) Intersection Safety Improvements	US 101/Fort Stevens Highway (OR 104)	Advance intersection warning signing on US 101.	Intersection Safety Improvements	**Low**	State
D17	US 101 / Fort Stevens Highway (OR 104) Intersection Improvements	US 101 / Fort Stevens Highway (OR 104)	Add eastbound right turn lane to Fort Stevens Highway (OR 104).	Intersection Capacity Improvements	**Low**	State
D18	Camp Rilea Highway Access - Advance Warning Signs	US 101 / Patriot Way	Install signs informing of possible convoys and/or congestion at Patriot Way. Signs could be free standing approximately 500 feet north and south of the intersection, or co-mounted on Camp Rilea guide signs. Optionally includes active flashing yellow lights controlled at Camp Rilea.	System Management Projects	**Low**	State
D19	Camp Rilea Highway Access - 2 Stage Left	US 101 / Patriot Way	Create a two-stage left turn movement for traffic exiting Camp Rilea using a raised channelized turn median. This long-term solution is dependent on growth in highway traffic volumes and activity at Camp Rilea.*	Intersection Capacity Improvements	**Low**	State
D20	US 101/Glenwood Village Rd. Intersection Safety Enhancement	US 101/Glenwood Village Rd. (M.P. 12.68)	Add southbound left turn lane to US 101.	Intersection Safety Improvements	**Low**	State
D21	US 101/ Sunset Beach Rd. Intersection Improvements	US 101/ Sunset Beach Rd.	Add J-turn on US 101 south of the intersection to facilitate movements from Sunset Beach Rd. to US 101 northbound.*	Intersection Capacity Improvements	**Low**	State
D22	US 101 Shoulder Rumble Strips - Warrenton to Gearhart.	US 101 from the south end of Warrenton to the north end of Gearhart.	Add rumble strips to highway shoulders and to centerline in do-not-pass zones. Avoid installing adjacent to residential areas and include gaps for bicyclist use.	Corridor Safety Improvements	**Low**	State
D23	Lewis and Clark Rd. Bridge Stop Control	Lewis and Clark Rd. / Fort Clatsop Rd. and Lewis and Clark Rd. / Logan Rd.	Replace yield signs on the approaches from the bridge with stop signs.	Intersection Safety Improvements	**Low**	County
D24	Lewis and Clark Rd. / Logan Rd. Intersection Improvements	Lewis and Clark Rd. / Logan Rd.	Improve sight distances at the intersection by modifying the alignment of Lewis and Clark Rd. to meet Logan Rd. further to the east. Low-impact project should work within environmental constraints.	Intersection Safety Improvements	**Low**	County

D25	Lewis and Clark Rd. Curve Safety Improvements	Lewis and Clark Rd. at curves near Crown Camp Rd. intersection.	Add enhanced sign and marking improvements on curves.	Corridor Safety Improvements	**Low**	State
D26	Lewis and Clark Rd. / N. Wahanna Rd. / Crown Camp Rd. Intersection Improvements	Lewis and Clark Rd. / N. Wahanna Rd. / Crown Camp Rd.	Realign to "T" the intersection of Wahanna Rd. and Lewis and Clark Rd. Add stop control to all three legs of the intersection. Design to accommodate logging and other large trucks that regularly make the left from Lewis and Clark Rd. to N Wahanna Rd.	Intersection Safety Improvements	**Medium**	County
D27	Wahanna Rd. Extension	Extend Wahanna Rd. to Bearman Creek Rd.	Provides alternative route to US 101 for residents. Implemented in coordination with Seaside, road includes parts in Seaside (north of Ave. S) and Clatsop County (south of Ave. S).	Local Street Connectivity	**Low**	County
D28	US 26 Passing Lane	US 26, between M.P. 5.0 and 6.0	Construct passing lanes.	Corridor Capacity Improvements	**Low**	
D29	OR 53/ Hamlet Rd. Intersection Improvements	OR 53/Hamlet Rd.	Stripe the Hamlet Rd. intersection approach.	Intersection Safety Improvements	**Low**	County
D30	US 26 Rumble Strips	US 26 throughout the County, as the opportunity arises	Add rumble strips to highway shoulders and to centerline in do-not-pass zones. Avoid installing adjacent to residential areas and include gaps for bicyclist use.	Corridor Safety Improvements	**Low**	State
D31	US 26 Climbing Lane	US 26 westbound, between M.P. 20.4 and 21.6	Construct climbing lane.	Corridor Capacity Improvements	**Low**	State
D32	OR 103 Shoulder Improvements	OR 103, between US 26 and M.P. 3.00	Add rumble strips to highway shoulders and to centerline in do-not-pass zones. Avoid installing adjacent to residential areas and include gaps for bicyclist use. Improve and stripe shoulders as necessary for rumble strip installation.	Corridor Safety Improvements	**Low**	State
D33	US 26 / Christmas Tree Rd. Access Management	US 26 / Christmas Tree Rd., just east of OR 103	Consolidate access points at highway adjacent businesses and add a left turn lane for access from US 26.	Intersection Safety Improvements	**Low**	State
D34	US 101 Shoulder Rumble Strips - Cannon Beach to Arch Cape	US 101 from the south end of Cannon Beach to the north end of Arch Cape.	Add rumble strips to highway shoulders and to centerline in do-not-pass zones. Avoid installing adjacent to residential areas and include gaps for bicyclist use.	Corridor Safety Improvements	**Low**	State
D35	US 101 near Beerman Creek Lane Reconstruction	US 101, south of Seaside (MP 22.6 to 23.17)	Partially reconstruct US 101 to eliminate the uneven pavement conditions. The lanes and shoulders will also be widened, and stormwater treatment installed.	System Management Projects	**Low**	State
Planning Projects and Other Transportation Modes						
X01	Rural Community Safety Study	Arch Cape, Miles Crossing-Jeffers Garden, Knappa-Svensen, and Westport	Review and identify strategies for managing speed and other safety issues in the Arch Cape, Miles Crossing-Jeffers Garden, Knappa-Svensen, and Westport communities	System Management Projects	**Low**	County
X02	Restore Rail Service to Tongue Point	Railroad tracks between Knappa and Westport	Repair inoperable portions of railroad tracks.	System Management Projects	**Low**	Private
X03	County Bridges Seismic Stability Evaluation	Countywide	Study to determine seismic stability of all county bridges. This study prepares the county to pursue funding for bridge improvements.	System Management Projects	**Medium**	County

X04	Tsunami Hazard Planning	Countywide	Develop a plan to identify and address multimodal infrastructure needs during and after a tsunami. One element of this planning effort will be identifying and connecting resilient routes that can be used during an evacuation. This planning effort will also identify and evaluate locations where new pedestrian and bicycle bridges are needed as part of evacuation routes.	System Management Projects	**High**	County
X05	Pedestrian/Bicycle Improvement Strategy	Countywide	Maintain shoulders and other walking and biking infrastructure in the County, including purchasing new street sweepers equipment.	System Management Projects	**Medium**	County
X06	US 101 Phase 2 Flood Mitigation/Wetland Restoration	US 101 south of Seaside near Circle Creek Campground (MP 23.16)	Phase 2 of a project to alleviate flooding on US 101 by removing man-made berms in strategic locations to allow floodwater to flow into lower-lying areas. This will also help restore a wetland on adjacent property. Phase 1 was initiated in 2013. Phase 2 includes constructing a new berm on the west side of US 101 (flooding occurs from west to east).	System Management Projects	**Low**	State

Clatsop County
Transportation System Plan

Figure 3 - Proposed Driving, Freight, and Waterway Improvements



Legend

Roadway Facilities and Projects

- Roadway Safety Improvements
- Roadway Widening
- Street Extension
- Planning Study
- Intersection Management Project
- Intersection Safety Project
- Intersection Capacity Project
- Freight or Waterway Project
- A1 Project Number
- City
- Park
- Clatsop County

The Improved Transportation System in Clatsop County

At study intersections where aspirational projects are expected to change vehicle operations, 2035 summer evening peak intersection operations were re-evaluated to assess the mobility impact of the projects. The results are shown in Table 4. With these investments, all study intersections outside Warrenton would be expected to meet OHP mobility targets and accommodate the expected travel demand through 2035. Projects were not proposed for study intersections within Warrenton, as the Warrenton TSP update process currently underway will address these locations.

Alternative mobility standards were considered for the US 101 corridor, but were determined not to be necessary for study intersections outside of Warrenton. With reasonable improvements current mobility standards are expected to be met. Alternative mobility standards may still be necessary within Warrenton, which will be evaluated as part of the City's TSP update.

Table 4: Intersection Operations with Aspirational Projects (2035 PM Peak)

Intersection	Mobility Target	Summer (30 HV)		Summer (30 HV) with Improvements		Operationally Impactful Improvement Project
		v/c Ratio	Delay (sec/veh)	v/c Ratio	Delay (sec/veh)	
Unsignalized Intersections under State Jurisdiction						
US 101 / Fort Stevens Hwy.	0.90	**0.33 / 0.94**	13.0 / 97.6	0.33 / 0.62	13.0 / > 150	D17: Addition of eastbound right turn lane on Fort Stevens Hwy.*
US 101 / Sunset Beach Rd.	0.95	**0.06 / 1.22**	10.8 / >150	0.06 / 0.83	10.8 / >150	D21: Addition of a J-turn on US 101 south of the intersection. Analysis assumes 1/3rd of the eastbound left turn volume from Sunset Beach Rd. switches to using this J-turn. J-turning vehicles initially make a right turn onto US 101 southbound, then use the J-turn facility to get on US 101 northbound. If a higher portion of vehicles use the J-turn, the operational benefits are greater.
Warrenton-Astoria Hwy. (US 101B) / Youngs River Rd. / Lewis and Clark Rd.**	0.80	0.18 / 0.19	10.8 / 11.2	0.43 / 0.24	9.5 / 7.0	D13: Conversion of three-way stop to roundabout control with southbound right turn bypass lane.
Warrenton-Astoria Hwy. (US 101B) / Fort Clatsop Rd. / SE Airport Ln.	0.90	0.01 / 0.29	8.4 / 18.7	0.01 / 0.22	8.2 / 17.5	D14: Addition of westbound right turn deceleration lane on Warrenton-Astoria Hwy. and southbound left turn lane on SE Airport Ln. *
Unsignalized Intersections under County Jurisdiction						
Lewis and Clark Rd. / Fort Clatsop Rd.***	0.75	0.04 / 0.05	7.4 / 9.0	0.04 / 0.05	7.4 / 9.0	D23: Replace yield signs on approaches from bridge with stop signs.
Lewis and Clark Rd. / Logan Rd.***	0.75	0.01 / 0.02	7.3 / 8.7	0.01 / 0.02	7.3 / 8.7	D23: Replace yield signs on approaches from bridge with stop signs.
Lewis and Clark Rd. / N Wahanna Rd. / Crown Camp Rd.****	0.75	0.05 / 0.06	7.8 / 9.2	0.26 / 0.14	9.4 / 8.7	D26: Realign the intersection to a "T" and establish stop control on all approaches.

Operations reported as major approach / minor approach critical movement

* Addition of a right turn lane on an ODOT facility meets the criteria described in Exhibit 7-2 of the ODOT Analysis Procedures Manual and will require approval of the ODOT Region Traffic Engineer.

** Original Intersection configuration cannot be analyzed in Synchro--operations calculated manually. Roundabout evaluated using HCM 2010 methodology in HCS 2010.

*** Original intersection configuration cannot be analyzed in Synchro--modifications made to best represent operations. Improvements match modifications used for original analysis.

**** Original intersection configuration cannot be analyzed in Synchro--modifications made to best represent operations. Improvements evaluated using Synchro.

Bold Red and Shaded indicates intersection exceeds mobility target

APPENDIX

Operations Reports - Intersections with Aspirational Projects

ROUNDABOUT REPORT

General Information		**Site Information**	
Analyst	*BLC*	Intersection	*Miles Crossing*
Agency or Co.	*DKS Associates*	E/W Street Name	*US 101B*
Date Performed	*11/4/2014*	N/S Street Name	*Lewis & Clark Rd*
Time Period	*30HV PM Peak*	Analysis Year	*2035*
Peak Hour Factor	*0.95*	Project ID	*Clatsop County TSP*

Project Description:

Volume Adjustment and Site Characteristics

	EB				WB				NB				SB			
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U
Number of Lanes (N)	0	1	0		0	1	0		0	1	0		0	1	0	
Lane Assignment			LTR				LTR				LTR				LTR	
Right-Turn Bypass	None				None				None				Non-Yielding			
Conflicting Lanes	1				1				1				1			
Volume (V), veh/h	235	60	50	0	5	45	45	0	30	5	85	0	80	140	175	0
Heavy Veh. Adj. (f_{HV}), %	3	3	3	3	5	5	5	3	5	5	5	3	7	7	7	3
Pedestrians Crossing	0				0				0				0			

Critical and Follow-Up Headway Adjustment

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (sec)	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929
Follow-Up Headway (sec)	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858

Flow Computations

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Circulating Flow (V_c), pc/h	254			294			410			89		
Exiting Flow (V_{ex}), pc/h	249			83			310			217		
Entry Flow (V_e), pc/h		374			105			133			248	197
Entry Volume veh/h		363			100			127			232	184

Capacity and v/c Ratios

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Capacity (c_{PCE}), pc/h		877			843			750			1034	
Capacity (c), veh/h		852			802			714			967	
v/c Ratio (X)		0.43			0.12			0.18			0.24	

Delay and Level of Service

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		9.5			5.8			7.0			6.1	0.0
Lane LOS		A			A			A			A	
Lane 95% Queue		2.2			0.4			0.6			0.9	
Approach Delay, s/veh	9.46			5.75			7.01			3.40		
Approach LOS, s/veh	A			A			A			A		
Intersection Delay, s/veh	6.27											
Intersection LOS	A											

 HCS 2010™ 6.65 Roundabouts Generated: 11/10/2014 10:40 AM

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	50	15	10	10	15	30
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.932		0.911	
Flt Protected		0.963			0.983	
Satd. Flow (prot)	0	1586	1539	0	1426	0
Flt Permitted		0.963			0.983	
Satd. Flow (perm)	0	1586	1539	0	1426	0
Link Speed (mph)		55	55		55	
Link Distance (ft)		592	474		406	
Travel Time (s)		7.3	5.9		5.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	17%	0%	12%	0%	15%
Adj. Flow (vph)	56	17	11	11	17	33
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	73	22	0	50	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		12	12		12	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (mph)	15			15	15	15
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization 20.5%	ICU Level of Service A
Analysis Period (min) 15	

Intersection						
Int Delay, s/veh	6					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	50	15	10	10	15	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	17	0	12	0	15
Mvmt Flow	56	17	11	11	17	33

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	22	0	-	0	145	17
Stage 1	-	-	-	-	17	-
Stage 2	-	-	-	-	128	-
Critical Hdwy	4.13	-	-	-	6.4	6.35
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.227	-	-	-	3.5	3.435
Pot Cap-1 Maneuver	1587	-	-	-	852	1025
Stage 1	-	-	-	-	1011	-
Stage 2	-	-	-	-	903	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1587	-	-	-	821	1025
Mov Cap-2 Maneuver	-	-	-	-	821	-
Stage 1	-	-	-	-	1011	-
Stage 2	-	-	-	-	870	-

Approach	EB	WB	SB
HCM Control Delay, s	5.7	0	9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1587	-	-	-	947
HCM Lane V/C Ratio	0.035	-	-	-	0.053
HCM Control Delay (s)	7.4	0	-	-	9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	25	35	25	40	60	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.921				0.967	
Flt Protected	0.980			0.981		
Satd. Flow (prot)	1515	0	0	1595	1672	0
Flt Permitted	0.980			0.981		
Satd. Flow (perm)	1515	0	0	1595	1672	0
Link Speed (mph)	55			55	55	
Link Distance (ft)	405			322	426	
Travel Time (s)	5.0			4.0	5.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	6%	3%	15%	3%	0%	5%
Adj. Flow (vph)	28	39	28	44	67	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	67	0	0	72	89	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	12			12	12	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (mph)	15	15	15			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 21.0% ICU Level of Service A

Analysis Period (min) 15

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	25	35	25	40	60	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	6	3	15	3	0	5
Mvmt Flow	28	39	28	44	67	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	178	78	89	0	-	0
Stage 1	78	-	-	-	-	-
Stage 2	100	-	-	-	-	-
Critical Hdwy	6.46	6.23	4.25	-	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.327	2.335	-	-	-
Pot Cap-1 Maneuver	803	980	1428	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	914	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	787	980	1428	-	-	-
Mov Cap-2 Maneuver	787	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	896	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	2.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1428	-	889	-	-
HCM Lane V/C Ratio	0.019	-	0.075	-	-
HCM Control Delay (s)	7.6	0	9.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	140	40	65	25	55	145
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865			0.902	
Flt Protected	0.950			0.965		
Satd. Flow (prot)	0	1514	0	1576	1501	0
Flt Permitted	0.950			0.965		
Satd. Flow (perm)	0	1514	0	1576	1501	0
Link Speed (mph)	55			55	55	
Link Distance (ft)	830			473	491	
Travel Time (s)	10.3			5.9	6.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	0%	8%	5%	11%	3%
Adj. Flow (vph)	156	44	72	28	61	161
Shared Lane Traffic (%)						
Lane Group Flow (vph)	156	44	0	100	222	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	12			12	12	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (mph)	15	15	15			15
Sign Control	Stop			Stop	Stop	

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization Err%	ICU Level of Service H
Analysis Period (min) 15	

Intersection	
Intersection Delay, s/veh	9
Intersection LOS	A

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Vol, veh/h	0	140	40	0	65	25	0	55	145
Peak Hour Factor	0.92	0.90	0.90	0.92	0.90	0.90	0.92	0.90	0.90
Heavy Vehicles, %	2	2	0	2	8	5	2	11	3
Mvmt Flow	0	156	44	0	72	28	0	61	161
Number of Lanes	0	0	1	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	9.4	8.7	8.8
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	72%	78%	0%
Vol Thru, %	28%	0%	28%
Vol Right, %	0%	22%	72%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	90	180	200
LT Vol	25	0	55
Through Vol	0	40	145
RT Vol	65	140	0
Lane Flow Rate	100	200	222
Geometry Grp	1	1	1
Degree of Util (X)	0.136	0.26	0.263
Departure Headway (Hd)	4.912	4.682	4.267
Convergence, Y/N	Yes	Yes	Yes
Cap	730	768	842
Service Time	2.943	2.711	2.292
HCM Lane V/C Ratio	0.137	0.26	0.264
HCM Control Delay	8.7	9.4	8.8
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.5	1	1.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	300	45	10	245	55	40	10	25	75	20	5
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	200		0	0		200	0		0	200		0
Storage Lanes	0		0	0		1	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.983				0.850		0.956			0.971	
Flt Protected		0.999			0.998			0.974		0.950		
Satd. Flow (prot)	0	1639	0	0	1682	1365	0	1603	0	1583	1699	0
Flt Permitted		0.999			0.998			0.974		0.950		
Satd. Flow (perm)	0	1639	0	0	1682	1365	0	1603	0	1583	1699	0
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		681			644			440			309	
Travel Time (s)		8.4			8.0			5.5			3.8	
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	40%	5%	0%	0%	4%	9%	0%	12%	0%	5%	0%	0%
Adj. Flow (vph)	5	316	47	11	258	58	42	11	26	79	21	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	368	0	0	269	58	0	79	0	79	26	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		12			12			12			12	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (mph)	15		15	15		15	15		15	15		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 42.5% ICU Level of Service A

Analysis Period (min) 15

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	5	300	45	10	245	55	40	10	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	Yeild	-	-	None	-	-	None
Storage Length	-	-	-	-	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	40	5	0	0	4	9	0	12	0
Mvmt Flow	5	316	47	11	258	58	42	11	26

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	258	0	0	316	0	0	618	605	316
Stage 1	-	-	-	-	-	-	326	326	-
Stage 2	-	-	-	-	-	-	292	279	-
Critical Hdwy	4.5	-	-	4.1	-	-	7.1	6.62	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.62	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.62	-
Follow-up Hdwy	2.56	-	-	2.2	-	-	3.5	4.108	3.3
Pot Cap-1 Maneuver	1115	-	-	1256	-	-	404	399	729
Stage 1	-	-	-	-	-	-	691	631	-
Stage 2	-	-	-	-	-	-	720	662	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1115	-	-	1256	-	-	381	392	729
Mov Cap-2 Maneuver	-	-	-	-	-	-	381	392	-
Stage 1	-	-	-	-	-	-	687	627	-
Stage 2	-	-	-	-	-	-	685	655	-

Approach	EB	WB	NB
HCM Control Delay, s	0.1	0.3	14.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	455	1115	-	-	1256	-	-	367	451
HCM Lane V/C Ratio	0.174	0.005	-	-	0.008	-	-	0.215	0.058
HCM Control Delay (s)	14.6	8.2	0	-	7.9	0	-	17.5	13.5
HCM Lane LOS	B	A	A	-	A	A	-	C	B
HCM 95th %tile Q(veh)	0.6	0	-	-	0	-	-	0.8	0.2

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	75	20	5
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	200	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	5	0	0
Mvmt Flow	79	21	5

Major/Minor	Minor2		
Conflicting Flow All	624	605	258
Stage 1	279	279	-
Stage 2	345	326	-
Critical Hdwy	7.15	6.5	6.2
Critical Hdwy Stg 1	6.15	5.5	-
Critical Hdwy Stg 2	6.15	5.5	-
Follow-up Hdwy	3.545	4	3.3
Pot Cap-1 Maneuver	394	415	786
Stage 1	721	683	-
Stage 2	664	652	-
Platoon blocked, %			
Mov Cap-1 Maneuver	367	408	786
Mov Cap-2 Maneuver	367	408	-
Stage 1	717	675	-
Stage 2	626	648	-

