Oregon Department of Transportation

TECHNICAL SERVICES
TRAFFIC - ROADWAY SECTION
TRAFFIC CONTROL PLANS UNIT

Web-Based Work Zone Traffic Analysis Tool Users' Guide

Fall 2010

Oregon Department of Transportation

DATE: April 2010

TO: Work Zone Traffic Analysis Associates

FROM: Scott McCanna, P.E.
State Traffic Control Plans Engineer

SUBJECT: Web-Based Work Zone Traffic Analysis Users' Guide

PURPOSE

The purpose of this manual is to familiarize folks with ODOT's Work Zone Traffic Analysis (WZTA) tool, WZTA methodologies, guidelines, policies, and procedures to use in their determination of lane closure restriction recommendations and construction delay estimates. The WZTA tool may also be used by anyone with an internet browser to gather traffic data from Oregon's Highway System.

The WZTA methodology outlined in this manual is intended to be utilized by ODOT's analysts as well as analysts for local authorities, consultant analysts and other professionals outside the Department.

Care should be taken in applying the methodology of this manual to projects developed outside the Department. Differences may exist between the ODOT WZTA lane closure policies and those policies established by other agencies. These differences may lead to inconsistencies in the analysis and subsequent lane closure restrictions and construction delay estimates of a particular project.

This manual is intended to supplement existing ODOT analysis policies while enhancing the specific discipline of WZTA. This manual is to be used as a resource, a technical reference and a teaching aide in the area of temporary WZTA. Please contact the Traffic Control Plans Unit within ODOT's Traffic-Roadway Section for clarification or interpretation of any policies and standards within this manual.

UPDATES

This manual is a living document. ODOT intends to update this manual on a regular basis; however, suggestions for changes or additions will be accepted at any time. Analysts may make recommendations with the expectation that their concerns will be addressed and may be incorporated into this document.

OREGON'S WEB-BASED WORK ZONE TRAFFIC ANALYSIS (WZTA) TOOL

WZTA METHODOLOGY

AND

USER'S GUIDES

Oregon's Web-Based
Work Zone Traffic Analysis

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http://www.oregon.gov/ODOT/HWY/TS/traffic_control_plans.shtml

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WORK ZONE TRAFFIC ANALYSIS
OREGON'S METHODOLOGY

INTRODUCTION

The purpose of this document is to examine the Work Zone Traffic Analysis (WZTA) methodology used by the Oregon Department of Transportation. This is the methodology that is used in the WZTA Web-Based Tool. This WZTA methodology and the steps followed during the analysis are laid out along with an example and a chance for the reader to work through an analysis problem by hand.

The Web-Based WZTA tool is based on the methodology found in this guide. Any exceptions are noted in the text, but they are very few. The goals of WZTA are two-fold:

Lane Closure Restrictions, also known as lane restrictions and **Delay Estimates** resulting from highway construction, maintenance, utility work or incidence response.

Lane restrictions tell the contractor when it is safe to close traffic lanes so that highway construction, maintenance and utility work can be carried out. The goal of lane restrictions is to ensure that there is enough capacity to carry the anticipated traffic with one or more traffic lanes closed. If there is too much traffic demand for the remaining travel lanes with a lane closure, then lane closure restrictions are put into place.

Purpose and Goals

Safety is the number one reason for a lane closure analysis. Providing adequate highway capacity is necessary to maintain a safe working and traveling environment.

Project efficiency is another benefit of lane closure analyses. Lane closure restrictions can result in extensive staging changes and/or lengthy project delays. Many project designs have been altered due to lane restrictions.

The idea behind determining lane restrictions is straightforward:

- Determine the volume of traffic expected on the highway.
- Determine the maximum amount of traffic the highway can handle and still maintain a free flowing situation. This is the “Free Flow Threshold” or FFT.
- If the anticipated traffic volume is larger than the amount of traffic that allows for free flow movement, lane closure restrictions are recommended.

The methodology and traffic thresholds used by ODOT for WZTA is based on decades of on-the-job experience, technical observation and engineering evaluation. It does *not* follow the Highway Capacity Manual (HCM) methodology for highway capacity analysis, but has been shown to be effective and efficient in anticipating the needed capacity to keep traffic moving safely through construction project areas.

Note: This methodology is designed for highway segment analysis. If intersection analysis is needed for work zone lane closures, a different methodology must be used. Contact the ODOT TCP Unit for details on intersection analysis.

Deliverables

Stand-alone reports (see Appendix F) should be submitted with the following analysis information:

- Lane closure restriction recommendations, ramp closures and potential detours. Include closure information for holidays, weekend restrictions and/or special events. Lane closure restrictions are written into the Boiler Plate, or Special Provisions, 00220.40(e). Examples of the specification language are included in the appendix.
- Delay estimates are submitted to the Project Manager and the Regional Mobility Liaison.

Significant Figures

Anyone who has done traffic analysis will tell you that analysis results are not set in stone. Highway free flow thresholds and traffic volumes can be highly variable and will contain a degree of uncertainty. For instance, reporting traffic volumes of 732.2 vehicles is not practical or appropriate. Depending on the level of confidence that an analyst has in the data, they may need to revisit it to see how sensitive the data is to change. Analysis results *will* be challenged by the contractor, project manager and others – the analyst must understand the amount of flexibility that the results contain.

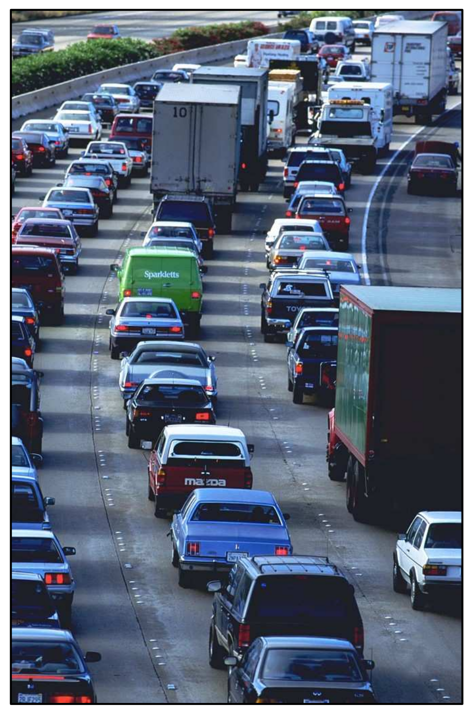
WORK ZONE TRAFFIC ANALYSIS METHODOLOGY

The most efficient way to perform work zone traffic analysis is by following this sequence:

- Gather Traffic Data
- Adjust the data to represent traffic volumes as PCEs for 24 / 7 / 365
- Establish a Free Flow Threshold (FFT)
- Compare PCEs & FFT to establish Lane Closure Restrictions
- Determine Delay Estimates
- Write reports for Lane Closure Restrictions and Delay Estimates

GATHERING TRAFFIC DATA

Traffic Volumes



Traffic volume data is available from ODOT, city and county sources. In most cases, traffic volume data from several sources is required to make a reasonable assessment of work zone traffic analysis.

Traffic counts can be obtained from the following sources:

- ODOT Counts – ODOT has an extensive library of manual and machine traffic counts from all over the state. ODOT's Transportation Data web site is a good starting place. At this time, ODOT's individual counts cannot be retrieved by folks outside of ODOT; however, the web-based WZTA tool contains a majority of these counts for analysis use. If a particular count cannot be found, please contact the ODOT Transportation Data section or the TCP Unit for help with ODOT traffic count data.
- Talk to ODOT's Regional Tech Centers and the Area Maintenance Manager for manual counts and for unique traffic characteristics in the project area.

- City and County manual and machine counts are also available. Contact the local agencies directly for this count data.
- If count data is not available from other sources, you can have new counts collected. Check with your project manager on how to do this.
- One of the best ways to get traffic volume data is to go to the project site and record the count information yourself. This will provide limited duration count information, but it is a great opportunity to observe the dynamics of the traffic in the area.

Traffic Count Data Types and Duration

- Ideally, use 24 hour ODOT manual full vehicle classification counts. If these are not available, use 14 to 16 hour counts. It is preferred to have 24 hour count data because a lot of construction work in populated areas is performed at night.

- Do not use 6 or 8 hour counts.
- Ideally, use counts that are no older than three to five years.
- Use full federal vehicle classification counts so you will have the heavy vehicle information.
- Use "straightaway" counts, if possible. These are counts taken on a segment of highway with no access or turn movement data included. Intersection or Ramp counts can be confusing and are often inaccurate. Use intersection or ramp counts as a second choice.
- Machine or tube counts are also available for use. ODOT maintains an extensive database of machine and tube counts that can provide 365 days worth of traffic volumes. If a manual traffic count is unavailable, counts from Oregon's Automatic Traffic Recorders or other machine counters are an acceptable source of volume data.

Other Traffic Data

The remaining traffic data needed for work zone traffic analysis, such as

- o Annual Average Daily Traffic Volumes,
- o Annual growth rates,
- o Truck percentages,
- o Seasonal trend data,
- o and Daily trend data

is covered in the following section which explains how to adjust the traffic data for use in work zone traffic analysis.

ADJUSTING TRAFFIC DATA

Introduction

When performing work zone traffic analysis, the traffic count data needs to be adjusted so that each hour during the project duration is represented by appropriate traffic volume data. Adjustments are needed to account for:

- Year of analysis by “growing out” the volumes if the counts were taken in a year other than the year of the project and/or if the project’s duration is longer than 12 months.
- Seasonal adjustments that allow for traffic fluctuations during the project’s duration.
- Weekday and weekend traffic volume differences.
- Heavy vehicle percentage so that “truck” volumes can be recalculated as “Passenger Car Equivalents” or PCEs.

When all the adjustments have been made, a matrix is developed that provides 24 hours of traffic data (if available) for each day of the week and month of the project's life.

	12 AM	1 AM	2 AM	. . . .	10 PM	11PM
Jan						
Feb						
Mar						
.						
.				Hourly volume estimates in each direction for weekend, weekday, or average day.		
.						
Nov						
Dec						
Dec						

Each highway segment will need at least four matrices; one for each direction of travel, with a set for weekdays and weekends as weekday and weekend traffic patterns can vary significantly. If more than one manual count is used and/or when daily trend data becomes available, fourteen unique matrices can be developed for each day of the week for each direction of travel.

Growth Rate Adjustments

If the traffic was counted in a different year than the construction year or if construction will take longer than 12 months, traffic volumes need to be "grown out" to represent the additional traffic on the roadway between the time that the count was taken and the construction year. Growth rates for all state highways are available from ODOT's Transportation Planning and Analysis Unit's (TPAU) Growth Rate Tables, which can be found on TPAU's web page. For analysis purposes, ODOT uses a linear growth rate rather than an exponential growth rate.

Traffic Volumes for 24 Hours

Ideally, 24 hour manual traffic counts that are less than three to five years old are used for work zone traffic analysis. Because so much construction is performed at night, analysts must be able to provide 24 hour traffic volumes. The web-based WZTA tool also requires 24 hour volume totals for some of its calculations. If 24 hour counts are not available, the volume matrix will be abbreviated to the number of hours available, typically 14 or 16 hours, and the count's total volume must be adjusted to reflect a 24 hour volume. The following factors are used to adjust the total volume of the count to reflect a 24 hour volume.

Duration of Count	Adjustment Factor
24	1
16	1.1
14	1.18
12	1.25
11	1.28
10	1.31
9	1.34
8	1.4

AADT to 24 Hour Count Volume Ratio

The AADT to 24 Hour Count Volume Ratio is the ratio between the analysis year AADT and the estimated 24 hour count volume. This is a primary adjustment factor in work zone traffic analysis. The ratio is used to adjust count volumes to the year of analysis by utilizing the growth rate to determine the analysis AADT. The ratio also accounts for the time of the year that the count was taken. If the count being used for WZTA was collected when the monthly ADT is approximately equal to the annual ADT, then the ratio will be closer to 1.0. It is preferred that the existing AADT to 24 hour count volume ratio be between 0.7 and 1.30 and the closer the ratio is to 1.0 the better. Factors outside this range change the volumes so much that they may become unreliable. After the ratio is calculated, it is applied to the seasonal adjustment factors.

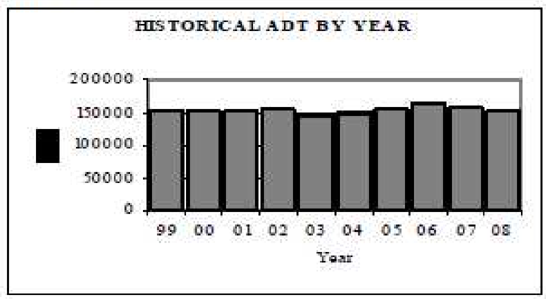
Seasonal Adjustments

Seasonal adjustment factors are taken from ODOT's Automatic Traffic Recorders (ATRs) and account for the variations in traffic volumes from month to month during the year. They also show the difference between weekday traffic volumes (Monday through Thursday) and weekend traffic volumes (Friday through Sunday) as discussed in the next section. Below is a sample of seasonal trend data from an ODOT ATR:

Location: I-205; MP 18.25; EAST PORTLAND FREEWAY NO. 64; 0.87 mile south of Mt. Hood Highway No. 26 (US26)
Site Name: Lents (26-022)
Installed: July, 1995

HISTORICAL TRAFFIC DATA

		Percent of AADT				
Year	Average Daily Traffic	Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
1999	150352	119	8.6	8.4	8.3	8.3
2000	150674	119	8.3	8.2	8.1	8.1
2001	151617	***	***	***	***	***
2002	153235	***	***	***	***	***
2003	146355	118	8.3	8.1	8.0	7.9
2004	147698	121	8.3	8.0	7.9	7.8
2005	153758	***	***	***	***	***
2006	161880	***	***	***	***	***
2007	155889	***	***	***	***	***
2008	151553	118	8.1	8.0	7.9	7.9



2008 TRAFFIC DATA

Month	Average Weekday Traffic	Percent of AADT	Average Daily Traffic	Percent of AADT
January	151014	100	144153	95
February	161463	107	152960	101
March	163389	108	155385	103
April	164685	109	157309	104
May	162915	107	155509	103
June	166232	110	158110	104
July	167907	111	155747	103
August	168279	111	159516	105
September	162599	107	156390	103
October	161692	107	153949	102
November	154689	102	148020	98
December	129304	85	121583	80

Classification Breakdown	Percent of AADT
Motorcycles	0.4
Passenger cars	73.3
Light Trucks	17.2
Buses	0.3
Single unit trucks (2 axles)	2.8
Single unit trucks (3 axles)	1.2
Single unit trucks (4 or more axles)	0.2
Single trailer trucks (4 or less axles)	0.5
Single trailer trucks (5 axles)	3.1
Single trailer trucks (6 or more axles)	0.6
Multi trailer trucks (5 or less axles)	0.1
Multi trailer trucks (6 axles)	0.0
Multi trailer trucks (7 or more axles)	0.3

Note that there is a column for Average Weekday Traffic and one for Average Daily Traffic. The Average Daily Traffic includes all seven days of the week, including the weekend traffic volumes. The Average Weekday traffic only includes volumes for Monday through Thursday.

There are also columns that show the percentage of the Annual Average Daily Traffic (AADT) that the highway carries each month. In the chart above, the average weekday traffic percent of ADT in August is 111, which means that the August ADT is 111 percent of the AADT. This 111 represents a weekday seasonal adjustment factor of 1.11.

The ATR chosen to produce these factors should be on the project highway and should be near the project site. If you choose an ATR that is not on the work zone highway, be sure that the ATR is on a highway that has similar characteristics, such as similar AADT, truck percentages, commuter vs. recreational traffic mix, etc.

If there is no ATR close to your project location, you can use TPAU's ATR Characteristic Table. The purpose of the ATR Characteristic Table is to provide general characteristics for each ATR in Oregon. The filtering capabilities of the table allow the user to find an applicable ATR on a roadway segment that has defined characteristics.

The ATR Characteristic Table and instructions on how to use it can be found on TPAU's website at http://www.oregon.gov/ODOT/TD/TPAU. Detailed information on using the ATR Characteristic method for finding an applicable ATR can be found in Chapter 4 of the Analysis Procedures Manual (APM). The ATR Characteristic Table itself is located at the following website: http://www.oregon.gov/ODOT/TD/TPAU/A_Data.shtml.

Using the ATR Characteristic Table

The following examples will demonstrate how easy the table is to use when attempting to find a characteristic ATR for use on a non-ODOT roadway. When a suitable characteristic ATR is found, simply locate the selected ATR and use the appropriate trend data in your analysis.

Example 1: Find an ODOT roadway with similar characteristics

Assume that the project roadway has the following characteristics:

- rural roadway in an agricultural area
- two-lane, two-way roadway
- the traffic volumes do not fluctuate much between weekdays and weekends
- the AADT is about 3000 vehicles per day

Open the ATR Characteristic Table and look at the column headings across row four. Working from left to right, make selections that will define the characteristics of the project area:

- At the **SEASONAL TRAFFIC TREND** column, click on the down arrow and choose "AGRICULTURAL"
- At the **AREA TYPE** column, click the down arrow and choose RURAL
- Choose "2" at the **# OF LANES** column
- At **WEEKLY TRAFFIC TREND**, choose STEADY

The ATR Characteristic Table should now be showing six potential ATRs that match the characteristics of our project roadway. Only one ATR, however, has an AADT that is within +/- 10% of our project AADT as defined in chapter 4 of the APM. Therefore, ATR 15-011, with an AADT of 2800 vehicles per day, is an appropriate ATR to use for seasonal and daily trend data for the analysis.

Example 2: Find an ODOT roadway with similar characteristics

This project roadway has the following characteristics:

- city arterial in a business district
- there are two lanes in each direction with a continuous two-way-left-turn-lane
- the traffic volumes are higher during the weekdays
- the AADT is about 25,000 vehicles per day

Working from left to right:

- At the **SEASONAL TRAFFIC TREND** column choose "COMMUTER"
- At the next column select SMALL URBAN
- Choose "5" at the **# OF LANES** column
- At **WEEKLY TRAFFIC TREND**, choose WEEKDAY

The ATR Characteristic Table should now be showing four potential ATRs that match the characteristics of the project roadway. Two ATRs have an AADT that is within +/- 10% of the project AADT as defined in chapter 4 of the APM, but ATR 18-018, with an AADT of 23,400 vehicles per day, is a closer match.

Using the Seasonal Trend Table

In the event that a characteristic ATR cannot be found, the Seasonal Trend Table can be used. Also developed by TPAU, the Seasonal Trend Table is designed to provide analysts with a default set of monthly trend data based on a generalized trend type, i.e. Commuter or Recreational Summer. Seasonal Trend Table factors are based on previous year ATR data and are updated annually by TPAU.

The Seasonal Trend Table and instructions on how to use it can be found on TPAU's website, with detailed information on using the Seasonal Trend Table method available in Chapter 4 of the Analysis Procedures Manual (APM). The Seasonal Trend Table itself is located at the following website: http://www.oregon.gov/ODOT/TD/TPAU/A_Data.shtml.

The Seasonal Trend Table provides monthly factors for both the 1st and 15th of the month, but for purposes of work zone traffic analysis, values for the 15th are used and applied to both weekdays and weekends.

Weekday vs. Weekend Traffic Volumes

Separate matrices are needed for weekday and weekend traffic. Weekend traffic may have a distribution of traffic throughout the day that is different than that on weekdays. If traffic volumes were collected on a weekday, as is most often the case, and weekend patterns are not significantly different than those on weekdays, then weekend volumes can be approximated using ATR trend data. To calculate trend factors for weekends, use this formula:

Weekend = [(7 * Daily Trend) – (4 * Weekday Trend)] / 3.

NOTE: It is the intent of ODOT's Transportation Data section to provide daily trend factors in the future. In the meantime, weekday factors will apply to Monday through Thursday and weekend factors will apply to Friday through Sunday.

If the project is on a route with significantly different traffic patterns on the weekdays than on the weekends, like a recreational route, it may be necessary to obtain multiple sets of traffic counts. This requires additional work and resources, but it is the only way to adequately account for the different traffic patterns.

Heavy Vehicles Adjustments

For the purposes of work zone traffic analysis, traffic volumes are discussed in terms of passenger car equivalents (PCEs). Truck volumes are converted to passenger car equivalents by applying a truck equivalency, or PCE factor, which ranges from 1.5 to 4.0, depending on facility type, terrain and types of heavy vehicles. For example, most interstate applications in Oregon would use a 2.5 factor to account for the substantial number of larger trucks, or the factor may be chosen if the terrain is rolling.

Also, the types of trucks that use Oregon’s freeways are not usually smaller delivery trucks, but large semi-tractor trailers, including triple tractor trailers. Therefore, a truck factor of 2.5 is appropriate for most areas of Oregon’s interstate system and heavy use highways, such as U.S. 26 and U.S. 97. The Highway Capacity Manual can be used as a starting point for determining appropriate PCE factors based on facility type and terrain.

Low Volume Roads

If the highway AADT is below 3,000 vehicles per day it is not necessary to complete an analysis. An analyst can document that the anticipated peak hour volume will not come close to reaching the free flow threshold of the highway.

UNDERSTANDING FREE FLOW THRESHOLD (FFT)

The free flow threshold represents the traffic flow rate beyond which traffic can no longer operate under a free flow condition. The free flow threshold is the point at which stable flow can no longer be sustained.

> ***Key Concept***
>
> *The **FREE FLOW THRESHOLD** is the point beyond which stable free flow travel cannot be sustained.*

At traffic flow rates above the free flow threshold, traffic begins to increase in density and decrease in speed and queuing begins to form upstream of the work zone. Traffic flow in this area becomes unstable as the influence of the work zone congestion begins to hinder traffic operations. This congested area will continue to expand if traffic volumes remain above the free flow threshold. As queues continue to form, traffic operations will break down.

You can observe traffic volumes that exceed the free flow threshold passing through a work zone at free flow speeds; however, this situation cannot be *sustained*. The free flow threshold is set at a point where the traffic flow rate can be sustained at free flowing operations for extended periods of time.

> ***Key Concept***
>
> *The **CAPACITY** is the maximum volume that can pass through a work zone.*

Once traffic volumes exceed the free flow threshold and traffic operations break down, queues will form. The traffic volume that can pass through the work zone is less than the traffic demand (the traffic volume that wants to pass through). The volume that actually passes through the work zone is the capacity of the work zone. The queue will continue to grow until the traffic demand becomes less than the work zone capacity.

To illustrate the concept of free flow threshold and capacity, let's take a look at the Highway Capacity Manual (HCM). The HCM uses the concept of level of service (LOS) to describe traffic flow characteristics. LOS C is commonly seen as the minimum acceptable LOS for rural roads and LOS D as the minimum traffic level for urban roadways. ODOT uses volume to capacity (v/c) ratios between 0.6 (rural) and 0.85 (urban) for highway design purposes. The v/c ratios that correlate with LOS C or LOS D are shown in the table below, which was taken from the HCM.

EXHIBIT 23-2. LOS CRITERIA FOR BASIC FREEWAY SEGMENTS

Criteria	LOS				
	A	B	C	D	E
FFS = 75 mi/h					
Maximum density (pc/mi/ln)	11	18	26	35	45
Minimum speed (mi/h)	75.0	74.8	70.6	62.2	53.3
Maximum v/c	0.34	0.56	0.76	0.90	1.00
Maximum service flow rate (pc/h/ln)	820	1350	1830	2170	2400
FFS = 70 mi/h					
Maximum density (pc/mi/ln)	11	18	26	35	45
Minimum speed (mi/h)	70.0	70.0	68.2	61.5	53.3
Maximum v/c	0.32	0.53	0.74	0.90	1.00
Maximum service flow rate (pc/h/ln)	770	1260	1770	2150	2400
FFS = 65 mi/h					
Maximum density (pc/mi/ln)	11	18	26	35	45
Minimum speed (mi/h)	65.0	65.0	64.6	59.7	52.2
Maximum v/c	0.30	0.50	0.71	0.89	1.00
Maximum service flow rate (pc/h/ln)	710	1170	1680	2090	2350
FFS = 60 mi/h					
Maximum density (pc/mi/ln)	11	18	26	35	45
Minimum speed (mi/h)	60.0	60.0	60.0	57.6	51.1
Maximum v/c	0.29	0.47	0.68	0.88	1.00
Maximum service flow rate (pc/h/ln)	660	1080	1560	2020	2300
FFS = 55 mi/h					
Maximum density (pc/mi/ln)	11	18	26	35	45
Minimum speed (mi/h)	55.0	55.0	55.0	54.7	50.0
Maximum v/c	0.27	0.44	0.64	0.85	1.00
Maximum service flow rate (pc/h/ln)	600	990	1430	1910	2250

Note:
The exact mathematical relationship between density and v/c has not always been maintained at LOS boundaries because of the use of rounded values. Density is the primary determinant of LOS. The speed criterion is the speed at maximum density for a given LOS.

The Highway Capacity Manual describes LOS C and LOS D as:

"LOS C provides for flow with speeds at or near the FFS [free flow speed] of the freeway. Freedom to maneuver within the traffic stream is noticeably restricted, and lane changes require more care and vigilance on the part of the driver. Minor incidents may still be absorbed."

"LOS D is the level at which speeds begin to decline slightly with increasing flows, and density begins to increase somewhat more quickly. Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort levels. Even minor incidents can be expected to create queuing, because the traffic stream has little space to absorb disruptions."

The HCM shows that free flow operations begin to deteriorate at LOS C. Further, the inability to absorb minor incidents in LOS D implies that the traffic flow has become unstable. This tells analysts that the free flow threshold is a point somewhere between LOS C and LOS D. Looking at the table, the v/c ratio associated with LOS C and LOS D is between 0.64 and 0.90 depending on the criteria. This is well below a v/c ratio of 1.0 which represents capacity; therefore ***the capacity will always be higher than the free flow threshold*.**

Free Flow Threshold Values

When possible, lane closures are restricted during those hours when the traffic volumes are expected to exceed the free flow threshold. Several default values for this threshold have been developed through many years of work zone observations, experience, engineering capacity studies and Region preferences.

Threshold Reducing Factors

The capacities mentioned above are based on 12 foot travel lanes with at least 2 feet of clearance on each side. Narrower lanes or clearances will result in reduced capacities. Other factors that could reduce capacity are steep grades, relaxed or unfamiliar driver population, poor pavement conditions and visually complex surrounding environments.

Free Flow Threshold for Multilane Highway & Freeway Work Zones

These thresholds are for a highway with two or more lanes in one direction; at least one lane is closed and the other lane is carrying the traffic with continuous flow. There are no interruptions (signals, stop signs, flaggers, etc.).

Free flow thresholds are in Passenger Car Equivalents (PCEs) per hour - per lane for a single direction with continuous flow.

- Region 1 – 1600 PCE
- Region 2 – 1400 PCE (at their request)
- Regions 3, 4 & 5 – 1500 PCE

The default values for the free flow threshold are based on decades of experience observing Oregon work zones and are provided as a starting point for analysis. Unique project circumstances and/or engineering judgment should always be taken into account when determining if the default value is appropriate. Instances when the default value may not be appropriate are discussed in a later section.

Free Flow Threshold for Bi-directional Work Zones

A bi-directional work zone is a two-lane highway, one lane in each direction, with one lane closed for construction. The remaining lane must carry traffic from both directions by using flaggers, pilot cars, or temporary signals. Because traffic in a bi-directional work zone is stop and go, the term “free flow” is used loosely. The free flow thresholds listed below include the combined traffic from *both* directions.

Free Flow Thresholds for Bi-directional Work Zones The PCEs below are for *both* directions.	
550 PCE	1.0 to 2.0 mile Closure Length
750 PCE	0.5 to 1.0 Mile Closure Length
900 PCE	Up to 0.5 Mile Closure Length
> 900 PCE	No Closure Typically Allowed

Closures in excess of 2.0 miles should be avoided since they can lead to dangerous access conflicts and because the traffic stream may begin to form discrete platoons.

The free flow thresholds for longer bi-directional work zones are lower due to the additional time it takes to travel through the work zone and the extra time that it takes for the work zone to clear when there is a change in the traffic’s direction.

SPECIAL OPERATIONS

Certain work zone operations and construction strategies that are employed in the field can have significant impacts on work zone traffic analysis. The free flow thresholds discussed earlier in this section apply to typical lane closures. Work zone operations such as beam swings or other intensive work near the travel lanes have a significantly lower free flow threshold than an ordinary lane closure due to the slower speeds and/or rubbernecking. Analysis requests may also be made asking for shoulder closure opportunities or windows during which rolling slowdowns or stop and hold operations may be used. For these circumstances, the free flow thresholds that follow are being recommended for use based on observations and may change in the future as additional data is collected.

Shoulder Closures

The free flow thresholds listed below are in PCEs per hour per lane and should be multiplied by the number of available travel lanes in order to determine an appropriate free flow threshold for closing a shoulder.

- 1600 PCEs/hr/lane in the Portland metropolitan area
- 1500 PCEs/hr/lane in the Salem and Eugene metropolitan areas
- 1400 PCEs/hr/lane in all other locations

A shoulder closure on I-5 in the Salem metropolitan area would therefore be 4500 PCEs where the interstate has three travel lanes.

Beam Swings/Paving Operations

This threshold applies to beam swings and other intensive work that causes significant rubbernecking when taking place next to live traffic. The threshold is based on observations made during beam swing and paving operations in 2005 and 2007. Observations specifically to determine the free flow threshold for beam swings were made after observing significant delays occurring repeatedly while traffic volumes were below the free flow thresholds typically used for lane closures. These observations have led to the beam swing and paving operation free flow threshold of 1200 PCEs/hr/lane.