Approach	SB
HCM Control Delay, s	16.5
HCM LOS	C

Minor Lane/Major Mvmt

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	5	155	0	0	10	210	790	15	5	900	30
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0		50	0		0	340		100	300		110
Storage Lanes	0		1	0		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor												
Frt			0.850		0.865				0.850			0.850
Flt Protected		0.963					0.950			0.950		
Satd. Flow (prot)	0	1685	1352	0	1514	0	1498	3167	1240	1662	3197	1365
Flt Permitted		0.963					0.950			0.950		
Satd. Flow (perm)	0	1685	1352	0	1514	0	1498	3167	1240	1662	3197	1365
Link Speed (mph)		55			55			55			55	
Link Distance (ft)		650			659			415			455	
Travel Time (s)		8.1			8.2			5.1			5.6	
Confl. Bikes (#/hr)									1			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	10%	0%	0%	0%	11%	5%	20%	0%	4%	9%
Adj. Flow (vph)	16	5	163	0	0	11	221	832	16	5	947	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	21	163	0	11	0	221	832	16	5	947	32
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		12			12			12			12	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (mph)	15		15	15		15	15		15	15		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary		
Area Type:	Other	
Control Type: Unsignalized		
Intersection Capacity Utilization 57.5%		ICU Level of Service B
Analysis Period (min) 15		

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	15	5	155	0	0	10	210	790	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	Free
Storage Length	-	-	50	-	-	-	340	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	10	0	0	0	11	5	20
Mvmt Flow	16	5	163	0	0	11	221	832	16

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	1816	2232	474	1761	2232	416	947	0	-
Stage 1	958	958	-	1274	1274	-	-	-	-
Stage 2	858	1274	-	487	958	-	-	-	-
Critical Hdwy	7.5	6.5	7.1	7.5	6.5	6.9	4.32	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-
Follow-up Hdwy	3.5	4	3.4	3.5	4	3.3	2.31	-	-
Pot Cap-1 Maneuver	50	43	516	55	43	591	667	-	0
Stage 1	280	338	-	180	240	-	-	-	0
Stage 2	322	240	-	536	338	-	-	-	0
Platoon blocked, %								-	
Mov Cap-1 Maneuver	36	29	516	24	29	591	667	-	-
Mov Cap-2 Maneuver	36	29	-	24	29	-	-	-	-
Stage 1	187	336	-	120	160	-	-	-	-
Stage 2	211	160	-	359	336	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	38.3	11.2	2.7
HCM LOS	E	B	

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	WBLn1	SBL	SBT
Capacity (veh/h)	667	-	34	516	591	809	-
HCM Lane V/C Ratio	0.331	-	0.619	0.316	0.018	0.007	-
HCM Control Delay (s)	13	-	217.1	15.2	11.2	9.5	-
HCM Lane LOS	B	-	F	C	B	A	-
HCM 95th %tile Q(veh)	1.4	-	2.1	1.3	0.1	0	-

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	5	900	30
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	Free
Storage Length	300	-	110
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	0	4	9
Mvmt Flow	5	947	32

Major/Minor	Major2		
Conflicting Flow All	832	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.1	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.2	-	-
Pot Cap-1 Maneuver	809	-	0
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %		-	
Mov Cap-1 Maneuver	809	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	SB
HCM Control Delay, s	0.1
HCM LOS	

Minor Lane/Major Mvmt

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	40	65	40	940	955	90
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0	70	230			175
Storage Lanes	1	1	1			1
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1471	1403	1511	1683	1683	1430
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1471	1403	1511	1683	1683	1430
Link Speed (mph)	55			55	55	
Link Distance (ft)	730			506	503	
Travel Time (s)	9.0			6.3	6.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	13%	6%	10%	4%	4%	4%
Adj. Flow (vph)	42	68	42	989	1005	95
Shared Lane Traffic (%)						
Lane Group Flow (vph)	42	68	42	989	1005	95
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	12			12	12	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (mph)	15	15	15			15
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization 65.6%	ICU Level of Service C
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	40	65	40	940	955	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Free
Storage Length	0	70	230	-	-	175
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	13	6	10	4	4	4
Mvmt Flow	42	68	42	989	1005	95

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2079	1005	1005	0	-	0
Stage 1	1005	-	-	-	-	-
Stage 2	1074	-	-	-	-	-
Critical Hdwy	6.53	6.26	4.2	-	-	-
Critical Hdwy Stg 1	5.53	-	-	-	-	-
Critical Hdwy Stg 2	5.53	-	-	-	-	-
Follow-up Hdwy	3.617	3.354	2.29	-	-	-
Pot Cap-1 Maneuver	55	288	659	-	-	0
Stage 1	338	-	-	-	-	0
Stage 2	313	-	-	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	51	288	659	-	-	-
Mov Cap-2 Maneuver	51	-	-	-	-	-
Stage 1	338	-	-	-	-	-
Stage 2	293	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	90.6	0.4	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	659	-	51	288	-
HCM Lane V/C Ratio	0.064	-	0.826	0.238	-
HCM Control Delay (s)	10.8	-	203	21.4	-
HCM Lane LOS	B	-	F	C	-
HCM 95th %tile Q(veh)	0.2	-	3.5	0.9	-

Section L:
Memorandum 12-Transportation System Recommendations

MEMORANDUM

DATE: January 21, 2014

TO: Clatsop County TSP Project Management Team

FROM: Chris Maciejewski, PE, PTOE - DKS Associates
Kevin Chewuk, PTP - DKS Associates

The project list in the memorandum was updated based on feedback from PAC meeting #5. The final project list can be found in TSP Volume 1.

SUBJECT: Clatsop County Transportation System Plan
Technical Memorandum #12: Transportation System Recommendations P11086-016

This document prioritizes the 87 solutions for the Clatsop County aspirational transportation system into a Financially Constrained Plan. Included is a summary of the process utilized to develop and analyze the solutions for the transportation system and a detail of the Financially Constrained and Planned Transportation Systems identified for Clatsop County.

The Investments

Clatsop County must make investment decisions to implement a set of transportation improvements that could reasonably be funded to meet identified needs through 2035. Overall, Clatsop County is expected to have around $4 million available in funding (beyond ongoing maintenance and operations programs) through County sources through 2035. ODOT estimates that it is reasonable for the County to assume that approximately $8 to $10 million in discretionary state and/or federal funds may also be available to invest in Clatsop County over the next 20 years. These assumptions establish an estimated constrained threshold for funding available to deal with system modernization and enhancement of approximately $12 to $14 million dollars through 2035.

Constrained and Aspirational Projects

Constrained projects are those projects that the County and ODOT believe are reasonably likely to be funded during the 20-year planning horizon based on the constrained funding threshold established through County and ODOT funding analysis. Aspirational projects (projects which the County supports and would like to implement) include all identified projects for improving Clatsop County's transportation system, regardless of their primary funding source, priority, that are not reasonably likely to be funded during the 20-year planning horizon, but do address an identified problem and are supported by the County and ODOT. The full list of constrained and aspirational projects is shown in Table 1, later in this document. Taking a multi-modal, network-wide approach to identifying transportation system solutions, these projects fall within one of several categories:

- **Driving** projects to improve connectivity, safety, and mobility throughout the County. Clatsop County identified 38 projects to improve driving conditions that would cost an estimated $102.5 million to complete.

- **Walking and Biking** projects to provide seamless connections throughout the County. Clatsop County identified 37 walking and biking projects that would cost an estimated $82.5 million to complete. It should be noted that there are a number of walking projects that are combined with biking projects and vice-versa, particularly shoulder widening or shared-use path projects.

  It should also be noted that there are several walking and biking projects identified that are shown at a larger scale and have an associated level of cost that is well beyond the current financial constraint threshold. However, the walking and biking projects have minimal impact on and can largely be accomplished in the existing (Right-of-Way) ROW. In addition, the biking and walking project are scalable and even though one may be identified in this TSP to address a longer segment, smaller phases could potentially be implemented or combined with a related maintenance activity like a pavement rehabilitation job.

- **Transit** projects to enhance the quality and convenience for passengers. A total of 6 transit projects were identified that would cost an estimated $135 thousand.

- **Other** projects to further study various multimodal and safety issues. A total of 6 projects were identified that would cost an estimated $2 million.

Funding Gap

The total cost of the aspirational transportation system projects is greater than the County's and partner agency's ability to raise funding. With nearly all of the current revenue streams being utilized for maintenance of the transportation system, and with these costs continuing to rise through 2035, the County is expected to have limited funds for transportation improvements. Unless additional revenue streams are developed, Clatsop County expects to have approximately $4 million to spend on the 34 transportation improvements on County facilities for which they may be the primary source of funding over the next 20 years. It would take nearly $63 million to construct all 34 projects, meaning nearly $59 million in investments will not be funded.

The County has also identified nearly $104 million worth of investments (spread out over 42 projects) along state highways. ODOT has determined that it is reasonable to assume that perhaps $8 to $10 million in state discretionary funds will be available to fund new projects in Clatsop County over the next 20 years[1]. Therefore, nearly $94 million worth projects on the state system are not expected to be funded within the TSP planning horizon.

The County has also identified 5 projects estimated at over $20 million that would be jointly funded by the State, County and local agencies, including Astoria, Warrenton, and Seaside, and 6 projects estimated at $135 thousand for which Sunset Empire Transportation District would be the primary

[1] The State has not committed any future funding for projects in Clatsop County. This estimate is based on assuming that Clatsop County will receive a reasonable share of the state/federal funding projected to be available over the 20-year planning horizon in Region 2 and based on ODOT sustaining their current revenue structure. It is used to illustrate the degree of financial constraints faced by ODOT as of the writing of this document. Actual funding through state and federal sources may be higher or lower than the range of this estimate. This estimate does not include projects that might be funded through the federal Highway Safety Improvement Program (HSIP).

source of funding. The County supports these projects, although full implementation (beyond project pre-design) is not anticipated for most of them.

Developing the Financially Constrained Plan

With an estimated $187 million worth of transportation system projects identified that Clatsop County and ODOT would support, the County must make investment decisions to identify which of these potential improvements are reasonably likely be funded between 2015 and 2035. While none of the funding projections detailed earlier in this document are assured, they do set the reasonably likely funding constraint threshold for the Clatsop County TSP. Projects not identified under the constraint threshold are, by default, aspirational, meaning that while they do address a legitimate problem and have local and/or state support, they are not expected to be funded during the 20-year planning horizon. This is not to say that priorities might not change in a way that moves a project from the constrained to the aspirational list and vice-versa. It also does not preclude the possibility that some aspirational projects may be implemented within the 20-year planning horizon if additional funding beyond the current constrained threshold is secured.

Setting Priorities to the Investments

Unless the County expands its funding options, most of the aspirational transportation system projects identified are not reasonably likely to be funded through 2035. For this reason, the transportation solutions were split into two categories. Those reasonably expected to be funded by 2035 were included in the Financially Constrained Transportation Project List, while the projects that are not expected to be funded by 2035 were included in the Aspirational Transportation Project List.

Each project from the Aspirational project list was scored based on the evaluation criteria that were developed in Technical Memorandum #4. The scores were totaled for project, and used to solicit feedback from the Project Management Team, and Project Advisory Committee. The input eventually led to the emergence of a hybrid package of transportation investments to be included as the recommended "Financially Constrained Transportation System."

The following adjustments were applied to the project evaluation criteria to address recommendations of the TSP Project Management Team and Project Advisory Committee:

- The evaluation scores for projects located in rural areas were adjusted to exclude urban oriented goals. This adjustment was applied to account for the different transportation characteristics and needs in urban and rural areas of the County.
- Projects were ranked based on the Corridor Health Tool results for the project location (see Technical Memorandum #7). Projects located along "poor" health segments were prioritized over those along "fair" or "good" segments. This adjustment was applied to prioritize projects that focus on improving safety along streets, an area the PAC felt should be weighted more heavily.
- Each project was scored with a resiliency factor based on its impact on evacuation or recovery efforts from local destructive events, its connectivity to ODOT Lifeline or key County

evacuation routes, or its distance from a tsunami zone. This adjustment was applied to prioritize projects that focus on resiliency, an area the PAC felt should be weighted more heavily.

Using the recommendations from the PAC, the projects were re-evaluated with two separate rankings, and the resulting scores were averaged to arrive at the hybrid package of transportation solutions. The two rankings are summarized below:

- Ranking A: This ranking averages the results of the project evaluation using the criteria established in Technical Memorandum #4 (and summarized above), the rural adjusted scores which exclude the evaluation of urban oriented goals, and the corridor health rankings, with an additional resiliency factor.
- Ranking B: This ranking averages the results of the project evaluation using the criteria established in Technical Memorandum #4 (and summarized above), while weighting Goal 5 to be worth double that of the other goals.

The Financially Constrained Project List

The Financially Constrained Project List identifies the transportation solutions off state highways that are reasonably expected to be funded by 2035 and have the highest priority for implementation. These projects are those for which the County would be the primary source of funding. About $4 million worth of investments, spread over 11 projects, are included in the Financially Constrained Transportation System. Of these investments, nearly $3 million has been allocated to fund 5 projects through pre-design only, meaning additional funding would be needed for full-design and construction. The Financially Constrained Project List is shown in Table 1 and in Figures 1, and 2.

Transportation solutions on the Financially Constrained Project List were recommended within several different priority/time horizons:

- Short-term: projects recommended for implementation in within 1 to 5 years.
- Medium-term: projects recommended for implementation in within 5 to 10 years.
- Long-term: projects likely to be implemented beyond 10 years from the adoption of this plan. These projects are important for the development of the County transportation network, but are unlikely to be funded in the next 10 years.

ODOT Projects on State Highways

In addition to the projects included in the Financially Constrained Plan that would primarily be funded by the County, ODOT has projected that it is reasonable to assume that approximately $8 to $10 million could be available from various state or federal sources over the 20-year planning horizon to address the nearly $104 million worth of projects identified along state highways. A reasonable estimate for how these funds could be invested (based on current needs) can be seen in Table 1 and Figures 1, and 2.

The projects shown in the constrained list are merely illustrative of a group of projects that could be funded. Because ODOT supports all of the projects listed in the constrained or aspirational plans, strict adherence to priority implementation of the projects currently shown on the constrained list is not required by ODOT. This list may be modified and adapted with the limits of the financial constraint threshold, as it currently exists or as it may evolve, to advance any supported project on state highways in response to any opportunity or issue that may arise during the planning horizon.

Aspirational Transportation System

The projects and actions outlined within the Financially Constrained Plan will help improve the transportation system in Clatsop County. If the County is able to implement a majority of the Financially Constrained Plan, nearly two decades from now Clatsop County residents will enjoy a safer, more balanced multimodal transportation network.

The Aspirational Transportation Project List identifies the transportation solutions that are not reasonably likely to be funded by 2035 based on current financial constraints. Nonetheless, each project identified is supported by the County and/or ODOT and is important to the transportation system. Some of the projects will require public sector funding and resources beyond what is available in the time frame of this plan. Others are contingent upon joint funding from local agencies. The Aspirational Transportation Project List includes nearly $173 million worth of investments beyond those included in the Financially Constrained Plan. The Aspirational Project List is shown in Table 1 and in Figures 1, and 2.

Transportation solutions on the Aspirational Transportation Project List were recommended within several different priority/time horizons:

- Long-term Phase 2: Projects with the highest priority for implementation beyond the projects included on the Financially Constrained Project List, should additional funding become available.
- Long-term Phase 3: Projects with the next highest priority for implementation beyond the projects included on the Financially Constrained Project List, should additional funding become available.
- Long-term Phase 4: The last phase of projects to be implemented, should additional funding become available.

Table 1: Financially Constrained and Aspirational Project List

Project #	Project Description	Project Location	Project Summary	Project Priority	Estimated Cost	Primary Funding Source
Walking and Biking Projects (see Figure 1)						
B01	Old US Highway 30 Improvements - Wauna-Westport	Old US Highway 30 (Taylorville Rd.) near Wauna and Westport	Stripe fog lines and center lines, expand shoulders as needed.	Aspirational-Long Term Ph3	$1,500,000	County
B02	Ziak-Gnat Creek Rd. Improvements	Ziak-Gnat Creek Rd. between US 30 and Knappa Dock Rd.	Improve shoulders to Major Collector standards.	Aspirational-Long Term Ph3	$5,800,000	County
B03	Knappa Dock Rd. Improvements	Knappa Dock Rd.	Improve shoulders to Major Collector standards and include bike symbols in shoulders at intersections.	Aspirational-Long Term Ph4	$1,400,000	County
B04	Hillcrest Loop Rd. Improvements	Hillcrest Loop Rd. between US 30 (M.P. 82.01) and Old US Highway 30	Improve shoulders to Major Collector standards and include bike symbols in shoulders at intersections.	Aspirational-Long Term Ph3	$4,500,000	County
B05	Old US Highway 30 Improvements - Svensen-Knappa	Old US Highway 30, between US 30 intersection (M.P. 82.01) and Svensen Market Rd.	Improve shoulders to Major or Minor Collector standards (as appropriate).	Aspirational-Long Term Ph3	$3,650,000	County
B06	Simonson Loop Rd. Improvements	Simonson Loop Rd. between Svensen Market Rd. and Old US Highway 30	Improve shoulders to Major Collector standards, including striping shoulders and include bike symbols in shoulders at intersections.	Aspirational-Long Term Ph4	$1,650,000	County
B07	US 30 / Svensen Market Rd. Intersection Improvements	US 30 / Svensen Market Rd. intersection	Improve bike shoulder striping through the intersection, placing the through bike movement to the left of the dedicated right turn lanes.	Aspirational-Long Term Ph4	$150,000	State
B08	US 30 / John Day River Rd. Intersection	US 30 / John Day River Rd. intersection	Improve bike shoulder striping through the intersection, placing the through bike movement to the left of the dedicated right	Aspirational-Long Term Ph3	$75,000	State

Table 1: Financially Constrained and Aspirational Project List

Project #	Project Description	Project Location	Project Summary	Project Priority	Estimated Cost	Primary Funding Source
	Improvements		turn lane.			
B09	Youngs River Rd. Shoulder Improvements - North Segment	Youngs River Rd. between Lewis and Clark Rd. and Tucker Creek Ln.	Improve paved shoulders to County standard for major collectors.	Aspirational-Long Term Ph3	$3,350,000	County
B10	Youngs River Rd. Shoulder improvements - South Segment	Youngs River Rd. between Tucker Creek Ln. and OR 202	Improve paved shoulders to County standard for major collectors.	Aspirational-Long Term Ph3	$6,800,000	County
B11	Lewis and Clark Rd. Shoulder Improvement - North Segment	Lewis and Clark Rd. between Kee Ln. and Logan Rd. (north intersection)	Improve paved shoulders to County standard for minor arterials/major collectors (as appropriate), including rumble strips and bike symbols. Avoid installing rumble strips adjacent to residential areas and provide gaps for bicyclists.	Aspirational-Long Term Ph2	$1,000,000	County
B12	Logan Rd. Shoulder Improvement	Logan Rd. between Lewis and Clark Rd. intersections	Improve paved shoulders to County standard for minor arterials, including rumble strips and bike symbols. Avoid installing rumble strips adjacent to residential areas and provide gaps for bicyclists.	Aspirational-Long Term Ph2	$2,050,000	County
B13	Lewis and Clark Rd. Shoulder Improvement - South Segment	Lewis and Clark Rd. between Logan Rd. (south intersection) and Seaside city limits.	Improve paved shoulders to County standard for minor arterials, including rumble strips and bike symbols. Avoid installing rumble strips adjacent to residential areas and provide gaps for bicyclists.	Aspirational-Long Term Ph2	$6,250,000	County
B14	US 101/ Sunset Beach Rd. Bike Improvements	US 101/Sunset Beach Rd.	Improve bike shoulder striping through the intersection, placing the through bike movement to the left of the dedicated right	Financially Constrained-Long Term	$100,000	State

Table 1: Financially Constrained and Aspirational Project List

Project #	Project Description	Project Location	Project Summary	Project Priority	Estimated Cost	Primary Funding Source
			turn lane.			
B15	Lewis Rd. Shoulder Improvements	Lewis Rd., along entire County facility in Sunset Beach.	Improve shoulders to Minor Collector standards. Install a speed warning system that activates when a motorist approaches at a high speed.	Aspirational-Long Term Ph2	$500,000	County
B16	Dellmoor Loop Shoulder Improvements	Dellmoor Loop, along entire County facility from US 101 to US 101.	Improve shoulders to Minor Collector standards, including striping shoulders	Aspirational-Long Term Ph3	$1,600,000	County
B17	US 101/ Highland Ln. Bike Improvements	US 101/Highland Ln.	Improve bike shoulder striping through the intersection, placing the through bike movement to the left of the dedicated right turn lane.	Aspirational-Long Term Ph3	$150,000	State
B18	US 101/ US 26 Southbound Interchange Bike Bypass	West side of US 101 through the US 26 interchange.	Off-highway shared use path for bypassing the US 101/US 26 interchange in the southbound direction. Beginning at M.P. 24.9, follows the local road, then continues as a new path until merging back onto the US 101 shoulder, around M.P. 25.7	Aspirational-Long Term Ph2	$1,100,000	County
B19	US 26 Shoulder Improvements	US 26 at all locations where paved shoulder width is less than four feet.	Improve paved shoulders to a minimum of four feet width.	Aspirational-Long Term Ph2	$5,250,000	State
B20	OR 103 Shoulder Improvements	OR 202 and Maple Road	Improve shoulders to ODOT standards and stripe.	Aspirational-Long Term Ph2	$7,400,000	State
B21	OR 202 Shoulder Improvements	OR 202 between Walluski Loop (north) and Youngs River Rd.	Improve shoulders to ODOT standards and stripe.	Aspirational-Long Term Ph2	$2,650,000	State
B22	Walluski Loop Shoulder Improvements	Walluski Loop	Improve shoulders to Major Collector standards and stripe.	Aspirational-Long Term Ph4	$5,350,000	County

Table 1: Financially Constrained and Aspirational Project List

Project #	Project Description	Project Location	Project Summary	Project Priority	Estimated Cost	Primary Funding Source
B23	New Young's Bay Bridge Bike Enhancements	New Young's Bay Bridge	Install additional bike detection for cyclists traveling along the bridge.	Financially Constrained-Long Term	$500,000	State
B24	Astoria Megler Bridge Bike Enhancements	Astoria Megler Bridge	Install additional bike detection for cyclists traveling along the bridge.	Aspirational-Long Term Ph2	$500,000	State
B25	Bike Wayfinding Signs	Bike facility intersections throughout the county.	Provide bike wayfinding signage at key junctions throughout the county to help bicyclists navigate bike routes and access major destinations.	Aspirational-Long Term Ph3	$25,000	County
B26	Bike Parking	Major destinations throughout the county.	Directly provide or encourage bike parking at major destinations throughout the county.	Aspirational-Long Term Ph3	$50,000	County
B27	Coast Bike Trail Designation	Lewis and Clark Rd. and US 101	Change Coast Bike Trail designation from Lewis and Clark Rd. to US 101	Aspirational-Long Term Ph3	$5,000	County
W01	Westport Pedestrian Improvements on US 30	US 30, between Old US 30 and Old Mill Town Rd.	Construct sidewalks and landscaping, add bike facilities. Implement parking management and speed reduction measures.	Aspirational-Long Term Ph2	$1,050,000	State
W02	OR 202 Shared Use Path	OR 202 between Astoria UGB and Clatsop County Fairgrounds	Add shared use path following road alignment.	Aspirational-Long Term Ph4	$2,300,000	State/ County
W03	Warrenton-Miles Crossing Off-Highway Shared Use Path Study	Warrenton to Miles Crossing.	Study for an off-highway shared use path. Study will determine potential alignments, width, security, wayfinding details, construction materials, costs, and funding sources.	Financially Constrained-Short Term	$150,000	County
W04	SE 19th St. Shared Use Path	SE 19th St from SE Ensign Ln to Animal Shelter Near SE Willow Dr.	Extends shared use path to connect with SE Ensign Ln. The animal shelter is a popular destination to walk to that is just off the pedestrian network.	Aspirational-Long Term Ph2	$1,250,000	County/ Warrenton

Table 1: Financially Constrained and Aspirational Project List

Project #	Project Description	Project Location	Project Summary	Project Priority	Estimated Cost	Primary Funding Source
W05	Lewis and Clark Rd. Shared Use Path	Lewis and Clark Rd. between Warrenton-Astoria Hwy. (US 101B) and Kee Ln.	Add shared use path following road alignment.	Financially Constrained-Medium Term**	$2,750,000 ($515,000 Funded for Design)	County
W06	Camp Rilea East Bypass Trail	Ridge Rd. between Delaura Beach Ln. and the Fort to Sea Trail	Add an additional three feet of gravel pathway along the west shoulder. Add a pedestrian pathway following the right-of-way of Columbia Beach Lane, Highway 104 and US 101, connecting to the Fort to Sea Trail just south of Camp Rilea.	Aspirational-Long Term Ph3	$2,500,000	County
W07	US 101 Camp Rilea Improvements	Patriot Way to Highland Lane	Widen narrow shoulders along the corridor.	Aspirational-Long Term Ph2	$3,000,000	State
W08	Sunset Beach Rd. Improvements	Sunset Beach Rd. between US 101 and the coast	Pedestrian improvements following road alignment.	Financially Constrained-Short Term**	$3,350,000 ($630,000 Funded for Design)	County
W09	Highland Ln. Improvements	Highland Ln., along entire County facility between US 101 and the coast.	Pedestrian improvements following road alignment.	Financially Constrained-Medium Term**	$700,000 ($95,000 Funded for Design)	County
W10	N. Wahanna Rd. Improvements	Wahanna Rd. from Lewis and Clark Rd. south to the end of County facility.	Change road cross section to include a multimodal path on the west side and two 10 ft. travel lanes, as detailed in the Seaside TSP.	Financially Constrained-Medium Term	$2,250,000	State/ County/ Seaside
Driving Projects (see Figure 2)						
D01*	Westport Intersections Improvement	US 30/Old Mill Town Rd. and US30/Westport Ferry Rd.	Realign intersections to reduce skew, improve illumination at intersections, and improve pedestrian crossings.	Financially Constrained-Medium Term	$2,000,000	State
D02	Westport Ferry New Collector to	Connects US 30/Old US Highway 30 to Westport	New collector to connect US 30 with the interstate ferry in Westport. Includes	Aspirational-Long Term Ph2	$3,000,000	County

Table 1: Financially Constrained and Aspirational Project List

Project #	Project Description	Project Location	Project Summary	Project Priority	Estimated Cost	Primary Funding Source
	US 30	Ferry Rd.	bike/ped facilities, left turn lanes off US 30 in both directions, and a right turn lane from US 30 westbound. Requires a new rail crossing and would close or make emergency-only the existing at-grade crossing.			
D03*	US 30 / Old US Highway 30-Hillcrest Loop Intersection Improvements	US 30 / Old US Highway 30-Hillcrest Loop Road intersection in Knappa	Reduce the paved width of the Old US Highway 30 approach. Improve pedestrian crossing on the east leg of the intersection.	Financially Constrained-Short Term	$200,000	State
D04	US 30 Shoulder Rumble Strips - Knappa to Astoria	US 30 between Old US Highway 30 (east of Abbot Rd) in Knappa and Astoria City Limits	Add rumble strips to highway shoulders and centerline in do-not-pass zones.	Aspirational-Long Term Ph4	$55,000	State
D05	US 30 Climbing Lane	US 30, between Fern Hill Rd. and John Day River Bridge	Add an eastbound climbing lane on US 30.	Aspirational-Long Term Ph4	$13,500,000	State
D06	Astoria Alternate Route Feasibility Study	Between OR 202 south of Astoria and US 30, east of Astoria	Project to study the feasibility of creating a 2-lane county road to provide an alternate route between OR 202 and US 30.	Financially Constrained-Medium Term	$200,000	County
D07	US 30/Liberty Ln. Intersection Improvements	US 30/Liberty Ln.	Realign intersection and provide a southbound left turn pocket on US 30.	Aspirational-Long Term Ph4	$400,000	State
D08	Irving Ave Extension	Irving Ave., between the existing east terminus and Nimitz Dr.	Extension of Irving Ave. to connect with Nimitz Dr. Implement in coordination with Astoria as project includes portions inside and outside the Astoria Urban Growth Boundary, including an Environmental Assessment (EA) if needed.	Financially Constrained-Short Term**	$7,000,000 ($995,000 Funded for Design and EA)	County/ Astoria

Table 1: Financially Constrained and Aspirational Project List

Project #	Project Description	Project Location	Project Summary	Project Priority	Estimated Cost	Primary Funding Source
D09	Highway 202 Flood Improvements	OR 202, just east of Williamsport Rd.	Raise the pavement just east of Williamsport Rd. (around the curve) to reduce recurring flooding.	Aspirational-Long Term Ph3	$9,000,000	State
D10	OR 202 Shoulder Rumble Strips	OR 202 from M.P. 4.63 to M.P. 6.44	Add rumble strips to highway shoulders and to centerline in do-not-pass zones.	Aspirational-Long Term Ph4	$100,000	State
D11	Miles Crossing Intersection Improvements	Warrenton-Astoria Hwy. (US 101B)/Lewis and Clark Rd./Youngs River Rd. intersection	Construct a roundabout at the intersection, with enhanced navigational signage on the approaches. This roundabout includes a southbound right-turn bypass lane, similar to the existing geometry, that allows US 101B southbound traffic to pass through the intersection unimpeded.	Financially Constrained-Medium Term	$5,600,000	State
D12	Warrenton-Astoria Hwy. (US 101B) Cross Section Improvements	Warrenton-Astoria Hwy. (US 101B) between Lewis and Clark River Bridge and Old Youngs Bay Bridge	Improve cross section to three lanes with one 12' travel lane in each direction, a 14' center left turn lane, two 6' sidewalks, and two 6' bike lanes.	Aspirational-Long Term Ph4	$10,000,000	State
D13	Warrenton-Astoria Hwy. (US 101B)/ Fort Clatsop Rd. Intersection Improvements	Warrenton-Astoria Hwy. (US 101B)/Fort Clatsop Rd.	Addition of westbound right turn deceleration lane on Warrenton-Astoria Hwy. (US 101B) and southbound left turn lane on SE Airport Ln.	Aspirational-Long Term Ph4	$350,000	State
D14	19th St. Extension	Extends the north-south alignment of 19th St. south to meet with Dolphin Rd. near Rainbows End Ln.	Extend 19th St. to create an alternative route to US 101. Implemented in coordination with Warrenton.	Financially Constrained-Short Term**	$4,600,000 ($655,000 Funded for Design)	County/ Warrenton
D15	US 101/ Fort Stevens Highway (OR 104)	US 101/Fort Stevens Highway (OR 104)	Advance intersection warning signing on US 101.	Aspirational-Long Term Ph4	$75,000	State

Table 1: Financially Constrained and Aspirational Project List

Project #	Project Description	Project Location	Project Summary	Project Priority	Estimated Cost	Primary Funding Source
	Intersection Safety Improvements					
D16	US 101 / Fort Stevens Highway (OR 104) Intersection Improvements	US 101 / Fort Stevens Highway (OR 104)	Add eastbound right turn lane to Fort Stevens Highway (OR 104).	Aspirational-Long Term Ph4	$450,000	State
D17	Camp Rilea Highway Access - Advance Warning Signs	US 101 / Patriot Way	Install signs informing of possible convoys and/or congestion at Patriot Way. Signs could be free standing approximately 500 feet north and south of the intersection, or co-mounted on Camp Rilea guide signs. Optionally includes active flashing yellow lights controlled at Camp Rilea.	Aspirational-Long Term Ph4	$75,000	State
D18*	Camp Rilea Highway Access - 2 Stage Left	US 101 / Patriot Way	Create a two-stage left turn movement for traffic exiting Camp Rilea using a raised channelized turn median. This long-term solution is dependent on growth in highway traffic volumes and activity at Camp Rilea.	Aspirational-Long Term Ph4	$200,000	State
D19*	US 101/Turley Lane-Glenwood Village Rd. Intersection Safety Enhancement	US 101/Turley Lane-Glenwood Village Rd.	Combine Turley Lane and Glenwood Village Lane into a single access to US 101. Add southbound left turn lane to US 101.	Financially Constrained-Funded	Funded	State
D20*	US 101/ Sunset Beach Rd. Intersection Improvements	US 101/ Sunset Beach Rd.	Add J-turn on US 101 south of the intersection to facilitate movements from Sunset Beach Rd. to US 101 northbound.	Financially Constrained-Funded	Funded	State
D21	US 101 Cross Section	Patriot Way to Sunset Beach Road	Widen to include center median and standard shoulders.	Aspirational-Long Term Ph2	$10,000,000	State

Table 1: Financially Constrained and Aspirational Project List

Project #	Project Description	Project Location	Project Summary	Project Priority	Estimated Cost	Primary Funding Source
	Improvements					
D22	US 101 at Cullaby Lake Safety Improvements	US 101 at Cullaby Lake Curves	Improve the Cullaby Lake curves to address safety concerns.	Aspirational-Long Term Ph3	$1,600,000	State
D23	US 101/ West Lake Road-Dellmoor Loop Improvements	US 101/ West Lake Road-Dellmoor Loop	Add left-turn lanes on US 101 and a second approach lane on West Lake Road nad Dellmoor Loop.	Aspirational-Long Term Ph3	$1,000,000	State
D24	US 101/ Surf Pines Lane Improvements	US 101/ Surf Pines Lane	Add a southbound right-turn lane on US 101.	Aspirational-Long Term Ph3	$100,000	State
D25	Lewis and Clark Rd. Bridge Stop Control	Lewis and Clark Rd. / Fort Clatsop Rd. and Lewis and Clark Rd. / Logan Rd.	Replace yield signs on the approaches from the bridge with stop signs.	Aspirational-Long Term Ph4	$5,000	County
D26	Lewis and Clark Rd. / Logan Rd. Intersection Improvements	Lewis and Clark Rd. / Logan Rd.	Improve sight distances at the intersection by modifying the alignment of Lewis and Clark Rd. to meet Logan Rd. further to the east. Low-impact project should work within environmental constraints.	Aspirational-Long Term Ph4	$1,950,000	County
D27	Lewis and Clark Rd. Curve Safety Improvements	Lewis and Clark Rd. at curves near Crown Camp Rd. intersection.	Add enhanced sign and marking improvements on curves.	Aspirational-Long Term Ph4	$5,000	County
D28	Lewis and Clark Rd. / N. Wahanna Rd. / Crown Camp Rd. Intersection Improvements	Lewis and Clark Rd. / N. Wahanna Rd. / Crown Camp Rd.	Realign to "T" the intersection of Wahanna Rd. and Lewis and Clark Rd. Add stop control to all three legs of the intersection. Design to accommodate logging and other large trucks that regularly make the left from Lewis and Clark Rd. to N Wahanna Rd.	Aspirational-Long Term Ph2	$800,000	County
D29	Wahanna Rd.	Extend Wahanna Rd. to	Provides alternative route to US 101 for	Aspirational-	$4,750,000	County/

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Table 1: Financially Constrained and Aspirational Project List

Project #	Project Description	Project Location	Project Summary	Project Priority	Estimated Cost	Primary Funding Source
	Extension	Beerman Creek Rd.	residents. Implemented in coordination with Seaside. The connection to Beerman Creek Road should be east of the bridge.	Long Term Ph2		Seaside
D30	US 101 near Beerman Creek Lane Reconstruction	US 101, south of Seaside (MP 22.6 to 23.17)	Partially reconstruct US 101 to eliminate the uneven pavement conditions. The lanes and shoulders will also be widened, and stormwater treatment installed.	Aspirational-Long Term Ph2	$4,000,000	State
D31	US 101 Southbound Turn Lane to US 26 Easbound	US 101 Southbound at US 26 Easbound	Extend the turn lane to US 26 from southbound US 101.	Aspirational-Long Term Ph2	$550,000	State
D32	US 101 Shoulder Rumble Strips - Cannon Beach to Arch Cape	US 101 from the south end of Cannon Beach to the north end of Arch Cape.	Add rumble strips to highway shoulders and to centerline in do-not-pass zones. Avoid installing adjacent to residential areas and include gaps for bicyclist use.	Aspirational-Long Term Ph4	$65,000	State
D33	US 26 Passing Lane	US 26, between M.P. 5.0 and 6.0	Construct passing lanes.	Aspirational-Long Term Ph4	$10,650,000	State
D34	OR 53/ Hamlet Rd. Intersection Improvements	OR 53/Hamlet Rd.	Stripe the Hamlet Rd. intersection approach.	Aspirational-Long Term Ph4	$5,000	County
D35	US 26 Rumble Strips	US 26 throughout the County, as the opportunity arises	Add rumble strips to highway shoulders and to centerline in do-not-pass zones. Avoid installing adjacent to residential areas and include gaps for bicyclist use.	Aspirational-Long Term Ph4	$200,000	State
D36	US 26 Climbing Lane	US 26 westbound, between M.P. 20.4 and 21.6	Construct climbing lane.	Aspirational-Long Term Ph4	$9,500,000	State
D37	US 26 / Christmas Tree Rd. Access Management	US 26 / Christmas Tree Rd., just east of OR 103	Consolidate access points at highway adjacent businesses and add a left turn lane for access from US 26.	Aspirational-Long Term Ph4	$500,000	State

Table 1: Financially Constrained and Aspirational Project List

Project #	Project Description	Project Location	Project Summary	Project Priority	Estimated Cost	Primary Funding Source
D38	OR 103 Safety Improvements	OR 103, between US 26 and M.P. 3.00	Add rumble strips to highway shoulders and to centerline in do-not-pass zones. Avoid installing adjacent to residential areas and include gaps for bicyclist use. Improve and stripe shoulders as necessary for rumble strip installation.	Aspirational-Long Term Ph4	$150,000	State
Transit Projects						
T01	New Westport Transit Stop	Near the planned County park adjacent to the ferry landing, at the former GP industrial site.	New transit stop in Westport as detailed in the Westport Corridor and Community Plan.	Aspirational-Long Term Ph4	$20,000	SETD
T02	New Arch Cape Transit Stop	Arch Cape - exact location to be determined in consultation with SETD.	New transit stop including amenities such as route and schedule information, seating, shelters with concrete landing pads, and trash cans.	Aspirational-Long Term Ph2	$20,000	SETD
T03	Transit Stop Improvements	Transit stops throughout the county.	Improve transit stops with amenities such as route and schedule information, seating, shelters with concrete landing pads, and trash cans. Priority locations should be developed in consultation with SETD considering locations with high demonstrated or potential ridership, near major destinations, and at transfer and NW Connector locations.	Aspirational-Long Term Ph3	$50,000	SETD
T04	Improve Transit Headways	US 101 and US 30	Coordinate with Sunset Empire Transit District to reduce transit headways. Consider establishing a frequent service line designation, if appropriate.	Aspirational-Long Term Ph4	$10,000	SETD
T05	Extend Transit Service Hours	US 101 and US 30	Coordinate with Sunset Empire Transit District to extend transit service hours.	Aspirational-Long Term Ph4	$10,000	SETD

Table 1: Financially Constrained and Aspirational Project List

Project #	Project Description	Project Location	Project Summary	Project Priority	Estimated Cost	Primary Funding Source
			Match transit hours with Clatsop Community College hours, where possible.			
T06	Provide Real-Time Transit Arrivals and AVL	Transit Stops throughout the county	Together with SETD, implement an automatic vehicle location (AVL) system that provides real-time transit arrival times to riders. Provide this information to customers at transit stops.	Aspirational-Long Term Ph4	$25,000	SETD
Other Projects						
X01	Rural Community Safety Study	Arch Cape, Miles Crossing-Jeffers Garden, Knappa-Svensen, and Westport	Review and identify strategies for managing speed and other safety issues in the Arch Cape, Miles Crossing-Jeffers Garden, Knappa-Svensen, and Westport communities	Financially Constrained-Short Term	$200,000	County
X02	Rail Study	Between Knappa and Westport	Feasibility study to restore rail service to Tongue Point, including track improvements.	Aspirational-Long Term Ph4	$100,000	State
X03	County Bridges Seismic Stability Evaluation	Countywide	Study to determine seismic stability of all county bridges. This study prepares the county to pursue funding for bridge improvements.	Financially Constrained-Short Term	$100,000	County
X04	Cascadia Event Facility Plan	Countywide	Develop a plan to identify and address multimodal infrastructure needs during and after a seismic event. This planning effort will identify resilient routes and connections that can be used during an evacuation, and identify and evaluate locations where new pedestrian and bicycle bridges are needed as part of evacuation routes.	Financially Constrained-Short Term	$150,000	County
X05	Pedestrian/Bicycle Improvement	Countywide	Maintain shoulders and other walking and biking infrastructure in the County,	Aspirational-Long Term Ph3	$300,000	County

Table 1: Financially Constrained and Aspirational Project List

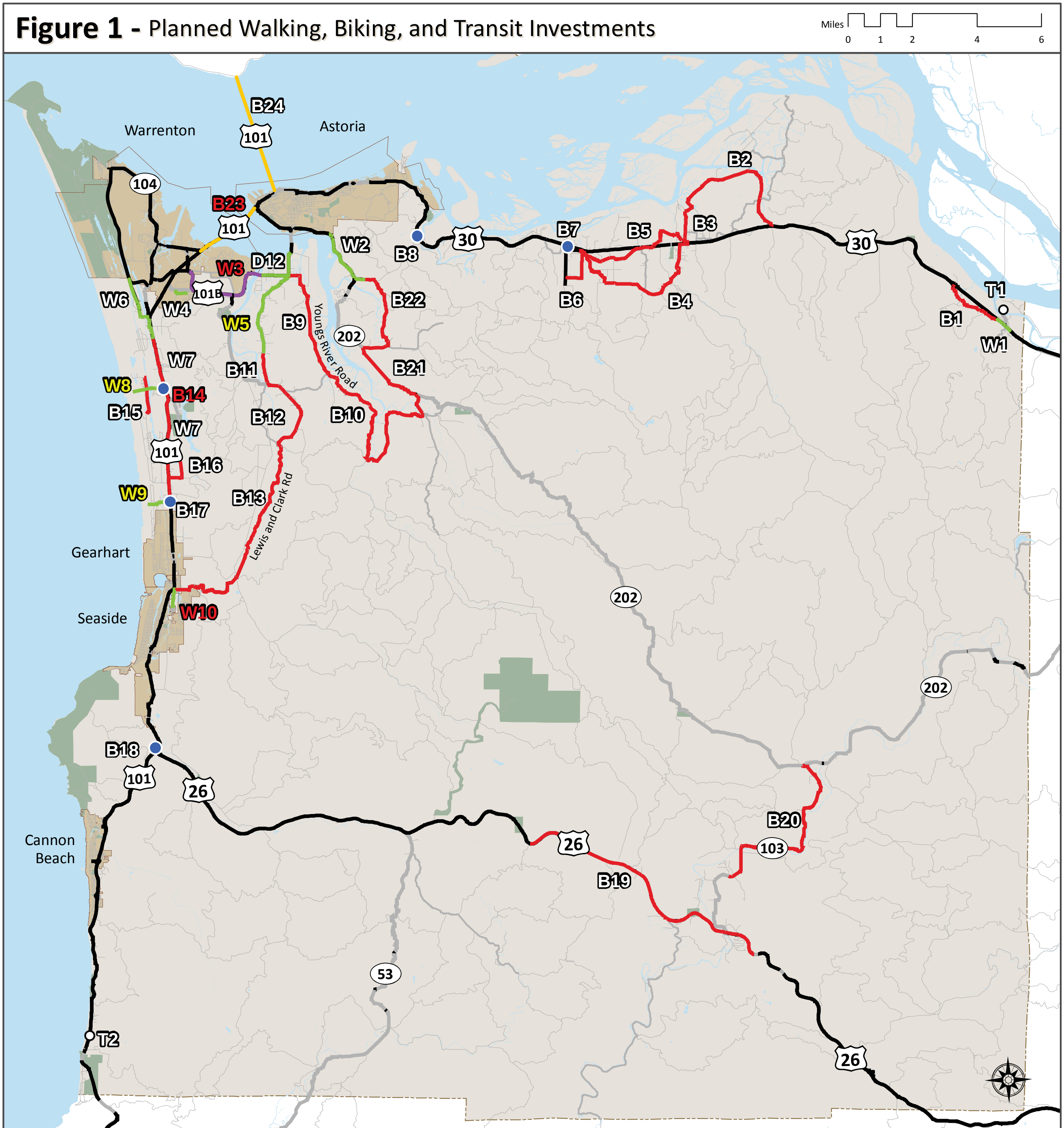
Project #	Project Description	Project Location	Project Summary	Project Priority	Estimated Cost	Primary Funding Source
	Strategy		including purchasing new street sweepers equipment.			
X06	US 101 Phase 2 Flood Mitigation/Wetland Restoration	US 101 south of Seaside near Circle Creek Campground (MP 23.16)	Phase 2 of a project to alleviate flooding on US 101 by removing man-made berms in strategic locations to allow floodwater to flow into lower-lying areas. This will also help restore a wetland on adjacent property. Phase 1 was initiated in 2013. Phase 2 includes constructing a new berm on the west side of US 101 (flooding occurs from west to east).	Aspirational-Long Term Ph2	$1,000,000	State

Red text indicates the project is included on the Financially Constrained Project List

* Planning concept potentially reduces vehicle-carrying capacity of the highway; further evaluation of the project design will be required at the time of implementation to ensure compliance with ORS 366.215.