Rolling Slowdowns

These thresholds were established based on a limited number of observations made during rolling slowdown operations on Oregon interstates. Future changes to this threshold will be made as additional data is collected. For obvious reasons, the term free flow threshold is not entirely accurate for this operation. The threshold refers more accurately to the highest traffic flow rate at which the queues that developed during the slowdown quickly dissipate without the lingering impacts cause by residual queues. The threshold to be used for these operations is 500 PCEs/hr/lane.

Special Events That Draw Additional Traffic

The analyst needs to determine if there are local events which will seriously impact the flow of traffic through the work zone if lanes were closed during the event. Special events would include school athletic events, i.e. an OSU football game, community celebrations such as the Rose Festival, Seattle to Portland bicycle event, Washington County Fair, Eugene Celebration, etc. Analysts should talk to the Area Maintenance Manager or other Region employees to see if there are any special events in the area.

COMPARING PCEs & FREE FLOW THRESHOLD

Once all of the traffic volumes have been adjusted and the free flow threshold has been established, these two values are compared for each hour during the project's duration. If the PCEs are larger than the free flow threshold, when possible, lane closures are restricted. The matrices of adjusted volumes that were created earlier are now completed by comparing the free flow threshold with the calculated PCEs. Those hours, during which the PCE volume is greater than the free flow threshold, are restricted from allowing lane closures. The figure below shows one weekday matrix where hourly volumes have been shaded to identify those values that exceed the free flow threshold.

Project Average Weekday (PCEs)

	12am-1am	1am-2am	2am-3am	3am-4am	4am-5am	5am-6am	6am-7am	7am-8am	8am-9am	9am-10am	10am-11am	11am-12pm	12pm-1pm	1pm-2pm	2pm-3pm	3pm-4pm	4pm-5pm	5pm-6pm	6pm-7pm	7pm-8pm	8pm-9pm	9pm-10pm	10pm-11pm	11pm-12am
January	173	153	169	223	284	459	648	1014	994	1056	1177	1254	1359	1524	1529	1647	1842	1769	1213	856	711	541	359	304
February	185	162	179	236	301	496	686	1074	1052	1118	1247	1328	1438	1613	1619	1744	1951	1874	1284	906	753	574	381	322
March	196	173	192	251	320	518	730	1143	1120	1190	1328	1414	1532	1718	1724	1857	2077	1995	1367	966	802	611	405	344
April	196	173	192	251	320	518	730	1143	1120	1190	1328	1414	1532	1718	1724	1857	2077	1995	1367	966	802	611	405	344
May	199	176	195	256	325	527	743	1163	1140	1211	1350	1438	1558	1748	1755	1889	2113	2031	1390	981	815	622	412	349
June	220	195	214	283	359	581	819	1282	1257	1335	1490	1586	1718	1927	1934	2083	2330	2238	1534	1082	899	684	454	385
July	230	203	224	295	376	608	856	1342	1315	1397	1559	1660	1798	2016	2025	2180	2438	2343	1605	1133	941	717	476	403
August	231	204	226	297	379	612	863	1352	1325	1407	1571	1673	1812	2032	2039	2195	2457	2360	1616	1142	949	723	479	406
September	204	180	199	263	334	540	761	1193	1169	1243	1386	1475	1599	1792	1799	1937	2167	2082	1426	1007	836	638	423	358
October	195	172	189	250	317	513	724	1133	1110	1180	1316	1402	1518	1703	1710	1840	2059	1978	1355	957	795	605	402	339
November	196	173	192	251	320	518	730	1143	1120	1190	1328	1414	1532	1718	1724	1857	2077	1995	1367	966	802	611	405	344
December	195	172	189	250	317	513	724	1133	1110	1180	1316	1402	1518	1703	1710	1840	2059	1978	1355	957	795	605	402	339

Blocking

The goal of blocking is to make the lane restriction recommendations more uniform to take into account what is practical for construction in the field. Some closure charts that may be developed will be very jagged, with almost every month and weekend/weekday scenario yielding a different result. In other cases, the chart may be almost completely blank with the exception of a few scattered hours here and there. Uniform recommendations will make construction scheduling and staging more realistic.

For example, even if the analysis indicates that one hour **will not be** over the free flow threshold while the hours immediately before and immediately after **are** over the free flow threshold, there is little point in allowing a lane to be closed for that particular hour. One hour is seldom long enough to accomplish enough work to justify the opening. The time it takes to set-up and take-down traffic control needs to be considered as well.

11am-12pm	12pm-1pm	1pm-2pm	2pm-3pm	3pm-4pm	4pm-5pm	5pm-6pm
677	708	746	820	848	826	826
864	903	952	1045	1083	1056	1056
951	994	1048	1150	1192	1160	1160
980	1024	1079	1185	1227	1196	1196
1052	1099	1158	1272	1318	1284	1284
1108	1159	1222	1341	1390	1355	1355
1209	1264	1332	1463	1517	1476	1476
1209	1264	1332	1463	1517	1476	1476
1137	1189	1254	1377	1427	1389	1389
994	1039	1095	1202	1246	1213	1213
936	978	1032	1133	1174	1143	1143
936	978	1032	1133	1174	1143	1143

In other cases, judgment is needed if the analysis results in no other hours that exceed the free flow threshold except for the two shown. In this case, the free flow threshold being used is 1500 PCEs/hr. The results taken literally would imply that lanes should not be closed during July and August between 3pm and 4pm. Since the flow rate is only 1517, the recommendation was made at this particular location to allow lane closures during July and August, even during the 3-4pm hour. The analyst should remember that volumes are adjusted by numerous factors and that these factors are often rounded, resulting in PCEs that are not exact or set in stone.

DELAY ESTIMATES

For the purposes of work zone traffic analysis, the concept of delay is defined as the *average additional travel time* that will be required to travel from one point to another as a result of construction activities. Existing delays resulting from current capacity and/or geometric deficiencies and from incidents are not included. To estimate delays, traffic microsimulation tools were used in combination with regression analysis to create functions based on best-fit curves to the analysis results.

Traffic microsimulation was performed using the Federal Highway Administration's (FHWA) Traffic Software Integrated System (TSIS) software (also known as CORSIM, short for corridor simulation). Each project scenario was modeled twice,

- Once with no restrictions on traffic flow, and
- Once with construction restrictions in place.

In this manner, the additional travel time resulting from construction activities could be estimated. Each of the models is simplistic, taking into account the construction restrictions only, without consideration of project-specific characteristics such as access points, ramps, or signals that may also impact traffic flow.

Model runs for the pre-construction scenario utilized industry-accepted lane capacities and a free flow speed equal to the posted speed limit plus 5 miles per hour. Model runs for construction scenarios utilized a free flow speed equal to 10 miles per hour less than the free flow speed of the pre-construction scenario. .

Within CORSIM, simple work zone scenarios were modeled for over 100,000 combinations of roadway types, traffic volumes, truck percentages, terrain, and staging strategies. The additional travel time between two points could then be determined, yielding the travel delay for the work zone. This methodology also avoids the need to calibrate each of the 100,000 plus models[1].

A "rubbernecking" or "gawking" factor was used to restrict the capacity of the work zone by a given percentage.

[1] Calibration of a microsimulation model typically involves modeling the existing conditions within a model and collecting data on delays, travel times, speeds, or other parameters in the field and comparing the collected data to the model results. The model's parameters are then modified to calibrate the model so that the model of the existing conditions matches existing performance. The model, with modified parameters, is then used to predict proposed conditions. By modeling both the existing and proposed conditions using identical parameters, it was intended to minimize the loss of accuracy created by skipping the calibration step, which, for the sheer number of models that were analyzed, would have been impractical.

The results of each individual analysis were grouped by model characteristics to allow for the development of volume vs. delay graphs for sets of model runs. For example, one set contains all of the freeway runs with two lanes in each direction in level terrain with a lane drop, no crossover, and truck percentages between 10 and 15 percent with hourly traffic volumes between 0 and 3500 vehicles per hour (vph).

The data within these groupings were exponentially regressed. The plot of the regression results forms a best-fit exponential curve through the microsimulation results. The regression results were used to develop functions that allow a delay estimate to be easily provided for any combination of staging type, traffic volume, truck percentage, and terrain type. These functions are embedded in the web-based Work Zone Traffic Analysis tool.

Analysis Types

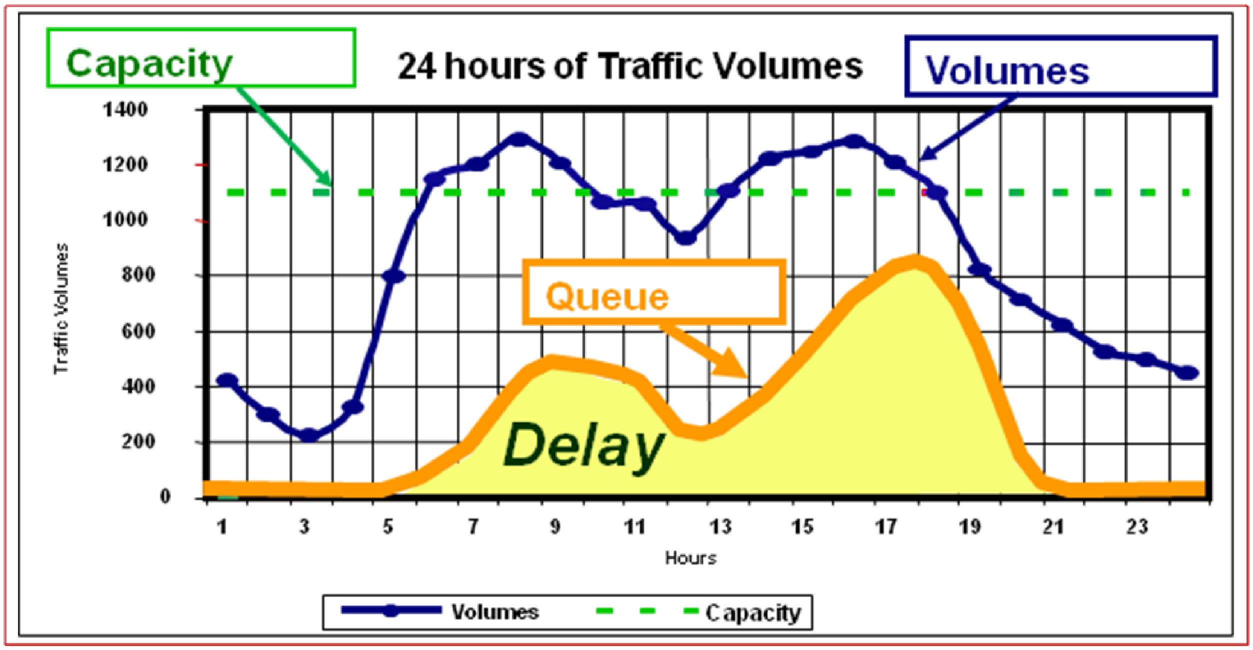
There are two different ways to report the results of delay estimates.

The ***general method*** is used for traffic volumes that are near or below the capacity of the work zone. These delay estimate numbers come from the delay functions created using CORSIM. For more information on these functions, contact the TCP work zone traffic analysis engineer. The general method should be used for most analyses.

The ***over-capacity* method** is best used in situations where the traffic volumes are *well in excess* of the work zone capacity. Traffic volumes that severely exceed the work zone capacity will generate unrealistic results as the exponential portion of the delay curve approaches infinity. This analysis type is a basic comparison between the cumulative demand and the cumulative capacity.

The over-capacity methodology described in the following section should be applied when traffic volumes are in excess of the capacity of the work zone. In these instances, long queues and substantial delays should be expected. Delays will be significant enough to be described in **vehicle-hours**, rather than minutes or seconds. When an over-capacity delay analysis is required, traffic behavior is chaotic and the analysis loses quantitative accuracy as a number of factors begin to impact the quality of the traffic projections.

Queuing and vehicle delay in over-capacity situations can be illustrated by graphing the traffic volumes and capacity to develop a visual representation of queuing as shown in the figure below.



The graph shows how traffic volumes compare with work zone capacity over time. When the volumes exceed the capacity, it means that not all of the demand is being served. This can result in delay, queuing and congestion.

The bottom line on the graph shows how queuing can develop when traffic volumes exceed capacity, as shown starting at about hour 6. Once the queue starts to build, it will continue to grow cumulatively, and will not decrease, until the traffic volumes are lower than the capacity, as seen at about hour 10. The queue will not fully dissipate until approximately hour 21.

Delay, in vehicle-hours, can be seen on the graph from hour 6 to hour 21 and is defined as the area under the queue. This graphing technique can give a quick visual evaluation of the hours when there is insufficient work zone capacity to meet demand.

Diversion

For one-time events, if delays are severe enough, drivers may find other ways to arrive at their destination. For a work zone that will be in place for more than a day, this phenomenon, known as traffic **diversion**, will significantly alter traffic patterns. With diversion, drivers will find alternate routes as well as change their schedules or simply avoid making the trip. Long term work zones, especially work zones that do not involve lane closures, may lose their impact on traffic operations as drivers become more familiar with the new traffic pattern.

WRITING LANE RESTRICTION AND DELAY ESTIMATE REPORTS

One of the last steps to be completed when performing work zone traffic analysis is to document the results of the analysis. Examples of work zone traffic analysis memos or reports are included in Appendix F. The exact format of these documents will vary from group to group; however, there needs to be a lane restriction and delay estimate memo or report that can be included in the project documentation so that details of the analysis can be traced back as needed at some future date.

Lane Closure Restriction Reports

Lane restrictions not only need to be documented for the project documentation, but they are also included in the project's Special Provisions (or Boiler Plate) in section 00220.40(e). Examples of simple and complex lane closure specifications can be found in Appendix E.

Delay Estimate Reports

Delay estimates determined for a project need to be reported to the project leader, project manager and to the Region Mobility Liaison and should be written up so that it can be included in the project documentation.

WINDING IT UP

Doing work zone traffic analysis by hand takes hours of data searching and thousands of calculations, but it is necessary for the analyst to understand the methodology and factors that go into the analysis so that the inputs and results can be evaluated. Work zone traffic analysis is an important part of project construction and the analyst is a key player in making sure that the construction is carried out in a safe and efficient manner.

STEP BY STEP ANALYSIS EXAMPLE

The following example will give analysts a chance to work through the sequence of WZTA, including hand calculations.

Project Scope

A bridge replacement project on I-5 in Region 3 is scheduled to begin in three years. The project leader is requesting a work zone traffic analysis to determine if there will be any lane closure restrictions during construction.

The proposed staging for the bridge construction is that one-half of the four-lane bridge will be built at a time, while reducing the travel lanes from four lanes to two and shifting all traffic to the other side. The work zone traffic analysis will help determine if the preliminary staging plans are appropriate or what modifications may need to be made.

Gather Data

a. Check with ODOT's Transportation Data Section to see if there are any recent full-classification counts for this section of highway. A recent full-classification 14-hour count is found near the project site.

b. Contact the Region Tech Center to see if there are additional counts. Also ask about any special events for which lane closures would not be advised.

c. Check the Transportation Volume Tables (TVT) to see where the closest and most appropriate ATR is. In this example, there is an ATR on the project highway near the project site. If no ATR was close, the TPAU ATR Characteristic Table or Seasonal Trend Table would be used to choose an appropriate ATR or trend data set.

d. Get maps of the area, straightline charts, grade, horizontal and vertical curve information, any geographical constraints, etc.

e. Gather AADT information from the most recent TVT.

f. Choose a truck percentage from the manual count or from the ODOT Highway Inventory Reports located on the Transportation Data section's website.

   http://www.oregon.gov/ODOT/TD/TDATA/otms/OTMS_Highway_Reports.shtml

g. Use TPAU's Future Volume Table to determine a growth rate for traffic at the project site. http://www.oregon.gov/ODOT/TD/TPAU/A_Data.shtml

h. Go out to the site and watch traffic; do some one to two hour counts and get a feel for the highway capacity and the dynamics of the area. Make note of any grade, horizontal and vertical curve situations, or any geographical constraints.

For this example we are only going to work through a portion of one matrix - the southbound weekday for the month of August. Actual analysis would involve developing at least four matrices; weekday and weekend volumes for 12 months and both directions of traffic. If daily trend factors are available, then up to 14 matrices could be developed.

If a 24 hour count is available, each matrix will contain PCEs for 24 hours a day, 12 months a year; therefore, the standard four matrices will result in a possible 4 x 24 x 12 or 1,152 calculations. Each PCE volume is generated by taking the manual count volumes through several calculations using the data gathered prior to analysis.

Adjust the Data

In order to convert hourly volumes into passenger car equivalents, manual counts need to be adjusted for:

- The appropriate percentage of heavy vehicles
- The year of analysis (growth rate)
- Twenty-four hours of the day
- Seasonal factors for the months of construction

The southbound manual count data in vehicles per hour is shown below in Table 1. If the count had been broken down into 15 minute increments then it would need to be combined into one hour increments prior to analysis.

Table 1: Raw Manual Count Data (Southbound)

Start Time	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM
VPH	462	641	677	758	940	1008	991	954	1030	1116	1094	1030	796	579

During the data gathering process the following traffic data was collected:

- Existing AADT = 26,000 vehicles per day
- Total Manual Count Volume (both directions) = 22,542 vehicles
- TPAU Growth Rate = 2.00%
- Heavy Vehicle Percentage = 35.0%
- PCE Factor = 2.5
- Analysis ATR = 20-020 (I-5 - Martin Creek)

Performing a work zone traffic analysis to determine lane closure restrictions can be accomplished in ten easy steps.

STEP 1 – Calculate Analysis Year AADT

Apply the TPAU growth rate to the existing year AADT to determine the AADT for the projected year of construction. In this example, construction is scheduled to begin in three years. When calculating the future year AADT, remember that ODOT uses a linear growth rate.

Analysis AADT = Existing AADT x [1 + (Rate x Years)]

Analysis AADT = 25,500 vpd x [1 + (0.02 x 3 yrs)]

Analysis AADT = **27,030 vpd**

STEP 2 – Estimate 24 Hour Count Volume

In order to calculate the AADT to 24 Hour Count Volume ratio, the 24 hour volume of the manual count must be estimated. If a 24 hour count was used, then no further calculations are necessary as the total manual count volume will be the same as the 24 hour volume. If a count was used with a duration of less than 24 hours, then a factor must be applied to estimate the 24 hour volume. The manual count provided in Table 1 has a count duration of 14 hours.

From the “Traffic Volumes for 24 Hours” section of the WZTA methodology, a factor of 1.18 is used to estimate a 24 hour volume from a 14 hour volume.

24 Hour Count Volume = Total Count Volume x Adjustment Factor

24 Hour Count Volume = 22,542 veh x 1.18

24 Hour Count Volume = **26,600 veh**

STEP 3 – Calculate Existing Ratio

Calculate the existing AADT to 24 Hour Count Volume ratio to determine if the manual count being used is appropriate for the analysis. Ratios ranging from 0.70 to 1.30 are acceptable, but the closer to 1.0 the better. Ratios outside this range indicate that the manual count was either taken at a bad time of the year or a count was used from a segment of highway with significantly lower or higher traffic volumes than the project location.

Existing AADT to 24 Hour Count Volume Ratio = Existing AADT/24 Hour Count Volume

Existing AADT to 24 Hour Count Volume Ratio = 25,500/26,600

Existing AADT to 24 Hour Count Volume Ratio = **0.96**

A ratio of 0.93 is well within the acceptable range of 0.70 to 1.30; therefore, the analysis can proceed with the chosen manual count. If the ratio was too high or too low, then another manual count should be used that better represents the traffic volumes at the project location.

STEP 3 (Continued) – Calculate Future Ratio

Calculate the future AADT to 24 Hour Count Volume ratio in the same manner as before, but use the analysis AADT calculated in Step 1. This ratio will be used in further calculations and will adjust the manual count volumes for growth as well as for when the count may have been taken. The resulting ratio will be applied to the seasonal trend data.

Future AADT to 24 Hour Count Volume Ratio = Future AADT/24 Hour Count Volume

Future AADT to 24 Hour Count Volume Ratio = 27,030/26,600

Future AADT to 24 Hour Count Volume Ratio = **1.02**

STEP 4 – Apply Future Ratio to Seasonal Trend Data

During the data gather process it was determined that ATR 20-020 is the appropriate ATR to use for the project location. Using the back of the Transportation Volume Tables (TVT) or ODOT's Transportation Data Section's website, the following seasonal adjustment factors for weekdays were identified for ATR 20-020:

ATR 20-020	Percent of ADT	Adjustment Factor
January	79	0.79
February	85	0.85
March	93	0.93
April	93	0.93
May	95	0.95
June	106	1.06
July	115	1.15
August	115	1.15
September	99	0.99
October	91	0.91
November	95	0.95
December	93	0.93

Now that the future AADT to 24 Hour Count Volume ratio has been calculated, it can be applied to the seasonal adjustment factors for ATR 20-020. These modified adjustment factors will be used to adjust the manual count volumes for seasonal variations and future growth. For this example we will only be adjusting volumes for the month of August, but the calculations are the same for each month.

Modified Adjustment Factor = Future Ratio x Base Adjustment Factor

Modified August Adjustment Factor = 1.02 x 1.15

Modified August Adjustment Factor = **1.17**

STEP 5 – Seasonally Adjust Volumes

After calculating the modified seasonal adjustment factor based on the future AADT to 24 Hour Count Volume ratio, apply that factor to the raw manual count volumes. Using the 3:00 PM hour as an example:

Seasonally Adjusted Volume = Raw Volume x Modified Seasonal Adjustment Factor

August Volume = 1,116 vph x 1.17

August Volume = **1,306 vph**

The traffic volumes calculated in Step 5 have now been adjusted for future growth and seasonal adjustments.

STEP 6 – Calculate Truck Volumes

The calculations in Step 6 through Step 9 will convert the seasonally adjusted traffic volumes that are in vehicles per hour into passenger car equivalents, or PCEs. The first step of this process is to calculate the amount of trucks that make up the hourly volumes.

Truck Volume = Seasonally Adjusted Volume x Truck Percentage

August Truck Volume = 1,306 vph x 0.35 (35%)

August Volume = **457 Trucks**

STEP 7 – Calculate Passenger Cars

The second step in converting vehicles per hour into PCEs is to calculate the amount of passenger cars that make up the hourly volumes.

Passenger Car Volume = Seasonally Adjusted Volume - Truck Volume

August Passenger Car Volume = 1,306 vph – 457 Trucks

August Passenger Car Volume = **849 Cars**

STEP 8 – Apply PCE Factor to Truck Volumes

The third step in converting vehicles per hour into PCEs is to apply a PCE factor to the amount of trucks that make up the hourly volumes. Passenger cars are already passenger cars, but trucks need to be adjusted to reflect the amount of passenger cars that would make up a single truck. In this example, the PCE factor is 2.5, which means that the composition of trucks and the type of terrain present is equivalent to approximately 2.5 passenger cars per truck.

Truck PCEs = Truck Volume x PCE Factor

August Truck PCEs = 457 Trucks x 2.5

August Truck PCEs = **1,143 PCEs**

STEP 9 – Calculate Total PCEs

The last step in converting vehicles per hour into PCEs is to sum the calculated truck PCEs with the total amount of passenger cars.

Total PCEs = Passenger Cars + Truck PCE's

August Total PCEs = 849 Cars + 1,143 Truck PCEs

August Total PCEs = **1,992 PCEs**

Using the seasonally adjusted August volume for each hour, the total PCE calculations for all 14 hours are provided below. The example calculations shown were for the 3:00 PM hour.

	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM
August Volumes	541	750	793	887	1100	1180	1160	1117	1206	1306	1281	1206	932	678
Number of Trucks	189	263	278	310	385	413	406	391	422	457	448	422	326	237
Number of Cars	352	487	515	577	715	767	754	726	784	849	833	784	606	441
Truck PCEs	473	658	695	775	963	1033	1015	978	1055	1143	1120	1055	815	593
Total PCEs	**825**	**1145**	**1210**	**1352**	**1678**	**1800**	**1769**	**1704**	**1839**	**1992**	**1953**	**1839**	**1421**	**1034**

STEP 10 – Choose a Free Flow Threshold and Compare

Up to this point, the manual count volumes have been “grown out” to account for future growth from the time the count was taken up to the start of construction, seasonally adjusted using ATR trend data and converted to PCEs by taking truck percentages into consideration. Once all of the calculations have been performed and a matrix of PCE volumes has been created, the final step in determining lane closure restrictions is to choose a free flow threshold (FFT) and compare. The full matrix of PCEs for southbound weekday is provided below. Remember that there will be at least three additional matrices in each completed analysis.

Southbound Weekday	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM
January	566	785	830	929	1153	1235	1215	1170	1263	1368	1340	1263	976	709
February	607	842	889	994	1234	1324	1301	1252	1353	1466	1437	1353	1045	759
March	668	927	981	1096	1360	1459	1435	1380	1491	1615	1583	1491	1151	839
April	665	921	973	1090	1351	1450	1426	1373	1481	1604	1574	1481	1145	833
May	680	944	997	1118	1385	1485	1461	1406	1517	1644	1612	1517	1173	854
June	759	1054	1113	1246	1545	1658	1629	1569	1693	1835	1798	1693	1308	952
July	825	1144	1209	1353	1678	1800	1769	1703	1839	1992	1954	1839	1421	1034
August	825	1144	1209	1353	1678	1800	1769	1703	1839	1992	1954	1839	1421	1034
September	709	984	1039	1164	1443	1546	1520	1464	1580	1713	1679	1580	1222	888
October	653	906	956	1071	1328	1424	1400	1348	1456	1577	1546	1456	1125	819
November	677	939	991	1110	1377	1476	1452	1397	1508	1635	1603	1508	1165	848
December	662	920	970	1086	1348	1444	1420	1368	1476	1600	1568	1476	1141	830

Choose an FFT that represents the traffic flow rate beyond which traffic can no longer operate at free flow condition. The FFT is the point beyond which stable free flow travel cannot be sustained. When choosing an FFT it is important to remember that the FFT is not the capacity. A work zone operating at capacity will incur delays, queues, and will operate below free flow speed. Default free flow thresholds for each Region should be used as a starting point for determining an appropriate FFT for analysis. It is assumed in this example that the terrain is level and that the work zone is on a tangent, therefore it is not necessary to deviate from the the default FFT of 1,500 PCEs/hr/lane for Region 3.

Now that the traffic volumes have been adjusted and an FFT has been chosen, all that remains is to compare the two. On the following table, the pink highlighted cells represent PCE volumes that exceed the FFT of 1,500 PCEs.

Southbound Weekday	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM
January	566	785	830	929	1153	1235	1215	1170	1263	1368	1340	1263	976	709
February	607	842	889	994	1234	1324	1301	1252	1353	1466	1437	1353	1045	759
March	668	927	981	1096	1360	1459	1435	1380	1491	1615	1583	1491	1151	839
April	665	921	973	1090	1351	1450	1426	1373	1481	1604	1574	1481	1145	833
May	680	944	997	1118	1385	1485	1461	1406	1517	1644	1612	1517	1173	854
June	759	1054	1113	1246	1545	1658	1629	1569	1693	1835	1798	1693	1308	952
July	825	1144	1209	1353	1678	1800	1769	1703	1839	1992	1954	1839	1421	1034
August	825	1144	1209	1353	1678	1800	1769	1703	1839	1992	1954	1839	1421	1034
September	709	984	1039	1164	1443	1546	1520	1464	1580	1713	1679	1580	1222	888
October	653	906	956	1071	1328	1424	1400	1348	1456	1577	1546	1456	1125	819
November	677	939	991	1110	1377	1476	1452	1397	1508	1635	1603	1508	1165	848
December	662	920	970	1086	1348	1444	1420	1368	1476	1600	1568	1476	1141	830

The highlighted matrix shown above is referred to as a lane closure chart and is used to determine the lane closure restrictions for a project. The highlighted cells in a lane closure chart should not be taken at face value however; engineering judgment is still required to interpret the results of a work zone traffic analysis and develop project specifications that balance safety and constructability.

Project Conclusions

In this example, we were tasked with identifying if any lane closure restrictions will be required during construction. Based on the southbound weekday lane closure chart that was developed, traffic lanes cannot be closed between 10:00 AM and 6:00 PM for most of the summer, with some peak hour restrictions in the spring and fall. With this information, it is clear that the original staging assumptions for this project will have to be reevaluated. The lane closure restrictions for this project will not allow for long term lane closures to accommodate staged construction of the new bridge. In this particular case, a diversion structure would be more appropriate.

One of the last steps to be completed when performing work zone traffic analysis is to document the results of the analysis. Examples of work zone traffic analysis memos or reports are included in Appendix F.