** Only the design phase of the project is included in the Financially Constrained Project List. The construction portion of the project is included in the Aspirational Project List.

Figure 1 - Planned Walking, Biking, and Transit Investments



Legend

- ○ Transit Project
- ● Bicycle Intersection Project
- Existing Shoulder or Bike Lane
- Road with Shoulder < 4'

Walking, and Biking Projects

- Proposed Bridge Safety Enhancement
- Proposed Shoulder Widening
- Proposed Pedestrian and Bicycle Improvements
- Proposed Planning Study

- A1 Project included in Aspirational Plan
- A1 Entire Project included in Financially Constrained Plan
- A1 Project Pre-Design included in Financially Constrained Plan

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Clatsop County
Transportation System Plan

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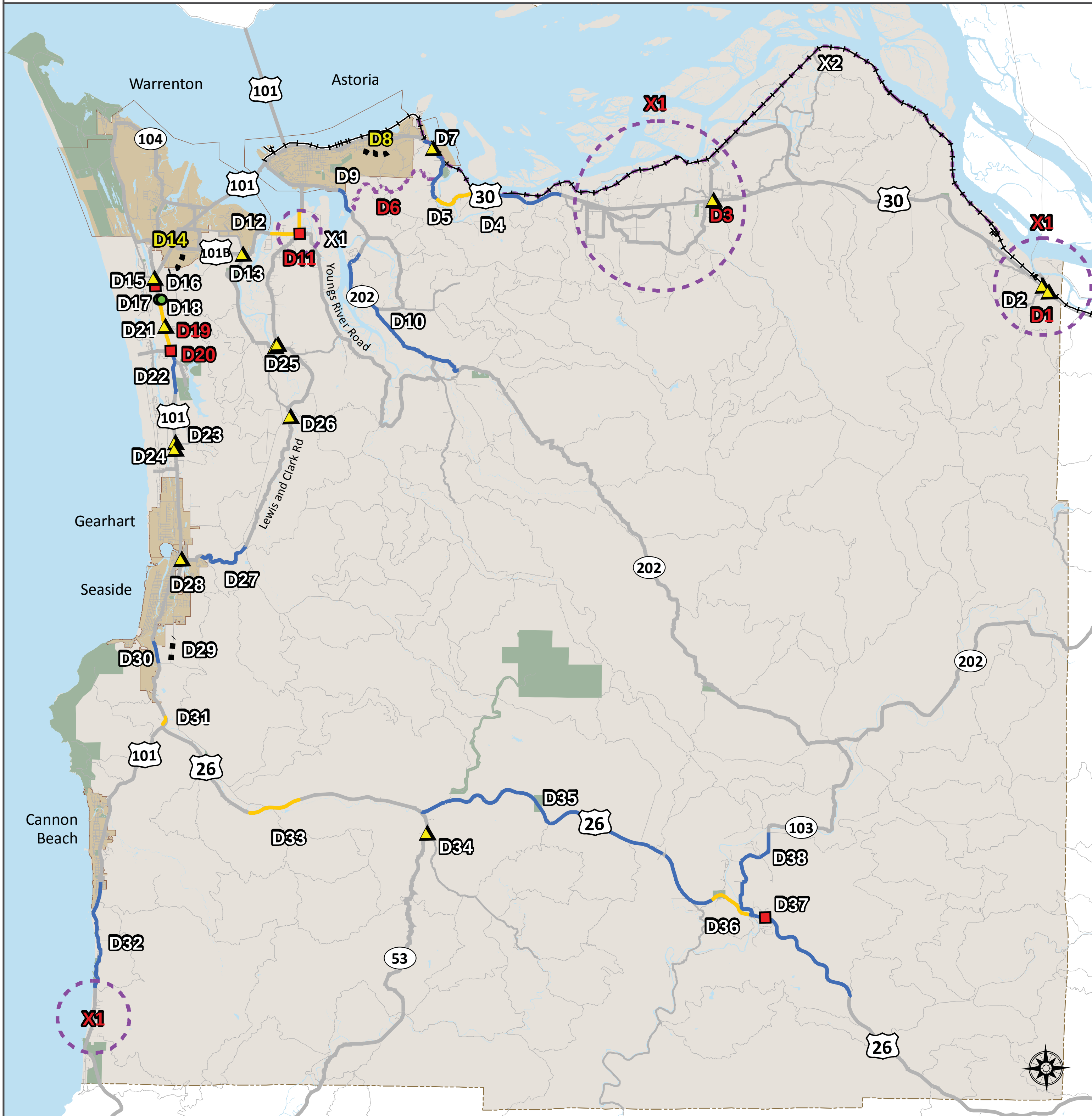
Figure 2 - Planned Driving Investments



Legend

Roadway Projects
- Roadway Safety Improvements
- Roadway Widening
- Street Extension
- Planning Study

Intersection Projects
- Intersection Management Project
- Intersection Safety Project
- Intersection Capacity Project

A1 Project included in Aspirational Plan
A1 Entire Project included in Financially Constrained Plan
A1 Project Pre-Design included in Financially Constrained Plan

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Putting the Plan to the Test

2035 intersection operations assuming the transportation system investments (Financially Constrained and Aspirational projects) were analyzed in Technical Memorandum #11. With over $187 million worth of transportation improvements, all study intersections (outside the Warrenton Urban Growth Boundary) are expected to meet mobility targets through 2035 during the evening peak period. Projects were not recommended for study intersections within Warrenton, as their TSP update will address these locations. While the US 101/Sunset Beach Road intersection was identified during earlier traffic analysis work to not meet current OHP mobility targets at that time, it would comply with the current alternative mobility target for the intersection adopted by the Oregon Transportation Commission in November, 2014.

Alternative mobility targets were determined to not be necessary for study intersections outside of Warrenton, as reasonable improvements recommended in the TSP would be expected to allow current OHP mobility targets to be met. Alternative mobility targets may still be necessary along the US 101 corridor through Warrenton, however that decision will be deferred to the City's TSP update.

Section M:
Memorandum 13-
Alternative Mobility Targets

Destination 2035

MEMORANDUM

DATE: December 23, 2014

TO: Clatsop County TSP Project Management Team

FROM: Chris Maciejewski, PE, PTOE - DKS Associates
Kevin Chewuk, PTP - DKS Associates

SUBJECT: Clatsop County Transportation System Plan
Technical Memorandum #13: Alternative Mobility Targets P11086-016

As part of the TSP update process, future forecasts and mobility needs were developed and documented in three memorandums: Technical Memorandum #6 (Future Traffic Forecast), Technical Memorandum #7 (Future Transportation Conditions and Needs), and Technical Memorandum #11 (Transportation System Solutions). Through this analysis, future year (2035) 30th-highest hour operating conditions were assessed on the state highway system for comparison to the mobility targets established in the Oregon Highway Plan (OHP).

No significant corridor deficiencies were identified outside the Warrenton Urban Growth Boundary. Projects were not recommended for study intersections within Warrenton, as their TSP update will address these locations. While the US 101/Sunset Beach Road intersection was identified during earlier traffic analysis work to not meet current OHP mobility targets at that time, it would comply with the current alternative mobility target for the intersection adopted by the Oregon Transportation Commission in November, 2014.

Alternative mobility targets were determined to not be necessary for any state highway corridors or intersections in Clatsop County, outside of Warrenton, at this time. Reasonable improvements recommended in the TSP would be expected to allow current OHP mobility targets to be met. Alternative mobility targets may still be necessary along the US 101 corridor through Warrenton, however that decision will be deferred to the City's TSP update.

Section N:

Memorandum 14- Implementing Regulations and Policy Amendments

MEMORANDUM

DATE: June 3, 2015

TO: Clatsop County TSP Project Management Team

FROM: Jennifer Bunch, Clatsop County Senior Planner

SUBJECT: Clatsop County Transportation System Plan
Task 8.3a Development code amendments P11086-016

This memorandum will present draft development code amendments based on recommendations in Technical Memorandum #3 prepared by Angelo Planning Group. The proposed amendments are attached as Exhibits A (LWDUO amendments) and B (Standards amendments). Below staff has responded to the recommendations in TM#3.

TPR 660-012-0045(1)(c), Technical Memorandum #3 p. 5

(1) Each local government shall amend its land use regulations to implement the TSP.

(c) In the event that a transportation facility, service or improvement is determined to have a significant impact on land use or requires interpretation or the exercise of factual, policy or legal judgment, the local government shall provide a review and approval process that is consistent with 660-012-0050. To facilitate implementation of the TSP, each local government shall amend regulations to provide for consolidated review of land use decisions required to permit a transportation project.

Recommendations: Existing code includes some provisions for consolidated review of applications and coordination with agencies like ODOT. It is recommended that these provisions be strengthened by:

- **Requiring that ODOT and applicable transportation facilities and services agencies be invited to participate in the pre-application conferences (Section 2.045); and**

Section 2.045 will be amended to include a provisions that requires services agencies be invited to attend a pre-application conference if it is determined that the agencies' facilities or services may be significantly impacted by the proposed development. Refer to Exhibit A.

- **Adding explicit references to ODOT and applicable transportation facilities and services agencies in referral and review of development applications (Section 2.080).**

Section 2.080 refers to public notice of applications to agencies. In Sections 2.110 and 2.115 which apply to mailed notices of hearings and applications, Clatsop County is required to issue notice to ODOT for developments within 750-feet of a state highway or if in the opinion of the Community Development Director that the development may have a significant impact on state facilities. Therefore, staff is not proposing any changes to 2.080.

TPR 660-012-0045(2)(a), Technical Memorandum #3 p. 6-7

(2) Local governments shall adopt land use or subdivision ordinance regulations, consistent with applicable federal and state requirements, to protect transportation facilities corridors and sites for their identified functions. Such regulations shall include:

(a) Access control measures, for example, driveway and public road spacing, median control and signal spacing standards, which are consistent with the functional classification of roads and consistent with limiting development on rural lands to rural uses and densities;

Recommendation: Existing County standards currently address this TPR requirement. It is recommended that the access spacing standards in the Standards Document be updated as needed through the TSP update process, and that the updated TSP refer to the Standards Document. References to local and State spacing standards may also be included in the TSP.

Section S5.000 *Vehicle Access and Control* will be amended to include updated access spacing. Refer to Exhibit B.

TPR 660-012-0045(3), Technical Memorandum #3 p. 9

(3) Local governments shall adopt land use or subdivision regulations for urban areas and rural communities as set forth below. The purposes of this section are to provide for safe and convenient pedestrian, bicycle and vehicular circulation consistent with access management standards and the function of affected streets, to ensure that new development provides on-site streets and access ways that provide reasonably direct routes for pedestrian and bicycle travel in areas where pedestrian and bicycle travel is likely if connections are provided, and which avoids wherever possible levels of automobile traffic which might interfere with or discourage pedestrian or bicycle travel.

Recommendations:

- **Add requirements related to pedestrian access way in parking lots in the Standards Document, Section S2.206 (Off-Street Parking Plan).**

Section S2.206 will be amended to include pedestrian access ways. Refer to Exhibit B.

- **Include definitions for pedestrian and bicycle facilities (e.g., access way) in the Standards Document, and make definitions consistent between the Standards Document and code.**

All references to "multi" use paths in S5.041 have been replaced with "shared" use path. Refer to Exhibit B.

- **Amend Section S5.041.4 of the Standards Document to allow for exceptions to street and access way requirements under the constraints and conditions described in TPR Section -0045(3)(b)(E).**

The exceptions identified in -0040(3)(b)(E) are already contained in S5.041(4)(D), no amendment is necessary.

TPR 660-012-0060, Technical Memorandum #3 p. 11

Recommendation: Update Section 5.354 to reflect the most recent changes to TPR Section -0060 and to simplify the reference to Section -0060.

Section 5.354 will be amended to ensure consistency with -0060. Refer to Exhibit A.

TPR 660-012-0045(4)

This TPR provision addresses ways to support transit in urban areas containing a population greater than 25,000, where the area is already served by a public transit system or where a determination has been made that a public transit system is feasible. Since transit was not a specific focus of Clatsop County's TSP update, TPR Subsection (4) was not initially addressed in Technical Memorandum #3. Staff wanted to include development requirements that supported transit.

Section S2.202 *Minimum Off-Street Parking Requirements* and S2.210 *Design Requirements for Off-Street Parking* will be amended to offer support of transit related improvements. Refer to Exhibit B.

Exhibit A

Proposed Amendments
New text is presented is **underlined** and deletions are ~~strikethrough.~~

Land and Water Development and Use Ordinance 80-14

1.030 Definitions

SHARED USE PATH: A facility for non-motorized access conforming to County standards and separated from the roadway, either in the roadway right-of-way, independent public right-of-way, or a public access easement. It is designed and constructed to allow for safe walking, biking, and other human-powered travel modes.

Section 2.045 Pre-application Conference.

(1) An applicant or the applicant's authorized representative shall request the Director to arrange a pre-application conference. Unless the applicant and Director agree that a conference is not needed, the conference shall be held within 15 days of the request. The purpose of the conference shall be to acquaint the applicant with the substantive and procedural requirements of the Ordinance, provide for an exchange of information regarding applicable elements of the Comprehensive Plan and development requirements, arrange such technical and design assistance as will aid the applicant, and to otherwise identify policies and proposed development. The Director, if requested by the applicant, shall provide the applicant with a written summary of the conference within 5 days of the conference. The summary shall include confirmation of the procedures to be used to process the application, a list of materials to be submitted and the criteria and standards which may apply to the approval of the application.

~~(1)~~**(2)** The Director shall invite applicable service agencies, such as Clatsop County Public Works and the Oregon Department of Transportation, to the pre-application conference if it is determined that the agencies' facilities or services may be significantly impacted by the proposed development.

SECTION 5.350 TRANSPORTATION SYSTEM IMPACT REVIEW

The following section incorporates requirements for developments that have the potential to impact the county's transportation system

Section 5.352 Traffic Impact Study

(1) Purpose.

The purpose of this section of the code is to implement Section 660-012-~~0045(2)(e)~~0060 of the State Transportation Planning Rule that requires the County to adopt a process to apply conditions to development proposals in order to minimize adverse impacts to and protect transportation facilities. This section establishes the standards for when a proposal must be reviewed for potential traffic impacts; when a Traffic Impact Study must be submitted with a development application in order to determine whether conditions are needed to minimize impacts to and protect transportation facilities; what must be in a Traffic Impact Study; and who is qualified to prepare the Study.

(2) When Required.

A Traffic Impact Study may be required to be submitted to the County with a land use application, when the following conditions apply:

(A) The road authority indicates in writing that the proposal may have operational or safety concerns along its facilities; or,

(B) A traffic impact study is required by the Oregon Department of Transportation (ODOT) pursuant to OAR 734-051; or,

~~(A)~~(C) The development application involves one or more of the following actions:

1) A change in zoning or a plan amendment designation; or

2) Change in use or intensity of use; or

3) Potential impact to residential or mixed-use areas; or

~~1)~~4) Potential impacts to key walking and biking routes, including but not limited to school routes and multimodal street improvements identified in the Transportation System Plan; or

~~2)~~5) Any proposed development or land use action that ODOT states may have operational or safety concerns along a state highway; and

~~3)~~6) The development shall cause one or more of the following effects, which can be determined by field counts, site observation, traffic impact analysis or study, field measurements, or crash history. The Institute of Transportation Engineers Trip Generation manual shall be used for determining vehicle trip generation:

(a) An increase in site traffic volume generation by ~~500~~ 400 Average Daily Trips (ADT) or more (or as required by the County Engineer); or

~~(a)~~(b) Location of existing or proposed driveways or access connections; or

~~(b)~~(c) An increase in ADT hour volume of a particular movement to and from the State highway by 20 percent or more; or

(d) An increase in use of adjacent streets by vehicles exceeding the 20,000 pound gross vehicle weights by 10 vehicles or more per day; or

~~(c)~~(e) Potential degradation of intersection level of service (LOS); or

~~(d)~~(f) The location of the access driveway does not meet minimum site distance requirements, or is located where vehicles entering or leaving the property are restricted, or such vehicles queue or hesitate on the State highway, creating a safety hazard; or

~~(e)~~(g) A change in internal traffic patterns that may cause safety problems, such as back up onto the highway or traffic crashes in the approach area.

(3) Traffic Impact Study Requirements;

(A) Preparation. A Traffic Impact Study shall be prepared by a professional engineer in accordance with OAR 734-051-~~0070~~1070.

(B) Transportation Planning Rule Compliance. ~~See Section 7 of the Transportation Plan.~~

(C) If the proposed development may cause one or more of the effects in Section 5.352(2), above, or other traffic hazard or negative impact to a transportation facility, the Traffic Impact Study shall include recommended mitigation measures.

(1) Approval Criteria:

(A) Criteria. When a Traffic Impact Study is required, approval of the development proposal requires satisfaction of the following criteria, in addition to other criteria applicable to the proposal:

~~*4)*~~*7)* The proposed site design and traffic and circulation design and facilities, for all transportation modes, including any mitigation measures, are designed to:

(a) Have the least negative impact on all applicable transportation facilities; and

(b) Accommodate and encourage non-motor vehicular modes of transportation to the extent practicable; and

(c) Make the most efficient use of land and public facilities as practicable; and

(d) Provide the most direct, safe and convenient routes practicable between on- site destinations, and between on-site and off-site destinations; and

(e) Otherwise comply with applicable requirements of the Clatsop County Land and Water Development Use Ordinance and the Standards Document.

(2) Conditions of Approval.

(A) In approving an action that requires a Traffic Impact Study, the County may condition that approval on identified mitigation measures.

Section 5.354 Amendments Affecting the Transportation System

(1) Review of Applications for Effect on Transportation Facilities.
When a development application includes a proposed comprehensive plan amendment, zone change or land use regulation change, the proposal shall be reviewed to determine whether it significantly affects a transportation facility. An amendment significantly affects a transportation facility if it would:

(A) Change the functional classification of an existing or planned transportation facility;~~. This would occur, for example, when a proposal causes future traffic to exceed the capacity of "collector" street classification, requiring a change in the classification to an "arterial" street, as identified by the Clatsop County Transportation System Plan ("TSP"); or~~

(B) Changes standards implementing a functional classification system; or

(C) Result in any of the effects listed in below in *1)* through *3)* based on projected conditions measured at the end of the planning period identified in TSP. As part of evaluating projected conditions, the amount of traffic projected to be generated within the area of the amendment may be reduced if the amendment includes an enforceable, ongoing requirement that would demonstrably limit traffic generation, including, but not limited to, transportation demand management. This reduction may diminish or completely eliminate the significant effect of the amendment.

1) Types or levels of travel or access that are inconsistent with the functional classification of an existing or planned transportation facility; or

2) Degrade the performance of an existing or planned transportion facility such that it would not meet the performance standards in the TSP or comprehensive plan; or

3) Degrade the performance of an existing or planned transportation facility that is otherwise projected not to meet the performance standards identified in the TSP or comprehensive plan.

~~**(C)**~~**(D)** Allows types or levels of land use that would result in levels of travel or access that are inconsistent with the functional classification of a transportation facility; or

~~**(D)**~~**(E)** Reduce the performance standards of the facility below the minimum acceptable level identified in the Transportation System Plan.

(2) Amendments That Affect Transportation Facilities.

If it is determined that there would be a significant effect, the approved amendments must ensure that allowed land uses are consistent with the identified function, capacity, and performance standards of the facility measured at the end of the planning period identified in the TSP through one or a combination of the remedies listed in (A) through (E) below, unless the amendment meets the balancing test in subsection in (E) or qualifies for partial mitigation in OAR 660-012-0060. An amendment that is approved using (2)(E) or (3), must recognize that additional motor vehicle traffic congestion may result and that other facility providers would not be expected to provide additional capacity for motor vehicles in response to this congestion.

~~Amendments to the comprehensive plan, zoning map and land use regulations which significantly affect a transportation facility shall assure that allowed land uses are consistent with the function, capacity, and level of service of the facility identified in the TSP. This shall be accomplished by one of the following:~~

~~**(A)** Amending the TSP to ensure that existing, improved, or new transportation facilities are adequate to support the proposed land uses consistent with the requirements of the Transportation Planning Rule (TPR); or,~~

~~**(A)** Altering land use designations, densities, or design requirements to reduce demand for automobile travel and meet travel needs through other modes of transportation; or~~

~~**(B)** Limiting allowed land uses to be consistent with the planned function of the transportation facility; or~~

~~**(C)** Amending the TSP to modify the planned function, capacity and performance standards, as needed to accept greater motor vehicle congestion to promote mixed use, pedestrian friendly development where multimodal travel choices are provided.~~

(A) Adopting measures that demonstrate allowed land uses are consistent with the planned function, capacity, and performance standards of the transportation facility.

(B) Amending the TSP or comprehensive plan to provide transportation facilities, improvements or services adequate to support the proposed land uses consistent with the requirements of this division; such amendments shall include a funding plan or mechanism pursuant to OAR 660-012-0060 or include an amendment to the transportation finance plan so that the facility, improvement, or service will be provided by the end of the TSP planning period.

(C) Amending the TSP to modify the planned function, capacity or performance standards of the transportation facility.

(D) Providing other measures as a condition of development or through a development agreement or similar funding method, including, but not limited to, transportation system management measures or minor transportation improvements. Local governments shall, as part of the amendment, specify when measures or improvements provided pursuant to this subsection will be provided.

(E) Providing improvements that would benefit modes other than the significantly affected mode, improvements to facilities other than the significantly affected facility, or improvements at other locations, if the provider of the significantly affected facility provides a written statement that the system-wide benefits are sufficient to balance the significant effect, even though the improvements would not result in consistency for all performance standards.

(3) Notwithstanding sections (1) and (2), an amendment may be approved that would significantly affect an existing transportation facility without assuring that the allowed land uses are consistent with the function, capacity and performance standards of the facility in accordance with OAR 660-012-0060.

<u>Section 5.412. Zone Change Criteria.</u>

The governing body shall approve a non-legislative zone designation change if it finds compliance with Section 1.040, and all of the following criteria:

(2) The proposed change is consistent with the policies of the Clatsop County Comprehensive Plan.

(3) The proposed change is consistent with the statewide planning goals (ORS 197).

(4) The property in the affected area will be provided with adequate public facilities and services including, but not limited to:

- **(A)** Parks, schools and recreational facilities
- **(B)** Police and fire protection and emergency medical service
- **(C)** Solid waste collection
- **(D)** Water and wastewater facilities
- **(E)** <u>The applicant shall demonstrate consistency with the Transportation Planning Rule, specifically by addressing whether the proposed amendment creates a significant effect on the transportation system pursuant to OAR 660-012-0060. If required, a Traffic Impact Study (TIS) shall be prepared in accordance with Section 5.350.</u> ~~The proposed change will insure that an adequate and safe transportation network exists to support the proposed zoning and will not cause undue traffic congestion or hazards.~~
- **(F)** The proposed change will not result in over-intensive use of the land, will give reasonable consideration to the character of the area, and will be compatible with the overall zoning pattern.
- **(G)** The proposed change gives reasonable consideration to peculiar suitability of the property for particular uses.
- **(H)** The proposed change will encourage the most appropriate use of land throughout Clatsop County.
- **(I)** The proposed change will not be detrimental to the health, safety and general welfare of Clatsop County.

Exhibit B

Proposed Amendments
New text is presented is **underlined** and deletions are ~~strikethrough.~~

Standards Document

S2.202. Minimum Off-Street Parking Space Requirements.

(7) The number of minimum required parking spaces may be reduced by up to 10% if:
- **(A)** The proposal is located within a ¼ mile of an existing or planned transit route, and;
- **(B)** Transit-related amenities such as transit stops, pull-outs, shelters, park-and-ride lots, transit-oriented development, and transit service on an adjacent street are present or will be provided by the applicant, or,
- **(C)** Site has dedicated parking spaces for motorcycles.

S2.206. Off-Street Parking Plan.

A plan indicating how the off-street parking and loading requirement is to be fulfilled, shall accompany the application for a development permit. The plan shall show all those elements necessary to indicate that these requirements are being fulfilled and shall include but not be limited to:

(1) Delineation of individual parking spaces.
(2) Circulation area necessary to serve spaces.
(3) Access to streets, alleys, and properties to be served.
(4) Curb cuts.
(5) Dimensions, continuity and substance of screening.
(6) Grading, drainage, surfacing and subgrading details.
(7) Delineations of all structures or other obstacles to parking and circulation on the site.
(8) Specifications as to signs and bumper guards.
(9) Pedestrian access ways.

S2.210. Design Requirements for Off-Street Parking.

(5) The following off-street parking development and maintenance shall apply in all cases, except single and two family dwellings:
- **(G)** In parking lots three acres and larger intended for use by the general public, the walkway shall be raised or separated from parking, parking aisles and travel lanes by a raised curb, concrete bumpers, bollards, landscaping or other physical barrier. If a raised walkway is used, curb ramps shall be provided in accordance with the Americans With Disabilities Act Accessibility Guidelines.
- **(H)** Parking lots for commercial and office uses that have designated employee parking and more than 20 parking spaces shall provide at least 10% of the employee parking spaces (with a minimum of one space) as preferential long-term carpool and vanpool parking spaces. Preferential carpool and vanpool parking spaces shall be closer to the entrances of the building that other parking spaces, with the exception of ADA accessible parking spaces.

CHAPTER 5 VEHICLE ACCESS CONTROL AND CIRCULATION.

S5.033 Access Control Standards.

(7) Access Spacing. The access spacing standards below shall apply to newly established public street intersections, private drives, and non-traversable medians unless -the Public Works Director determines that site and or road conditions make it impractical to meet the access spacing standard.

Access Spacing			
Functional Classification	Posted Speed	Minimum Spacing Between Driveways and/or Streets	Minimum Spacing Between Traffic Signals
Arterial	35 mph or less	~~150~~ 265 feet	~~2800 feet~~
	40 mph	~~185~~ 265 feet	~~400 feet~~
	45 mph	~~230~~ 265 feet	~~400 feet~~
	50 mph	~~275~~ 265 feet	
	55 mph	~~350~~265 feet	Per ODOT Standards
Major Collector	25-35 mph	130 feet	
Minor Collector	25-35 mph	~~100~~ 65 feet	
Local Street	25 mph	Access to each lot permitted	
Subdivision (10+ lots)	25 mph	Access to each lot permitted	N/A
Subdivision (4-9 lots)	20 mph		
Partition (> 3 ***)	20 mph		
Partition (1-3 lots)	15 mph		

(8) Number of Access Points. For single-family (detached and attached), two-family, and three-family housing types, one street access point is permitted per lot, when alley access cannot otherwise be provided; except that two access points may be permitted for two-family and three-family housing on corner lots (i.e., no more than one access per street), subject to the access spacing standards above. The number of street access points for multiple family, commercial, industrial, and public/institutional developments shall be minimized to protect the function, safety and operation of the street(s) and sidewalk(s) for all users. Shared access may be required, in conformance with Section S5.033(9), below, in order to maintain the required access spacing, and minimize the number of access points. An additional access point may be allowed for an additional accessory structure on a case-by-case basis by permit issued by the Public Works Director or County Engineer.

(10) Street Connectivity and Formation of Blocks Required. In order to promote efficient vehicular and pedestrian circulation throughout the county, land divisions and large site developments, as determined by the Community Development Director, shall produce complete blocks bounded by a connecting network of public and/or private streets, in accordance with the following standards:

- **(C)** Driveway Openings. Driveway openings or curb cuts shall be the minimum width necessary to provide the required number of vehicle travel lanes (12 feet for each travel lane). The following standards (i.e., as measured where the front property line meets the sidewalk or right-of-way) are required to provide adequate site access, minimize surface water runoff, and avoid conflicts between vehicles and pedestrians:
  - *5)* Driveway Aprons. Driveway aprons (when required) shall be constructed of concrete or asphalt and shall be installed between the street right-of-way and the private drive, as shown above. Driveway aprons shall conform to ADA standards for sidewalks and pathways, which require a continuous route of travel that is a minimum of ~~3~~ 4 feet in width, with a cross slope not exceeding 2 percent.

S5.040. PEDESTRIAN AND BICYCLE ACCESS AND CIRCULATION

S5.041. Purpose.

To ensure safe, direct and convenient pedestrian and bicycle circulation, all new development in rural communities, except single family detached housing (i.e., on individual lots), shall provide a continuous pedestrian and/or ~~multi-~~shared use pathway system. (Pathways only provide for pedestrian circulation. ~~Multi-~~Shared use pathways accommodate pedestrians and bicycles.) The system of pathways shall be designed based on the standard~~s~~ in ~~Subsections~~ S5.~~034~~041(~~1~~4) ~~and S5.034(2)~~ below:

(1) Continuous Pathways. The pathway system shall extend throughout the development site, and connect to all future phases of development, adjacent trails, public parks and open space areas whenever possible. The developer may also be required to connect or stub pathway(s) to adjacent streets and private property, in accordance with the provisions of S5.033 - Access Control Standards, and S6.000 - Transportation Improvements and Road Standard Specifications for Design and Construction

(2) Safe, Direct, and Convenient Pathways. Pathways within developments shall provide safe, reasonably direct and convenient connections between primary building entrances, and all adjacent streets based on the following definitions:

- **(A)** Reasonably direct. A route that does not deviate unnecessarily from a straight line or a route that does not involve a significant amount of out-of-direction travel for likely users.
- **(B)** Safe and convenient. Bicycle and pedestrian routes that are reasonably free from hazards and provide a reasonably direct route of travel between destinations.

(3) Connections Within Development. For all developments subject to Site Design Review, pathways shall connect all building entrances to one another. In addition, pathways shall connect all parking areas, storage areas, recreational facilities and common areas (as applicable), and adjacent developments to the site.

(4) Street Connectivity. ~~Multi~~ Shared use pathways (for pedestrians and bicycles) shall be provided at or near mid-block where the block length exceeds the length required by Section S5.104. Pathways shall also be provided where cul-de-sacs or dead-end streets are planned, to connect the ends of the streets together, to other streets, and/or to other developments. Pathways used to comply with these standards shall conform to all of the following criteria:

(A) ~~Multi-~~Shared use pathways (i.e., for pedestrians and bicyclists) are no less than ~~8~~10-feet wide and located within a ~~12~~ 14 foot right-of-way or easement that allows access for emergency vehicles;

(B) If streets within a subdivision or neighborhood are lighted, pathways shall also be lighted;

(C) Stairs or switchback paths using a narrower right-of-way/easement may be required in lieu of a ~~multi-~~shared use pathway where grades are steep;

(D) The decision-maker may determine, based upon facts in the record, that a pathway is impracticable due to: physical or topographic conditions (e.g., freeways, railroads, extremely steep slopes, sensitive lands, and similar physical constraints); buildings or other existing development on adjacent properties that physically prevent a connection now or in the future, considering the potential for redevelopment; and sites where the provisions of recorded leases, easements, covenants, restrictions, or other agreements recorded as of the effective date of this Code prohibit the pathway connection.

6) Vehicle/Pathway Separation. Where pathways are parallel and adjacent to a driveway or street (public or private), they shall be raised 6 inches and curbed, or separated from the driveway/street by a 5-foot minimum strip with bollards, a landscape berm, r other physical barrier. If a raised path is used, the ends of the raised portions must be equipped with curb ramps.

7) Housing/Pathway Separation. Pedestrian pathways shall be separated a minimum of 5 feet from all residential living areas on the ground floor, except at building entrances. Separation is measured from the pathway edge to the closest dwelling unit. The separation area shall be landscaped. No pathway/building separation is required for commercial, industrial, public, or institutional uses.

8) Crosswalks. Where pathways cross a parking area, driveway, or street ("crosswalk"), they shall be clearly marked with contrasting paving materials, humps/raised crossings, or painted striping. An example of contrasting paving material is the use of a concrete crosswalk through an asphalt driveway. If painted striping is used, it should consist of thermo-plastic striping or similar type of durable application.

9) Pathway Surface. Pedestrian ~~P~~pathway surfaces shall be concrete, asphalt, brick/masonry pavers, or other durable surface, at least 5 feet wide, and shall conform to ADA requirements. ~~Multi-~~Shared use paths (i.e., for bicycles and pedestrians) shall be the same materials, at least ~~8~~ 10 feet wide.

10) Accessible routes. Pathways shall comply with the federal Americans With Disabilities Act (ADA), which requires accessible routes of travel from the parking spaces to the accessible entrance. The route shall be compliant with the following standards:

(f) Shall not contain curbs or stairs;
(g) Must be at least 3 feet wide;
(h) Is constructed with a firm, stable, slip resistant surface; and
(i) The slope shall not be greater than 1:12 in the direction of travel.

CHAPTER 6. ROAD STANDARD SPECIFICATIONS FOR DESIGN AND CONSTRUCTION.

Section 6.000. Transportation Improvements and Road Standard Specifications for Design and Construction.

S6.005. General Road and Access Policies:

(1) Purpose. The establishment of the criteria to be used in Clatsop County for evaluating the appropriateness of proposed roads which are intended to provide access to lots or parcels. This criteria shall form the basis for determining what requirements are necessary to ensure that there will be adequate provisions available now, and in the future, to provide for the transportation needs of lots, parcels, or developments.

The Clatsop County Road Standards are the intended to provide access to new development in a manner which reduces construction cost, makes efficient use of land, allows emergency vehicle access while discouraging inappropriate traffic volumes and speeds, and which accommodates convenient pedestrian and bicycle circulation. The standards apply to County roads, dedicated roads and private roads.

The Road Standards to be applied are based on the density of the zone in which it will be built and shall be constructed to that standard. The Clatsop County Department of Community Development, Planning Commission or Board of County Commissioners will on a case by case basis consider possible future ~~parcelization~~ land divisions and whether or not the road being built should be private or dedicated.

Where a partition is proposed in Major or Peripheral Big Game Range areas, the road shall be located to minimize its impact on big game range.

S6.050. Public and County Road Standards.

(1) Road Design:

(A) The radius of curvature, grade and intersection curb return radius of streets shall conform ~~with~~to the minimum standards prescribed in Tables 1, 2, 3, and 4 of these standards.

(5) Standard Specifications; All roadway excavation, fill construction, subgrade preparation, aggregate bases, surfacing, prime coats and paving will be built in accordance with the ~~1974~~ current edition of the Oregon ~~State Highway Division's~~Department of Transportation " Oregon Standard Specifications for ~~Highway~~ Construction". Whenever these specifications refer to the State, consider that to mean the County of Clatsop, the appropriate County Department or appropriate County address. In case of discrepancy or conflict in the plans, standard specifications, supplemental standard specifications and special provisions, they shall govern in the following order:

(A) Special Provisions
(B) Plans specifically applicable to the project.
(C) Standard or general plans.
(D) Supplemental Standard Specifications.
(E) Standard Specifications.

(6) Testing: All testing except as herein noted, will conform to methods described in "A.A.S.H.T.O. Materials, Part 11, Tests", ~~11th~~ current Edition ~~1974~~. All lab costs for testing will be born by the developer.

(7) Inspection: The County Road Department shall be notified 48 hours in advance of the time for subgrade inspection, 48 hours in advance of the time for base inspection and 48 hours in advance of the time for paving inspection. The subgrade is to be inspected before placing the base. The base is to be inspected before placing the pavement.

If proper notification for inspection has not been given, the Clatsop County Road Department will not grant approval of the road for twelve months. In this way, the County can observe any deficiencies that may develop in the road and have them corrected before acceptance.

(8) Subgrade: All subgrades will be compacted in accordance with ~~Section 203.41 of~~ the Standard Specifications.

(9) Aggregate Base: Aggregates for aggregate base shall be gravel or rock, crushed or uncrushed, including sand, reasonably well graded from coarse to fine. The grading shall be such that the maximum size shall not exceed 75 percent of the compacted thickness of the layer in which it is incorporated. The aggregate fraction passing a 1/4" sieve shall constitute not less than 10 percent nor more than 50 percent of the whole, by weight, and not more than 8 percent of the total aggregate shall pass a no. 200 sieve. Within the above limits, the subbase aggregate shall be so graded that the materials will be dense and firm when watered and compacted. If crushed aggregate meeting the requirements of ~~Section 703.07 of the~~ Standard Specifications is used, a 2-inch reduction in aggregate base depth will be allowed.

(10) Asphalt Prime Coat: For all roadway sections using an oil mat, an asphalt prime coat will be applied to the aggregate base in addition to the oil mat. The prime coat will be applied in accordance with Section 408 of the Standard Specifications. Application rate and type of oil will be as approved by the County Public Works Director. The aggregate shall be 3/4 to ½ or as approved by the County Public Works Director and specified in Section 703.12 of the Standard Specifications. The aggregate shall be applied approximately at the rate of 0.01 cubic yards/square yard. A three-day curing period will be required.

(11) ~~Asphalt Penetration Mac~~adam: Where any oil mat is required it shall be applied in accordance with ~~Section 406 of~~ the Standard Specifications. ~~It shall be equal to or greater than a Type 0-9 penetration macadam as shown on the O.S.H.D. Standard Table of Details (Drawing No. 1833).~~ The bituminous material used in the first two spreads shall be as approved by the County Public Works Director. The bituminous material used in the seal coat may be as approved by the Public Works Director.

(12) Asphalt Concrete Pavement: Where asphalt concrete pavement is required it shall be done in accordance with ~~Sections 401 and 403 of~~ the Standard Specifications. The asphalt cement shall be as approved by the County Public Works Director. The class of asphalt concrete shall be Class B.

(13) ~~Concrete Curb~~: Where required Portland cement concrete curbs shall be constructed in accordance with Clatsop County "curb-driveway" Standard Drawing and ~~Section 609 of~~the Standard Specifications. The concrete shall be Class 3300 as specified in ~~Section 504 of~~the Standard Specifications.

(14) Select Backfill: The curbs shall be backfilled in the areas shown on the plans with select backfill. This select backfill shall consist of materials with a maximum size of three inches. The material shall compacted to at least 90 percent of its relative maximum density.

Table 1- Right-of-Way and Improvement Standards Table

Functional Road Class	A.D.T	Design Standard Typical	Travel Width	R-O-W Width	Surface Type	Design Speed MPH	Max. % Grade	Min. Curve Radius	Street Signs
County Road Standards									
Resource Route	300-1000	A-38	38	48-54	A.C./Oil	35	12	500	(1)
Arterial	>1000	A - 32	24	80	A.C.	45	12	750	(1)
Major Collector	300 – 1000	A - ~~28~~30	2422***	60	A.C.	40	12	500	(1)
Minor Collector		A-28	22	60	A.C.	35	12	500	(1)
Local	60 – 300	A - 24	2220	60	A.C./Oil	35	12	350	(1)
Public and Private Road Standards									
Subdivision (10+ lots)	>60	A - 22	20	50	A.C.(5)	25	12	250	(1)
Subdivision (4-9 lots)	30 – 60	A - 20	18	50	A.C.(5)	20	12**	150	(1)
Partition (> 3 ***)	<60	A - 20	18	50	Gravel	20	12**	150	(1)
Partition (1-3 lots)	<30	A – 14(4)	14	25	Gravel	15	16*	50	(1)

*	If unavoidable conditions exist a grade of 2% greater than that shown may be allowed with A.C. paving.
**	If unavoidable conditions exist a grade of 4% greater than that shown may be allowed with A.C. paving.
***	May be reduced to 22 feet as specified in AASHTO if approved by the County Engineer.
(1)	One (1) approved street sign will be provided at each intersection for each named street.
(2)	All dead-end streets will be terminated with a cul-de-sac or approved turnaround. See Design Standard Typical Cul-de-sac for details.
(3)	Drainage/slope easements may be required if roadway slopes extend beyond the right-of-way.
(4)	A-14 roads require turn-outs at a maximum distance of 400 feet, or at a lesser interval that will maintain a continuous visual contact between each successive turn-out.
(5)	Minimum A.C. thickness is 3” nominally compacted ODOT Class C, or approved equal.

Table 1A - Road Improvement Policy Matrix

(For Reference Purposes Only)

	Resources Zones	Non-Resource Zones	
	New Road Created or Existing Road Used	New Road Created	Existing Road Used
1.Must a road be improved in conjunction with a partition?			
A. Private Road	No	Yes	Yes (1)
B. Public Road	No	Yes	No
C. County Road	Yes (2)	Yes	No
2. Minimum Road Standard Required?			
A. Private Road	n/a	A-~~12~~14	A-~~12~~14(1)
B. Public Road	n/a	A-20	A-20
C. County Road	(2)	A-20(3)	A-20

(1) If an existing private road provides access to a parcel, this road must be improved to at least an A-~~12~~ 14 standard. See Table 1, Road Right-of-way and Improvement Standards.

(2) If a County road is created or utilized in a resource zone to provide access to a partitioned parcel, the Board of Commissioners shall establish minimum improvement standards and control the timing of the improvement.

(3) If a new portion of a County road is created to provide access to a non-resource zone partition, the Board of Commissioners shall set the improvement standards (the minimum improvement shall be an A-20 standard).