WEB-BASED WORK ZONE TRAFFIC ANALYSIS TOOL

USER'S GUIDE

Oregon Department of Transportation

WZTA WEB-BASED TOOL

USER'S GUIDE

Table of Contents

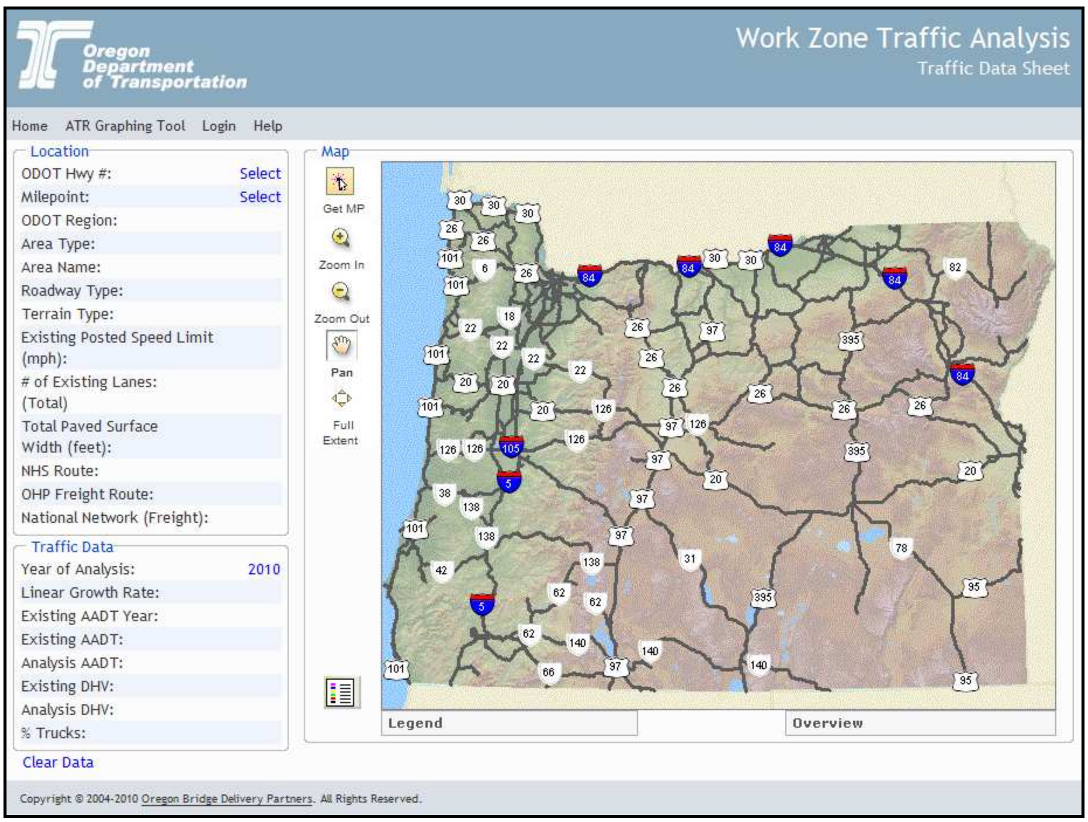
WZTA WEB-BASED TOOL

USER'S GUIDE

INTRODUCTION

Construction and maintenance activities on Oregon's highways often require that traffic lanes be closed and that travel delay be minimized. Work Zone Traffic Analysis (WZTA) tells the contractor when traffic volumes are low enough that lanes can be safely closed and provides delay estimates to quantify the impacts of lane closures and other mobility restrictions.

ODOT's web-based Work Zone Traffic Analysis tool can be found at the following website: http://wzta.obdp.org.



PROJECT DELIVERABLES

The WZTA web-based tool has many features, but it is primarily used to develop project deliverables for work zone traffic analysis. These project deliverables include lane closure restriction charts and estimated travel delays.

Lane Closure Restrictions

Lane restrictions tell the contractor when it is safe to close traffic lanes so that highway construction, maintenance and utility work can be carried out. The goal of lane restrictions is to ensure that there is enough capacity to carry the anticipated traffic with one or more traffic lanes closed. If there is too much traffic demand for the remaining travel lanes with a lane closure, then lane closure restrictions are put into place. Please refer to the Methodology section of the WZTA manual for information on how lane closure restrictions are developed.

Delay Estimates

For the purposes of work zone traffic analysis, the concept of delay is defined as the *average additional travel time* that will be required to travel from one point to another as a result of construction activities. Existing delays resulting from current capacity and/or geometric deficiencies and from incidents are not included. To estimate delays, traffic microsimulation tools were used in combination with regression analysis to create functions that are embedded in the web-based WZTA tool. Please refer to the Methodology section of the WZTA manual for information on how these delay calculations were developed.

WZTA ACCOUNT TYPES

The WZTA tool can be used by anyone with internet access, but there are four types of accounts with access to different features. Users are assigned an account type based on the features they need and whether or not they have successfully completed the WZTA training course.

Guest

Users who have not completed the WZTA training course are considered guests. Guests have access to the Traffic Data Sheet and the ATR Graphing Tool and can use the web-based tool to view and gather traffic and location data with nothing more than an ODOT highway number and milepoint.

Analyst/General User

General users, or Work Zone Traffic Analysts, have access to the same features as guests, but can develop lane closure restriction charts and delay estimates using the analysis features of the web-based tool. Access to the analysis tools requires a login and password that analysts receive after completing the WZTA training course.

Manager

Analysts or general users who are classified as Managers have the added functionality of being able to reset user passwords. If a user is unable to reset their own password, they can ask a user with manager status or an Administrator to reset their password for them.

Administrator

The WZTA training course instructors and the developers of the web-based tool are classified as administrators. Administrators set up accounts for new users, manage training information and perform routine data updates.

WZTA MENU BAR

The default menu bar for the web-based WZTA tool contains the following important links:

- **Home** – If at any point you wish to return to the Traffic Data Sheet, use the “Home” link or the “Back” or “Cancel” commands inside the tool. <u>DO NOT</u> use the “Back” arrow in your web browser or you may lose your data.
- **ATR Graphing Tool** – The ATR graphing tool provides users with the ability to view ATR trend data and graph historic traffic volumes collected from Oregon’s Automatic Traffic Recorders (ATRs). Please refer to the Methodology section of the WZTA manual for information regarding ATR’s and how to use them.

- **Login** – In order to use the analysis functions of the WZTA tool, a user needs to log in. If a user has forgotten their password, they can reset it through the login screen. Use of the Traffic Data Sheet and ATR graphing tool does not require a login and password.
- **Help Page** – The help page contains links to various ODOT websites and useful documents for your reference.

After a user has logged in to the system, the following links will become available:

- **My Folders** – All reports, user manual counts, user trend data and aggregate delay summaries are stored in My Folders. Users can access their files from anywhere at any time; the web-based WZTA tool does not require any information to be stored on a local machine. Certified users can use My Folders to store, edit and share reports and data with other analysts.
- **Profile Settings** – Profile settings display user information, such as Login ID and e-mail address, and allow the user to make changes to their profile at any time. If you want to change your password, you would do so through your profile settings.
- **Logout** – After completing a work zone traffic analysis, use the logout feature to return to the default Traffic Data Sheet that all users can access. Only certified users can use the analysis tools included in the web-based WZTA tool and it is important to logout if a non-registered user intends to use the tool on the same computer.

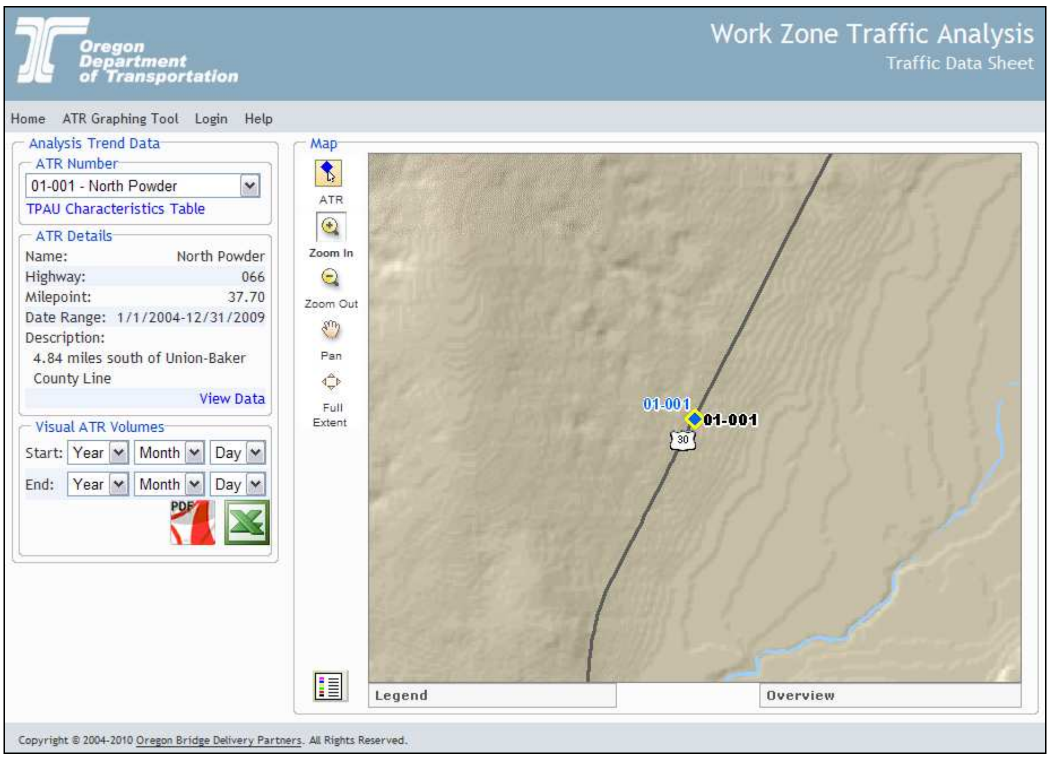
Note: If you leave the tool unattended for more than ten minutes the site will time-out and you will be forced to re-enter your data.

ATR GRAPHING TOOL

Automatic Traffic Recorders (ATRs) are permanent devices built into many state highways that count traffic volumes 24/7/365**.** Collecting traffic volumes year round also enables ATRs to be used for determining seasonal trends in traffic. Selecting the **ATR Graphing Tool** on the menu bar will navigate the user away from the traffic data sheet and open a statewide map of active ATRs. An ATR can be chosen in one of two ways; using the ATR icon in the upper left corner of the map to select an ATR (shown as a blue diamond), or selecting an ATR number from a drop-down list in the upper left-hand box.

A complete list of active ATRs can be found in the back of the Transportation Volume Tables (TVT), published by ODOT's Transportation Data Section, or at the following website: http://www.oregon.gov/ODOT/TD/TDATA/tsm/tvt.shtml

When an ATR has been selected from the map or manually entered, detailed information about that ATR will be displayed. These details include the ATR name, location and date range of available traffic volumes. In order to view seasonal trend data for the chosen ATR, select View Data.



Seasonal Trend Data represents seasonal fluctuations in traffic volumes throughout the year for both weekdays and weekends. It is the percentage of the monthly average daily traffic (ADT) in relation to the annual average daily traffic (AADT).

A trend factor of 1.15 on a July weekday for example, corresponds to a monthly ADT that is 15% higher than the AADT.

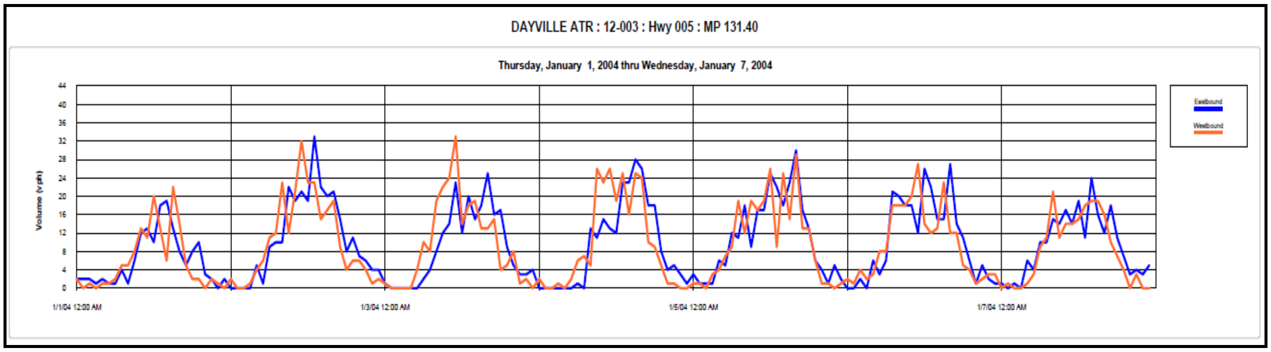
Trend Data for 01-001 - North Powder

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
January	0.852	0.852	0.852	0.852	0.753	0.753	0.753
February	0.938	0.938	0.938	0.938	0.890	0.890	0.890
March	0.990	0.990	0.990	0.990	0.913	0.913	0.913
April	1.077	1.077	1.077	1.077	1.011	1.011	1.011
May	1.111	1.111	1.111	1.111	1.084	1.084	1.084
June	1.124	1.124	1.124	1.124	1.098	1.098	1.098
July	1.176	1.176	1.176	1.176	1.091	1.091	1.091
August	1.117	1.117	1.117	1.117	1.034	1.034	1.034
September	1.118	1.118	1.118	1.118	0.997	0.997	0.997
October	1.101	1.101	1.101	1.101	0.974	0.974	0.974
November	0.970	0.970	0.970	0.970	0.842	0.842	0.842
December	0.881	0.881	0.881	0.881	0.727	0.727	0.727

Close

The ATR graphing tool is primarily used to graph raw traffic volumes collected from Oregon’s ATRs. The date range shown in the ATR details represents the range of available data that is available for graphing. This range, however, does not guarantee that data will be continuous. If an ATR was temporarily out of service then the graph will display zero for those time periods when data was not being collected.

Users can graph ATR traffic volumes by selecting a start and end date under *Visual ATR Volumes*. Only those dates that fall within the date range of the chosen ATR can be used. The dates in which to graph historic traffic volumes are selected using a series of drop down boxes, starting with the year and followed by the month and day. Traffic volumes are graphed in 7 day increments regardless of the specified time period, allowing the user to make comparisons from week to week. A graph of historic traffic volumes can be created by selecting either the PDF or Excel icon. A sample graph displaying a single week of data is shown below.



It is important to note that if you have more than one graph displayed on the same page (up to 3 per page); the scale of each graph may vary.

To return to the Traffic Data Sheet select **Home** from the menu bar.

STATE HIGHWAY NUMBERS

When traveling throughout Oregon, motorists are most familiar with the route numbers associated with each highway. Highway route numbers are based on the following types of routes:

- Interstate Routes, like I-5 or I-84,
- US Routes, like US 101 or US 26, or
- State Routes, like OR 22 or OR 126.

Jurisdictions such as cities, counties and the state have responsibility for, or have jurisdiction, over these highways. The Oregon Department of Transportation has assigned unique numbers to all state run highways. These unique identifiers are in most cases different than the route numbers. A single route number can have multiple unique highway numbers assigned to it. For example, US 26 extends from the coast to the Idaho border and contains 10 segments with unique highway numbers.

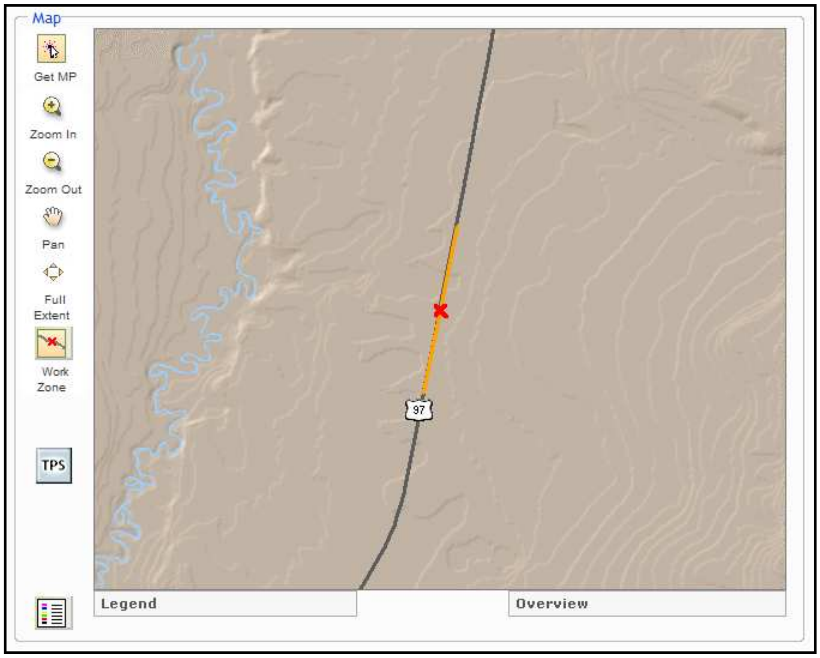
The web-based WZTA tool uses these unique ODOT state highway numbers to identify specific highway locations. If you are unfamiliar with the Oregon state highway numbering system, a link to the *ODOT Highway Number Cross Reference Table* is provided on the help page.

MAP ATTRIBUTES

The WZTA map includes multiple features that allow the user to view additional information about their location.

- **Work Zone** – If the map has been zoomed out, panned or otherwise moved from its view of the selected location, the work zone button will return the map to its default close-up view.
- **TPS** – The TPS button activates the Traffic Planning Sheet (TPS).
- **Overview** – This feature highlights where the selected location is in relation to the state of Oregon.

- **Legend** – The legend dropdown in the lower left corner of the map can be used to turn on additional data layers or turn off existing ones. Users will notice that some of the features are grayed out because they cannot be viewed at the given zoom level, such as horizontal curve and vertical grade data. In order to see this information, zoom in until the features become active. Experiment with the legend features to view ATR locations, ODOT traffic count locations, Motor Carrier route maps and other valuable information.



- **Reset Legend** –The image to the left of the map legend is the reset legend button and can be used to reset the map layers to the default view.

TRAFFIC DATA SHEET

When a highway number and milepoint has been selected, the Traffic Data Sheet will populate with location and traffic data specific to your chosen location. Items highlighted in **dark orange** require input by the analyst. A work zone traffic analysis cannot be performed without this information. Delay information and staging is required for delay estimates only.

Location Data

The following location data is shown on the Traffic Data Sheet:

- **ODOT Region** – The State of Oregon is geographically divided into 5 Regions. For more information on ODOT Regions, please refer to the following link: www.oregon.gov/ODOT/TD/TDATA/gis/odotmaps.shtml#ODOT_Region_Maps
- **Area Type** – Identifies if your location is within a Metropolitan Planning Organization (MPO), an Urban Growth Boundary (UGB), or is Rural.
- **Area Name** – The name of the MPO or UGB that your location may be located in.
- **Area (shoulder)** – Identifies if your location is within an area that has higher thresholds for shoulder closures. Areas range from Eugene to Portland along I-5.
- **Roadway Type** – Identifies if your location is on a freeway, a multilane highway or a bidirectional highway.
    - **Freeway** –Divided multilane highway, usually high speed having a minimum of two lanes for exclusive use of traffic in each direction with uninterrupted flow and full access control.
    - **Multilane** –Two or more lanes of traffic in each direction. It may or may not have a two-way left turn lane (TWLTL) or median and may have full, partial or limited access control.

- **Bidirectional** – Two lanes with one lane of traffic in each direction, with little or no access control.

- **Terrain Type** – Level, rolling or mountainous terrain.
- **Existing Posted Speed Limit** – The existing posted speed limit of the highway at your location. Even if there is construction in the area, this will always show the *preconstruction* posted speed.
- **Number of Existing Lanes (per direction)** – A required input by the analyst. Identifies the number of lanes per direction. When selected, the total number of lanes across both directions, including two-way left turn lanes if applicable, will be provided for reference. The total number of lanes will most always be higher than the number of existing lanes per direction. The exception is divided highways, such as I-5, which will show only the number of lanes in one direction of travel.
- **Total Paved Surface Width** – The total width of pavement including travel lanes, shoulders and traversable medians.
- **NHS Route** – Indicates if the highway is part of the National Highway System.
- **OHP Freight Route** – Indicates if the highway is an Oregon Highway Plan designated freight route.
- **National Network (Freight)** – Indicates if the highway is part of the National Freight Network.
- **Functional Classification** – Indicates the functional classification of the highway.

Traffic Data

The following traffic data is shown on the Traffic Data Sheet:

- **Year of Analysis** – The year for which you want to perform a work zone traffic analysis and develop a lane closure restriction chart. The year of analysis can also be used to gather traffic data and calculate a future year

AADT and Design Hour Volume (DHV). The year of analysis will default to the current year, but can be modified by the user.

- **Linear Growth Rate** – Identifies the projected 20 year linear growth rate of traffic on the selected highway at your location.
- **Existing AADT Year** – The year in which the Annual Average Daily Traffic was recorded.
- **Existing AADT** – The Annual Average Daily Traffic volume recorded in the year listed above.
- **Analysis AADT** – If the Year of Analysis is different than the Existing AADT Year, the Existing Year AADT is increased by the Linear Growth Rate to determine the future year or analysis year AADT.
- **Existing DHV and Analysis DHV** – Existing and Analysis Year Design Hourly Volumes. DHV's are used for ODOT planning and project level analysis and are defined as the 30th highest volume.
- **% Trucks** – The percentage of heavy vehicles. For the purpose of work zone traffic analysis, trucks or heavy vehicles usually have three or more axles and/or six or more tires.
- **PCE Factor** – Truck volumes are converted to passenger car equivalents by applying a truck equivalency, or PCE factor, which ranges from 1.5 to 4.0, depending on facility type, terrain and types of heavy vehicles.
- **Free Flow Threshold** – When possible, lane closures are restricted during those hours when the traffic volumes are expected to exceed the free flow threshold. Free flow thresholds are in Passenger Car Equivalents (PCEs) per hour - per lane for a single direction with continuous flow. Default values are as follows:
  - Region 1 – 1600 PCE
  - Region 2 – 1400 PCE (at their request)
  - Regions 3, 4 & 5 – 1500 PCE

- **Analysis Trend Data** – A required input by the analyst. Lane closure restriction charts and delay estimates require seasonal trend data to develop monthly traffic volumes. Please refer to the Methodology section of the WZTA manual for more information on selecting an appropriate set of seasonal trend factors.
- **Manual Counts** – A required input by the analyst. Manual counts provide the base traffic volumes for developing lane closure restriction charts and delay estimates. Users can choose from ODOT manual counts or their own and can select up to seven counts per analysis.

Delay Information and Staging

In order to develop delay estimates, users are required to provide delay information and anticipated construction staging.

- **Work Zone Analysis Length** – The length of the proposed work zone. Multilane and Freeway work zones default to 4,000 feet (0.75 miles) and are for visual purposes only. Changing this value will increase or decrease the length of the work zone as it appears on the map. Bidirectional work zones will require an input of up to 2 miles. Work zone length can be entered in either feet or miles.
- **Project Start Month** – The estimated start of construction. Delay estimates are independent of the Year of Analysis and can be longer than twelve months.
- **Project End Month** – The estimated end of construction.
- **Staging** – The anticipated work zone construction staging. Default staging values include a proposed lane closure or a proposed crossover. Crossovers are defined as any action that requires a reduction in vehicle speed at the start and end of the work zone, such as shifting traffic to the oncoming direction of travel or to an offset detour structure. The development of detailed staging plans will be covered in another section.

SIMPLE WALKTHROUGH

At a minimum, there are six steps required for developing lane closure restriction charts plus two additional steps for generating delay estimates. The eight steps required for a simple lane closure analysis and delay estimate are as follows:

1. Select a Location
2. Input the Number of Lanes
3. Select the Year of Analysis
4. Choose appropriate Analysis Trend Data
5. Choose appropriate Manual Count Data
6. Input Delay Information
7. Set Default Work Zone Staging
8. Save Report

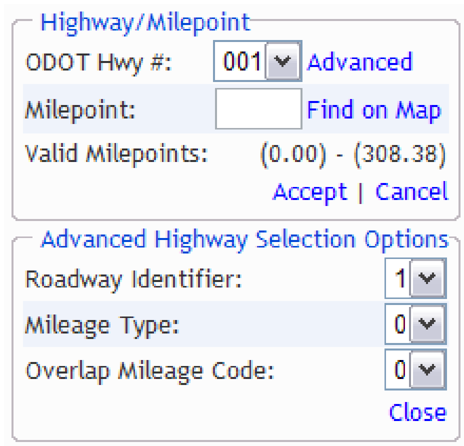
If a delay estimate is not required as part of your analysis, steps 6 and 7 can be omitted without affecting the development of a lane closure restriction chart. Delay information and work zone staging can be added at any time, allowing users to create delay estimates whenever they are needed.

Selecting a Location

There are two methods in which to select a location in the Traffic Data Sheet; manual entry of the ODOT highway number and milepoint, or using the GIS interface to select a location from the map.

If the unique state highway number and milepoint of your location is known, the Select links to the right of *ODOT Hwy #* and *Milepoint* can be used to select the highway number from a drop down list of available ODOT highways.

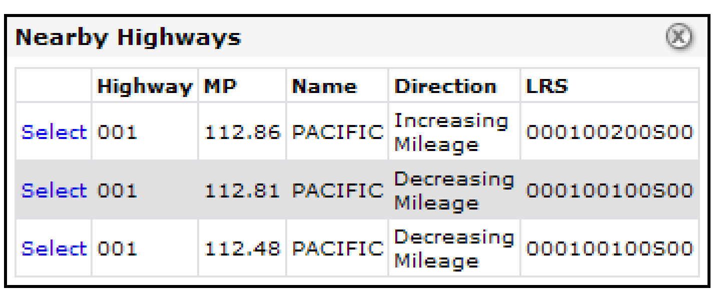
When an ODOT highway number is chosen, a valid milepoint range will be displayed for that highway.



The Advanced option to the right of the ODOT Hwy # drop down list can be used to build a unique Linear Referencing System (LRS) number if your intended location is on a couplet or has a non-default mileage type or overlap code. Building an LRS number from scratch is not recommended unless the user is familiar with ODOT's linear referencing system.

Selecting Find on Map will locate the chosen highway and milepoint on the map, allowing the user to visually verify the intended location. Once a valid location has been identified, select Accept to return to the Traffic Data Sheet.

If the user does not know the ODOT state highway number and milepoint, or would rather select a location visually using the map, the *Get MP* button in the upper left corner of the map is used to select a location. After a location has been selected using the map controls, a box will appear with a list of nearby locations in which to choose from.



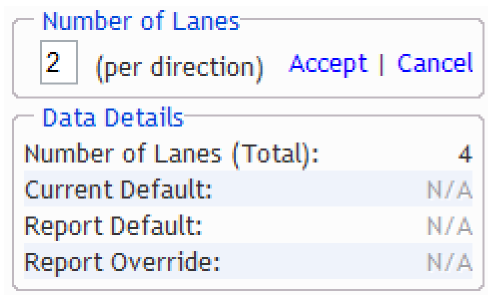
Nearby Highways

	Highway	MP	Name	Direction	LRS
Select	001	112.86	PACIFIC	Increasing Mileage	000100200S00
Select	001	112.81	PACIFIC	Decreasing Mileage	000100100S00
Select	001	112.48	PACIFIC	Decreasing Mileage	000100100S00

Select a location from the list to populate the Traffic Data Sheet with location and traffic data. Selecting a location is the first step in developing lane closure restriction charts and delay estimates.

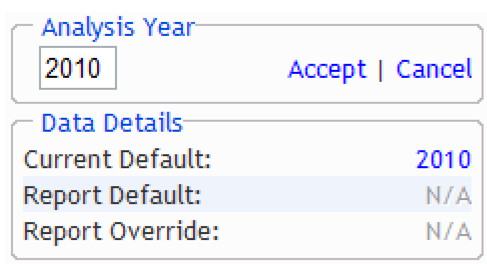
Choosing the Number of Lanes

Select the **# of Existing Lanes** and input the number of lanes per direction. The total number of lanes, as described above, is provided as a reference and can be helpful in determining the number of lanes per direction if your location is on a multilane or other undivided highway.



Year of Analysis

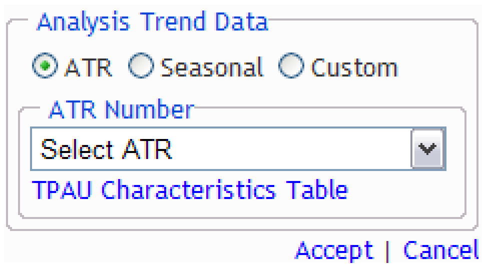
Select the year for which you want to perform a work zone traffic analysis and develop a lane closure restriction chart. The year of analysis will default to the current year, but can be modified by the user.



Lane closure restriction charts are produced for a single calendar year using the Analysis Year selected by the user. If an analyst requires lane closure restriction charts for multiple years of construction, separate analyses will need to be created for each year of construction.

Choosing Analysis Trend Data

Select Manage Analysis Trend Data to choose the appropriate source of seasonal trend data for your analysis. Analysts can choose trend data from three sources; ATR's, Seasonal Factors or Custom. An ATR can be chosen in one of two ways; using the ATR icon in the upper left corner of the map to select an ATR (shown as a blue diamond), or selecting an ATR number from a drop-down list in the upper left-hand box.

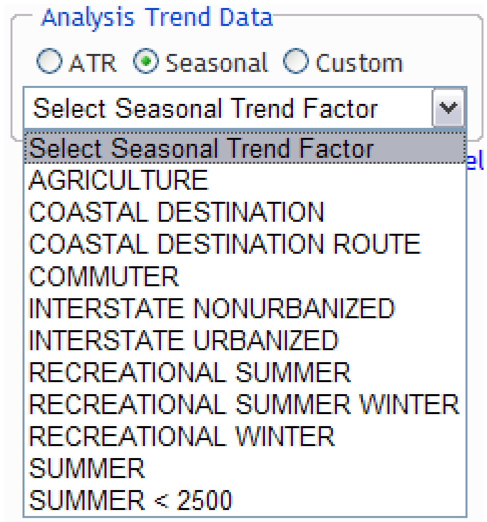


When viewing the map, the WZTA web-based tool will automatically display the nearest ATR on the physical highway of the work zone being analyzed. If the nearest ATR is too far away from your work zone, the TPAU Characteristics Table can be used to find an appropriate ATR. Please refer to the Methodology section of the WZTA manual for more information on selecting an appropriate ATR.

When an ATR has been selected from the map or from the drop-down list, detailed information about that ATR will be displayed. These details include the ATR name, description and location. In order to view seasonal trend data for the chosen ATR, select View Data.

If an analyst determines that there is not an applicable ATR that can be used to provide seasonal trend data, then a default set of seasonal trend factors can be used.

Selecting the Seasonal radio button will provide a drop-down list of Seasonal Trend Factors published by TPAU.



Please refer to the Methodology section of the WZTA manual for more information on selecting an appropriate Seasonal Factor Set.