TECHNICAL MEMORANDUM

DATE: June 5, 2015

TO: Clatsop County TSP Project Management Team

FROM: Heather Hansen, Clatsop County Community Development Director

SUBJECT: Clatsop County Transportation System Plan
Task 8.3b Comprehensive Plan Goals & Policies P11086-016

This memorandum presents proposed goals & policies for the Clatsop County Comprehensive Plan.

Goals: The Goals from Tehnical Memo #4 were tailored to reflect county government's role in transportation planning, infrastructure, and services.

Policies: The Objectives from Technical Memo #4 were restated as policies, if applicable, or they were removed. Some policies were also added.

The following is a summary of the substantive changes relative to Technical Memo #4:

1. An overarching Goal was added to reflect a priority of the committee that emerged during the course of the PAC meetings : **"Foster resilient natural hazard and lifeline route systems."**
2. Resiliencey policies were added to several goals (see highlighted text below)
3. "Provide transit service and amenities that encourage a higher level of ridership" was changed to **"Coordinate countywide transit services, facilities, and improvements with local jurisdictions to encourage a higher level of ridership"** since county government does not provide transit service

Clatsop County Comprehensive Plan – PROPOSED GOALS & POLICIES
Statewide Planning Goal 12: Transportation

County Transportation Goals:

- Goal 1: Foster resilient natural hazard evacuation and lifeline route systems (overarching goal)
- Goal 2: Provide for efficient motor vehicle travel to and through the county.
- Goal 3: Increase the convenience and availability of pedestrian and bicycle modes.
- Goal 4: Coordinate countywide transit services, facilities, and improvements with local jurisdictions to encourage a higher level of ridership.
- Goal 5: Provide an equitable, balanced and connected multi-modal transportation system.
- Goal 6: Enhance the health and safety of residents.
- Goal 7: Foster a sustainable transportation system.
- Goal 8: Ensure the transportation system supports a prosperous and competitive economy.
- Goal 9: Coordinate with local and state agencies and transportation plans.

GOAL 1: **Foster resilient natural hazard evacuation and lifeline route systems (overarching goal)**

GOAL 2: **Provide for efficient motor vehicle travel to and through the county.**

Policy 2a: Develop a program to systematically implement improvements that enhance mobility at designated high-priority locations.

Policy 2b: Adopt a standard for mobility to help maintain a minimum level of motor vehicle travel efficiency and by which land use proposals can be evaluated. State and City mobility standards will be supported on facilities under the respective jurisdiction.

Policy 2c: Identify opportunities to reduce the use of state highways for local trips.

Policy 2d: Limit access points on highways and arterials. Support consolidated and shared access points.

GOAL 3: **Increase the convenience and availability of pedestrian and bicycle modes.**

Policy 3a: Identify improvements (e.g., street lighting, bike parking) that complement pedestrian and bicycle facilities such as sidewalks and bike lanes and that encourage more use of these facilities.

Policy 3b: Improve walking and biking connections to county amenities.

Policy 3c: Enhance way finding signage for those walking and biking, directing them to bus stops, key routes and destinations, and tsunami evacuation routes.

Policy 3d: Promote walking, bicycling, and sharing the road through public information and participation.

Policy 3e: Identify necessary changes to the land development code to improve connectivity between compatible land uses for pedestrian and bicycle trips.

GOAL 4: **Coordinate countywide transit services, facilities, and improvements with local jurisdictions that encourage a higher level of ridership.**

Policy 4a: Assist in identifying potential locations for designated park-and-ride lots.

Policy 4c: Assist in identifying areas that support additional transit services, and coordinate with transit providers to improve the coverage, quality and frequency of services

Policy 4d: Assist in identifying improvements (e.g., sidewalk and bicycle connections, shelters, benches) that complement transit facilities such as bus stops and that encourage higher usage of transit.

GOAL 5: **Provide an equitable, balanced and connected multi-modal transportation system.**

Policy 5a: Identify new or improved transportation connections to enhance system efficiency.

Policy 5b: Ensure that existing and planned pedestrian throughways are clear of obstacles and obstructions (e.g., utility poles).

Policy 5c: Support connectivity between the various communities in the county.

GOAL 6: **Enhance the health and safety of residents.**

Policy 6a: Identify improvements needed along natural hazard evacuation and Seismic Lifeline Routes.

Policy 6b: Give priority to pedestrian and bicycle facilities that also serve as tsunami evacuation routes.

Policy 6c: Identify improvements to address high collision locations and improve safety for walking, biking and driving trips in the county.

Policy 6d: Enhance existing highway crossings for walking and biking users.

Policy 6e: Identify deficient locations in the county where enhanced street crossings for walking and biking users are needed.

Policy 6f: Improve the visibility of transportation users in constrained areas, such as on hills and blind curves.

Policy 6g: Support programs that encourage walking and bicycling, and educate regarding good traffic behavior and consideration for all users.

GOAL 7: Foster a sustainable transportation system.

Policy 7a: Develop and support reasonable alternative mobility targets for motor vehicles that align with economic and physical limitations on State highways and County roads where necessary.

Policy 7b: Minimize impacts to the scenic, natural and cultural resources in the county.

Policy 7c: Support alternative vehicle types by identifying potential electric vehicle plug-in stations and developing implementing code provisions.

Policy 7d: Identify areas where alternative land use types would significantly shorten trip lengths or reduce the need for motor vehicle travel within the county.

Policy 7e: Maintain the existing transportation system assets to preserve their intended function and maintain their useful life.

Policy 7f: Identify opportunities to improve travel reliability and safety with system management solutions.

Policy 7g: Identify stable and diverse revenue sources for transportation investments to meet the needs of the county, including new and creative funding sources to leverage high priority transportation projects.

Policy 7h: Consider costs and benefits when identifying project solutions and prioritizing public investments.

Policy 7i: Utilize transparency when determining transportation system investments.

GOAL 8: Ensure the transportation system supports a prosperous and competitive economy.

Policy 8a: Encourage improvements to the freight system efficiency, access, capacity and reliability.

Policy 8b: Support transportation improvements that will enhance access to employment.

Policy 8c: Support increases in the distribution of travel information to maximize the reliability and effectiveness of highways.

Policy 8d: Identify and improve local Lifeline Routes to increase economic resilience after a local natural hazard disaster.

GOAL 9: Coordinate with local and state agencies and transportation plans.

Policy 9a: Work with the North Coast Regional Solutions Center to promote projects that improve regional linkages.

Policy 9b: Coordinate with the Clatsop County Parks and Recreation Master Plan regarding trail guidelines and connections between parks, recreation areas, and trails.

Policy 9c: Coordinate with the Oregon Transportation Plan and associated modal plans.

Policy 9d: Coordinate regional project development and implementation with local jurisdictions (e.g., evacuation routes, countywide transit, and jurisdictional transfer of roadways).

Section O:
Meeting Summaries

CLATSOP COUNTY TRANSPORTATION SYSTEM PLAN
PROJECT ADVISORY COMMITTEE (PAC) MEETING #1
SUMMARY

DKS
720 SW Washington St.
Suite 500
Portland, OR 97205
503.243.3500
www.dksassociates.com

Date: Wednesday, December 4th, 2013

Time: 6:00 PM to 8:00 PM

Location: Judge Guy Boyington Building, 857 Commercial Street, Astoria

Purpose: The purpose of this meeting is to provide an orientation to the TSP project and to obtain input on the Vision, Goals, and Objectives for transportation in Clatsop County.

1. Sign-in, Agenda Overview, and Introductions

Ed Wegner from Clatsop County opened the meeting. Chris Maciejewski from DKS Associates followed up by going over the agenda. We then went around the room and everyone introduced themselves. The PAC members were asked to state what they thought the ideal transportation system for Clatsop County would look like. They stated that an ideal transportation system plan would include:

- Addressing emergency evacuation routes
- Seismic resiliency and emergency access during an event
- Clear set of objectives and expectations on how the county can develop
- Interconnectivity between communities and not separate bubbles
- Coordination of evacuation service corridors
- What maintenance and operations can do to help during an emergency
- Pedestrian and bicycle safety
- Safety in transportation

2. Project Orientation

Chris gave an overview of transportation system planning. A transportation system plan (TSP) is required by the state Transportation Planning Rule (TPR) OAR 660-012-0015. It provides long range direction for development of transportation facilities and services for all modes, and ensures the planned systems are adequate to meet the needs of planned land uses.

- A TSP must provide consistency with state and regional plans, establish an efficient network of arterials/collectors, develop standards for layout, spacing, and connectivity of local streets, protect facilities and corridors for intended uses, provide public transportation services to meet basic needs, and develop a network of sidewalks and bikeways linking residential areas to activity centers, a finance program that is reasonably likely, and implementing code and ordinances.

- Common elements of a TSP include Motor Vehicle Plan, Pedestrian Plan, Bicycle Plan, Transit Plan, Other Modes Plans (i.e.: Water, Air), Financing, and Implementing Codes and Ordinances.
- A set of goals, objectives, and evaluation criteria are used to develop and rank alternatives for each modal plan.
- Chris went over the public involvement process that includes the Project Advisory Committee (PAC), a project website, and public open houses.

3. Transportation Vision, Goals, and Objectives

The following vision was posed to the PAC group:

What should the transportation system look like in 20 years and what should it accomplish?

The following goals were provided to the PAC group to stimulate ideas on some possible goal statements to describe what we want to accomplish.

- Goal 1: Provide for efficient motor vehicle travel to and through the city.
- Goal 2: Increase the convenience and availability of pedestrian and bicycle modes.
- Goal 3: Provide transit service and amenities that encourage a higher level of ridership.
- Goal 4: Provide an equitable, balanced and connected multi-modal transportation system.
- Goal 5: Enhance the health and safety of residents.
- Goal 6: Foster a sustainable transportation system.
- Goal 7: Ensure the transportation system supports a prosperous and competitive economy.
- Goal 8: Coordinate with local and state agencies and transportation plans.

The project team noted that the goals are not in order of priority and are intended to provide direction for the development of transportation system solutions. The PAC group then broke up into three small groups and drafted their own goal statements along with priorities. The top priority goals for each group are as follows:

Group #1's Goals:

- Emergency Response
- Protect what we have
- Rail access to Tongue Point
- Bypass (freight mobility)

Group #2's Goals:

- Safety for all modes
- Good melding between County TSP, local agency TSPs and ODOT
- Multimodal improvements
- System planning for evacuations or major natural disasters

Group #3's Goals:

- Preserve what we have
- Safety considering all modes
- Maintain/improve roadway conditions considering all modes
- System improvements

4. Questions/Comments from Public Attendees

There were no public attendees at the meeting.

5. Next Steps

The project team went over the best times or days to hold future meetings. A doodle poll will be sent to the PAC group to determine the best day and times to hold future meetings. The next PAC meeting is not expected until late winter/early spring. In the meantime, the consultant staff will be finalizing Technical Memorandum #4: Goals, Objectives, and Criteria and continue working on the draft of Technical Memorandum #5: Existing Conditions. In the meantime, please visit the project website http://www.clatsopcountytsp.org and provide comments on draft project deliverables as they come available.

CLATSOP COUNTY TRANSPORTATION SYSTEM PLAN PROJECT ADVISORY COMMITTEE (PAC) MEETING #2 SUMMARY

DKS

720 SW Washington St.
Suite 500
Portland, OR 97205
503.243.3500
www.dksassociates.com

Date: Thursday, April 10th, 2014

Time: 3:00 PM to 5:00 PM

Location: Judge Guy Boyington Building, 857 Commercial Street, Astoria

Purpose: The purpose of this meeting is to review the findings from Tech Memos #5 through #7 regarding existing and future baseline conditions and discuss the process for developing alternatives to meet the existing and future transportation system deficiencies.

1. Sign-in, Agenda Overview, and Introductions

Chris Maciejewski from DKS Associates opened the meeting and followed up by going over the agenda. We then went around the room and everyone introduced themselves.

2. Process Update

Chris provided an overview of the transportation system plan process to date. The draft of Technical Memorandum #5: Existing Conditions has been completed and delivered to the PAC. Drafts of Technical Memorandums #6: Future Traffic Forecast and Technical Memorandum #7: Future Transportation Conditions and Needs are being worked on.

3. Overview of Existing and Future Conditions

Chris gave a presentation on the Existing Conditions findings throughout Clatsop County (see http://www.clatsopcountytsp.org for a link to the presentation). The following comments and discussion items came up:

- Seaside and Astoria are not included in Clatsop County's TSP due to each city having recent TSP's.
- Ensign Lane is now open and the county is seeing lots of diverging traffic.
- There are two bridge decks that are very scary for bikes:
    - The old bay bridge
    - Hwy 202 at Walluski Loop
- Right of way is very restricted on the rural roads. There could be some locations where "Bikes on Roadway" signs could be beneficial.
- Bicyclist safety is more nuanced for rural roads. Volume of traffic needs to be considered. Suggestions include a threshold for when bike lanes would be recommended for rural facilities.

- A suggestion came up to provide recommendations or guidance to Sunset Transportation Services (STS). It might be more beneficial to increase transit frequency vs increasing service destinations, for example.
- Suggestion that the upcoming Warrenton TSP looks at the two problem intersections on US 101 in depth and that the Clatsop County TSP provides guidance and general policy direction.
- In Astoria, the Irving Street extension should be mentioned in the county TSP. Also mention alternate routes.
- ODOT's position on a bypass is if the purpose for an alternate route is for emergencies, we may want to focus on OR 202 and improve that route vs building a new bypass.
- The condition of bridges is a primary concern for emergency management.
- The TSP is an ideal place to lay out policies for jurisdictional transfers of facilities like Wahanna and Ridge Roads.

The following comments were made in reference to Technical Memorandum #5: Existing Conditions

- Add that come summertime, US 101 is at capacity.
- Add an additional volume plot of peak weekends and provide more information on the worst weekends.
- Add a plot showing vehicle volumes 10 years ago compared to today.
- General consensus is that geometrics might not be equally important with regards to the corridor health tool. The desire is to see some different figures with various weighting options.

5. Questions/Comments from Public Attendees

There were no public attendees at the meeting.

6. Next Steps

The next PAC meeting is not expected until August. In the meantime, the consultant staff will be finalizing Technical Memorandum #5: Existing Conditions and continue working on the draft of Technical Memorandum #6: Future Traffic Forecast and Technical Memorandum #7: Future Transportation Conditions and Needs. In the meantime, please visit the project website http://www.clatsopcountytsp.org and provide comments on draft project deliverables as they come available.

The county and consultant staff will conduct a series of Town Hall events at various locations throughout the county in the next couple months. These events will provide an overview of Technical Memorandums #1 through #7 and provide the public an opportunity to offer their input on the goals and objectives of the plan as well as the specific transportation system alternatives to be considered to address the transportation system deficiencies.

Clatsop County Transportation System Plan

Project Advisory Committee (PAC) Meeting #3 Summary

MEETING DATE: August 20, 2014

MEETING TIME: 3:00 p.m. to 5:00 p.m.

MEETING LOCATION: Clatsop County Public Services Building, 800 Exchange Street, Suite 430, Astoria

MEETING PURPOSE: The purpose of this meeting is to review the findings from Tech Memos #8 through #10 regarding funding assumptions, transportation standards and the process for developing alternatives to meet the existing and future transportation system deficiencies.

TOPICS

1. Sign-in, Agenda Overview, and Introductions

The project team opened the meeting by reviewing the agenda, and introducing themselves. Some PAC members requested that meeting materials be sent out further in advance of the meeting.

2. Initial Funding Assumptions

The project team presented the projected revenues and expenditures over the next 20 years for the county, based on an average of the last five years of funding data. Over the next 20 years, it is expected that the county will have an additional $3.7 million to spend on transportation projects. This does not include exactions from future development or grants that could be obtained.

During the PAC meeting, it was also noted that this estimate assumes that county expenditures for maintenance were assumed to increase in the future with an escalation factor of 3.2 percent, based on the Construction Cost Index during August 2014. This helps to account for the reality that facilities are expected to deteriorate at a faster rate and will likely require more funding for maintenance.

In addition, the county expects to receive between $8 and $10 million from the state to cover investments along state highways over the next 20 years. The project team described the current funding sources and potential areas to generate more funding. The PAC had the following comments regarding funding:

- The road district tax only applies to rural areas of the County.
- The $3.7 million is for County street improvement needs.

- Most of the ODOT $8-10 million will be spent on State Highways. Need strong tie to use ODOT funds for local streets.
- The PAC thinks the county should consider increasing the revenue stream. Some suggestions included system development charges, or a County Gas Tax. The PAC suggested that the gas tax could differ between the summer and winter months to place more burden on visitors. The PAC does not think a gas tax would pass a public vote. PAC thinks we need to have buy off from Warrenton since a majority of the revenue will come from that City. PAC thinks it's the most reasonable of the funding measures, especially during the summer months. Might be worth educating the public. It spreads the cost among the people using the system.
- System Development Charges: The project team suggested that system development charges make more sense in rapidly growing areas.
- Transportation Utility Fee (TUF): Tillamook County may have a TUF. There are no methods to collecting a TUF in the county, rural areas don't get utility bills. TUF won't apply to some people who use the system.
- The PAC thinks we should show what we get with the additional taxes. "We get these projects without and these with."
- What about getting money from cyclists? The PAC thinks bike lanes and shoulders make it safer to drive, in addition to cycle, but only drivers pay gas tax.
- What can we do to improve health through transportation? There may be funding for improving health through transportation. Focus on improving health and reducing obesity, the funding could come from grant or federal sources for wellness
- At federal and state level, there is a lot of support for investing in pedestrian/bike facilities.
- The project team noted that nothing we do in this plan commits the county to increasing taxes. We just make a recommendation and can show what projects you could get with the increased revenue.
- Emergency response may be costly, we need to focus on it during the Plan.
- Shovel ready tsunami projects related transportation improvements may have focused funding. Maybe do engineering on a few projects and have local match in advance, to move it up on the list for state funding.

3. Overview of Transportation Standards

The PAC discussed the proposed street standards and had the following comments:

- Change Westport Ferry Road to a Minor Arterial.
- Shoulder widening may be a common theme for TSP projects.
- Shoulder should include asphalt surfaces.
- Private road standards need to be added.
- County truck routes will be added to the figures.
- What about adding pathways outside of the roadway so you don't walk adjacent to travelway? The project team noted that we are adding a pathway standard to the plan that you can implement where wanted.
- Separate bike lanes from streets in areas where it makes sense.
- The PAC had some concern about having urban sections on the traffic calming measures. They feel they are a rural county and won't have many locations to apply those standards.

4. Brainstorm Transportation Solutions

This part of the meeting focused on describing key areas of interest, and desired direction for transportation system solutions in the future. The project team will take the input gained from this discussion and use it to guide the development of the types of improvements the community would like to see and evaluate the plan to ensure it aligns with local interests. Some relevant information discussed with the PAC included:

- Develop solutions to address the Corridor Health tool segments ranking as "poor."
- Consider bike/pedestrian bridges to get people across waterways to help during evacuations. The PAC noted that these structures would likely survive the earthquake to help people evacuate, but likely not a tsunami. Sunset Beach Road should be priority for a pedestrian/bike bridge.
- Other planning efforts are currently figuring out where the trail system should go for evacuations. The County needs a trail connectivity program to link to the routes coming from these planning efforts.
- There may be future funding for emergency preparedness. Consider a project to evaluate seismic stability of the county bridges.
- There is too much pavement at the Old US Highway 30/Hillcrest Loop Road intersection.
- Focus on safety upgrades at intersections.
- The J-Turn project at Sunset Beach Lane is funded, costing around $600k-$800k.
- Pedestrian facilities are needed along SE 19th Street, from Ensign Lane to the animal shelter.
- Lewis and Clark Road upgrade from US 101 Business south to Fort Clatsop Road.
- Lewis and Clark Road upgrade in Seaside.
- Wahanna Road upgrade in Seaside.
- Incorporate Camp Rilea recommendations into the TSP.
- Consider alternate mobility targets for US 101 between Warrenton and Gearhart.
- US 101 should be focus for bicycle safety. If don't have enough money focus on improving facilities for the southbound direction to get biggest bang for your buck.
- US 26 near OR 103 should be reviewed for safety enhancements.
- Westport Ferry Road realignment.
- Feasibility study of 2-lane county roadway for alternate route from US 30 to OR 202.
- Irving Street extension in Astoria.
- Highway 202 upgrades.
- Old Youngs Bay Bridge bike/pedestrian improvements or resurface to have solid surface on both sides for bikes.
- Flood improvements along OR 202, raising the pavement just east of Williamsport Road (around the curve).

5. Next Steps

The project team will develop the initial project list. At the next meeting, the PAC will be presented with the draft transportation system solutions, evaluation criteria ratings, and cost estimates.

Clatsop County Transportation System Plan

Project Advisory Committee (PAC) Meeting #4 Summary

MEETING DATE: November 17, 2014

MEETING TIME: 3:00 p.m. to 5:00 p.m.

MEETING LOCATION: Judge Guy Boyington Building, 857 Commercial Street, Astoria

MEETING PURPOSE: The purpose of this meeting is to review the transportation system solutions from Tech Memo #11 and determine how projects will be prioritized for the financially constrained transportation system.

TOPICS

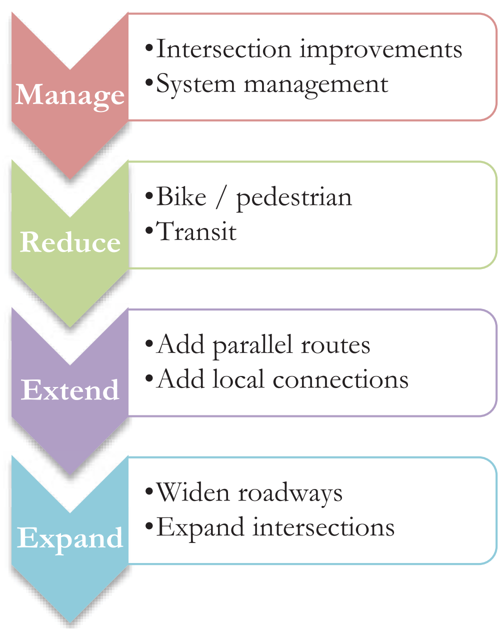
1. Project Status Update

The project team opened the meeting by reviewing the agenda, and introducing themselves.

2. Overview of Transportation System Solutions Memorandum

The project team developed transportation solutions through the following process, following state guidelines:

- Solutions to manage congested locations were considered first
- Next, solutions that reduce driving demand at congested locations were considered
- Next, solutions that extend the life of streets by improving parallel routes and local connections were considered
- The last solution considered was expanding existing streets or intersections



Members of the PAC were curious about the traffic volumes along US 101 through the county, and the project team suggested it was approximately 20,000 per day, depending on location and time of year. The PAC suggested that we need to acknowledge in the TSP that the county experiences these high traffic volumes during the summer and explain the ultimately there isn't an easy fix but we're managing it through other transportation investments.

The PAC suggested that the TSP should be guided by the bigger questions in the county, including natural disasters and evacuation and recovery from these events, freight movement, and summer congestion. The PAC noted that although the county can't fix all of these issues with the limited transportation funding, any project is a step in the right direction, especially related to system resiliency from natural disasters.

The project team went over the draft transportation system solutions with the PAC. The PAC felt the following projects should be a higher priority in the county:

- Irving Street Extension in Astoria
- Wahanna Road improvements in Seaside
- Miles Crossing Roundabout
- 19th Street Extension, near Warrenton
- Wahanna Road extension, south of Seaside

3. Discuss Prioritization Options

The project team reminded the PAC that the county is expected to have approximately $4 million to spend on transportation projects. In addition, the county expects to receive between $8 and $10 million from the state to cover investments along state highways over the next 20 years. The project team then explained how the evaluation criteria was applied under five different rankings to prioritize the transportation solutions. Each project from the Aspirational project list was scored based on the evaluation criteria that were developed in Technical Memorandum #4. The scores were totaled for project, and used to solicit feedback. The rankings included the following:

- Ranking 1: Projects were ranked with the unadjusted scoring from the evaluation criteria.
- Ranking 2: Projects were forced ranked by solution type (Manage projects were first, Reduce projects were second, Extend projects were third, and Expand projects were last) and then prioritized by the evaluation score.
- Ranking 3: Projects were grouped by solution type (Manage, Reduce, Extend, Expand) and then prioritized by the evaluation score among the groups.
- Ranking 4: Evaluation scores for projects in rural areas were adjusted to exclude mode-specific, environmental impact, and demand management goals.
- Ranking 5: Project rankings were based on Corridor Health Tool results for project location. Poor Health = High, Fair = Medium, Good = Low.

The PAC suggested that the projects should be prioritized based on the key issues in the county including natural disasters and evacuation and recovery from these events, safety, and summer congestion. The following adjustments to the project evaluation criteria were recommended by the PAC:

- The evaluation scores for projects located in rural areas should be adjusted to exclude urban oriented goals. This adjustment will be applied to account for the different transportation characteristics and needs in urban and rural areas of the County.
- Projects should be ranked based on the Corridor Health Tool results for the project location (see Technical Memorandum #7). Projects located along "poor" health segments were prioritized over those along "fair" or "good" segments. This adjustment will be applied to prioritize projects that focus on improving safety along streets, an area the PAC felt should be weighted more heavily.

- Each project should be scored with a resiliency factor based on its impact on evacuation or recovery efforts from local destructive events, its connectivity to ODOT Lifeline or key County evacuation routes, or its distance from a tsunami zone. This adjustment will be applied to prioritize projects that focus on resiliency, an area the PAC felt should be weighted more heavily.

Using the recommendations from the PAC, the projects will be re-evaluated with two separate rankings, and the resulting scores will be considered to arrive at the hybrid package of transportation solutions. The two rankings are summarized below:

- Ranking A: This ranking will average the results of the project evaluation using the criteria established in Technical Memorandum #4 (and summarized above), the rural adjusted scores which exclude the evaluation of urban oriented goals, and the corridor health rankings, with an additional resiliency factor.
- Ranking B: This ranking will average the results of the project evaluation using the criteria established in Technical Memorandum #4 (and summarized above), while weighting Goal 5 to be worth double that of the other goals.

4. Next Steps

The recommendations of the PAC will be incorporated into the materials presented at the upcoming community event series for the TSP. The project team will further incorporate the public feedback from the community event series into Technical Memorandum #12- Transportation System Recommendations. At the next meeting, the PAC will be presented with the aspirational and financially constrained system projects.

Clatsop County Transportation System Plan

Project Advisory Committee (PAC) Meeting #5 Summary

MEETING DATE: February 2, 2015

MEETING TIME: 3:00 p.m. to 5:00 p.m.

MEETING LOCATION: Judge Guy Boyington Building, 857 Commercial Street, Astoria

MEETING PURPOSE: The purpose of this meeting is to review the aspirational and financially constrained transportation system projects from Tech Memo #12 and confirm that it is ready to move forward to the Draft Transportation System Plan.

TOPICS

1. Sign-in, Agenda Overview

The project team opened the meeting by reviewing the agenda, and providing an update on the TSP update process.

2. Community Event Feedback

The project team summarized some of the feedback obtained from the Community Event Series #2 attendees. A summary of feedback included:

- Shoulders on the Old Youngs Bay Bridge are too narrow.
- The shoulders along bridges need to be swept more frequently.
- Shoulder improvements are needed along OR 103, near Jewell. There is a lot of pedestrian activity in this area.
- Project X5 (Pedestrian/Bicycle Improvement Strategy) should be a high priority.
- Project B14 (US 101/ Sunset Beach Rd. Bike Improvements) should be a high priority. This is a rather hazardous location for cyclists.
- Consider a project to install a series of push button activated or passive detection warning lights for cyclists traveling along the New Youngs Bay Bridge and Astoria Megler Bridge.
- There are no alternate routes to US 30, east of Astoria. When the highway has an incident, there is no way to bypass it.
- There is no left turn lane at the US 30/Old US Highway 30 intersection, east of the Koppisch Road intersection.
- A project should be added to widen US 101 to three lanes between Patriot Way and Sunset Beach Road.
- Project D3 (US 30 / Old US Highway 30-Hillcrest Loop Intersection Improvements) should be a high priority.
- Problem intersections. These specifically included; Hwy 30/Knappa Jct., Old Hwy 30/Hwy 30 between the overpass and the turn off for Kopisch Road, Hillcrest/Conroy.
- Project X1 (Rural Community Safety Study) should be a high priority.

- Project X2 (Rail Study) should include a study to restore rail service, including track improvements.

3. Review Updated Project Priorities

At PAC meeting #4, we discussed the initial scoring of the Aspirational project list based on the evaluation criteria that were developed in Technical Memorandum #4. Input from the PAC led to the emergence of a hybrid package of transportation investments to be included as the recommended Financially Constrained Transportation Plan.

The following adjustments were applied to the project evaluation criteria to address recommendations of the PAC:

- The evaluation scores for projects located in rural areas were adjusted to exclude urban oriented goals. This adjustment was applied to account for the different transportation characteristics and needs in urban and rural areas of the County.
- Projects were ranked based on the Corridor Health Tool results for the project location (see Technical Memorandum #7). Projects located along "poor" health segments were prioritized over those along "fair" or "good" segments. This adjustment was applied to prioritize projects that focus on improving safety along streets, an area the PAC felt should be weighted more heavily.
- Each project was scored with a resiliency factor based on its impact on evacuation or recovery efforts from local destructive events, its connectivity to ODOT Lifeline or key County evacuation routes, or its distance from a tsunami zone. This adjustment was applied to prioritize projects that focus on resiliency, an area the PAC felt should be weighted more heavily.

Using the recommendations from the PAC, the projects were re-evaluated with two separate rankings, and the resulting scores were averaged to arrive at the hybrid package of transportation solutions. The two rankings are summarized below:

- Ranking A: This ranking averages the results of the project evaluation using the criteria established in Technical Memorandum #4 (and summarized above), the rural adjusted scores which exclude the evaluation of urban oriented goals, and the corridor health rankings, with an additional resiliency factor.
- Ranking B: This ranking averages the results of the project evaluation using the criteria established in Technical Memorandum #4 (and summarized above), while weighting Goal 5 to be worth double that of the other goals.

4. Review Financially Constrained Projects

The project team reviewed the financially constrained projects with the PAC. Overall, the PAC noted the challenge in picking high priority projects with limited funding. However, they agreed the best approach would be to find the best fit of projects with the current revenue streams. Rather than focusing on motor vehicle capacity increasing projects, the focus should be on transportation system safety and resiliency issues. The following feedback was received:

- Projects funded through design should be referred to as pre-design only, since they are likely only to be 30 percent plans.
- Projects B23 and B24 are important, but could benefit from technology advancements in the future. Keep these projects as long term for that case.
- Project W2- The PAC thinks this segment of OR 202 is okay for biking, and believes this would be difficult to maintain with the flooding issues. The project should be moved to the aspirational plan.

- Project W5- Lewis and Clark Road seems reasonably safe for biking to PAC members. Traffic volumes are fairly low, but it's a county Arterial. Keep this project in the financially constrained plan.
- Project W6 and W7- The extent of W6 should be modified per the Camp Rilea Plan, and project W7 should be replaced project W8.
- Project W8- Modify the project description to include improved shoulders per the Camp Rilea plan.
- Project W9- Modify the project description to include general pedestrian improvements along the roadway alignment. This project is very important for resiliency.
- Project W10- Modify the project description to include general pedestrian improvements along the roadway alignment. This project is very important for resiliency.
- Project W11- Provide more money to this project to fully fund using state, county and Seaside money.
- Project D3 should be a higher priority.
- Project D11 should be fully funded.
- Project D12 should be moved to the aspirational plan.
- Project D19 is funded and should be high priority.
- Project X1- Rural Community Safety Study, should be a higher priority per community feedback.
- Project X3 should be a higher priority.

The PAC agreed that with these changes, the project list is ready to move forward into the Draft TSP.

5. Next Steps

The feedback from the PAC will be incorporated into the project list for the Draft TSP. The county is also preparing Technical Memorandum #14- Implementing Regulations and Policy Amendments. This memorandum, along with the Draft TSP, will be discussed at the next PAC meeting.

Clatsop County Transportation System Plan

Project Advisory Committee (PAC) Meeting #6 Summary

MEETING DATE: April 29, 2015

MEETING TIME: 3:00 p.m. to 5:00 p.m.

MEETING LOCATION: Judge Guy Boyington Building, 857 Commercial Street, Astoria

MEETING PURPOSE: The purpose of this meeting is to review the Draft TSP and discuss the recommended transportation projects and programs.

TOPICS

1. Sign-in, Agenda Overview

The project team opened the meeting by reviewing the agenda.

2. Update on the Process

The project team updated the PAC on the progress since our previous meeting. Since the previous meeting, the project team incorporated feedback from the PAC into the Draft TSP, and completed Technical Memorandum #14-Implementing Regulations and Policy Amendments. The project team also attended a briefing with the County Board of Commissioners to provide them an update on the TSP update.

3. Highlights of the Draft Plan

The project team summarized the key changes that were incorporated into the Draft TSP, including:

- Projects funded through design should be referred to as pre-design only, since they are likely only to be 30 percent plans.
- Projects B23 and B24 are important, but could benefit from technology advancements in the future. Keep these projects as long term for that case.
- Project W2- The PAC thinks this segment of OR 202 is okay for biking, and believes this would be difficult to maintain with the flooding issues. The project should be moved to the aspirational plan.
- Project W5- Lewis and Clark Road seems reasonably safe for biking to PAC members. Traffic volumes are fairly low, but it's a county Arterial. Keep this project in the financially constrained plan.
- Project W6 and W7- The extent of W6 should be modified per the Camp Rilea Plan, and project W7 should be replaced project W8.
- Project W8- Modify the project description to include improved shoulders per the Camp Rilea plan.

- Project W9- Modify the project description to include general pedestrian improvements along the roadway alignment. This project is very important for resiliency.
- Project W10- Modify the project description to include general pedestrian improvements along the roadway alignment. This project is very important for resiliency.
- Project W11- Provide more money to this project to fully fund using state, county and Seaside money.
- Project D3 should be a higher priority.
- Project D11 should be fully funded.
- Project D12 should be moved to the aspirational plan.
- Project D19 is funded and should be high priority.
- Project X1- Rural Community Safety Study, should be a higher priority per community feedback.
- Project X3 should be a higher priority.
- Ensign Lane will be fully constructed by the time of Plan adoption, so it should be listed as fully funded.
- Remove the "optimum right-of-way" text from the roadway cross-sections.
- Remove the block spacing standards from Table 2.
- Move the Traffic Calming section to Volume 2.
- Add System Development Charges and/or Traffic Impact Fees as possible funding mechanisms.
- Modify the description of project X04.

4. Highlights of the Implementing Code and Policy Updates

The project team walked the PAC through the Development Code and Comprehensive Plan Goals and Policies Amendments.

5. Next Steps

The PAC recommend adoption of the TSP.

- The Adoption Draft TSP must be submitted to the DLCD 35 days before public hearings can begin.
- Public hearings will be held in late 2015. PAC members are encouraged to attend public hearings and support the TSP.
- After the public hearings the Planning Commission will vote on the TSP.
- Following Planning Commission approval, the Board of County Commissioners will vote to officially adopt the TSP.

Clatsop County Transportation System Plan

Project Management Team (PMT) Meeting #1 Summary

MEETING DATE:	July 22, 2014
MEETING TIME:	1:00 p.m. to 3:00 p.m.
MEETING LOCATION:	Clatsop County Public Works, 1100 Olney Ave, Astoria
MEETING PURPOSE:	The purpose of this meeting is to review the transportation standards from Tech Memo #10 and brainstorm initial solutions for the identified transportation system needs through 2035.

TOPICS

1. Overview of Transportation Standards

The PMT reviewed the draft transportation standards from Technical Memorandum #10. The following feedback was provided:

- The county felt that fewer street design options would be less confusing for staff. Five street designs should be provided for county streets, including one for a minor arterial street, major collector street, minor collector street, local street, and a truck route on a minor arterial or major collector.
- Add a street design for truck routes with a 2 foot buffer between the travel lane and shoulder. The travel lane should be 12 feet wide along these streets.
- Remove urban street designs, just assume city standard will be applied within the Urban Growth Boundary or city limits.
- Change the drainage width to be 5-8 feet for all street designs.
- Do not show bike lanes, just shoulders for all streets.
- Local truck routes- county staff will provide a figure of local truck routes.
- Local lifeline routes- county staff will take on the identification of these routes in a future study.
- Spacing standards- remove requirement for maximum block size.
- Add driver speed feedback signs to the list of traffic calming measures.

2. Initial Funding Assumptions

The county expects to receive between $8 and $10 million from the state to cover investments along state highways over the next 20 years. The county will provide more funding data information to estimate the expected revenue from county sources.

3. Brainstorm Transportation Solutions

The project team discussed potential transportation solutions, including:

- Bridge replacement projects on evacuation routes.
- Seismic stability of county bridges along evacuation routes.
- Projects to improve a driver's line of sight at intersections.
- Upgrading streets to county standards.
- Intersection improvements at Old US Highway 30/Hillcrest Loop Road/US 30.
- Improvements along US 26, near the Elderberry Inn.
- Incorporate Projects from US 101 Camp Rilea to Surf Pines Facility Plan

4. Next Steps

- County to Provide More Information on Funding Data
- County to provide map of local truck routes.
- DKS to Draft Funding Assumptions Technical Memorandum
- PAC Meeting #3: Wednesday, August 20th, 3-5 p.m.

Clatsop County Transportation System Plan
Project Management Team (PMT) Meeting #2 Summary

MEETING DATE: October 27, 2014

MEETING TIME: 10:00 a.m. to 12:00 p.m.

MEETING LOCATION: Clatsop County Public Works, 1100 Olney Ave, Astoria

MEETING PURPOSE: The purpose of this meeting is to review the transportation system solutions from Tech Memo #11 and determine how projects will be prioritized for the financially constrained transportation system.

TOPICS

1. Transportation System Solutions

The PMT reviewed and provided the following feedback on the aspirational projects:

- Project W4- High Priority Project to the county.
- Project W6- This project is completed, but keep on the list.
- Project W10- This road is heavily used, with lots of pedestrian traffic.
- Project D6- High Priority Project to the county. Change "bypass" to "Alternate Route."
- Project D8- High Priority Project to the county. This project could be phased for an environmental study.
- Project D11- Delete this project, they are currently being improved.
- Project D15- High Priority Project to the county. Primary funding source should be County and Warrenton.
- Project D20- Will be fully funded by the state. Cost estimate at $2 million.
- Project D21- Will be fully funded by the state. Cost estimate at $600-$800k.
- Project D23- High Priority Project to the county.
- Project D27- Wahanna Road extension should connect to Beerman Creek Road east of the bridge.
- Project X1- Delete this project, it is for recreational purposes.
- Project X4- High Priority Project to the county. Change name to "Cascadia Event Facility Plan." Should identify resilient routes and connections that can be used during evacuations, and identify and evaluate locations where pedestrian/bicycle bridges are needed to support evacuation routes.
- Add pedestrian/bicycle improvement strategy project for shoulder maintenance, including the purchasing of new street sweeper equipment.
- Add a project for a longer turn lane to US 26 from US 101 southbound.
- Add a project for Phase 2 of flood mitigation strategy for US 101.

- Add a project for reconstruction of US 101 near Beerman Creek Lane.
- Add a rural community safety study project, to review and identify strategies for managing speed and other safety issues in the Arch Cape, Miles Crossing-Jeffers Garden, Knappa-Svensen, and Westport communities.

2. Project Evaluation

The PMT suggested that the project evaluation should consider the differences between those in urban and rural areas of the county. In addition, it should consider the Corridor Health Tool results and the project solution types (Manage, Reduce, Extend, Expand).

3. Upcoming Community Meetings

- Targeting first two weeks of December
- 3 locations- Bob Chisholm Community Center in Seaside, Lewis and Clark Elementary School in Miles Crossing and Knappa High School in Svensen.

4. Next Steps

- PAC Meeting #4: Monday, November 17th, 3-5 p.m.

Clatsop County Transportation System Plan

Community Event Series #1 Summary

MEETING LOCATIONS:

Tuesday, June 3rd. Bob Chisholm Community Center, 1225 Avenue A, Seaside, 4:30-6:30 P.M.

Wednesday, June 4th. Arch Cape Fire Station, 79729 Highway 101, Arch Cape, 4:30-6:30 P.M.

Thursday, June 5th. Guy Boyington Building, 857 Commercial Street, Astoria, 4:30-6:30 P.M.

Tuesday, June 10th. Columbia River Substation, 92435 Svensen Market Road, Svensen, 4:30-6:30 P.M.

Wednesday, June 11th. Jewell School, 83874 Highway 103, Jewell, 4:30-6:30 P.M.

Clatsop County is in the process of updating its Transportation System Plan (TSP). The TSP provides a long term (20-year) plan for how to best meet transportation needs of community residents, workers and businesses. The plan evaluates the current transportation system and determines how it could be improved to make travel in Clatsop County better. The plan will balance the needs of walking, bicycling, driving, transit, freight, and other modes into an equitable and efficient transportation system

As part of this planning process, the TSP team (staff and consultants) facilitated a series of community events to review work completed to date on the project and talk to participants about how to solve current and future transportation issues in the County. The community events were held at locations around the county in an open "drop in" format, with approximately 20 people attending the events in total.

Participants included staff from Clatsop County, the Oregon Department of Transportation, as well as residents, property owners, business owners, local agency staff, and members of the consulting team.

The community events featured a series of activities that included:

- A "TSP 101" automated ongoing PowerPoint presentation that gave an overview of transportation system planning and then maps, photos, and brief text about existing and future conditions in Clatsop County for driving, walking, biking, transit, and freight.
- Six stations featuring information about topics related to travel – Walking and Biking, Transit, Driving, Road Safety, Other Transportation Modes, and Emergency Preparedness and Resiliency. These included interactive exercises with large maps of the County for commenting on with sticky notes. Project team members were present to explain work done for the project thus far, answer questions, and generally discuss the station topic with participants.
- A take-home packet with summaries of the project findings and progress to date, including copies of the maps used in the station exercises.
- A survey to gather public input on current transportation needs in the county.

The following themes emerged from the feedback for each topic:

Walking and Biking

- Lack of safe routes to destinations was the most cited reason for not biking.
- Support for facilities for walking and biking, and a preference for separated facilities.
- Walking and biking along US 101 and US 30 is uncomfortable, feels unsafe, and crossing the highway can be difficult.
- Poor road quality of local roads discourages walking and biking.
- Support for bike parking requirements for large businesses.

Transit

- Few people use transit for everyday travel.
- Routes and schedules are not well known.
- Support for improved bus service to Portland (downtown and airport).

Driving

- Strong desire to improve the quality and standards of local streets.
- Getting on to busy highways can be difficult in uncontrolled locations.
- Support for comprehensive paved shoulders on highways in the county.
- Highway 103 and Highway 202 perceived as in need of repairs.
- Support for a gravel road standard, for unimproved local roads.
- Improvements to highways should be context sensitive to coastal environment and views.

Road Safety

- Safety concern at intersections where neither approach has a control device.
- The area around the Highway 26 / Highway 103 intersection feels unsafe, especially the left turn off of Highway 26 onto Highway 103.

Other Transportation Modes

- Accommodating freight and trucks at 8th / Commercial in Astoria is a priority.
- Tourism is a vital aspect of the local economy.

Emergency Preparedness and Resiliency

- Tsunami evacuation routes are hard to locate, particularly in Gearhart.