The third option for choosing analysis trend data is selecting a custom set of seasonal trend factors created by the user. Typical uses for custom trend data include locations where no applicable trend factors exist or if slight modifications to existing seasonal trend factors are needed. Selecting the Custom trend data option will allow the user to select a saved custom factor set from their folders.

NOTE: Custom trend factor sets will need to be created prior to managing analysis trend data within a report, as the user is not given the option to create a new custom factor set from within the Analysis Trend Data screen. If the user wishes to use a custom factor set but one has not been created, simply save the report, create a factor set and return to your previously saved report.

Custom trend factor sets are created from within **My Folders** and are stored in a user's **ATR Trend Factors** folder. Users will have the option to create a new ATR Trend Factor set or copy or delete all previously created trend factor sets.

ATR Trend Factors

New Manual Count | New ATR Trend Factor

Blank Factors	Copy | Delete
User Factors	Copy | Delete

Create Sub Folder | Edit Folder | Delete Folder

Select New ATR Trend Factor to create a custom set of seasonal trend factors. When creating custom trend data, users can input factor values manually or use various import options. Manually entering factor values can be tedious, but a copy feature is available to copy values from one day to another. The factor values input table and copy feature is shown below. The web-based WZTA tool requires seasonal trend factors for each day of the week and for every month of the year, but these values do not have to be unique. It is acceptable to use the same seasonal factors for weekdays (Monday-Thursday) and another for weekends (Friday-Sunday).

Factor Values

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
January	1.000	1.000	1.000	1.000	1.000	1.000	1.000
February	1.000	1.000	1.000	1.000	1.000	1.000	1.000
March	1.000	1.000	1.000	1.000	1.000	1.000	1.000
April	1.000	1.000	1.000	1.000	1.000	1.000	1.000
May	1.000	1.000	1.000	1.000	1.000	1.000	1.000
June	1.000	1.000	1.000	1.000	1.000	1.000	1.000
July	1.000	1.000	1.000	1.000	1.000	1.000	1.000
August	1.000	1.000	1.000	1.000	1.000	1.000	1.000
September	1.000	1.000	1.000	1.000	1.000	1.000	1.000
October	1.000	1.000	1.000	1.000	1.000	1.000	1.000
November	1.000	1.000	1.000	1.000	1.000	1.000	1.000
December	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Copy Factor Values

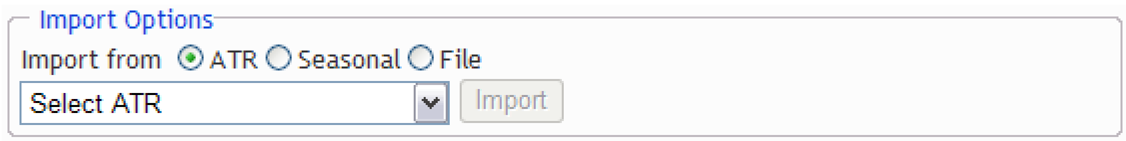
From: Monday

To: Monday through Monday

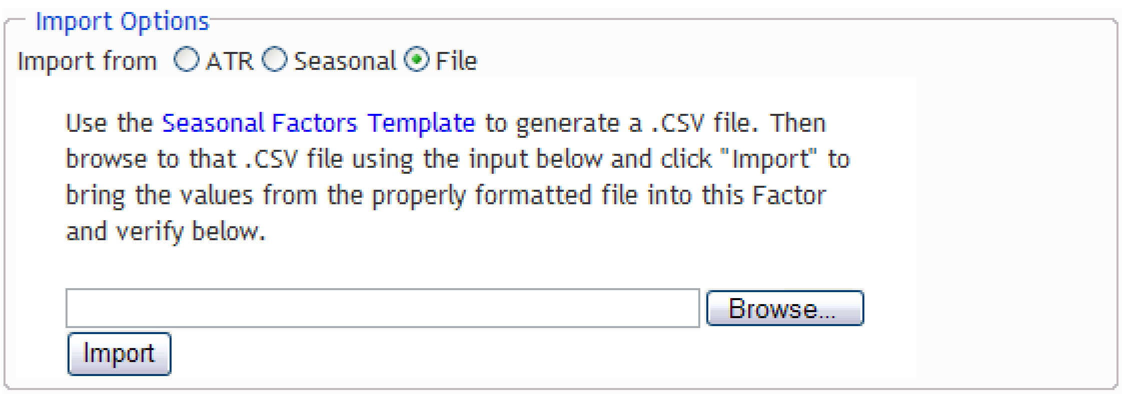
Copy

Users are also given the option to import trend factors from an existing ATR, from a TPAU Seasonal Trend Factor set or from a custom template. Importing from an ATR or Seasonal factor set allows the user to select an existing ODOT ATR or

Seasonal Factor Set published by TPAU to use as a base for developing a custom set of trend factors.



Importing from a File enables the user to create a factor set in an Excel template rather than through manual entry. Once the template has been populated, a .CSV file is created and saved on the user's computer that can then be uploaded into the Factor Values table.



Once a custom trend factor set has been created and saved, the data set can be used in analysis or shared with other users. The sharing of custom trend factors will be covered in more detail in another section.

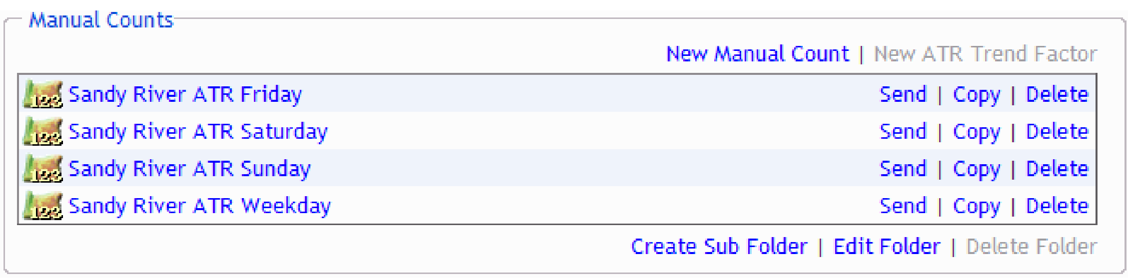
Choosing Manual Counts

Select Manage Manual Counts to choose the manual count data for your analysis. Manual counts are the basis for all lane closure restrictions and delay estimates, so it is important to choose traffic counts that are appropriate for your analysis. In general, 24 or 16-hour counts are preferred and counts should not be more than 3 to 5 years old. At a minimum, WZTA requires at least one manual count for analysis.

The web-based WZTA tool has been designed to allow for up to 7 manual counts per analysis, which means that a separate count can be used for each day of the week. The number of counts required for an analysis depends heavily on the location. A rural highway with minimal fluctuations in daily traffic patters may only require a single manual count, whereas a coastal route with a commuter influence may need up to 4 manual counts to adequately cover the varying traffic patterns from weekday to weekend.

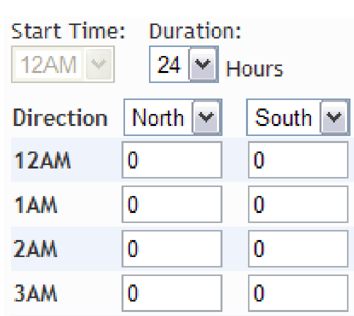
User Counts

When selecting a manual count, users have the option to use ODOT counts stored in WZTA's database of manual counts or User counts created by the analyst. If selecting a User count, the user will be directed to their manual counts folder where they can choose a previously saved manual count by selecting the count name or create a new manual count.

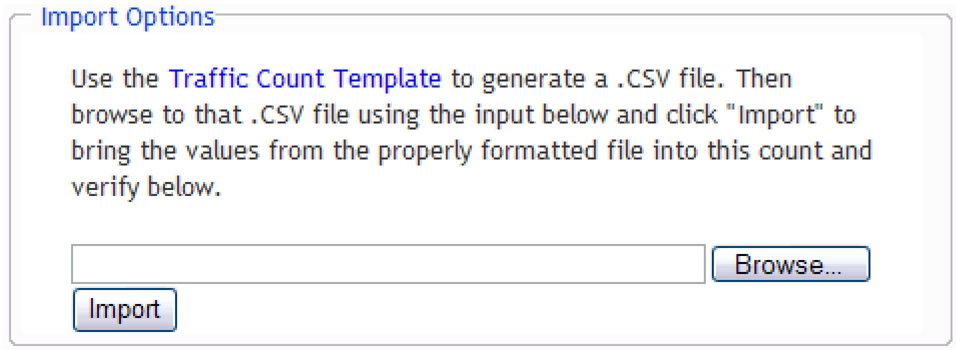


Select New Manual Count to create a new manual count using data not currently available in the ODOT count database. New manual counts can be created with data collected specifically for your analysis or from other sources, such as automatic traffic recorders or City and County databases. Users can add manual counts for two directions and up to 24 hours in length.

Similar to creating a custom set of analysis trend factors, user manual counts can be entered manually or through an import process. Manual entry of count data, as shown below, requires a start time, duration and the direction of travel.



In order to make the process of creating manual counts easier for the analyst, the web-based WZTA tool includes a custom template that can be used to add a new count in excel and import directly into the tool.



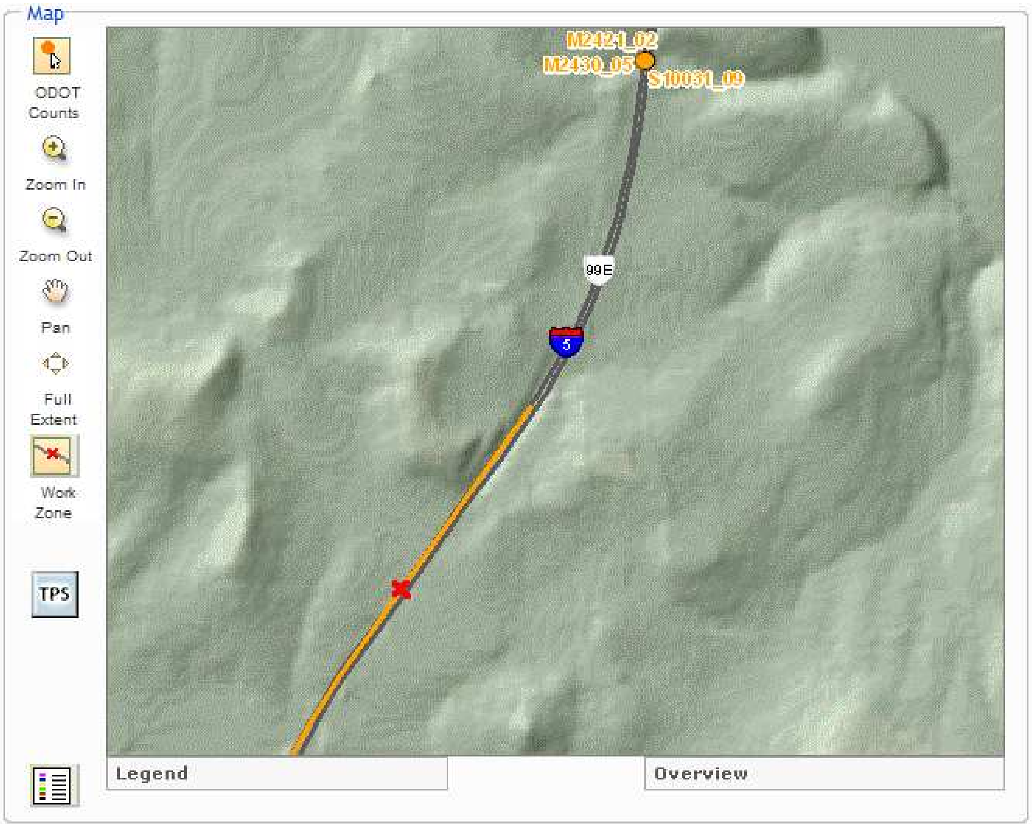
The traffic count template creates a .CSV file that can be saved to a user's computer and uploaded via the browse and import buttons.

Once a user manual count has been created and saved, the data can be used immediately in your analysis by selecting the name of the new count. User manual counts can also be shared with other users or stored for use on future projects. The sharing of user created manual counts will be covered in more detail in another section.

ODOT Counts

The web-based WZTA tool contains an extensive database of ODOT traffic counts. All traffic counts since the year 2000 that are managed by ODOT's Transportation Data Section are available to the user. The WZTA traffic count database is updated quarterly to provide the most up-to-date data for analysts.

Selecting an ODOT count will activate the manual counts map layer and display the manual count that is nearest to your work zone.



The map controls can be used to pan and zoom in order to find a manual count that is most appropriate for your analysis.

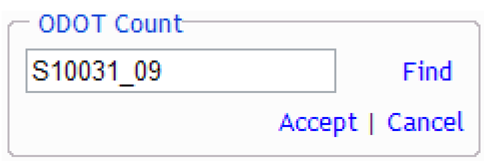
Each manual count shown on the map will have a count ID, such as M1001_10. The last two digits of the count ID represent the year the count was taken, in this case, 2010. If the count is an intersection count, there will be two letters that follow the count year, such as NL or EL. The NL indicates that the volumes contained in the count represent the north leg of the intersection.

In order to select a count displayed on the map, use the *ODOT Counts* icon in the upper left corner of the map and click directly on the dot representing the count. When selected, a list of available counts will be displayed along with information such as location, description, 24-hour count volume and date(s) counted. Manual counts are often performed at the same location but in different years. If this is the case, simply select the count that is most appropriate for your analysis. Please refer to the Methodology section of the WZTA Manual for more information on choosing the most appropriate manual count.

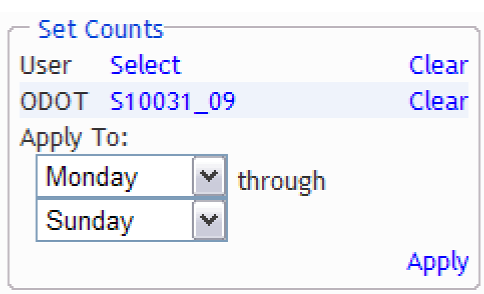
ODOT Counts

	Count ID	Road Description	HWY	MP	Cross Road	24 Hour Count	Date Range
Select	M2421_02	Pacific Hwy(I-5) st'away count between BattleCreek & Kuebler Interchanges	001	251	Null	58186	10/11/14-17 2002
Select	M2430_05	Pacific Hwy(I-5) st'away count FC11	001	251	between Battlecreek & Kuebler Blvd. Intch.	57780	June 28/29 2005
Select	S10031_09	Pacific Highway	001	251	Pacific Highway #1 (I-5) - between Battle Creek Interchange & Kuebler Interchange - at MP 251.00	62055	10/27/2009-10/28/2009

Select an appropriate manual count and then Accept the ODOT count.



Once an ODOT or User count has been selected, it can be applied to the appropriate days of the week. At a minimum, WZTA requires that one manual count be applied to all seven days of the week; otherwise separate manual counts can be used for each individual day. In order to generate a lane closure restriction chart for the entire week, apply the selected ODOT or User count to Monday through Sunday via the drop-down lists.



Select Apply to set the manual count that will be used for analysis. The resulting AADT Adjustment Summary provides the analyst with a quick means to evaluate the appropriateness of the chosen ODOT or User count.

AADT Adjustment Summary

Existing AADT:		50300
Existing AADT Year:		2008
Day	**24 Hour Volume**	**Ratio**
Mon	62055	0.81
Tue	62055	0.81
Wed	62055	0.81
Thu	62055	0.81
Fri	62055	0.81
Sat	62055	0.81
Sun	62055	0.81
		View Counts

Please refer to the Methodology section of the WZTA Manual for more information on the 24 Hour Count Volume and AADT to 24-hour Count Ratio and how they are used in both analysis and in the evaluation of manual counts.

Delay Information

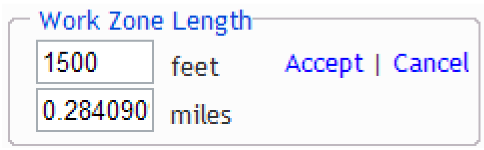
Delay estimates require all of the data needed to generate a lane closure restriction chart plus specific delay information and work zone staging. Delay information includes a work zone analysis length and project schedule.

Delay Information

Work Zone Analysis Length:	4000 ft
Project Start Month:	Nov-2010
Project End Month:	Nov-2010

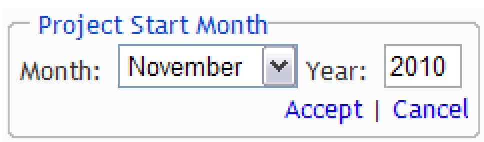
The work zone analysis length is the length of the proposed work zone. Multilane and Freeway work zones default to 4,000 feet (0.75 miles) and are for visual purposes only. Changing this value will increase or decrease the length of the work zone as it appears on the map.

Unlike Freeway or Multilane work zones, Bidirectional work zones require a work zone length for analysis.



The length of a Bidirectional work zone defaults to 1,500 feet but lengths of up to 2 miles can be selected. Work zone length can be entered in either feet or miles.

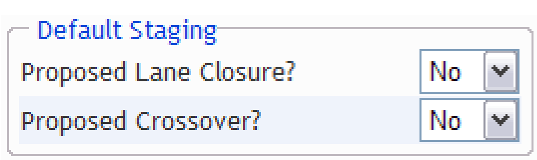
In addition to a work zone analysis length, a project schedule is required in order to calculate delay estimates. The project schedule requires a project start month and a project end month.



A project schedule can be as short as one month or as long as several years. When prompted, users enter the project schedule by month and year.

Default Work Zone Staging

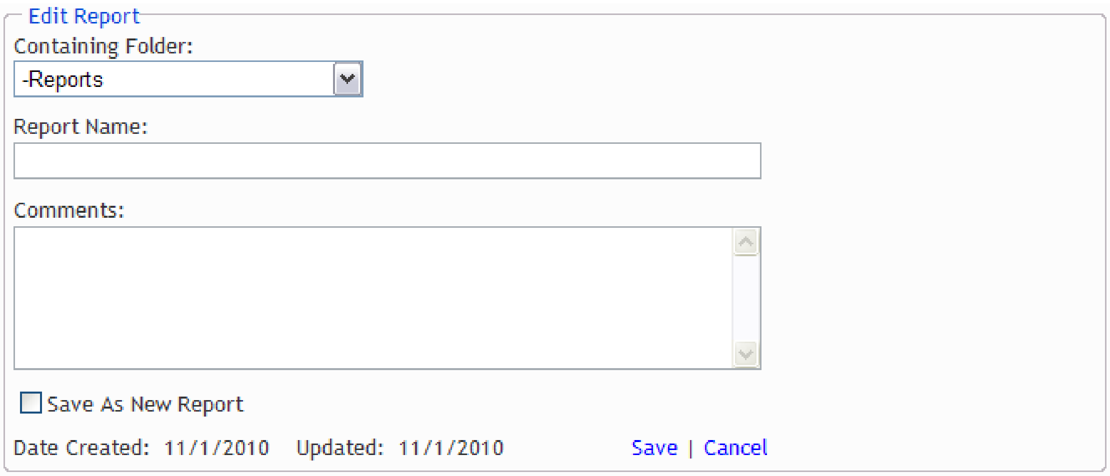
Default work zone staging includes proposed lane closures and/or proposed crossovers and is chosen in the Staging Details screen. Select No next to *Proposed Lane Closure?* or *Proposed Crossover?* to access Staging Details. Select the default work zone staging via a drop-down list.



When selected, the default staging option(s) will apply to both directions of travel for the duration of construction. Detailed staging plans, including custom schedules and additional staging options will be covered in another section.

Saving a Report

In order to generate a lane closure restriction chart or delay estimate, users must save their current report via the Save Data link at the bottom of the Traffic Data Sheet. Saving a report will bring the user to the Edit Report screen where they can provide a report name and select the folder they want to contain the new report. Users are also given the opportunity to include report comments for future reference.



The *Save As New Report* check-box can be used if you are modifying an existing report and want to save a new version. If the *Save As New Report* check-box is not selected, then the existing report will be overridden, even if a new Report Name is provided.

VIEW REPORTS

After a report has been created and saved, the View Reports link at the bottom of the Traffic Data Sheet will give users the option to view a lane closure chart, delay summary or create an over-capacity delay report. Creating an over-capacity delay report will be covered in another section.

Lane Closure Charts

Select Lane Closure Charts to bring up the closure chart report options available for your analysis. When creating a lane closure restriction chart, users have the option to select from three closure types; Lane, Shoulder or High Intensity. Users must also choose the direction of travel for which they want to generate a lane closure chart as well as the closure chart output format.

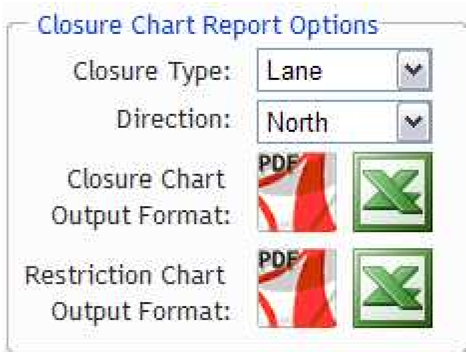
A closure type of *Lane* will create a lane closure chart that determines when a lane can be closed. The *Shoulder* closure type will create a shoulder closure chart that identifies when a shoulder can be closed. A *High Intensity* lane closure chart will identify when lane closures for high intensity work, such as beam swings or paving operations, can occur. Please refer to the Methodology section of the WZTA Manual for more information on the various types of lane closure charts and the default free flow thresholds that are used.

The available directions of travel will default to the predominant direction assigned to the highway being analyzed. If your work zone is physically located on a north/south segment of the highway, but the highway is predominately east/west, then your choices for direction of travel will be east/west. A separate lane closure chart must be created for each direction of travel for both multilane and freeway work zones. Bidirectional work zones combine volumes for both directions, so only one closure chart is created

NOTE: With the exception of couplets, traffic data in the web-based WZTA tool is not directional. If large discrepancies exist between the start and end of your work zone, i.e. through an interchange, it may be necessary to create separate analyses with different values for truck percentage, AADT, etc.

Users have the option to output closure charts in either PDF or Excel format. PDF printouts are the preferred option as they reduce the likelihood of data being modified beyond WZTA. The Excel format exports the closure charts into a table format and is only recommended if the user wishes to use Excel for blocking or other formatting that does not change the integrity of the data. I

An additional closure chart output format will become available if the highway being analyzed contains three or more lanes in each direction.



The Restriction Chart output format creates a lane closure chart that not only identifies when a lane can be closed, but how many lanes.

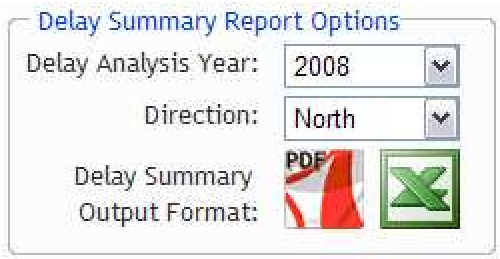
4a-5a	5a-6a	6a-7a	7a-8a	8a-9a	9a-10a	10a-11a	11a-12p	12p-1p	1p-2p	2p-3p	3p-4p	4p-5p	5p-6p	6p-7p	7p-8p
2	1	0	0	1	1	1	1	1	0	0	0	0	0	1	1
2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1

Instead of displaying hourly volumes in passenger car equivalents and highlighting those volumes that exceed the free flow threshold, the Restriction Chart displays the number of lanes that can be closed and highlights the hours where no lanes can be closed.

Delay Summary Reports

Similar to creating a lane closure chart, users can create delay summary reports by selecting Delay Summary under View Reports. The delay summary report options include the delay analysis year, the direction of travel and the delay summary output format.

Unlike lane closure charts, which provide results for a single calendar year based on the year of analysis, delay summary reports can span multiple years and are based on the project's start and end month.



If the project schedule spans more than a single year, a delay summary report will need to be created for each available year. The default directions of travel are the same as for lane closure charts and the output format includes both PDF and Excel.

FILE MANAGEMENT

The management of files in the web-based WZTA tool is performed in **My Folders**. All reports, user manual counts, user trend data and aggregate delay summaries are stored here. Users that have taken the WZTA training course and have received a login and password can use the tool's file management system to store, edit and share reports and data with other analysts.

User Folders

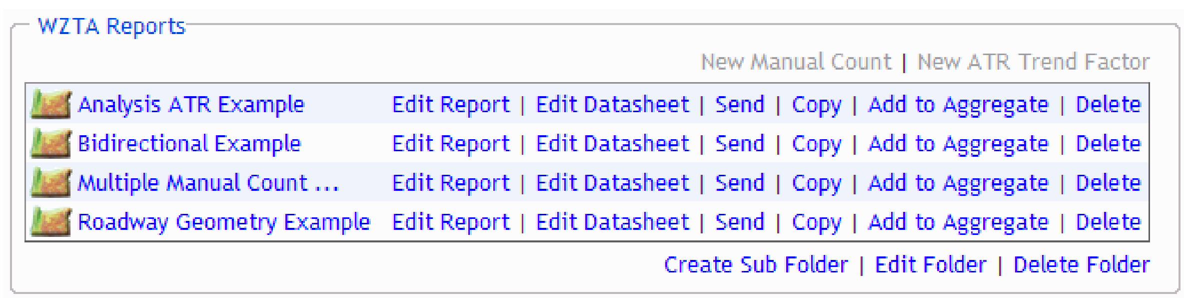
Each user is provided six parent folders. Parent folders cannot be modified, but they can contain sub folders that are created by the user. A default view of a user's folders is shown below.

A sub folder can easily be created and added to any parent folder by selecting the Create Sub Folder link. When creating a sub folder, select the parent folder where the sub folder will be located and provide a folder name. The folder description is not required but can be used to add comments about the folder being created.

If a parent folder contains sub folders, the parent folder can be closed by clicking on the folder icon. It is also important to note that a sub folder cannot be deleted if it contains any files. Only empty folders can be removed from My Folders.

Report Options

Multiple options are available for managing saved reports within the web-based WZTA tool. Users can edit, send, copy or delete a report, as well as add a report to an aggregate delay summary.

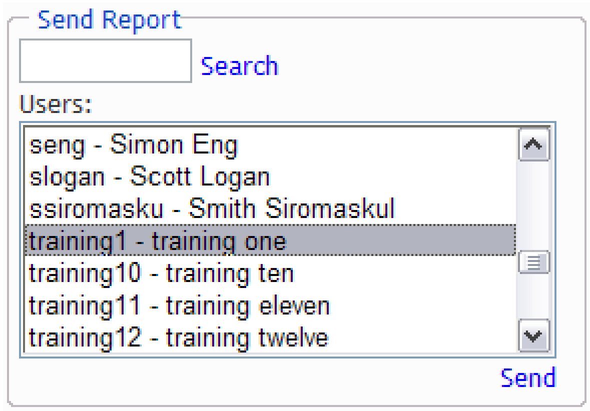


Editing a report allows the user to modify the folder where it is stored, change the report name, and add or modify report comments. The Edit Datasheet link can be used to modify the data contained within the saved report.

Sending a report allows a report to be shared with other users. A report can also be copied and saved with a new filename or moved to another folder. Adding a report to an aggregate delay summary will be covered in another section.

Sharing Files

Users can share reports, manual counts or analysis trend factors with other users via the **Inbox** or **Shared** folders. The Send feature allows files to be sent directly to another user's inbox.



Users can search for a recipient by username, first or last name, e-mail address, or can select directly from a list of certified users. Files that have been sent to you from other users will show up in your inbox, where they can be edited or copied to another folder.

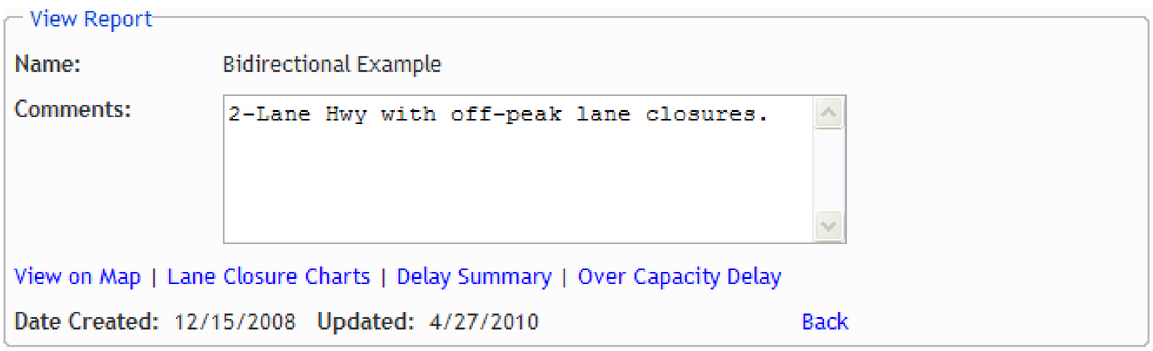
Reports and files can also be stored in your shared folder. Shared folders can be used to send multiple manual counts or saved reports without having to send each file individually to a user's inbox. Shared folders are a convenient means of accessing reports from multiple users and creating aggregate delay reports.

Region Mobility Liaisons and Project Managers responsible for managing delay estimates on statewide mobility corridors will typically use their shared folder to access files from their WZTA analysts quickly and easily. Shared folders of other users can be accessed through the Show Other Users link under a user's list of folders.

Once selected, other user's folders can be found by searching for a recipient's username, first or last name, e-mail address, or they can be selected directly from a list of certified users.

Viewing Reports

By selecting the name of a saved report, the View Report options will become available.

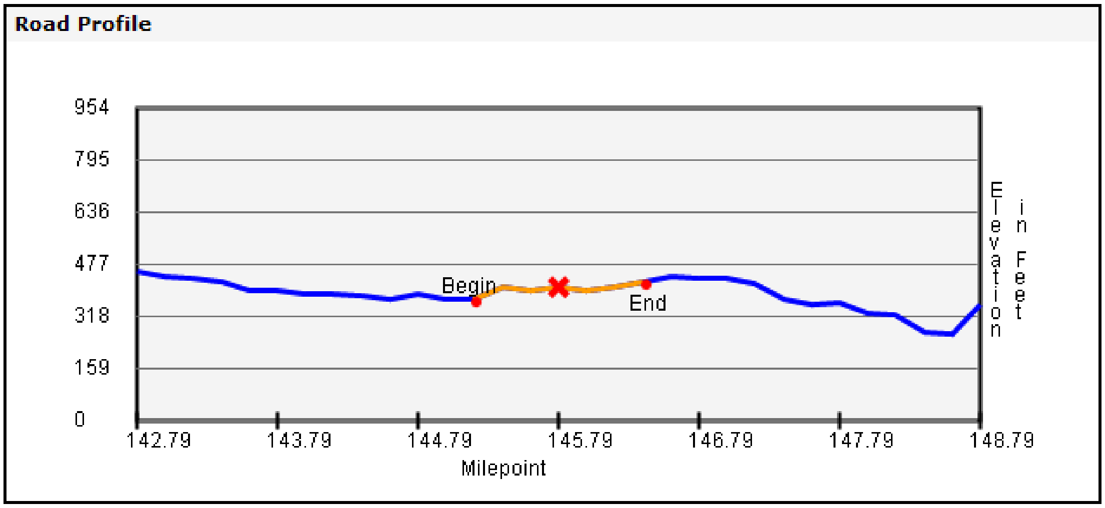


When viewing a report, users have the option to view and/or modify the data contained in the report via the View on Map link or create a lane closure chart, a delay summary, or perform an over capacity delay analysis.

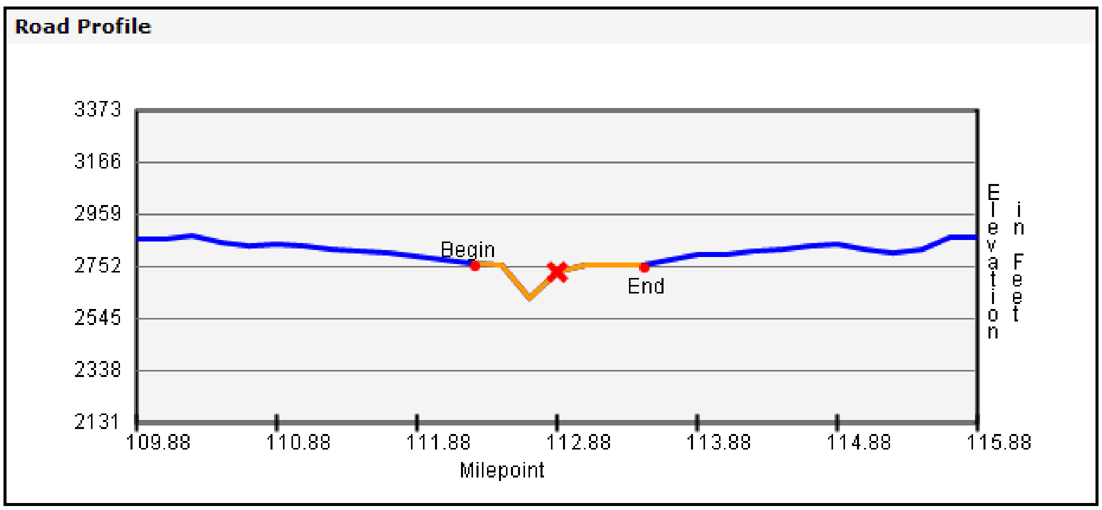
TRAFFIC PLANNING SHEET (TPS)

The Traffic Planning Sheet (TPS) provides detailed traffic and roadway data for a six mile segment surrounding the selected location. The TPS can be used to view and summarize project related data or identify free flow threshold reducing factors such as steep grades and complex roadway geometry. There are three components of the TPS; the road profile, a straightline diagram and horizontal curve and vertical grade tables.

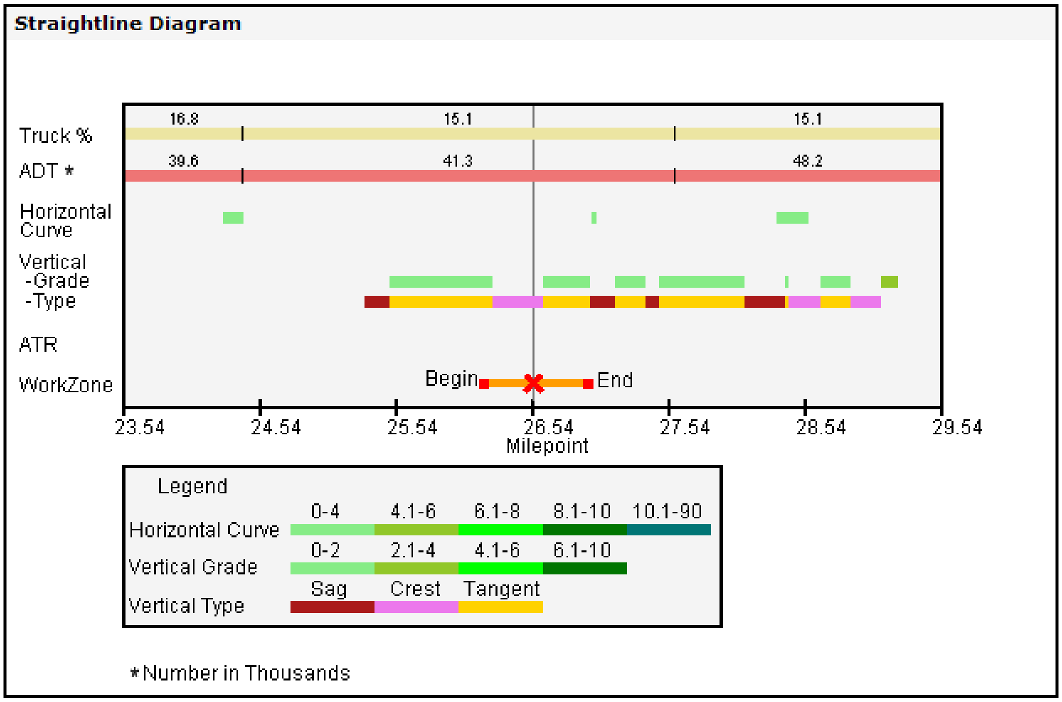
The roadway profile is based on ground elevation and displays roadway elevation in feet.



In some cases, the profile will appear to fall sharply. This is the result of a bridge crossing a canyon or other substantial drop in elevation.



The straightline diagram displays traffic and roadway data over a six mile long segment, with break points indicating changes in traffic volumes and truck percentages. These break points are often interchanges or other point sources where traffic is either added or removed from the system.



Roadway data available in the straightline diagram includes horizontal curves, vertical grades and vertical curve types. A color coded legend is available to help identify degree of curvature, percent grade and vertical curve type.

Detailed information regarding geometry can be found in the horizontal curve and vertical grade tables. The horizontal curve table, shown below, identifies the point of curvature (PC) and point of tangent (PT), represented as the begging and ending milepoint, as well as the degree of curve.

Horizontal Curve Table

LRS	BEGIN_MP	ENDING_MP	Degree Curve Angle
000100200S00	23.40	23.54	0.50
000100200S00	23.63	23.63	0.00
000100200S00	24.27	24.42	0.25
000100200S00	24.51	24.51	0.00
000100200S00	26.97	27.01	1.00
000100200S00	27.16	27.16	0.00
000100200S00	28.33	28.56	2.00
000100200S00	28.71	28.71	0.00

The vertical grade table identifies the tangent sections between vertical curves and the percent grade. The beginning milepoint represents the point of vertical tangent (PVT) and the ending milepoint represents the point of vertical curve (PVC).

Vertical Grade Table

LRS	BEGIN_MP	ENDING_MP	Vertical Percent
000100200S00	25.49	26.24	0.21
000100200S00	26.62	26.96	-1.42
000100200S00	27.15	27.37	-0.64
000100200S00	27.46	28.09	-0.44
000100200S00	28.39	28.42	1.00
000100200S00	28.65	28.87	-0.38
000100200S00	29.10	29.22	-3.00

The vertical type table identifies the point of vertical curve (PVC) and point of vertical tangent (PVT), represented by the beginning and ending milepoint, as well as the type of vertical curve between tangent sections.

Vertical Type Table

LRS	BEGIN_MP	ENDING_MP	TYPE:S-Sag C-Crest
000100200S00	25.30	25.49	S
000100200S00	26.24	26.62	C
000100200S00	26.96	27.15	S
000100200S00	27.37	27.46	S
000100200S00	28.09	28.39	S
000100200S00	28.42	28.65	C
000100200S00	28.87	29.10	C

All of the information available in the TPS can be summarized in a report by selecting the PDF button above the road profile. The PDF version of the TPS includes a map of the selected location, the location and traffic data from the Traffic Data Sheet, as well as the road profile and straightline diagram. The summary report does not include the horizontal curve and vertical grade tables, but the tables themselves can be copied and pasted directly into a spreadsheet application.

WORK ZONE TRAFFIC ANALYSIS

FOR NON-ODOT FACILITIES

Oregon
Department
of Transportation

WORK ZONE TRAFFIC ANALYSIS
FOR NON-ODOT FACILITIES

Table of Contents

WORK ZONE TRAFFIC ANALYSIS
FOR NON-ODOT FACILITIES

INTRODUCTION

The WZTA tool provides default traffic and roadway data for all ODOT facilities, but the tool is flexible and can also be used to generate lane closure charts and delay estimates for non-ODOT highways. Before using the web-based WZTA tool for non-ODOT highway analysis, you need to understand WZTA methodology and how it is used. Please refer to the Methodology section of the WZTA Manual and go through the exercises until a comfort level is reached with both the methodology and the web-based WZTA application.

LANE CLOSURE RESTRICTIONS & DELAY

There are three steps to perform in order to determine lane closure restrictions and delay estimates for non-ODOT roadways using the web-based WZTA tool:

1. Gathering Project Data
2. Developing Trend Data
3. Running WZTA using the information gathered

GATHERING PROJECT DATA

At a minimum, the following data is required for the project roadway:

- Roadway Type: Freeway, Multilane, or Two-lane Two-way (bidirectional)
- Terrain Type: Level, Rolling or Mountainous
- Existing posted speed limit (pre-construction)
- Number of existing lanes per direction
- Yearly traffic growth rate (linear)
- Existing Annual Average Daily Traffic (AADT) and the year that it was last recorded
- Truck Percentage

- Seasonal and Daily Traffic Trends - i.e. are volumes higher in July vs. December or higher during weekdays or weekends, or is there little difference between the two? (See next section for developing seasonal and daily trends)
- Traffic volumes from counts:
    - In hourly increments
    - 24 hour counts are optimal
    - 14-16 hour counts are acceptable unless a start time for night work cannot be determined from the data available
    - Counts taken within the last 3-5 years are preferred

DEVELOPING TREND DATA

Work zone traffic analysis requires seasonal and daily trend information in order to determine month to month and day to day variations in traffic volumes. There are various sources available to develop trend data and which source you use depends on your project location. Trend data primarily comes from Automatic Traffic Recorders (ATRs) but can also be developed using other techniques if no ATRs are available.

If trend data is available from city or county traffic recorders, a user trend data set can be created and used for analysis. Refer to the WZTA User's Guide in the WZTA Manual for detailed steps on how to develop and save a user created set of trend data. If trend data is not available from city or county installed traffic recorders, ATRs from ODOT highway segments with similar characteristics to the project roadway can be used. ODOT's Traffic Planning and Analysis Unit (TPAU) created the "ATR Characteristic Table" which finds ATRs on ODOT highways based on defined characteristics. See the Methodology section of the WZTA Manual for an explanation of ATRs and how to use them.

The purpose of the ATR Characteristic Table is to provide general characteristics for each ATR in Oregon. The filtering capabilities of the table allow the user to find an applicable ATR on a roadway segment that has defined characteristics.

The ATR Characteristic Table and instructions on how to use it can be found on TPAU's website at http://www.oregon.gov/ODOT/TD/TPAU/. Detailed information on using the ATR Characteristic method for finding an applicable ATR can be found in **Chapter 4** of the **Analysis Procedures Manual (APM)**.

The ATR Characteristic Table itself is located at the following website:

http://www.oregon.gov/ODOT/TD/TPAU/A_Data.shtml\

Using the ATR Characteristic Table

The following examples will demonstrate how easy the table is to use when attempting to find a characteristic ATR for use on a non-ODOT roadway. When a suitable characteristic ATR is found, simply select the chosen ATR either from the map or by manual entry on the **Manage Analysis Trend Data** page of the WZTA tool and the appropriate trend data will be used in your analysis.

Example 1: Find an ODOT roadway with similar characteristics

Assume that the project roadway has the following characteristics:

- rural roadway in an agricultural area
- two-lane, two-way roadway
- the traffic volumes do not fluctuate much between weekdays and weekends
- the AADT is about 3000 vehicles per day

Open the **ATR Characteristic Table** and look at the column headings across row four. Working from left to right, make selections that will define the characteristics of the project area:

- At the **SEASONAL TRAFFIC TREND** column, click on the down arrow and choose "AGRICULTURAL"
- At the **AREA TYPE** column, click the down arrow and choose RURAL
- Choose "2" at the **# OF LANES** column
- At **WEEKLY TRAFFIC TREND**, choose STEADY

The ATR Characteristic Table should now be showing six potential ATRs that match the characteristics of our project roadway. Only one ATR, however, has an AADT that is within +/- 10% of our project AADT as defined in chapter 4 of the APM. Therefore, ATR 15-011, with an AADT of 2800 vehicles per day, is an appropriate ATR to use for seasonal and daily trend data for our analysis.

Example 2: Find an ODOT roadway with similar characteristics

This project roadway has the following characteristics:

- city arterial in a business district
- there are two lanes in each direction with a continuous two-way-left-turn-lane
- the traffic volumes are higher during the weekdays
- the AADT is about 25,000 vehicles per day

Working from left to right:

- At the **SEASONAL TRAFFIC TREND** column choose "COMMUTER"
- At the next column select SMALL URBAN
- Choose "5" at the **# OF LANES** column
- At **WEEKLY TRAFFIC TREND**, choose WEEKDAY

The ATR Characteristic Table should now be showing four potential ATRs that match the characteristics of our project roadway. Two ATRs have an AADT that is within +/- 10% of our project AADT as defined in chapter 4 of the APM, but ATR 18-018, with an AADT of 23,400 vehicles per day, is a closer match.

Using the Seasonal Trend Table

In the event that a characteristic ATR cannot be found or seasonal and daily trends cannot be developed using non-ODOT traffic recorders, the Seasonal Trend Table can be used. Also developed by TPAU, the Seasonal Trend Table is designed to provide analysts with a default set of monthly trend data based on a generalized trend type, i.e. Commuter or Recreational Summer. Seasonal Trend Table factors are based on previous year ATR data and are updated annually by TPAU.

The Seasonal Trend Table and instructions on how to use it can be found on TPAU's website, with detailed information on using the Seasonal Trend Table method available in **Chapter 4** of the **Analysis Procedures Manual (APM)**.

The Seasonal Trend Table itself is located at the following website:

http://www.oregon.gov/ODOT/TD/TPAU/A_Data.shtml

The Seasonal Trend Table provides monthly factors for both the 1st and 15th of the month, but for purposes of work zone traffic analysis, values for the 15th are used and applied to both weekdays and weekends. After determining which set of seasonal factors apply to the project roadway, simply select and apply the appropriate trend factor set from the **Manage Analysis Trend Data** page in the WZTA tool.

RUNNING WZTA USING THE INFORMATION GATHERED

After gathering the necessary project data and determining the appropriate trend data to use, a work zone traffic analysis can be performed using the WZTA web-based tool. The following steps reflect the basic process for running WZTA using the information gathered up to this point. Please refer to the WZTA User's Guide for detailed information on using the web-based tool to develop lane closure restriction charts and delay estimates.

To begin an analysis, open the WZTA web-based tool and log in using your login and password. If this is your first time using the analysis portion of the WZTA tool, use the login and password provided to you after completion of the training course. The WZTA web-based tool is located at the following website: https://wzta.obdp.org.

Instead of selecting an ODOT highway number and milepoint to populate the traffic data sheet with default values, use the information gathered above to override the traffic and roadway data required for an analysis.

Location Data

Starting with the **Location** data input the following information as it relates to your project location:

- Roadway Type: Freeway, Multilane, Bidirectional
- Terrain Type: Level, Rolling or Mountainous
- Existing posted speed limit (pre-construction)
- Number of existing lanes per direction

You do have the option to input the ODOT Region where your project is located but it is not required for analysis. Selecting an ODOT Region will provide a default value for the Free Flow Threshold (FFT) but there is an option to input or override the FFT in the **Traffic Data** section.

While inputting the required location data you will notice that several items remain blank and do not have an option to override them. These include Area Type and Area Name, which identifies if the work zone is located within a Metropolitan Planning Organization (MPO), an Urban Growth Boundary (UGB) or is Rural, the Total Paved Surface Width and whether or not the project is on an NHS Route, an OHP Freight Route or a National Freight Route. These items are informational only and are not required for an analysis. Default values are available for ODOT highways but they are not necessary for work on a non-ODOT facility.

Traffic Data

In order to develop lane closure restriction charts, the next step is to input the traffic data gathered for your project. Under **Traffic Data** input the following data as it relates to your project location:

- Year of Analysis
- Linear Growth Rate
- Existing Annual Average Daily Traffic (AADT) and the year that it was last recorded
- Truck Percentage

- Seasonal and Daily Traffic Trends
- Traffic volumes from counts

Input seasonal and daily traffic trends based on the method that was most appropriate for your project area. If a user set of trend factors was created, select and apply the appropriate user set. If the ATR Characteristic Table was used, simply select the characteristic ODOT ATR using the map or manual entry. If a characteristic ATR could not be found and the Seasonal Trend Table was used, select the appropriate seasonal trend factor set.

Since your project location is not on an ODOT highway, you will most likely use a user count versus an ODOT count. Refer to the WZTA User's Guide for detailed information on how to develop and save a user created count. Select and apply the appropriate user count(s) for your project from the **Manage Manual Counts** page of the WZTA tool.

Delay Information

Delay estimates for work zone traffic analysis requires a project duration and work zone staging information. Under **Delay Information** and **Staging** input the following information for your project:

- Work Zone Analysis Length
- Project Start Month
- Project End Month
- Proposed Lane Closure/Proposed Crossover

The work zone analysis length is required for bidirectional work zones only. The proposed lane closure or proposed crossover will allow you to input a default staging for the entire project duration. If you plan to use a more complex staging strategy, please refer to the WZTA User's Guide for detailed information on how to develop custom staging. After all the location data, traffic data and delay information has been provided for your project, the last step is to save your data and view the available reports. Please refer to the WZTA User's Guide for additional information regarding lane closure restriction and delay reports.

FAQ

I only have an Average Daily Traffic (ADT) volume for my project location, how do I develop the Annual Average Daily Traffic (AADT) volume required for analysis?

Unlike ODOT, most local agencies do not record traffic volumes 365 days a year, so they are unable to report AADT for a particular location. In most cases, tube counts are collected over a 24 or 48 hour period and then a 24-hour volume is reported as the ADT. In order to develop an AADT from your ADT volume, refer to chapter 4 of the ODOT Analysis Procedure Manual and the methodology used for determining design hour volumes. Instead of calculating a seasonal adjustment factor for the 30^{th} highest hour however, you will calculate a seasonal adjustment factor for the average, or 100% condition.

TRAFFIC DATA SHEET

USER'S GUIDE

Oregon Department of Transportation

WORK ZONE TRAFFIC ANALYSIS TOOL
TRAFFIC DATA SHEET USER'S GUIDE

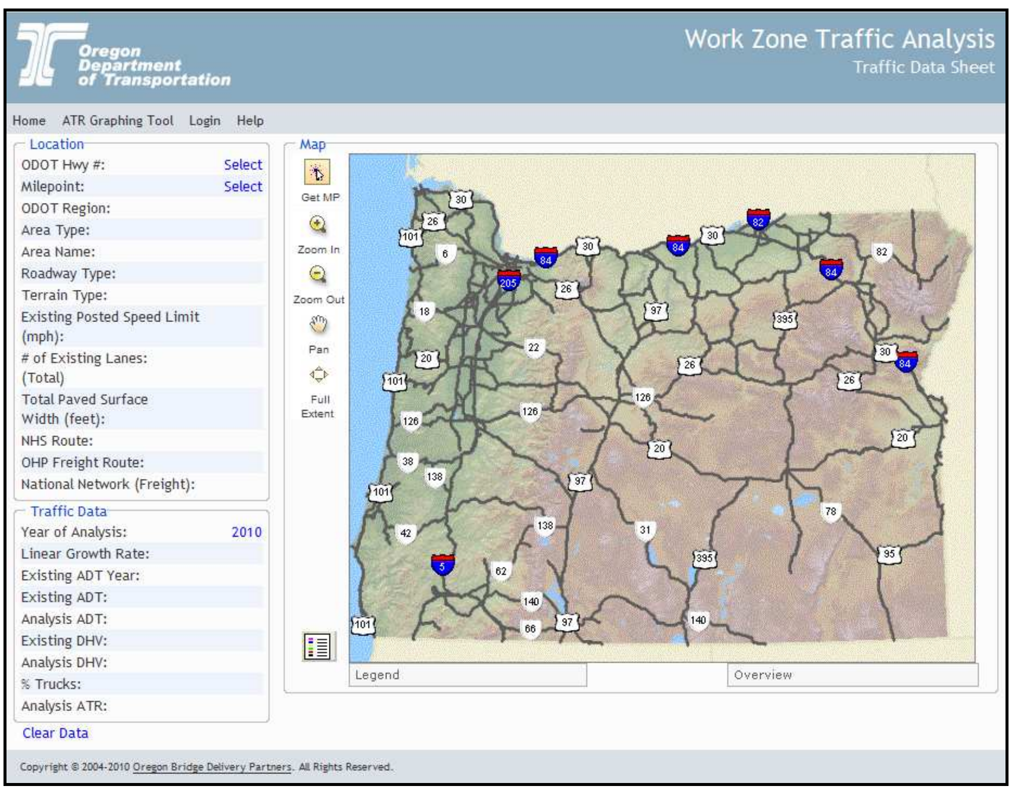
Table of Contents

INTRODUCTION

ODOT's web-based Work Zone Traffic Analysis (WZTA) tool makes Oregon's highway data available to anyone with internet access. The traffic data sheet provides users with traffic and roadway data such as Annual Average Daily Traffic (AADT) volumes, historic truck percentages and horizontal curve and vertical grade information.

The web-based tool provides users with access to a myriad of data sources, such as traffic and roadway data that was typically scattered amongst numerous databases and publications. By combining work zone traffic analysis with a GIS interface, both analysts and the general public can use the traffic data sheet to gather project related data with nothing more than an ODOT highway number and milepoint.

ODOT's Work Zone Traffic Analysis Tool and the traffic data sheet can be found at the following website: http://wzta.obdp.org.



TRAFFIC DATA SHEET MENU BAR

The Traffic Data Sheet menu bar contains the following important links:

- **Home** – If at any point you wish to return to the Traffic Data Sheet, use the "Home" link or the "Back" or "Cancel" commands inside the tool. DO NOT use the "Back" arrow in your web browser or you may lose your data.
- **ATR Graphing Tool** – The ATR graphing tool provides users with the ability to view ATR trend data and graph historic traffic volumes collected from Oregon's Automatic Traffic Recorders (ATRs). Please refer to the Methodology section of the WZTA manual for information regarding ATR's and how to use them.
- **Login** – In order to use the analysis functions of the WZTA tool, a user needs to log in. Use of the Traffic Data Sheet and ATR graphing tool does not require a login and password.
- **Help Page** – The help page contains links to various ODOT websites and useful documents for your reference.

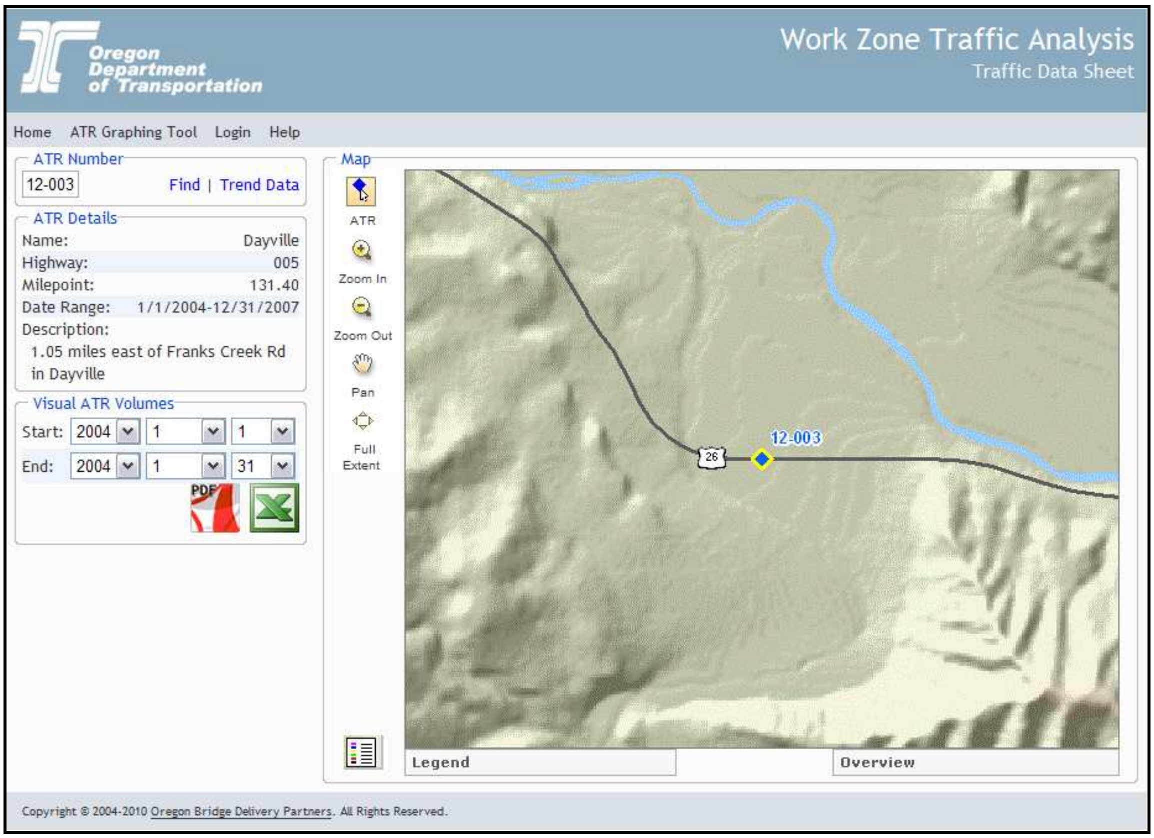
Note: If you leave the tool unattended for more than ten minutes the site will time-out and you will be forced to re-enter your data.

ATR GRAPHING TOOL

Automatic Traffic Recorders (ATRs) are permanent devices built into many state highways that count traffic volumes 24/7/365**.** Collecting traffic volumes year round also enables ATRs to be used for determining seasonal trends in traffic. Selecting the **ATR Graphing Tool** on the menu bar will navigate the user away from the traffic data sheet and open a statewide map of active ATRs. An ATR can be chosen in one of two ways; using the ATR icon in the upper left corner of the map to select an ATR (shown as a blue diamond), or select the ATR number from a drop-down list in the upper left-hand box.

A complete list of active ATRs can be found in the back of the Transportation Volume Tables (TVT), published by ODOT's Transportation Data Section, or at the following website: http://www.oregon.gov/ODOT/TD/TDATA/tsm/tvt.shtml

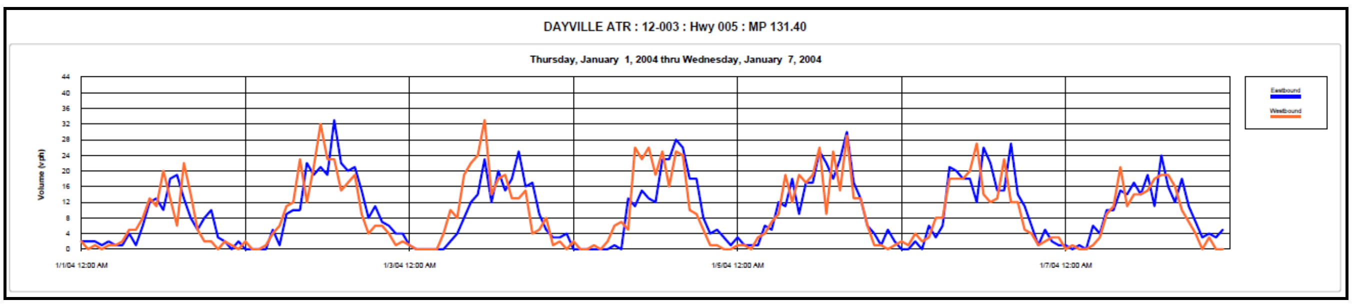
When an ATR has been selected from the map or drop-down, detailed information about that ATR will be displayed. These details include the ATR name, location and date range of available traffic volumes. In order to view seasonal trend data for the chosen ATR, select Trend Data.



Seasonal Trend Data represents seasonal fluctuations in traffic volumes throughout the year for both weekdays and weekends. It is the percentage of the monthly average daily traffic (ADT) in relation to the annual average daily traffic (AADT). A trend factor of 1.15 on a July weekday for example, corresponds to a monthly ADT that is 15% higher than the AADT.