Clatsop County Transportation System Plan

Community Event Series #2 Summary

MEETING LOCATIONS:

Wednesday, December 3rd. Lewis and Clark Elementary School, 92179 Lewis and Clark Road, Astoria, 4:00-6:00 P.M.

Thursday, December 4th. Bob Chisholm Community Center, 1225 Avenue A, Seaside, 4:00-6:00 P.M.

Tuesday, December 9th. Knappa High School, 41535 Old US Highway 30, Astoria, 4:00-6:00 P.M.

Clatsop County is in the process of updating its Transportation System Plan (TSP). The Transportation System Plan (TSP) provides a long term guide to County transportation investments. The plan evaluates the current transportation system and determines how it could be improved to make travel in Clatsop County better. Clatsop County has begun the process to identify opportunities to improve our current and future transportation system over the next 20 years.

As part of this planning process, the TSP team (staff and consultants) facilitated a series of community events to review work completed to date on the project and talk to participants about the preliminary solutions and projects that are proposed to improve the transportation system in the County.

The community events were held at locations around the county in an open "drop in" format, with approximately 15 people attending the events in total. Participants included staff from Clatsop County, the Oregon Department of Transportation, as well as residents, property owners, business owners, local agency staff, and members of the consulting team. The County advertised for the community events through a variety of means, including:

- Announcements on the project website.
- Meeting flyers posted in a variety of locations.
- E-mail announcements to people who have expressed an interest in the project to date.

The community events featured a series of activities that included:

- A "Welcome Station" that gave an overview of transportation system planning and the major components of the TSP update.
- Six stations featuring information about topics related to the TSP update – Goals and Funding, Corridor Health and Operations, Collisions, High Priority Projects, all Walking, Biking and Transit projects, and all Driving projects. These included interactive exercises with large maps of the County for commenting on with sticky notes. Project team members were present to explain work done for the project thus far, answer questions, and generally discuss the station topic with participants.
- A handout with summaries and maps of the high priority projects and a form to gather public input.

The following feedback was obtained from the community meeting attendees:

Walking and Biking

- Shoulders on the Old Youngs Bay Bridge are too narrow.
- The shoulders along bridges need to be swept more frequently.
- Shoulder improvements are needed along OR 103, near Jewell. There is a lot of pedestrian activity in this area.
- Check the cost estimate for project W11, the $7 million taken from the Seaside TSP represents the entire segment, including the portion that is not under county jurisdiction.
- Project X5 (Pedestrian/Bicycle Improvement Strategy) should be a high priority.
- Project B14 (US 101/ Sunset Beach Rd. Bike Improvements) should be a high priority. This is a rather hazardous location for cyclists.
- Consider a project to install a series of push button activated or passive detection warning lights for cyclists traveling along the New Youngs Bay Bridge and Astoria Megler Bridge.

Driving

- There are no alternate routes to US 30, east of Astoria. When the highway has an incident, there is no way to bypass it.
- There is no left turn lane at the US 30/Old US Highway 30 intersection, east of the Koppisch Road intersection.
- A project should be added to widen US 101 to three lanes between Patriot Way and Sunset Beach Road.
- Project D3 (US 30 / Old US Highway 30-Hillcrest Loop Intersection Improvements) should be a high priority.
- Problem intersections. These specifically included; Hwy 30/Knappa Jct., Old Hwy 30/Hwy 30 between the overpass and the turn off for Kopisch Road, Hillcrest/Conroy.

Other Transportation Modes

- Project X1 (Rural Community Safety Study) should be a high priority.
- Project X2 (Rail Study) should include a study to restore rail service, including track improvements.
- ODOT gets a lot of complaints about rumble strips for being too noisy.
- Safety study - Knappa/Svensen area. Discussed priority of a proposed safety study analysis of the rural roads in this area. Discussion about shoulder/road widths, intersections, etc. These are typically older roads, but in primarily residential areas with a variety of use by pedestrians, animals, traffic, etc.
- Big Creek/Little Creek. Discussion about breach of Little Creek and how Big Creek may threaten to re-route itself into the old Little Creek channel. Concern for integrity of Hwy 30 and/or Old Hwy 30 in event of a catastrophic and sudden reroute of Big Creek.
- Rail study/track improvements. Discussion about the challenges in establishing reliable rail service in the area. Primarily related to needed infrastructure improvements/needs.

Section P:
County Bridge Inventory

Bridge Inventory for Clatsop County (2013)

Jurisdiction	Road	Mile Point	Bridge	Structure Name	Sufficiency Rating*
County	Clifton Rd	3.9	11295	Clifton Ferry Ramp	0
County	Westport Ferry Rd	0.24	11118	Plympton Cr.	89.1
County	Westport Ferry Rd	0.36	16545	Westport Ferry L.	70.6
County	Hungry Hollow Lp	0.43	19635	West Cr	82.5
County	Hungry Hollow Lp	0.53	11120 19636	West Ck #2	79
County	Westport Tunnel Ln	0.07	07C19	Bradwood Br.	0
County	Brownsmead Dike Ln	0.27	11129	Saspal Slough Bridge	84.6
County	Brownsmead Dike Ln	0.67	11128	Blind Slough Br.	53.9
County	Barendse Rd	0.07	11138A	Blind Slough Mn. Br.	97
County	Jackson Rd	1	11139	Mcintire Br.	0
County	Aldrich Point Rd	0.03	11124A	Gnat Creek Br.	83.9
County	Aldrich Point Rd	0.76	18826	N/A	89.9
County	Knappa Dock Rd	0.32	11141	Sp Railroad	62.4
County	Knappa Dock Rd	1.22	11294	Knappa Dock Br.	44.8
County	Hillcrest Lp	3.89	11142	Big Creek Br.	72.2
County	Old Hwy 30 - Knappa	1.26	07C04	Lower Big Ck.Bridge	85.9
County	Pearson Rd	0.08	11152	Pearson Rd. Br.	42.6
County	Svensen Market Rd	1.38	11153	Upper Bear Cr Br.	67.2
County	Svensen Island Rd	0.37	11154A	Svensen Slough Br.	90.5
County	Maki Rd	0.622	11155A	Maki Rd. Br.	93.2
County	Maki Rd	0.64	11155B	N/A	93.4
County	Old Hwy 30 - Svensen	0.27	07C13	Bear Cr. Br.	75
County	Old Hwy 30 - Svensen	0.66	0C714	Marys Ck. Br.	0
County	Old Hwy 30 - Svensen	1.74	07C21	Ferris Ck.	0
County	Walluski Loop Rd	2.97	11160A	Irving Br.	94.3
County	Labiske Ln	1.83	18843	Wallooskee R	88.6
County	Labiske Ln	1.91	18842	Wallooskee R	73.6
County	Olney Ln	0.32	11171A	Olney Cut-Off	80.9
County	Olney Ln	0.86	11172A	N Fk Klaskanine R	97
County	Youngs River Rd	3.86	11299 19634	Tucker Ck. Br.	100
County	Youngs River Rd	7.8	11170A	Youngs R. Falls Br.	84.5
County	Youngs River Rd	10.56	011161	Olney Cutoff Br #1	86.4
County	Logan Rd	2.76	11208A	Stavebolt Br.	73.3
County	Lewis & Clark Rd	0.17	20633	N/A	75
County	Lewis & Clark Rd	3.42	11185A	Mcewan Slough Br.	66.4
County	Lewis & Clark Rd	3.88	11186A	Netel Grange Br.	51.8
County	Lewis & Clark Rd	4.76	07C03	Crown Z Overpass	85.1
County	Dolphin Rd	0.07	07C05	Rodney Acres Br.	44.5
County	Dolphin Rd	1.19	N/A	Skipanon R	N/A
County	Perkins Ln	0.41	17413	Perkins Rd.	92.5
County	Sunset Beach Ln	0.46	11230A	Sunset Lake Br.	49.4
County	Carnahan Park Rd	0.012	N/A	Skipanon R	0
County	Cullaby Lake Ln	0.38	011228	Cullaby Lake Rd Br	67
County	Lounsberry Ln	0.43	007C12	Maki Bridge	67
County	Highlands Ln	0.21	007C15	Neacoxie Cr Br.	98.9
County	North Wahanna Rd	0.2	11149A	Neawanna Cr	96.9
County	Wahanna Rd	0.06	11148	Sunquist Rd.	0
County	Beerman Creek Ln	0.17	11151	Beerman Cr.	59
County	Rippet Ln	0.129	11236	Rippet Rd. Br.	76.1
County	Klootchy Ck Park Rd	0.01	B1168 07C022	Klootchy Creek	58
County	Hamlet Rd	3.77	11219A	Asvick Br.	79.1
County	Hamlet Rd	4.73	11220A	N. Fk Nehalem R.	76.9
County	Hamlet Rd	5.52	11221A	Hill Br.	77.5
County	Hamlet Rd	5.65	11222A	Dayton Br.	77.8
County	Mattson Rd	0.98	11223A	Mattson Rd. Br.	80.3
County	Hill Rd	0.53	07C07	Hill Road Bridge	65.7
County	Wunsch Rd	0.1	11245	Herbert Rd. Br.	80.5

Bridge Inventory for Clatsop County (2013)

Jurisdiction	Road	Mile Point	Bridge	Structure Name	Sufficiency Rating*
County	Kampy Ln	0.45	11254A	Kampy Rd. Br.	92.7
County	Lower Nehalem Rd	0.96	11237	Humbug Br.	96.1
County	Lower Nehalem Rd	1.98	11240	Nehalem Br.	80
County	Lower Nehalem Rd	2.01	N/A	Nehalem R.	0
County	Lower Nehalem Rd	5.41	11242	Spruce Run Ck.	94.6
County	Beneke Ckeek Rd	3.19	N/A	Beneke Cr	0
County	Northrup Creek Rd	1.37	11201A	Northrup Ck. Br.	96.9
County	Northrup Creek Rd	2.5	17412	N/A	84.2
County	Fishhawk Rd	2.36	N/A	Fishhawk Cr	N/A
County	Strum Creek Rd	0.21	N/A	N/A	N/A
County	Fishhawk Falls Pit Road	0.02	07C09	07C09	76.4
County	Sjoli Ln	0.078	07C08	S Joli Rd. Bridge	75.7
ODOT	Highway 9	0	07949A	Columbia River, Hwy 9 (Astoria-Megler Br)	73
ODOT	Highway 9	0	07949D	Columbia River, Hwy 9 (Astoria-Megler Bridge)	54.3
ODOT	Highway 9	0.28	07949B	Columbia River, Hwy 9 (Astoria-Megler Br)	67
ODOT	Highway 9	2.41	07949C	Columbia River & Hwy 2W & Hwy 9 (Astoria-Megler)	71
ODOT	Highway 9	4.91	8306	Youngs Bay, Hwy 9 (New Youngs Bay)	56.8
ODOT	Highway 9	8.73	8317	Skipanon River, Hwy 9	88.7
ODOT	Highway 9	12.82	1468	Hwy 9 over Glenwood Private Rd (Pooles)	55.4
ODOT	Highway 9	19.58	03079A	Mill Creek, Hwy 9	95.1
ODOT	Highway 9	19.72	1305	Neawanna Creek, Hwy 9	54.3
ODOT	Highway 9	22.48	3080	Shangri La Creek, Hwy 9 (Dooley)	65
ODOT	Highway 9	24.1	1481	Necanicum River, Hwy 9 (Skiberene)	45.2
ODOT	Highway 9	25.27	16673	Hwy 9 over Hwy 47	83
ODOT	Highway 9	28.37	18658	Hwy 9 over Hwy 9 Conn to Cannon Beach	93.6
ODOT	Highway 9	28.7	6713	Ecola Creek, Hwy 9	49.6
ODOT	Highway 9	29.53	7226	Hwy 9 over Sunset Blvd (Cannon Beach)	78.2
ODOT	Highway 9	30.62	7405	Hwy 9 over Warren St (Cannon Beach)	79.7
ODOT	Highway 9	34.05	1878	Austins Point Half Viaduct, Hwy 9	76.9
ODOT	Highway 9	35.57	1797	Arch Cape Creek & Webb Ave, Hwy 9	64.7
ODOT	Highway 46	0.11	20732	Necanicum River, Hwy 46 at MP 0.11	99.8
ODOT	Highway 46	1.46	3086	Bergsvik Creek, Hwy 46 at MP 1.46	89.7
ODOT	Highway 46	5.98	3088	Jack Horner Creek, Hwy 46	78.8
ODOT	Highway 46	6.5	1319	Soapstone Creek, Hwy 46	50.8
ODOT	Highway 46	7.74	2319	North Fork Nehalem River, Hwy 46 at MP 7.74	83.7
ODOT	Highway 47	2.24	21188	Volmer Creek, Hwy 47 at MP 2.24	83
ODOT	Highway 47	3.99	19666	Mail Creek, Hwy 47	84.8
ODOT	Highway 47	4.4	2601	Necanicum River, Hwy 47 at MP 4.40 (Black)	44.7
ODOT	Highway 47	5.85	3095	Lindsley Creek, Hwy 47	56.1
ODOT	Highway 47	7.07	6524	North Fork Necanicum River, Hwy 47 at MP 7.07	73.5
ODOT	Highway 47	8.22	3099	Little Humbug Creek, Hwy 47	62.7
ODOT	Highway 47	10.23	01812A	Necanicum River, Hwy 47 at MP 10.23	70.1
ODOT	Highway 47	16.28	1831	West Humbug Creek, Hwy 47	53.5
ODOT	Highway 47	17.37	1832	East Fork Humbug Creek, Hwy 47	56.8
ODOT	Highway 47	21.73	2165	Nehalem River & Hwy 103, Hwy 47	39.7
ODOT	Highway 47	24.23	2164	North Fork Quartz Creek, Hwy 47	47.2
ODOT	Highway 47	24.47	2166	South Fork Quartz Creek, Hwy 47 at MP 24.47	65.2
ODOT	Highway 47	28.92	02479A	South Fork Rock Creek, Hwy 47	70
ODOT	Highway 92	70.71	00185A	Plympton Creek, Hwy 2W	64
ODOT	Highway 92	77.25	921	Gnat Creek, Hwy 2W	50.8
ODOT	Highway 92	82.52	7417	Big Creek, Hwy 2W	59.1
ODOT	Highway 92	82.84	7418	Maggie Johnson Rd over Hwy 2W	91.9
ODOT	Highway 92	85.27	9546	Ferris Creek, Hwy 2W	60.8
ODOT	Highway 92	86.21	9544	Bear Creek, Hwy 2W	69.8
ODOT	Highway 92	86.43	9543	Marys Creek, Hwy 2W	79.5
ODOT	Highway 92	92.5	01827B	John Day River, Hwy 2W	71.8
ODOT	Highway 092C	72.75	9598	Hwy 2W Conn over Hwy 2W (Wauna Intchg)	97
ODOT	Highway 102	4.58	02320A	Walluski River, Hwy 102	89.5

Bridge Inventory for Clatsop County (2013)

Jurisdiction	Road	Mile Point	Bridge	Structure Name	Sufficiency Rating*
ODOT	Highway 102	11.85	03104A	North Fork Klaskanine River, Hwy 102 at MP 11.85	95.8
ODOT	Highway 102	15.76	1964	North Fork Klaskanine River, Hwy 102 at MP 15.76	91.3
ODOT	Highway 102	19.27	1963	South Fork Klaskanine River, Hwy 102 at MP 19.27	78
ODOT	Highway 102	25.43	3108	Hamilton Creek, Hwy 102	91.2
ODOT	Highway 102	29.32	1991	Beneke Creek, Hwy 102	54.5
ODOT	Highway 102	29.84	03110A	Nehalem River, Hwy 102 at MP 29.84	68.1
ODOT	Highway 102	32.06	03111A	Nehalem River, Hwy 102 at MP 32.06	66.6
ODOT	Highway 102	33.59	18775	Squaw Creek, Hwy 102	97.9
ODOT	Highway 102	35.08	03112A	Nehalem River, Hwy 102 at MP 35.08	61.1
ODOT	Highway 102	36.75	01707A	Sager Creek, Hwy 102	96.9
ODOT	Highway 102	38.1	01710A	Oflow Channel, Hwy 102 at MP 37.98	96.9
ODOT	Highway 102	38.59	03113A	Nehalem River, Hwy 102 at MP 38.59	94.8
ODOT	Highway 102	38.81	01712A	Grub Creek, Hwy 102	96.8
ODOT	Highway 103	0.02	03103A	Fishhawk Creek, Hwy 103 (Jewell)	97.3
ODOT	Highway 103	5.25	2074	Nehalem River, Hwy 103 at MP 5.25	62
ODOT	Highway 103	6.32	18165	Cow Creek, Hwy 103	91.3
ODOT	Highway 104	2.32	11233B	Power Slough (Alder Creek), Hwy 104	94.8
ODOT	Highway 104Y	4.62	1400	Skipanon River, Hwy 104 Spur	38.7
ODOT	Highway 105	0.17	11226A	Skipanon River, Hwy 105	95.3
ODOT	Highway 105	4.78	711	Lewis & Clark River, Hwy 105	28.7
ODOT	Highway 105	6.89	330	Youngs Bay, Hwy 105 (Old Youngs Bay)	7
ODOT	Highway 105	7.1	2418	Hwy 105 over Port of Astoria Belt Line (Abandoned)	60.2

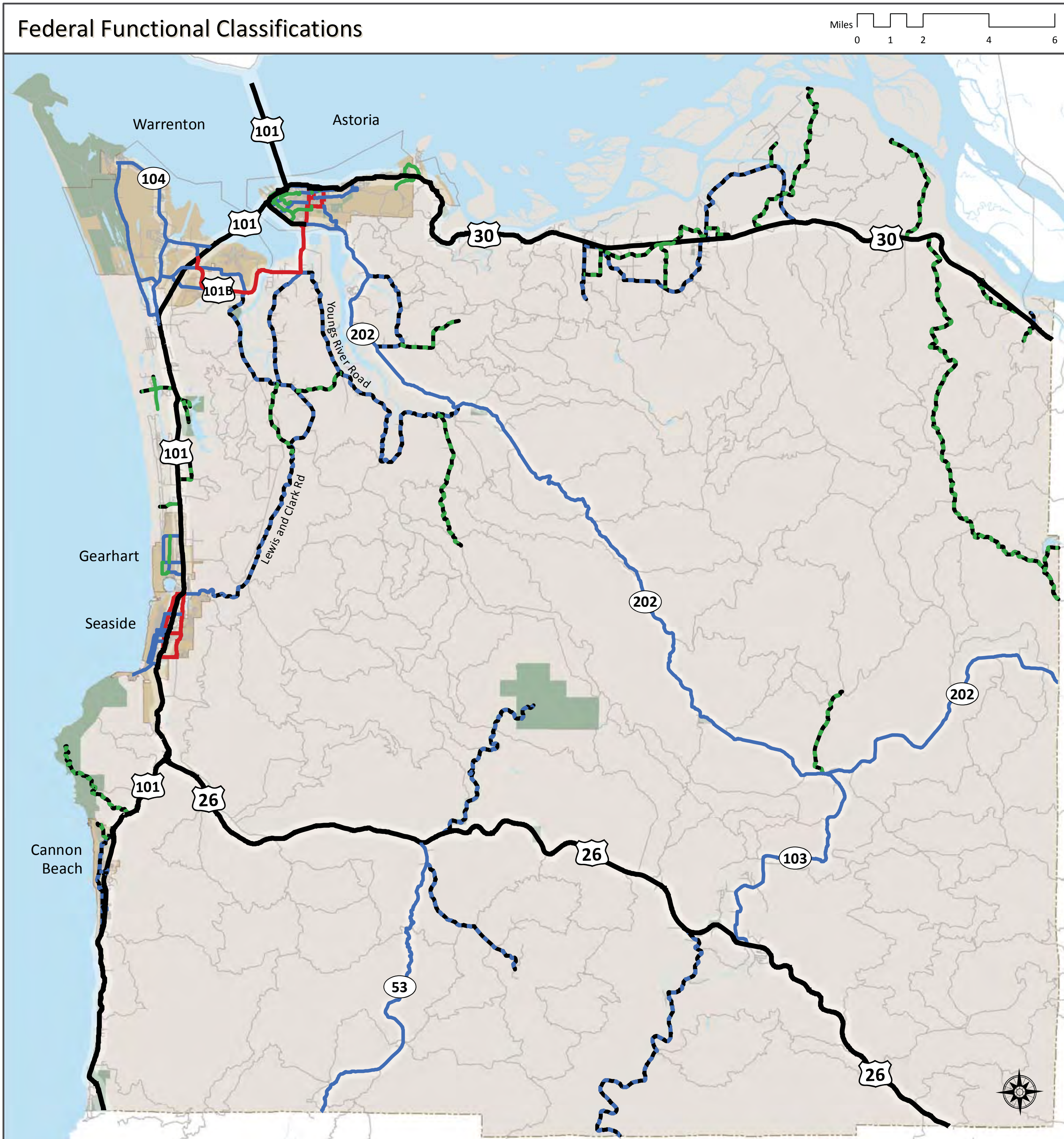
* Sufficiency rating is an overall measure of the bridge's condition, comparing the existing bridge to a new bridge designed to current engineering standards on a 0 - 100 scale. The sufficiency rating is used to determine elibility for federal fund matches. Repair funding requires a rating less than 80. Replacement funding requires a rating less than 50 and the bridge to be functionally obsolete or structurally deficient.

Section Q:
Federal Roadway Functional Classifications

Clatsop County
Transportation System Plan

Destination 2035

Federal Functional Classifications



Legend

Federal Functional Classification

- Principal Arterial
- Minor Arterial
- Major Collector
- Minor Collector
- Rural Major Collector
- Rural Minor Collector

- City
- Park
- Clatsop County