The ATR graphing tool is primarily used to graph raw traffic volumes collected from Oregon's ATRs. The date range shown in the ATR details represents the range of available data that is available for graphing. This range, however, does not guarantee that data will be continuous. If an ATR was temporarily out of service then the graph will display zero for those time periods when data was not being collected.

Users can graph ATR traffic volumes by selecting a start and end date under *Visual ATR Volumes*. Only those dates that fall within the date range of the chosen ATR can be used. The dates in which to graph historic traffic volumes are selected using a series of drop down boxes, starting with the year and followed by the month and day. Traffic volumes are graphed in 7 day increments regardless of the specified time period, allowing the user to make comparisons from week to week. A graph of historic traffic volumes can be created by selecting either the PDF or Excel icon. A sample graph displaying a single week of data is shown below.



It is important to note that if you have more than one graph displayed on the same page (up to 3 per page); the scale of each graph may vary.

To return to the Traffic Data Sheet select **Home** from the menu bar.

STATE HIGHWAY NUMBERS

When traveling throughout Oregon, motorists are most familiar with the route numbers associated with each highway. Highway route numbers are based on the following types of routes:

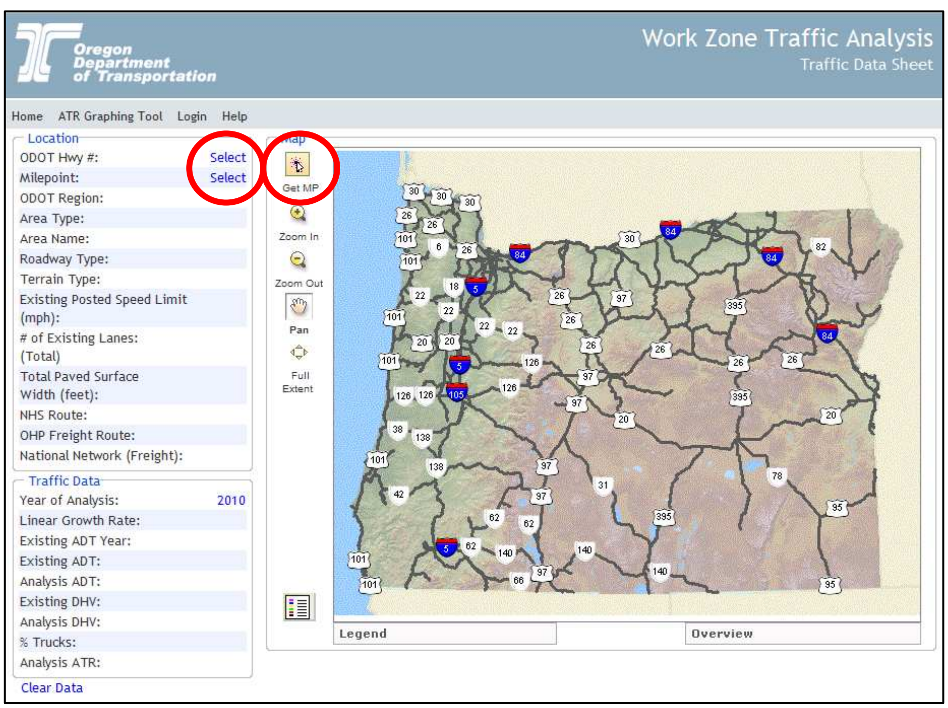
- Interstate Routes, like I-5 or I-84,
- US Routes, like US 101 or US 26, or
- State Routes, like OR 22 or OR 126.

Jurisdictions such as cities, counties and the state have responsibility for, or have jurisdiction, over these highways. The Oregon Department of Transportation has assigned unique numbers to all state run highways. These unique identifiers are in most cases different than the route numbers. A single route number can have multiple unique highway numbers assigned to it. For example, US 26 extends from the coast to the Idaho border and contains 10 segments with unique highway numbers.

The web-based WZTA tool uses these unique ODOT state highway numbers to identify specific highway locations. If you are unfamiliar with the Oregon state highway numbering system, a link to the *ODOT Highway Number Cross Reference Table* is provided on the help page.

SELECTING A LOCATION

There are two methods in which to select a location in the Traffic Data Sheet; manual entry of the ODOT highway number and milepoint, or using the GIS interface to select a location from the map.



If the unique state highway number and milepoint of your location is known, the Select links to the right of *ODOT Hwy #* and *Milepoint* can be used to select the highway number from a drop down list of available ODOT highways. When an ODOT highway number is chosen, a valid milepoint range will be displayed for that highway. Selecting Find on Map will locate the chosen highway and milepoint on the map, allowing the user to visually verify the intended location. Once a valid location has been identified, select Accept to return to the Traffic Data Sheet.

If the user does not know the ODOT state highway number and milepoint, or would rather select a location visually using the map, the *Get MP* button in the upper left corner of the map is used to select a location. After a location has been selected using the map controls, a box will appear with a list of nearby locations in which to choose from. Select a location from the list to populate the Traffic Data Sheet with location and traffic data.

LOCATION AND TRAFFIC DATA

When a highway number and milepoint has been selected, the Traffic Data Sheet will populate with location and traffic data specific to your chosen location. The following location data is shown on the Traffic Data Sheet:

- **ODOT Region** – The State of Oregon is geographically divided into 5 Regions. For more information on ODOT Regions, please refer to the following link: www.oregon.gov/ODOT/TD/TDATA/gis/odotmaps.shtml#ODOT_Region_Maps

- **Area Type** – Identifies if your location is within a Metropolitan Planning Organization (MPO), an Urban Growth Boundary (UGB), or is Rural.

- **Area Name** – The name of the MPO or UGB that your location may be located in.

- **Roadway Type** – Identifies if your location is on a freeway, a multilane highway or a bidirectional highway.

- **Freeway** –Divided multilane highway, usually high speed having a minimum of two lanes for exclusive use of traffic in each direction with uninterrupted flow and full access control.
- **Multilane** –Two or more lanes of traffic in each direction. It may or may not have a two-way left turn lane (TWLTL) or median and may have full, partial or limited access control.
- **Bidirectional** – Two lanes with one lane of traffic in each direction, with little or no access control.

- **Terrain Type** – Level, rolling or mountainous terrain.
- **Existing Posted Speed Limit** – The existing posted speed limit of the highway at your location. Even if there is construction in the area, this will always show the *preconstruction* posted speed.
- **Number of Existing Lanes** – Identifies the total number of lanes across both directions, including two-way left turn lanes if applicable. The exception is divided highways, such as I-5, which will show only the number of lanes in one direction of travel.
- **Total Paved Surface Width** – The total width of pavement including travel lanes, shoulders and traversable medians.
- **NHS Route** – Indicates if the highway is part of the National Highway System.
- **OHP Freight Route** – Indicates if the highway is an Oregon Highway Plan designated freight route.
- **National Network (Freight)** – Indicates if the highway is part of the National Freight Network.
- **Functional Classification** – Indicates the functional classification of the highway.

The following traffic data is shown on the traffic data sheet.

- **Year of Analysis** – The year for which you want to calculate future year AADT and Design Hour Volume (DHV). The year of analysis will default to the current year, but can be modified by the user.

- **Linear Growth Rate** – Identifies the projected 20 year linear growth rate of traffic on the selected highway at your location.

- **Existing AADT Year** – The year in which the Annual Average Daily Traffic was recorded.

- **Existing AADT** – The Annual Average Daily Traffic volume recorded in the year listed above.

- **Analysis AADT** – If the Year of Analysis is different than the Existing AADT Year, the Existing Year AADT is increased by the Linear Growth Rate to determine the future year or analysis year AADT.

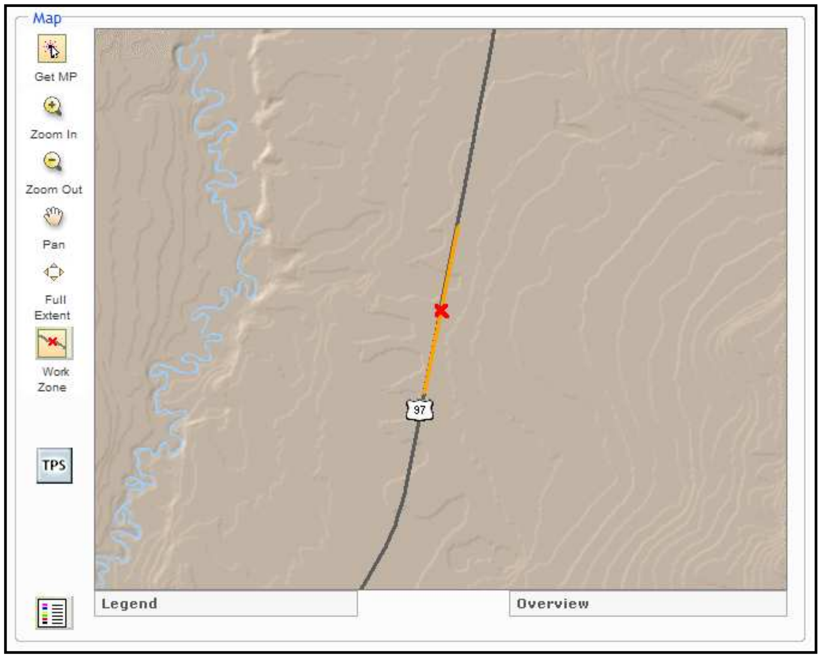
- **Existing DHV and Analysis DHV** – Existing and Analysis Year Design Hourly Volumes. DHV's are used for ODOT planning and project level analysis and are defined as the 30^{th} highest volume.

- **% Trucks** – The percentage of heavy vehicles. For the purpose of work zone traffic analysis, trucks or heavy vehicles usually have three or more axles and/or six or more tires.

MAP ATTRIBUTES

The WZTA map includes multiple features that allow the user to view additional information about their location.

- **Work Zone** – If the map has been zoomed out, panned or otherwise moved from its view of the selected location, the work zone button will return the map to its default close-up view.
- **Legend** – The legend dropdown in the lower left corner of the map can be used to turn on additional data layers or turn off existing ones. Users will notice that some of the features are grayed out because they cannot be viewed at the given zoom level, such as horizontal curve and vertical grade data. In order to see this information, zoom in until the features become active. Experiment with the legend features to view ATR locations, ODOT traffic count locations, Motor Carrier route maps and other valuable information.



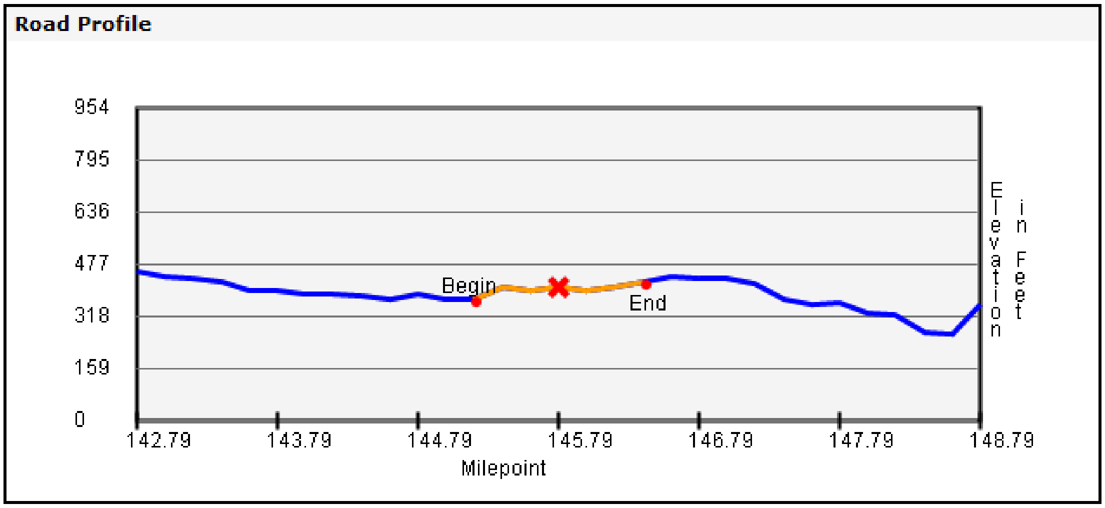
- **TPS** – The TPS button activates the Traffic Planning Sheet (TPS).
- **Reset Legend** –The image to the left of the map legend is the reset legend button and can be used to reset the map layers to the default view.
- **Overview** – This feature highlights where the selected location is in relation to the state of Oregon.

TRAFFIC PLANNING SHEET (TPS)

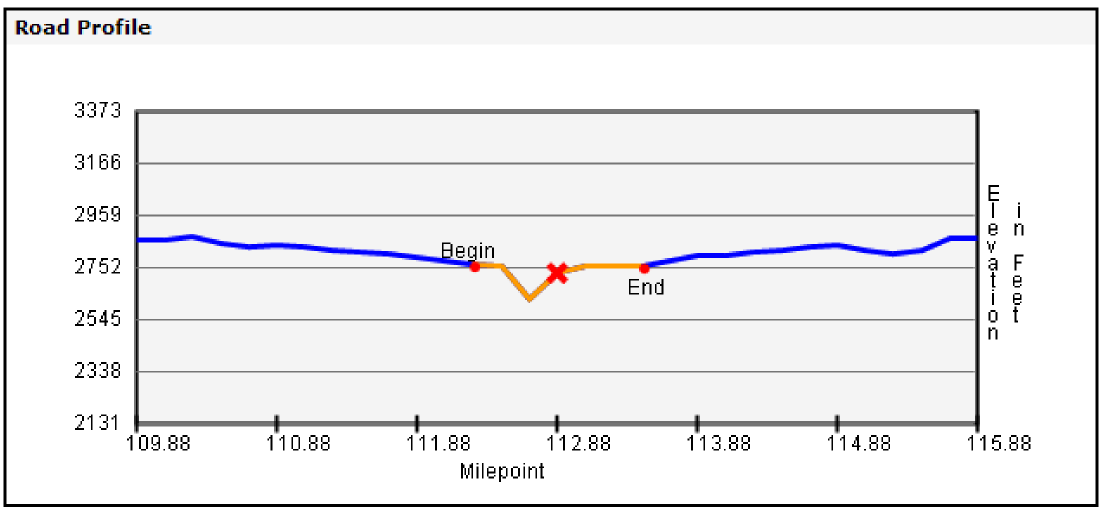
The Traffic Planning Sheet (TPS) provides detailed traffic and roadway data for a six mile segment surrounding the selected location. There are three components of the

TPS; the road profile, a straightline diagram and horizontal curve and vertical grade tables.

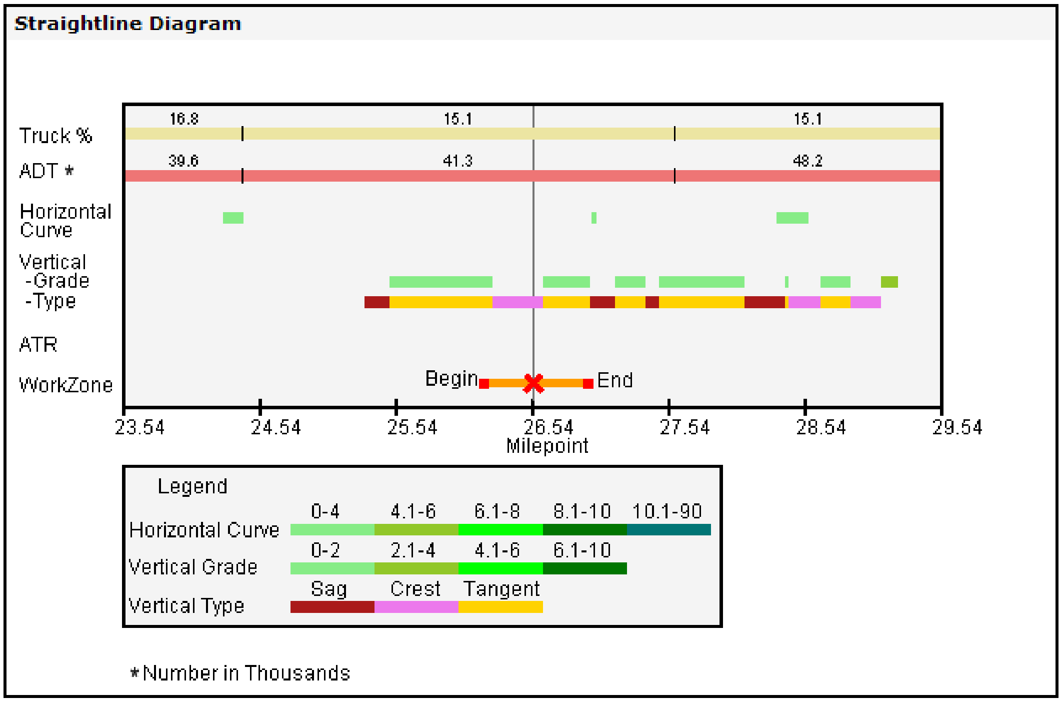
The roadway profile is based on ground elevation and displays roadway elevation in feet.



In some cases, the profile will appear to fall sharply. This is the result of a bridge crossing a canyon or other substantial drop in elevation.



The straightline diagram displays traffic and roadway data over a six mile long segment, with break points indicating changes in traffic volumes and truck percentages. These break points are often interchanges or other point sources where traffic is either added or removed from the system.



Roadway data available in the straightline diagram includes horizontal curves, vertical grades and vertical curve types. A color coded legend is available to help identify degree of curvature, percent grade and vertical curve type.

Detailed information regarding geometry can be found in the horizontal curve and vertical grade tables. The horizontal curve table, shown below, identifies the point of curvature (PC) and point of tangent (PT), represented as the begging and ending milepoint, as well as the degree of curve.

Horizontal Curve Table

LRS	BEGIN_MP	ENDING_MP	Degree Curve Angle
000100200S00	23.40	23.54	0.50
000100200S00	23.63	23.63	0.00
000100200S00	24.27	24.42	0.25
000100200S00	24.51	24.51	0.00
000100200S00	26.97	27.01	1.00
000100200S00	27.16	27.16	0.00
000100200S00	28.33	28.56	2.00
000100200S00	28.71	28.71	0.00

The vertical grade table identifies the tangent sections between vertical curves and the percent grade. The beginning milepoint represents the point of vertical tangent (PVT) and the ending milepoint represents the point of vertical curve (PVC).

Vertical Grade Table			
LRS	**BEGIN_MP**	**ENDING_MP**	**Vertical Percent**
000100200S00	25.49	26.24	0.21
000100200S00	26.62	26.96	-1.42
000100200S00	27.15	27.37	-0.64
000100200S00	27.46	28.09	-0.44
000100200S00	28.39	28.42	1.00
000100200S00	28.65	28.87	-0.38
000100200S00	29.10	29.22	-3.00

The vertical type table identifies the point of vertical curve (PVC) and point of vertical tangent (PVT), represented by the beginning and ending milepoint, as well as the type of vertical curve between tangent sections.

Vertical Type Table			
LRS	**BEGIN_MP**	**ENDING_MP**	**TYPE:S-Sag C-Crest**
000100200S00	25.30	25.49	S
000100200S00	26.24	26.62	C
000100200S00	26.96	27.15	S
000100200S00	27.37	27.46	S
000100200S00	28.09	28.39	S
000100200S00	28.42	28.65	C
000100200S00	28.87	29.10	C

All of the information available in the TPS can be summarized in a report by selecting the PDF button above the road profile. The PDF version of the TPS includes a map of the selected location, the location and traffic data from the Traffic Data Sheet, as well as the road profile and straightline diagram. The summary report does not include the horizontal curve and vertical grade tables, but the tables themselves can be copied and pasted directly into a spreadsheet application.

Appendix

APPENDIX GUIDE

APPENDIX A – STATE HIGHWAY CROSS REFERENCE TABLE

APPENDIX B – ACRONYMS

APPENDIX C – GLOSSARY

APPENDIX D – WEBSITE LINKS

APPENDIX E – CONSTRUCTION SPECIFICATIONS

APPENDIX F – EXAMPLE PROJECT MEMOS

APPENDIX A – HIGHWAY CROSS REFERENCE TABLES

State Highway Cross Reference Tables

Route No.	Highway Name	Oregon Highway No.
I-5	PACIFIC	1
I-82	MCNARY	70
I-84	COLUMBIA RIVER	2
I-84	OLD OREGON TRAIL	6
I-84	BAKER-COPPERFIELD	12
I-84	HISTORIC COLUMBIA RIVER	100
I-105	EUGENE-SPRINGFIELD	227
I-205	EAST PORTLAND FREEWAY	64
I-205	CLACKAMAS	171
I-405	STADIUM FREEWAY	61

Route No.	Highway Name	Oregon Highway No.
US 20	ALBANY-CORVALLIS	31
US 20	ALBANY-JUNCTION CITY	58
US 20	CENTRAL OREGON	7
US 20	CORVALLIS-LEBANON	210
US 20	CORVALLIS-NEWPORT	33
US 20	MCKENZIE	15
US 20	MCKENZIE-BEND	17
US 20	PACIFIC HIGHWAY WEST	1W (91)
US 20	SANTIAM	16
US 26	CENTRAL OREGON	7
US 26	JOHN DAY	5
US 26	MADRAS-PRINEVILLE	360
US 26	MT. HOOD	26
US 26	NEHALEM	102
US 26	OCHOCO	41
US 26	STADIUM FREEWAY	61
US 26	SUNSET	47
US 26	THE DALLES-CALIFORNIA	4
US 26	WARM SPRINGS	53
US 30	COLUMBIA RIVER	2
US 30	HISTORIC COLUMBIA RIVER	100
US 30	HUNTINGTON	449
US 30	LA GRANDE-BAKER	66
US 30	LOWER COLUMBIA RIVER	2W (92)
US 30	MOSIER-THE DALLES	292
US 30	OLD OREGON TRAIL	6
US 30	OLDS FERRY-ONTARIO	455
US 30	OREGON-WASHINGTON	8

US 30	PACIFIC	1
US 30	PENDLETON	67
US 30	STADIUM FREEWAY	61
US 30	THE DALLES-CALIFORNIA	4
US 30B	OLDS FERRY-ONTARIO	455
US 30BY	NORTHEAST PORTLAND	123
US 95	I.O.N.	456
US 95S	OLDS FERRY-ONTARIO	455
US 97	SHERMAN	42
US 97	THE DALLES-CALIFORNIA	4
US 97B	KLAMATH FALLS-LAKEVIEW	20
US 97B	KLAMATH FALLS-MALIN	50
US 97B	MCKENZIE-BEND	17
US 101	CARPENTERVILLE	255
US 101	OREGON COAST	9
US 101B	NEHALEM	102
US 101B	WARRENTON-ASTORIA	105
US 197	THE DALLES-CALIFORNIA	4
US 199	REDWOOD	25
US 395	CENTRAL OREGON	7
US 395	COLUMBIA RIVER	2
US 395	FREMONT	19
US 395	JOHN DAY	5
US 395	JOHN DAY-BURNS	48
US 395	LAKEVIEW-BURNS	49
US 395	MCNARY	70
US 395	OLD OREGON TRAIL	6
US 395	PENDLETON-JOHN DAY	28
US 395	UMATILLA-STANFIELD	54
US 730	COLUMBIA RIVER	2

Route No.	Highway Name	Oregon Highway No.
OR 3	ENTERPRISE-LEWISTON	11
OR 6	WILSON RIVER	37
OR 7	BAKER-COPPERFIELD	12
OR 7	LA GRANDE-BAKER	66
OR 7	WHITNEY	71
OR 8	TUALATIN VALLEY	29
OR 10	BEAVERTON-HILLSDALE	40
OR 10	FARMINGTON	142
OR 10	PACIFIC HIGHWAY WEST	1W (91)
OR 11	OREGON-WASHINGTON	8
OR 11	PENDLETON	67
OR 18	SALMON RIVER	39
OR 18B	WILLAMINA-SHERIDAN	157

OR 19	JOHN DAY	5
OR 19	WASCO-HEPPNER	300
OR 22	NORTH SANTIAM	162
OR 22	SALEM	72
OR 22	SALMON RIVER	39
OR 22	THREE RIVERS	32
OR 22	WILLAMINA-SALEM	30
OR 27	CROOKED RIVER	14
OR 31	FREMONT	19
OR 34	ALSEA	27
OR 34	CORVALLIS-LEBANON	210
OR 34	CORVALLIS-NEWPORT	33
OR 34	PACIFIC HIGHWAY WEST	1W (91)
OR 35	HISTORIC COLUMBIA RIVER	100
OR 35	MT. HOOD	26
OR 36	MAPLETON-JUNCTION CITY	229
OR 37	PENDLETON	67
OR 37	PENDLETON-COLD SPRINGS	36
OR 37	PENDLETON-JOHN DAY	28
OR 38	UMPQUA	45
OR 39	HATFIELD	426
OR 39	KLAMATH FALLS-LAKEVIEW	20
OR 39	KLAMATH FALLS-MALIN	50
OR 42	COOS BAY-ROSEBURG	35
OR 42S	COQUILLE-BANDON	244
OR 43	OSWEGO	3
OR 46	OREGON CAVES	38
OR 47	MIST-CLATSKANIE	110
OR 47	NEHALEM	102
OR 47	SUNSET	47
OR 47	TUALATIN VALLEY	29
OR 51	INDEPENDENCE	193
OR 51	MONMOUTH-INDEPENDENCE	43
OR 52	OLDS FERRY-ONTARIO	455
OR 53	NECANICUM	46
OR 58	WILLAMETTE	18
OR 62	CRATER LAKE	22
OR 66	GREEN SPRINGS	21
OR 69	BELTLINE	69
OR 70	DAIRY-BONANZA	23
OR 74	HEPPNER	52
OR 78	STEENS	442
OR 82	WALLOWA LAKE	10
OR 86	BAKER-COPPERFIELD	12
OR 86S	BAKER-COPPERFIELD	12

OR 99	COOS BAY-ROSEBURG	35
OR 99	GOSHEN-DIVIDE	226
OR 99	NORTH UMPQUA	73
OR 99	PACIFIC	1
OR 99	PACIFIC HIGHWAY WEST	1W (91)
OR 99	REDWOOD	25
OR 99	ROGUE RIVER	60
OR 99	ROGUE VALLEY	63
OR 99	SAMS VALLEY	271
OR 99	UMPQUA	45
OR 99	WILLAMETTE	18
OR 99E	ALBANY-JUNCTION CITY	58
OR 99E	HILLSBORO-SILVERTON	140
OR 99E	PACIFIC	1
OR 99E	PACIFIC HIGHWAY EAST	1E (81)
OR 99EB	SALEM	72
OR 99W	BELLEVUE-HOPEWELL	153
OR 99W	HILLSBORO-SILVERTON	140
OR 99W	PACIFIC HIGHWAY WEST	1W (91)
OR 103	FISHHAWK FALLS	103
OR 104	FORT STEVENS	104
OR 104S	FORT STEVENS	104
OR 120	SWIFT	120
OR 126	BELTLINE	69
OR 126	CLEAR LAKE-BELKNAP SPRINGS	215
OR 126	EUGENE-SPRINGFIELD	227
OR 126	FLORENCE-EUGENE	62
OR 126	MCKENZIE	15
OR 126	OCHOCO	41
OR 126	PACIFIC HIGHWAY WEST	1W (91)
OR 126	SANTIAM	16
OR 126B	MCKENZIE	15
OR 126B	PACIFIC HIGHWAY WEST	1W (91)
OR 130	LITTLE NESTUCCA	130
OR 131	NETARTS	131
OR 138	ELKTON-SUTHERLIN	231
OR 138	NORTH UMPQUA	138
OR 138	PACIFIC	1
OR 140	FREMONT	19
OR 140	GREEN SPRINGS	21
OR 140	KLAMATH FALLS-LAKEVIEW	20
OR 140	KLAMATH FALLS-MALIN	50
OR 140	LAKE OF THE WOODS	270
OR 140	SOUTH KLAMATH FALLS	424
OR 140	WARNER	431

OR 141	BEAVERTON-TUALATIN	141
OR 153	BELLEVUE-HOPEWELL	153
OR 154	LAFAYETTE	154
OR 164	JEFFERSON	164
OR 173	TIMBERLINE	173
OR 180	EDDYVILLE-BLODGETT	180
OR 182	OTTER ROCK	182
OR 194	MONMOUTH	194
OR 200	TERRITORIAL	200
OR 201	CENTRAL OREGON	7
OR 201	OLDS FERRY-ONTARIO	455
OR 201	SUCCOR CREEK	450
OR 202	NEHALEM	102
OR 203	LA GRANDE-BAKER	66
OR 203	MEDICAL SPRINGS	340
OR 203	OLD OREGON TRAIL	6
OR 204	WESTON-ELGIN	330
OR 205	FRENCHGLEN	440
OR 206	CELILO-WASCO	301
OR 206	JOHN DAY	5
OR 206	WASCO-HEPPNER	300
OR 207	HEPPNER	52
OR 207	HEPPNER-SPRAY	321
OR 207	HERMISTON	333
OR 207	JOHN DAY	5
OR 207	LEXINGTON-ECHO	320
OR 207	SERVICE CREEK-MITCHELL	390
OR 207	WASCO-HEPPNER	300
OR 210	SCHOLLS	143
OR 211	CLACKAMAS	171
OR 211	EAGLE CREEK-SANDY	172
OR 211	WOODBURN-ESTACADA	161
OR 212	CLACKAMAS	171
OR 212	CLACKAMAS-BORING	174
OR 213	CASCADE HWY NORTH	68
OR 213	CASCADE HWY SOUTH	160
OR 213	CLACKAMAS	171
OR 213	EAST PORTLAND FREEWAY	64
OR 214	HILLSBORO-SILVERTON	140
OR 214	PACIFIC HIGHWAY EAST	1E (81)
OR 214	SILVER CREEK FALLS	163
OR 216	SHERARS BRIDGE	290
OR 216	THE DALLES-CALIFORNIA	4
OR 216	WAPINITIA	44
OR 217	BEAVERTON-TIGARD	144

OR 218	SHANIKO-FOSSIL	291
OR 219	HILLSBORO-SILVERTON	140
OR 219	PACIFIC HIGHWAY WEST	1W (91)
OR 221	SALEM-DAYTON	150
OR 222	SPRINGFIELD-CRESWELL	222
OR 223	DALLAS-RICKREALL	189
OR 223	KINGS VALLEY	191
OR 224	CLACKAMAS	171
OR 224	EAST PORTLAND FREEWAY	64
OR 225	MCVAY	225
OR 226	ALBANY-LYONS	211
OR 227	TILLER-TRAIL	230
OR 228	HALSEY-SWEET HOME	212
OR 229	SILETZ	181
OR 230	WEST DIAMOND LAKE	233
OR 233	AMITY-DAYTON	155
OR 233	LAFAYETTE	154
OR 233	SALMON RIVER	39
OR 234	SAMS VALLEY	271
OR 237	COVE	342
OR 237	LA GRANDE-BAKER	66
OR 238	JACKSONVILLE	272
OR 240	YAMHILL-NEWBERG	151
OR 241	COOS RIVER	241
OR 242	MCKENZIE	15
OR 244	UKIAH-HILGARD	341
OR 245	DOOLEY MOUNTAIN	415
OR 250	CAPE BLANCO	250
OR 251	PORT ORFORD	251
OR 255	CARPENTERVILLE	255
OR 260	ROGUE RIVER LOOP	260
OR 273	SISKIYOU	273
OR 281	HOOD RIVER	281
OR 282	ODELL	282
OR 293	ANTELOPE	293
OR 331	UMATILLA MISSION	331
OR 332	SUNNYSIDE-UMAPINE	332
OR 334	ATHENA-HOLDMAN	334
OR 335	HAVANA-HELIX	335
OR 339	FREEWATER	339
OR 350	LITTLE SHEEP CREEK	350
OR 351	JOSEPH-WALLOWA LAKE	351
OR 361	CULVER	361
OR 370	O'NEIL	370
OR 380	PAULINA	380

OR 402	KIMBERLY-LONG CREEK	402
OR 410	SUMPTER	410
OR 413	HALFWAY-CORNUCOPIA	413
OR 414	PINE CREEK	414
OR 422	CHILOQUIN	422
OR 422S	CHILOQUIN	422
OR 429	CRESCENT LAKE	429
OR 451	VALE-WEST	451
OR 452	SUCCOR CREEK	450
OR 453	ADRIAN-ARENA VALLEY	453
OR 454	ADRIAN-CALDWELL	454
OR 501	ALSEA-DEADWOOD	201
OR 528	SPRINGFIELD	228
OR 540	CAPE ARAGO	240
OR 542	POWERS	242
OR 551	WILSONVILLE-HUBBARD	51

APPENDIX B – ACRONYMS

ACRONYMS

AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
ATR	Automatic Traffic Recorder
TWLTL	Continuous Two-Way Left Turn Lane
DHV	Design Hourly Volume
FHWA	Federal Highway Administration
GIS	Geographic Information System
MCTD	Oregon Motor Carrier Transportation Division
MP	Milepoint, Milepost
MPO	Metropolitan Planning Organization
NHS	National Highway System
OAR	Oregon Administrative Rules
ODOT	Oregon Department of Transportation
ORS	Oregon Revised Statutes
OSHA	Occupational Safety and Health Administration (U.S.)
OSP	Oregon State Police
OTC	Oregon Transportation Commission
OTIA	Oregon Transportation Investment Act
OTP	Oregon Transportation Plan
PCE	Passenger Car Equivalents
PE	Professional Engineer (registered licensed)
STIP	Statewide Transportation Improvement Plan
TSP	Transportation System Plan
TVT	ODOT's Transportation Volume Tables
UGB	Urban Growth Boundary
VMT	Vehicle Miles Traveled
Xing	Crossing

APPENDIX C – GLOSSARY OF TERMS

GLOSSARY OF TERMS

TERM	DEFINITION
Bidirectional Roadway	Two travel lanes with one lane of traffic in each direction, with little or no access control.
Capacity	The maximum number of vehicles that can pass a given section of roadway during a given period of time under prevailing roadway and traffic conditions.
Continuous Two-Way Left-Turn Lane	A traversable median to accommodate left-turn egress movements from opposite directions.
Delay	In this context, additional average travel time experienced per vehicle per hour.
Freeway	A fully access controlled highway.
Highway	(ORS 801.305) Every public way, road, street, thoroughfare and place, including bridges, viaducts and other structures within the boundaries of this state, open, used or intended for use of the general public for vehicles or vehicular traffic as a matter of right.
Lane Closure Restrictions	ODOT often limits the hours that work zone traffic lanes and roads may be closed in an effort to reduce motorist delay, inconvenience and crash potential.
Lane Drop	Lane Closure. When a travel lane is closed for construction
Manual Traffic Counts	Traffic counts used for analysis should be close to the work area, on the same type of highway designation and should also have been taken in the last three to five years.
Multilane Roadway	Four travel lanes with two lanes of traffic in each direction. It may or may not have a two way left turn lane or median and may have full, partial or limited access control.
MUTCD	The Manual of Uniform Traffic Control Devices and the ODOT supplements are standard guidance handbooks used by all designers in the state. This is mandated by Oregon state law.
OAR	Oregon Administrative Rules – Rules written by a government agency intended to clarify the intent of an adopted law.
ORS	Oregon Revised Statues – The laws that govern the State of Oregon.
Peak Hour	Hour of the day with the most traffic, usually during morning and evening commute times. Generally not the design hour.
Queue	A line of vehicles waiting to be served by the highway.
Raised Median	A non-traversable median where curbs delineate the median and the adjacent traffic lane.
Roadway	The portion of a highway improved, designed, or ordinarily used for vehicular travel, exclusive of the berm or shoulder.

TERM	DEFINITION
Seasonal Adjustments	Adjusting the traffic count data so that it reflects the time of year during which construction will take place, if different from the traffic count date.
Shoulder(s)	[ORS 801.480] The portion of a highway, whether paved or unpaved, contiguous to the roadway that is primarily used by pedestrians, stopped vehicles, for emergency use, exclusive of auxiliary lanes, curbs, and gutters.
Work Zone (WZ)	An area of a highway with construction, maintenance or utility work activities. It extends from the first warning sign to the “End Road Work” sign or the last traffic control device.

APPENDIX D – WEBSITES FOR ANALYSTS

WEBSITES FOR WZTA ANALYSTS

The Internet is dynamic and these addresses may change or vanish!
If you find a link that is not correct, please call Amanda Westmoreland at 503-986-3493.

ODOT TRAFFIC-ROADWAY SECTION

http://www.oregon.gov/ODOT/HWY/TS/traffic_control_plans.shtml

ODOT HIGHWAY CROSS REFERENCE TABLE

http://www.oregon.gov/ODOT/TD/TDATA/otms/Route_Hwy_CrossRef.shtml

ODOT DIGITAL VIDEO LOG

http://www.oregon.gov/ODOT/TD/TDATA/rics/VideoLog.shtml

ODOT TRAFFIC COUNTING PROGRAM

http://www.oregon.gov/ODOT/TD/TDATA/tsm/tvt.shtml

TRANSPORTATION PLANNING AND ANALYSIS UNIT (TPAU)

http://www.oregon.gov/ODOT/TD/TPAU/

STATE HIGHWAY INVENTORY REPORTS

http://www.oregon.gov/ODOT/TD/TDATA/otms/OTMS_Highway_Reports.shtml

2008 BOILDER PLATE SPECIAL PROVISIONS

http://www.oregon.gov/ODOT/TD/TDATA/otms/Route_Hwy_CrossRef.shtml

OTMS EQUATIONS AND MILEPOINT RANGE INFORMATION

http://highway.odot.state.or.us/cf/highwayreports/equations_milepoint_parms_xls.cfm

MCTD RESTRICTION NOTICE GUIDELINES

https://wzta.obdp.org/site/files/MCTDRestrictionNoticeGuidelines.pdf

MOTOR CARRIER ROUTE MAPS

http://www.oregon.gov/ODOT/MCT/OD.shtml#Route_Maps

APPENDIX E – CONSTRUCTION SPECIFICATIONS

ODOT'S LANE CLOSURE RESTRICTIONS

Section 00220.40 (e) - Standard Specifications

Construction

00220.40 General Requirements - Provide the following for public traffic in all construction areas:

(e) Lane Restrictions - Do not close any traffic lanes during the periods listed below:

(1) Weekdays:

- Between 7:00 a.m. and 9:00 a.m. and between 4:00 p.m. and 6:00 p.m. Monday through Thursday.
- Between 7:00 a.m. and 9:00 a.m. Friday morning.

(2) Weekends - Between 3:00 p.m. on Friday and midnight on Sunday.

(3) Holidays - Between noon on the day preceding a legal holiday or holiday weekend and midnight on a legal holiday or the last day of holiday weekend, except for Thanksgiving, when no lanes may be closed between noon on Wednesday and midnight on the following Sunday.

For the purposes of this Section, legal holidays are as follows:

- New Year's Day on January 1
- Memorial Day on the last Monday in May
- Independence Day on July 4
- Labor Day on the first Monday in September
- Thanksgiving Day on the fourth Thursday in November
- Christmas Day on December 25

When a holiday falls on Sunday, the following Monday shall be recognized as a legal holiday.

When a holiday falls on Saturday, the preceding Friday shall be recognized as a legal holiday.

(4) Special Events - Between noon on the day preceding and midnight on the final day of the special event.

ODOT'S LANE CLOSURE RESTRICTIONS

Section 220.40 (e) - Special Provisions

(Unless otherwise indicated by instruction, use all the subsections, paragraphs, and sentences on all projects.)

00220.40(e) Lane Restrictions - Replace the paragraph that begins "Do not close any…" with the following paragraph:

Do not close any traffic lanes and remove all barricades and objects from the roadway during the following periods:

(Use the following lead-in paragraph, and subsections (1) and (2) only when modifying lane restrictions. Submit a Traffic Analysis Work Request Form to the Region Traffic Office for the lane restrictions. It's available on the web at http://www.oregon.gov/ODOT/HWY/TS/resources.shtml)

Replace subsections (1) and (2) with the following:

(1) Weekdays:

- Between ____ a.m. and ____ a.m. and between ____ p.m. and ____ p.m. Monday through Thursday
- Between ____ a.m. and ____ a.m. Friday morning

(2) Weekends - Between ____ p.m. on Friday and midnight on Sunday.

(Use the following subsection (4) to list special events. List the names, times, and dates of the events.)

(4) Special Events - Add the following to the end of this subsection:

The following special events will occur during this Project:

- ____________________

Special Provisions - Lane Restrictions Simple Example

00220.40(e) Lane Restrictions - Do not close any traffic lanes on Example Highway (US XX), Monday through Friday, between:

10:00 a.m. - 6:00 p.m.

<u>Milepoints 1.04 to 7.00 and Milepoints 27.20 to 56.06</u>

Maintain a minimum of one lane with maximum closure length of 2.0 miles, except through the towns of Valley and Townsend the maximum closure length shall be reduced to 1/2 mile.

In addition, do not close any traffic lanes between:
3:00 p.m. on Fridays and midnight on Sundays.
Noon on the day preceding legal holidays or holiday weekends and midnight on legal holidays or the last day of holiday weekends, except for Thanksgiving, when no lanes may be closed between noon on Wednesday and midnight on the following Sunday.

For the purposes of this section, legal holidays are as follows:

New Year's Day on January 1
Memorial Day on the last Monday in May
Independence Day on July 4
Labor Day on the first Monday in September
Thanksgiving Day on the fourth Thursday in November
Christmas Day on December 25

When a holiday falls on Sunday, the following Monday shall be recognized as a legal holiday. When a holiday falls on Saturday, the preceding Friday shall be recognized as a legal holiday.

Roadways shall be free of barricades or other objects and all lanes opened to traffic during the restrictive periods listed above.

Special Provisions - Lane Restrictions Not-So-Simple Example

00220.40(e) Lane Restrictions - Do not close any traffic lanes on Caine Highway (OR XXX) and Bluebird Highway (OR XXX), as follows:

Caine Highway (OR XX) MP 0.00 to MP 4.31

Single Lane Closure:

	Westbound	Eastbound
Weekdays	6:00 AM – 7:00 PM	6:00 AM – 7:00 PM
Saturdays	10:00 AM – 6:00 PM	10:00 AM – 6:00 PM
Sundays	11:00 AM – 6:00 PM	11:00 AM – 6:00 PM

Caine Highway (OR XXX) / Landfall Freeway (I-XXX) MP 4.31 to MP 4.91 And Clear Highway North (OR XXX) / 2nd Ave.

Single Lane Closure:

	Northbound	Southbound
Weekdays	5:30 AM – 8:00 PM	6:00 AM – 8:00 PM
Saturdays	9:00 AM – 8:00 PM	9:00 AM – 8:00 PM
Sundays	11:00 AM – 8:00 PM	11:00 AM – 8:00 PM

Two Lane Closure:

	Northbound	Southbound
Weekdays	5:00 AM – 12 Midnight	5:00 AM – 12 Midnight
Saturdays	6:00 AM – 12 Midnight	12 Midnight Friday – 12 30 AM 6:30 AM – 12 Midnight
Sundays	8:00 AM – 12 Midnight	8:00 AM – 12 Midnight

Caines Highway (OR XXX) MP 4.91 to MP 5.06

Single Lane Closure:

	Westbound	Eastbound
Weekdays	5:00 AM – 8:00 PM	5:00 AM – 8:00 PM
Saturdays	10:00 AM – 7:00 PM	10:00 AM – 7:00 PM
Sundays	11:00 AM – 7:00 PM	11:00 AM – 7:00 PM

In addition, do not close any traffic lanes between:

12:00 noon on the day preceding legal holidays or holiday weekends and 12:00 midnight on legal holidays or the last day of holiday weekends, except for Thanksgiving, when no lanes may be closed between 12:00 noon on Wednesday and 12:00 midnight on the following Sunday.

For the purposes of this section, legal holidays are as follows:

New Year's Day on January 1
Memorial Day on the last Monday in May
Independence Day on July 4
Labor Day on the first Monday in September
Thanksgiving Day on the fourth Thursday in November
Christmas Day on December 25

When a holiday falls on Sunday, the following Monday shall be recognized as a legal holiday. When a holiday falls on Saturday, the preceding Friday shall be recognized as a legal holiday.

Roadways shall be free of barricades or other objects and all lanes opened to traffic during these periods.

APPENDIX F – EXAMPLE PROJECT MEMOS

EXAMPLE 1

Project Memo Example – Two-lane Highway

Oregon Department of Transportation **INTEROFFICE MEMO**
Region X Traffic Unit (xxx) xxx-xxxx
Fax (xxx) xxx-xxxx

DATE: XXX

TO: XXX
Title

FROM: Your Name
Title

SUBJECT: Work Zone Restrictions
Project Name
XX Highway No. X (Route No.), M.P. xx.xx – M.P. xx.xx
Key #XXXXX

Recommendations on lane restrictions for the subject project are shown below.

00220.40(e) Lane Restrictions:

Do not close any traffic lanes as follows:

<u>XXX Highway (Route No.)</u>
No lane closures are allowed between X:XX p.m. and X:XX p.m. on weekdays.
Lane closures may be allowed at any time on weekends.
Alternating one-way traffic operations controlled by flaggers would be needed during lane closures.

Cross Streets (as applicable)
No lane closures are allowed between 4:00 p.m. and 6:00 p.m. on weekdays.
Lane closures may be allowed at any time on weekends.
Alternating one-way traffic operations controlled by flaggers would be needed during lane closures.

In addition, do not close any traffic lanes between:

Noon on the day preceding legal holidays or holiday weekends and 12:00 midnight on legal holidays or the last day of holiday weekends, except for Thanksgiving, when no lanes may be closed between 12:00 noon on Wednesday and 12:00 midnight on the following Sunday.

For the purposes of this section, legal holidays are as follows:

New Year's Day on January 1
Memorial Day on the last Monday in May
Independence Day on July 4
Labor Day on the first Monday in September
Thanksgiving Day on the fourth Thursday in November
Christmas Day on December 25

When a holiday falls on Sunday, the following Monday shall be recognized as a legal holiday. When a holiday falls on Saturday, the preceding Friday shall be recognized as a legal holiday.

Also, do not close any traffic lanes during the following special events:

List of special events, festivals, sports events

Roadways shall be free of barricades or other objects and all lanes opened during these periods.

Please call me at (xxx) xxx-xxxx if you have any questions or need additional information.

Cc: John Smith
Mary Jones

EXAMPLE 2

Project Memo Example - Multilane Highway

Oregon Department of Transportation **INTEROFFICE MEMO**
Region X Traffic Unit (xxx) xxx-xxxx
Fax (xxx) xxx-xxxx

DATE: XXX

TO: XXX
Title

FROM: Your Name

Title

SUBJECT: Work Zone Restrictions
Project Name
XX Highway No. X (Route No.), M.P. xx.xx – M.P. xx.xx
Key #XXXXX

Recommendations on lane restrictions for the subject project are shown below.

00220.40(e) Lane Restrictions:

Do not close any traffic lanes as follows:

XXX Highway (Route No) Northbound and Southbound

No single lane closures are allowed:
Between 6:00 a.m. and 7:00 p.m., Monday - Friday
Between 10:00 a.m. and 6:00 p.m., Saturday - Sunday

In addition, do not close any traffic lanes between:

Noon on the day preceding legal holidays or holiday weekends and 12:00 midnight on legal holidays or the last day of holiday weekends, except for Thanksgiving, when no lanes may be closed between 12:00 noon on Wednesday and 12:00 midnight on the following Sunday.

For the purposes of this section, legal holidays are as follows:

New Year's Day on January 1
Memorial Day on the last Monday in May
Independence Day on July 4
Labor Day on the first Monday in September
Thanksgiving Day on the fourth Thursday in November
Christmas Day on December 25

When a holiday falls on Sunday, the following Monday shall be recognized as a legal holiday. When a holiday falls on Saturday, the preceding Friday shall be recognized as a legal holiday.

Roadways shall be free of barricades or other objects and all lanes opened during these periods.

Please call me at (xxx) xxx-xxxx if you have any questions or need additional information.

Cc: John Smith
Mary Jones

EXAMPLE 3

Oregon

Theodore R. Kulongoski, Governor

INTER OFFICE MEMO

Department of Transportation
Traffic Unit
63055 N Hwy 97
Bend, OR 97701
(503) 555-1234

30 June 2050

TO: John Smith, Project Leader

FROM: Jane Doe, TCP Designer & Traffic Analyst

SUBJECT: Work Zone Lane Restrictions & Travel Delay Estimate
Specified Project Name and Location

ODOT Region 4 Traffic Section recommends the following lane usage for construction:

The passing lane on US 97 in the 20th Century Drive area may be closed during construction. Due to the volume of traffic, the contractor will be required to maintain at least one lane of travel each way. The anticipated delay generated by this passing lane closure is calculated at less than 1 minute.

For this project the standard holiday and weekend restrictions will apply. Holidays that fall on a Monday have restrictions that run from the preceding Friday at noon through the midnight of the following Monday/Tuesday evening. Holidays that fall during the work week have restrictions that run from the noon of day before to midnight of the holiday. For those holidays that fall on a Friday, restrictions from the noon of the Thursday before, to the midnight of the following Sunday/Monday evening. Weekend restrictions extend from Friday at noon to midnight of the following Sunday/Monday evening. Construction is not allowed during the July 4th Independence Day holiday and the July 28 through July 30 All-State Mosquito Festival.

If you have any questions or concerns on the lane restrictions or travel delay estimates, please call me at (503) 555-1234.

2010 ATR CHARACTERISTIC TABLE (Printed: 07/07/10)

SEASONAL TRAFFIC TREND	AREA TYPE	# OF LANES	WEEKLY TRAFFIC TREND	AADT	OHP CLASSIFICATION	ATR	COUNTY	HIGHWAY ROUTE, NAME, & LOCATION	MP	STATE HIGHWAY NUMBER
SUMMER < 2500	RURAL	2	WEEKDAY	760	DISTRICT HIGHWAY	01-001	BAKER	US30, LA GRANDE-BAKER HIWY, 4.84 MILES SOUTH OF UNION BAKER COUNTY LINE	37.70	66
SUMMER < 2500	RURAL	2	WEEKDAY	210	DISTRICT HIGHWAY	01-007	BAKER	OR203, MEDICAL SPRINGS HWY, 2.08 MILES EAST OF OLD OREGON TRAIL	36.86	340
SUMMER < 2500	RURAL	2	WEEKEND	600	DISTRICT HIGHWAY	01-010	BAKER	OR 86, BAKER-COPPERFIELD HWY, 2.21 MILES NORTHWEST OF DRY GULCH ROAD	37.55	12
INTERSTATE NON-URBANIZED	RURAL	4	WEEKEND	8900	INTERSTATE HIGHWAY	01-011	BAKER	I84, OLD OREGON TRAIL, 0.45 MILES SOUTH OF UNION-BAKER COUNTY LINE	286.65	6
RECREATIONAL SUMMER	RURAL	2	WEEKEND	1400	REGIONAL HIGHWAY	01-012	BAKER	OR 7, WHITNEY HWY, 0.20 MILES SOUTH OF GRIFFIN GULCH LANE	48.20	71
COASTAL DESTINATION	RURAL	2	WEEKEND	2000	DISTRICT HIGHWAY	02-003	BENTON	OR 34, ALSEA HWY, 4.67 MILES SOUTHWEST OF CORVALLIS NEWPORT HWY	53.89	27
AGRICULTURAL	RURAL	2	STEADY	1000	DISTRICT HIGHWAY	02-005	BENTON	OR 223, KINGS VALLEY HWY, 1.41 MILES SOUTH OF HOSKINS-SUMMIT ROAD	26.43	191
COMMUTER	RURAL	2	WEEKDAY	5000	REGIONAL HIGHWAY	02-007	BENTON	OR 99W, PACIFIC HWY WEST,5.47 MILES NORTH OF MONROE CEMETARY ROAD	94.90	91
RECREATIONAL SUMMER / WINTER	RURAL	2	WEEKEND	8700	STATEWIDE HIGHWAY	03-006	CLACKAMAS	US 26, MT. HOOD HWY, 0.79 MILES EAST OF E. ARLIE MITCHELL ROAD IN RHODODENDRON	44.87	26
RECREATIONAL WINTER	RURAL	2	WEEKEND	2100	STATEWIDE HIGHWAY	03-007	CLACKAMAS	OR 35, MT. HOOD HWY, 0.18 MILES EAST OF WARM SPRINGS HWY	57.99	26
RECREATIONAL SUMMER / WINTER	RURAL	2	WEEKEND	1600	DISTRICT HIGHWAY	03-008	CLACKAMAS	OR173, TIMBERLINE HWY, 0.04 MILES NORTH OF MT HOOD HWY	5.45	173
RECREATIONAL SUMMER	RURAL	2	WEEKEND	4900	STATEWIDE HIGHWAY	03-009	CLACKAMAS	US26, WARM SPRINGS HWY, 0.32 MILES SOUTH OF MT HOOD HWY	57.77	53
INTERSTATE NON-URBANIZED	URBANIZED	6	WEEKEND	85700	INTERSTATE HIGHWAY	03-011	CLACKAMAS	I5, PACIFIC HWY, 1.38 MILES SOUTH OF WISONVILLE-HUBBARD HWY	281.20	1
AGRICULTURAL	RURAL	2	WEEKDAY	3900	DISTRICT HIGHWAY	03-013	CLACKAMAS	OR 213, CASCADE HWY (SOUTH), 2.05 MILES NORTHEAST OF CLACKAMAS-MARION COUNTY LINE	22.15	160
AGRICULTURAL	RURAL	2	STEADY	2300	DISTRICT HIGHWAY	03-014	CLACKAMAS	OR 211, WOODBURN-ESTACADA HWY, 3.17 MILES NORTHEAST OF WALL STREET	24.35	161
INTERSTATE URBANIZED	URBANIZED	6	STEADY	79600	INTERSTATE HIGHWAY	03-016	CLACKAMAS	I-205, E. PORTLAND FREEWAY, 1.99 MILES EAST OF PACIFIC HWY	1.27	64
COMMUTER	URBANIZED	4	WEEKDAY	32100	STATEWIDE HIGHWAY	03-017	CLACKAMAS	OR212, CLACKAMAS HWY, 0.14 MILES WEST OF S.E. 122ND AVENUE	6.8	171
COMMUTER	URBANIZED	5	WEEKDAY	35400	STATEWIDE HIGHWAY	03-018	CLACKAMAS	OR224, CLACKAMAS HWY, 0.13 MILES WEST OF JOHNSON ROAD	3.6	171
COASTAL DESTINATION	SMALL URBAN FRINGE	4	WEEKEND	13800	STATEWIDE HIGHWAY	04-001	CLATSOP	US 101, OREGON COAST HWY, 2.09 MILES NORTH OF GEARHART LOOP ROAD	15.90	9
COASTAL DESTINATION ROUTE	SMALL URBAN FRINGE	2	WEEKEND	7200	STATEWIDE HIGHWAY	04-004	CLATSOP	US 101, OREGON COAST HWY, 0.01 MILES NORTH OF LOWER COLUMBIA RIVER HWY	3.79	9
SUMMER	RURAL	2	WEEKEND	10300	STATEWIDE HIGHWAY	05-006	COLUMBIA	US 30, LOWER COLUMBIA RIVER HWY, 1.03 MILES WEST OF RAINIER ROAD	53.33	92
COASTAL DESTINATION ROUTE	RURAL	2	WEEKEND	7600	STATEWIDE HIGHWAY	06-001	COOS	US 101, OREGON COAST HWY, 1.9 MILES SOUTH OF COOS-DOUGLAS COUNTY LINE	221.67	9
COASTAL DESTINATION	RURAL POPULATED	2	WEEKDAY	6200	STATEWIDE HIGHWAY	06-004	COOS	US 101, OREGON COAST HWY, 1.02 MILES SOUTH OF 18TH S.W.S STREET	275.87	9
COASTAL DESTINATION	SMALL URBAN FRINGE	4	WEEKDAY	13700	STATEWIDE HIGHWAY	06-009	COOS	US 101, OREGON COAST HWY, 0.28 MILES NORTH OF COOS BAY-ROSEBURB HWY	243.99	9
SUMMER	RURAL	2	WEEKEND	2700	STATEWIDE HIGHWAY	07-001	CROOK	US 26, OCHOCO HWY, 2.03 MILES WEST OF OCHOCO DAM	22.85	41
COMMUTER	SMALL URBAN FRINGE	2	WEEKDAY	7000	STATEWIDE HIGHWAY	07-002	CROOK	OR126, OCHOCO HWY, 0.35 MILES WEST OF DESCHUTES-CROOK COUNTY LINE	3.23	41
COASTAL DESTINATION	SMALL URBAN FRINGE	2	STEADY	8700	STATEWIDE HIGHWAY	08-005	CURRY	US 101, OREGON COAST HWY, 1.11 MILES NORTH OF OREGON-CALIFORNIA STATE LINE	362.00	9
COASTAL DESTINATION ROUTE	RURAL POPULATED	4	WEEKDAY	2700	STATEWIDE HIGHWAY	08-009	CURRY	US 101, OREGON COAST HWY, 0.11 MILES SOUTHEAST OF JEFFERSON STREET (BATTLE ROCK WAYSIDE)	301.45	9
SUMMER	URBANIZED	4	WEEKDAY	20400	STATEWIDE HIGHWAY	09-003	DESCHUTES	US 97, THE DALLES-CA HWY, 0.17 MILES SOUTH OF CHINA HAT ROAD	142.41	4
SUMMER	RURAL	2	WEEKEND	2500	STATEWIDE HIGHWAY	09-005	DESCHUTES	US 20, CENTRAL OREGON HWY, 1.49 MILES EAST OF POWELL BUTTE ROAD	6.28	7
COMMUTER	URBANIZED	4	WEEKDAY	42200	STATEWIDE HIGHWAY	09-007	DESCHUTES	US 97, THE DALLES-CA HWY, 0.49 MILES SOUTH OF EMPIRE AVENUE	135.95	4
SUMMER	URBANIZED	4	WEEKDAY	38100	STATEWIDE HIGHWAY	09-009	DESCHUTES	US 97, THE DALLES-CA HWY, 0.23 MILES SOUTH OF REVERE AVENUE	137.96	4
RECREATIONAL SUMMER	RURAL	2	WEEKEND	7600	STATEWIDE HIGHWAY	09-014	DESCHUTES	US 20 / OR 126, SANTIAM HWY, 0.31 MILES SOUTH OF BLACK BUTTE RANCH ROAD	93.19	16
SUMMER	RURAL	2	WEEKEND	8900	STATEWIDE HIGHWAY	09-015	DESCHUTES	US 20, MCKENZIE-BEND HWY, 0.47 MILES NORTHWEST OF INNES MARKET ROAD	9.25	17
COMMUTER	SMALL URBAN FRINGE	5	WEEKDAY	27200	STATEWIDE HIGHWAY	09-020	DESCHUTES	US 97, THE DALLES-CA HWY, 1.40 MILES SOUTH OF YEW AVENUE	124.45	4
SUMMER	RURAL	2	STEADY	7900	STATEWIDE HIGHWAY	09-021	DESCHUTES	OR126, MCKENZIE WHY, 1.38 MILES WEST OF S.W. HELMHOLT WAY	108.27	15
SUMMER < 2500	RURAL	2	WEEKEND	1200	STATEWIDE HIGHWAY	09-024	DESCHUTES	US20, CENTRAL OREGON HWY, 5.80 MILES NORTHWEST OF DESCHUTES-LAKE COUNTY LINE	63.45	7
COASTAL DESTINATION ROUTE	RURAL	2	WEEKEND	3300	STATEWIDE HIGHWAY	10-003	DOUGLAS	OR 38, UMPQUA HWY, 7.08 MILES EAST OF SCOTTSBURG WEST ROAD	23.65	45
RECREATIONAL SUMMER	RURAL	2	WEEKEND	1000	REGIONAL HIGHWAY	10-004	DOUGLAS	OR 138, NORTH UMPQUA HWY, 0.10 EAST OF SUSAN CREEK ROAD	28.41	138
INTERSTATE NON-URBANIZED	SMALL URBAN FRINGE	4	STEADY	29900	INTERSTATE HIGHWAY	10-005	DOUGLAS	I5, PACIFIC HWY, 0.53 MILES NORTH OF WINCHESTER INTERCHANGE	129.75	1
AGRICULTURAL	RURAL	2	STEADY	5600	STATEWIDE HIGHWAY	10-006	DOUGLAS	OR 42, COOS BAY-ROSEBURG HWY, 1.22 MILES WEST OF BROCKWAY ROAD	70.51	35
INTERSTATE NON-URBANIZED	RURAL	4	WEEKEND	21500	INTERSTATE HIGHWAY	10-007	DOUGLAS	I5, PACIFIC HWY, 5.06 MILES NORTH OF OR99	145.39	1
INTERSTATE NON-URBANIZED	RURAL POPULATED	4	WEEKEND	19400	INTERSTATE HIGHWAY	10-008	DOUGLAS	I5, PACIFIC HWY, 0.54 MILES NORTH OF CANYONVILLE/DAYS CREEK INTERCHANGE (FIFTH STREET)	98.82	1
AGRICULTURAL	RURAL	2	STEADY	180	DISTRICT HIGHWAY	11-004	GILLIAM	OR 206, WASCO-HEPPNER HWY, 0.86 MILES EAST OF JOHN DAY HWY	41.74	300
SUMMER	RURAL	2	WEEKDAY	770	REGIONAL HIGHWAY	11-007	GILLIAM	OR19, JOHN DAY HWY, 6.31 MILES SOUTH OF COLUMBIA RIVER	6.81	5
INTERSTATE NON-URBANIZED	RURAL	4	WEEKEND	10500	INTERSTATE HIGHWAY	11-009	GILLIAM	I84, COLUMBIA RIVER HWY, 0.25 MILES EAST OF HEPPNER HWY	147.60	2
RECREATIONAL SUMMER	RURAL	2	WEEKEND	950	STATEWIDE HIGHWAY	12-003	GRANT	US26, JOHN DAY HWY, 1.05 MILES EAST OF FRANKS CREEK ROAD IN DAYVILLE	131.40	5
SUMMER < 2500	RURAL	2	WEEKEND	360	STATEWIDE HIGHWAY	12-006	GRANT	US 395, PENDLETON-JOHN DAY HWY, 0.62 MILES SOUTH OF BRIDGE OVER LONG CREEK	89.20	28
RECREATIONAL SUMMER	RURAL	2	WEEKEND	910	STATEWIDE HIGHWAY	12-009	GRANT	US 26, JOHN DAY HWY, 0.53 MILES EAST OF MAIN STREET IN PRAIRIE CITY	175.79	5
AGRICULTURAL	RURAL	2	WEEKEND	500	STATEWIDE HIGHWAY	13-001	HARNEY	US 395, JOHN DAY-BURNS HWY, 1.31 MILES NORTH OF CENTRAL OREGON HWY	66.3	48
SUMMER < 2500	RURAL	2	STEADY	2200	STATEWIDE HIGHWAY	13-003	HARNEY	US 20, CENTRAL OREGON HWY, 0.04 MILES NORTHEAST OF GREENHOUSE LANE, SOUTHWEST OF HINES	126.60	7
SUMMER < 2500	RURAL	2	WEEKDAY	420	DISTRICT HIGHWAY	13-005	HARNEY	OR 205, FRENCH GLEN HWY, 0.01 MILES SOUTH OF STEENS HWY	0.01	440
SUMMER < 2500	RURAL	2	WEEKDAY	1500	REGIONAL HIGHWAY	13-007	HARNEY	OR 78, STEENS HWY, 0.03 MILES WEST OF FRENCHGLEN HWY	1.70	442
RECREATIONAL SUMMER / WINTER	RURAL	2	WEEKEND	1300	STATEWIDE HIGHWAY	14-003	HOOD RIVER	OR 35, MT. HOOD HWY, 2.12 MILES SOUTH OF HOOD RIVER HWY	82.91	26
INTERSTATE NON-URBANIZED	RURAL	4	WEEKDAY	33200	INTERSTATE HIGHWAY	15-001	JACKSON	I5, PACIFIC HWY, 2.77 MILES SOUTH OF THE VALLEY OF THE ROGUE BRIDGE	42.84	1

2010 ATR CHARACTERISTIC TABLE (Printed: 07/07/10)										
SEASONAL TRAFFIC TREND	**AREA TYPE**	**# OF LANES**	**WEEKLY TRAFFIC TREND**	**AADT**	**OHP CLASSIFICATION**	**ATR**	**COUNTY**	**HIGHWAY ROUTE, NAME, & LOCATION**	**MP**	**STATE HIGHWAY NUMBER**
INTERSTATE NON-URBANIZED	RURAL	4	WEEKEND	15100	INTERSTATE HIGHWAY	15-002	JACKSON	I5, PACIFIC HWY, 0.86 MILES SOUTH OF ROGUE VALLEY HWY	11.03	1
SUMMER < 2500	RURAL	2	WEEKEND	1000	DISTRICT HIGHWAY	15-007	JACKSON	OR66, GREEN SPRINGS HWY, 0.15 MILES EAST OF SISKIYOU HWY	6.61	21
AGRICULTURAL	RURAL	2	STEADY	2900	DISTRICT HIGHWAY	15-011	JACKSON	OR 238, JACKSONVILLE HWY, 0.68 MILES WEST OF APPLEGATE ROAD AT RUCH	24.94	272
SUMMER	RURAL	4	WEEKEND	7400	REGIONAL HIGHWAY	15-013	JACKSON	OR 62, CRATER LAKE HWY, 1.71 MILES NORTH OF SAMS VALLEY	15.34	22
COMMUTER	RURAL POPULATED	4	WEEKDAY	9000	DISTRICT HIGHWAY	15-014	JACKSON	OR 99W, ROGUE VALLEY HWY, 0.44 MILES NORTHWEST OF TALENT RD	15.82	63
COMMUTER	URBANIZED	6	STEADY	41900	STATEWIDE HIGHWAY	15-017	JACKSON	OR62, CRATER LAKE HWY, 0.61 MILES EAST OF PACIFIC HWY	1.11	22
INTERSTATE URBANIZED	URBANIZED	4	WEEKDAY	46400	INTERSTATE HIGHWAY	15-019	JACKSON	I5, PACIFIC HWY, 0.33 MILES SOUTHEAST OF THE MEDFORD INTERCHANGE	28.33	1
SUMMER	RURAL	2	WEEKEND	2600	STATEWIDE HIGHWAY	15-020	JACKSON	OR 140, LAKE OF THE WOODS HWY, 1.27 MILES EAST OF LAKE CREEK LOOP	16.03	270
SUMMER	SMALL URBAN	3	WEEKEND	12400	STATEWIDE HIGHWAY	16-002	JEFFERSON	US 97 / US 26, THE DALLES-CA HWY, 0.37 MILES NORTH OF MADRAS-PRINEVILLE HWY	96.92	4
SUMMER	RURAL	2	WEEKEND	6600	STATEWIDE HIGHWAY	16-006	JEFFERSON	US 26, WARM SPRINGS HWY, 4.42 MILES NORTHWEST OF THE DALLES-CALIFORNIA HWY	113.29	53
INTERSTATE NON-URBANIZED	SMALL URBAN FRINGE	4	WEEKEND	20600	INTERSTATE HIGHWAY	17-001	JOSEPHINE	I5, PACIFIC HWY, 2.08 MILES SOUTH OF MONUMENT DRIVE	64.20	1
COASTAL DESTINATION ROUTE	RURAL	2	WEEKEND	2900	STATEWIDE HIGHWAY	17-003	JOSEPHINE	OR199, REDWOOD HWY, 0.37 MILES NORTH OF OREGON-CALIFORNIA STATE LINE	41.32	25
SUMMER	SMALL URBAN FRINGE	4	STEADY	10900	STATEWIDE HIGHWAY	17-005	JOSEPHINE	OR199, REDWOOD HWY, 0.50 MILES EAST OF REDWOOD AVENUE	4.68	25
RECREATIONAL SUMMER	RURAL	2	WEEKEND	4600	STATEWIDE HIGHWAY	18-006	KLAMATH	US97, THE DALLES-CA HWY, 0.40 MILES SOUTH OF CHEMULT DUMP ROAD	204.65	4
SUMMER < 2500	RURAL	2	STEADY	960	STATEWIDE HIGHWAY	18-017	KLAMATH	0R140, KLAMATH FALLS-LAKEVIEW HWY, 4.20 MILES EAST OF YELLOW JACKET SPRINGS ROAD AT BEATTY	44.98	20
COMMUTER	SMALL URBAN	5	WEEKDAY	23000	REGIONAL HIGHWAY	18-018	KLAMATH	OR 39, KLAMATH FALLS-MALLIN HWY, 0.46 MILES SOUTH OF MAIN STREET	-4.00	50
SUMMER	RURAL	2	WEEKEND	3600	STATEWIDE HIGHWAY	18-019	KLAMATH	US97, THE DALLES-CA HWY, AT THE OREGON-CALIFORNIA STATE LINE	289.44	4
AGRICULTURAL	RURAL	2	WEEKDAY	4200	STATEWIDE HIGHWAY	18-020	KLAMATH	OR39, KLAMATH FALLS-MALLIN HWY, 0.36 MILES WEST OF HATFIELD HWY	16.15	50
RECREATIONAL SUMMER	RURAL	2	WEEKEND	470	DISTRICT HIGHWAY	18-021	KLAMATH	OR 62, CRATER LAKE HWY, 0.28 MILES NORTHWEST OF SUN MOUNTAIN ROAD	91.05	22
SUMMER	RURAL	2	STEADY	5600	STATEWIDE HIGHWAY	18-022	KLAMATH	US97, THE DALLES-CA HWY, 3.53 MILES NORTH OF MODOC POINT ROAD	254.30	4
SUMMER < 2500	RURAL	2	WEEKEND	770	STATEWIDE HIGHWAY	18-023	KLAMATH	US97, THE DALLES-CALIFORNIA HWY, 4.32 MILES NORTH OF CHILOQUIN HWY	243.22	4
SUMMER < 2500	RURAL	2	STEADY	740	STATEWIDE HIGHWAY	19-004	LAKE	US395, FREMONT HWY, 0.26 MILES SOUTH OF LAKEVIEW-BURNS HWY	120.83	19
SUMMER < 2500	RURAL	2	WEEKEND	850	STATEWIDE HIGHWAY	19-008	LAKE	US398, FREMONT HWY, 0.30 MILES NORTH OF OREGON-CALIFORNIA STATE LINE	157.43	19
SUMMER < 2500	RURAL	2	WEEKEND	690	REGIONAL HIGHWAY	19-010	LAKE	OR 31, FREMONT HWY, 2.25 MILES SOUTHEAST OF 1ST STREET	49.60	19
SUMMER < 2500	RURAL	2	STEADY	1800	DISTRICT HIGHWAY	20-004	LANE	OR36, MAPLETON-JUNCTION CITY HWY, 2.36 MILES SOUTHWEST OF GOLDSON ROAD	41.04	229
COASTAL DESTINATION	RURAL	2	WEEKEND	6200	STATEWIDE HIGHWAY	20-005	LANE	OR126, FLORENCE-EUGENE HWY, 3.06 MILES WEST OF TERRITORIAL WHY	43.86	62
INTERSTATE URBANIZED	URBANIZED	6	WEEKDAY	57800	INTERSTATE HIGHWAY	20-008	LANE	1-105, EUGENE-SPRINGFIELD HWY, 0.66 MILES WEST OF PACIFIC HWY IN EUGENE	2.82	227
RECREATIONAL SUMMER	RURAL	2	WEEKEND	3300	STATEWIDE HIGHWAY	20-010	LANE	OR126, MCKENZIE HWY, 2.74 MILES EAST OF SOUTH GATE CREEK ROAD	29.14	15
COMMUTER	URBANIZED	4	WEEKDAY	48800	STATEWIDE HIGHWAY	20-011	LANE	OR569, BELTLINE HWY, 0.76 MILES WEST OF PACIFIC HWY	12.00	69
RECREATIONAL SUMMER	RURAL	2	WEEKEND	2600	STATEWIDE HIGHWAY	20-017	LANE	OR58, WILLAMETTE HWY, 0.10 MILES EAST OF KITSON SPRINGS ROAD	37.36	18
INTERSTATE NON-URBANIZED	RURAL	4	WEEKEND	22600	INTERSTATE HIGHWAY	20-020	LANE	I5, PACIFIC HWY, 1.24 MILES NORTH OF DOUGLAS-LANE COUNTY LINE	169.25	1
SUMMER < 2500	RURAL	2	STEADY	1600	DISTRICT HIGHWAY	20-023	LANE	OR200, TERRITORIAL HWY, 3.46 MILES SOUTH OF MAPLETON JUNCTION CITY HWY	13.54	200
COASTAL DESTINATION	RURAL	2	WEEKEND	5000	STATEWIDE HIGHWAY	21-006	LINCOLN	US20 / OR34, CORVALLIS-NEWPORT HWY, 0.11 MILES WEST OF LINCOLN-BENTON COUNTY LINE	34.24	33
COASTAL DESTINATION	SMALL URBAN FRINGE	3	WEEKEND	16000	STATEWIDE HIGHWAY	21-007	LINCOLN	US101, OREGON COAST HWY, AT WEST DEVILS LAKE ROAD	112.35	9
COASTAL DESTINATION	SMALL URBAN	5	WEEKEND	25000	STATEWIDE HIGHWAY	21-008	LINCOLN	US101, OREGON COAST HWY, 0.07 MILES NORTH OF "D" RIVER STATE WAYSIDE	114.91	9
COASTAL DESTINATION	SMALL URBAN	5	STEADY	18300	STATEWIDE HIGHWAY	21-009	LINCOLN	US101, OREGON COAST HWY, AT 25TH STREET IN NEWPORT	139.11	9
INTERSTATE NON-URBANIZED	SMALL URBAN FRINGE	4	STEADY	59500	INTERSTATE HIGHWAY	22-005	LINN	I5, PACIFIC HWY, 0.41 MILES NORTH OF ALBANY-JUNCTION CITY HWY	234.80	1
AGRICULTURAL	RURAL	2	WEEKDAY	4900	DISTRICT HIGHWAY	22-010	LINN	OR 226, ALBANY-LYONS HWY, 0.43 MILES EAST OF SANTIAM HWY	0.43	211
AGRICULTURAL	RURAL	2	WEEKDAY	2400	REGIONAL HIGHWAY	22-012	LINN	OR99E, ALBANY-JUNCTION CITY HWY, 2.28 MILES SOUTH OF HALSEY-SWEET HOME HWY	21.64	58
SUMMER	SMALL URBAN FRINGE	5	WEEKDAY	11600	REGIONAL HIGHWAY	22-013	LINN	US20, SOUTH SANTIAM HWY, 0.38 MILES SOUTHEAST OF SODAVILLE-WATERLOO DRIVE, SOUTHEAST OF LEBANON	19.05	16
INTERSTATE NON-URBANIZED	RURAL	4	WEEKEND	37400	INTERSTATE HIGHWAY	22-016	LINN	I5, PACIFIC HWY, 2.01 MILES SOUTH OF HALSEY-SWEET HOME HWY	214.56	1
RECREATIONAL SUMMER	RURAL	2	WEEKEND	1100	REGIONAL HIGHWAY	22-017	LINN	US20, SANTIAM HWY, 0.91 MILES WEST OF SODA FORK ROAD	51.47	16
COMMUTER	SMALL URBAN FRINGE	5	WEEKDAY	26900	STATEWIDE HIGHWAY	22-020	LINN	OR34, CORVALLIS-LEBANON HWY, 0.89 MILES EAST OF RIVERSIDE DRIVE	3.92	210
COMMUTER	URBANIZED	4	WEEKDAY	36700	REGIONAL HIGHWAY	22-022	LINN	US20 / 99E, ALBANY JUNCTION CITY HWY, 0.28 MILES NORTHEAST OF ALBANY-CORVALLIS HWY	2.14	58
AGRICULTURAL	RURAL	2	WEEKDAY	4800	STATEWIDE HIGHWAY	23-006	MALHEUR	US 20 / US 26, CENTRAL OREGON HWY, 0.26 MILES WEST OF OLDS FERRY ONTARIO HWY	257.86	7
SUMMER < 2500	RURAL	2	WEEKEND	1200	STATEWIDE HIGHWAY	23-012	MALHEUR	US 95, I.O.N. HWY, 6.74 MILES NORTH OF BLUE MOUNTAIN PASS SUMMIT	101.17	456
RECREATIONAL SUMMER	RURAL	2	WEEKEND	1200	STATEWIDE HIGHWAY	23-013	MALHEUR	US 20, CENTRAL OREGON HWY, 0.07 MILES EAST OF JUNTURA-RIVERSIDE ROAD	189.34	7
INTERSTATE NON-URBANIZED	RURAL	5	STEADY	16100	INTERSTATE HIGHWAY	23-014	MALHEUR	I84, OLD OREGON TRAIL, 1.03 MILES NORTHWEST OF OREGON-IDAHO STATE LINE	376.98	6
INTERSTATE NON-URBANIZED	RURAL	4	WEEKEND	8500	INTERSTATE HIGHWAY	23-016	MALHEUR	I84, OLD OREGON TRAIL, 1.47 MILES SOUTH OF BAKER-MALHEUR COUNTY LINE	353.47	6
COMMUTER	SMALL URBAN	2	WEEKDAY	10300	REGIONAL HIGHWAY	24-001	MARION	OR99E, PACIFIC HWY EAST, 1.29 MILES SOUTH OF HILLSBORO-SILVERTON HWY	34.16	81
SUMMER	URBANIZED	5	WEEKDAY	25000	STATEWIDE HIGHWAY	24-004	MARION	OR 22, NORTH SANTIAM HWY, 0.91 MILES EAST OF LANCASTER DRIVE INTERCHANGE	2.82	162
SUMMER	URBANIZED	4	WEEKDAY	19300	STATEWIDE HIGHWAY	24-005	MARION	OR 22, NORTH SANTIAM HWY, 3.35 MILES EAST OF SILVER CREEK FALLS HWY	10.02	162
RECREATIONAL SUMMER	RURAL	3	WEEKEND	4700	STATEWIDE HIGHWAY	24-013	MARION	OR22, NORTH SANTIAM HWY, 0.95 MILES WEST OF RAILROAD AVENUE S.E. (ENTRANCE TO MINTO COUNTY PARK)	33.69	162
COMMUTER	URBANIZED	4	WEEKDAY	85900	STATEWIDE HIGHWAY	24-014	MARION	OR 22, WILLAMINA-SALEM HWY, SALEM BRIDGE, AT THE POLK-MARION COUNTY LINE	25.9	30
RECREATIONAL SUMMER	RURAL	2	WEEKEND	4000	STATEWIDE HIGHWAY	24-015	MARION	OR 22, NORTH SANTIAM HWY, 1.20 MILES EAST OF DETROIT AVENUE	51.30	162

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SEASONAL TRAFFIC TREND	AREA TYPE	# OF LANES	WEEKLY TRAFFIC TREND	AADT	OHP CLASSIFICATION	ATR	COUNTY	HIGHWAY ROUTE, NAME, & LOCATION	MP	STATE HIGHWAY NUMBER
COMMUTER	RURAL	2	WEEKDAY	7700	REGIONAL HIGHWAY	**24-016**	MARION	OR551, WILSONVILLE-HUBBARD HWY, 0.22 MILES SOUTH OF EHLEN ROAD	3.70	51
SUMMER	RURAL	2	STEADY	2400	DISTRICT HIGHWAY	**24-020**	MARION	OR219, HILLSBORO-SILVERTON HWY, 1.85 MILES SOUT OF SOUTH OF ST. PAUL HWY N.E.	31.88	140
COMMUTER	RURAL	2	WEEKDAY	1390	REGIONAL HIGHWAY	**25-007**	MORROW	OR74, HEPPNER HWY, 1.38 MILES SOUTHEAST OF LEXINGTON-ECHO HWY	37.83	52
INTERSTATE NON-URBANIZED	RURAL	4	WEEKEND	13100	INTERSTATE HIGHWAY	**25-008**	MORROW	I84, OLD OREGON TRAIL, 0.60 MILES SOUTHEAST OF COLUMBIA RIVER HWY	168.55	6
INTERSTATE NON-URBANIZED	RURAL	4	WEEKEND	29500	INTERSTATE HIGHWAY	**26-001**	MULTNOMAH	I84, COLUMBIA RIVER HWY, 0.04 MILES WEST OF SANDY RIVER, EAST OF TROUTDALE	17.71	2
COMMUTER	URBANIZED	6	WEEKDAY	139800	STATEWIDE HIGHWAY	**26-002**	MULTNOMAH	US26, SUNSET HWY, 0.20 MILES WEST OF STADIUM FREEWAY AT THE VISTA RIDGE TUNNELS	73.75	47
COMMUTER	URBANIZED	5	WEEKDAY	32300	STATEWIDE HIGHWAY	**26-003**	MULTNOMAH	OR26, MT. HOOD HWY, 0.18 MILES SOUTHEAST OF S.E. POWELL VALLEY ROAD	14.36	26
INTERSTATE URBANIZED	URBANIZED	6	STEADY	121100	INTERSTATE HIGHWAY	**26-004**	MULTNOMAH	I5, PACIFIC HWY, 0.41 MILES SOUTH OF OREGON-WASHINGTON STATE LINE	307.97	1
INTERSTATE URBANIZED	URBANIZED	4	WEEKDAY	94800	INTERSTATE HIGHWAY	**26-005**	MULTNOMAH	I405, STADIUM FREEWAY HWY, 0.64 MILES NORTHWEST OF PACIFIC HWY	0.60	61
RECREATIONAL SUMMER	RURAL	2	WEEKEND	790	DISTRICT HIGHWAY	**26-012**	MULTNOMAH	HISTORIC COLUMBIA RIVER HWY, 0.10 MILES WEST OF BRIDAL VEIL FALLS STATE PARK	13.94	100
INTERSTATE URBANIZED	URBANIZED	6	WEEKDAY	161500	INTERSTATE HIGHWAY	**26-014**	MULTNOMAH	I84, COLUMBIA RIVER HWY, AT THE N.E 53RD AVENUE UNDERCROSSING	3.35	2
INTERSTATE URBANIZED	URBANIZED	6	WEEKDAY	142100	INTERSTATE HIGHWAY	**26-015**	MULTNOMAH	I84, COLUMBIA RIVER HWY, 0.49 MILES EAST OF PACIFIC HWY	0.49	2
INTERSTATE URBANIZED	URBANIZED	6	WEEKDAY	140900	INTERSTATE HIGHWAY	**26-016**	MULTNOMAH	I5, PACIFIC HWY, 1.07 MILES NORTH OF S.W. TERWILLIGER BLVD IN PORTLAND	298.24	1
INTERSTATE URBANIZED	URBANIZED	6	WEEKDAY	146500	INTERSTATE HIGHWAY	**26-018**	MULTNOMAH	I205, EAST PORTLAND FREEWAY, 0.22 MILES SOUTH OF S.E. WASHINGTON STREET UNDERCROSSING	20.35	64
INTERSTATE URBANIZED	URBANIZED	6	WEEKDAY	130000	INTERSTATE HIGHWAY	**26-019**	MULTNOMAH	I5, PACIFIC HWY, 0.03 MILES SOUTH OF NORTH AINSWORTH STREET UNDERCROSSING	304.66	1
INTERSTATE URBANIZED	URBANIZED	6	WEEKDAY	153000	INTERSTATE HIGHWAY	**26-022**	MULTNOMAH	I205, EAST PORTLAND FREEWAY, 0.87 MILES SOUTH OF MT. HOOD HWY	18.25	64
INTERSTATE URBANIZED	URBANIZED	8	WEEKDAY	136900	INTERSTATE HIGHWAY	**26-024**	MULTNOMAH	I205, EAST PORTLAND FREEWAY, 1.06 MILES SOUTH OF OREGON-WASHINGTON STATE LINE, ON GOVERNMENT ISLAND	25.50	64
INTERSTATE URBANIZED	URBANIZED	4	WEEKDAY	138700	INTERSTATE HIGHWAY	**26-026**	MULTNOMAH	I5, PACIFIC HWY, 0.34 MILES NORTHEAST OF STADIUM FREEWAY	300.37	1
INTERSTATE URBANIZED	URBANIZED	8	WEEKDAY	110200	INTERSTATE HIGHWAY	**26-027**	MULTNOMAH	I405, STADIUM FREEWAY HWY, 1.16 MILES SOUTHWEST OF PACIFIC HWY (WEST END OF FREMONT BRIDGE)	3.05	61
COASTAL DESTINATION	RURAL	2	WEEKEND	18600	STATEWIDE HIGHWAY	**27-001**	POLK	OR 18, SALMON RIVER HWY,0.19 MILES EAST OF THREE RIVERS HWY	23.76	39
COMMUTER	URBANIZED	2	WEEKDAY	12000	REGIONAL HIGHWAY	**27-002**	POLK	OR 221, SALEM-DAYTON HWY, 0.09 MILES NORTH OF BRUSH COLLEGE RD N.W.	18.60	150
COMMUTER	RURAL	2	WEEKDAY	7000	REGIONAL HIGHWAY	**27-005**	POLK	OR 99W, PACIFIC HWY WEST, 1.43 MILES NORTH OF POLK-BENTON COUNTY LINE	70.90	91
COMMUTER	URBANIZED	5	WEEKDAY	26300	STATEWIDE HIGHWAY	**27-006**	POLK	OR 22, WILLAMINA-SALEM HWY, 0.97 MILES WEST OF INDEPENDENCE HWY	19.40	30
SUMMER	RURAL	2	WEEKEND	2700	STATEWIDE HIGHWAY	**28-001**	SHERMAN	US 97, SHERMAN HWY, 0.83 MILES NORTHEAST OF 1ST ST.	17.36	42
INTERSTATE NON-URBANIZED	RURAL POPULATED	4	WEEKDAY	10800	INTERSTATE HIGHWAY	**28-002**	SHERMAN	I84, COLUMBIA RIVER HWY, 0.44 MILES WEST OF RUFUS/JOHN DAY DAM INTERCHANGE	109.51	2
COASTAL DESTINATION ROUTE	RURAL POPULATED	2	WEEKEND	6200	STATEWIDE HIGHWAY	**29-001**	TILLAMOOK	US 101, OREGON COAST HWY, 2.08 MILES SOUTH OF WASHINGTON STREET	53.75	9
SUMMER < 2500	RURAL	4	STEADY	2500	REGIONAL HIGHWAY	**30-002**	UMATILLA	US 730, COLUMBIA RIVER HWY, 0.24 MILES EAST OF PENDLETON-COLD SPRINGS HWY	193.70	2
INTERSTATE NON-URBANIZED	RURAL	4	WEEKEND	14600	INTERSTATE HIGHWAY	**30-004**	UMATILLA	I84, OLD OREGON TRAIL, 6.20 MILES WEST OF PENDLETON-JOHN DAY HWY	203.34	6
SUMMER < 2500	RURAL	2	WEEKEND	860	STATEWIDE HIGHWAY	**30-007**	UMATILLA	US395, PENDLETON-JOHN DAY HWY, 1.34 MILES SOUTHWEST OF W. MAIN STREET	16.7	28
COMMUTER	SMALL URBAN	5	WEEKDAY	22600	STATEWIDE HIGHWAY	**30-008**	UMATILLA	US395, PENDLETON-JOHN DAY HWY, 0.09 MILES SOUTH OF OLD OREGON TRAIL	1.77	28
RECREATIONAL SUMMER	RURAL	3	WEEKEND	1100	REGIONAL HIGHWAY	**30-012**	UMATILLA	OR204, WESTON-ELGIN HWY, 1.44 MILES SOUTHEAST OF OREGON-WASHINGTON HWY	0.12	330
COMMUTER	RURAL	2	WEEKDAY	7600	STATEWIDE HIGHWAY	**30-019**	UMATILLA	US395, UMATILLA-STANFIELD HWY, 0.12 MILES NORTHWEST OF FEEDVILL ROAD (NORTHWEST OF STANFIELD)	8.70	54
COMMUTER	SMALL URBAN	5	WEEKDAY	14700	STATEWIDE HIGHWAY	**30-021**	UMATILLA	OR11, OREGON-WASHINGTON HWY, 0.86 MILES SOUTH OF OREGON-WASHINGTON STATE LINE	34.46	8
INTERSTATE NON-URBANIZED	RURAL	4	WEEKEND	17100	INTERSTATE HIGHWAY	**30-025**	UMATILLA	I82, MCNARY HWY, 0.58 MILES SOUTH OF OREGON-WASHINGTON STATE LINE	0.58	70
INTERSTATE NON-URBANIZED	RURAL	4	WEEKEND	9500	INTERSTATE HIGHWAY	**30-026**	UMATILLA	I84, OLD OREGON TRAIL, 0.76 MILES SOUTHEAST OF UMATILLA-MISSION HWY	216.81	6
INTERSTATE NON-URBANIZED	RURAL	4	WEEKEND	14700	INTERSTATE HIGHWAY	**30-027**	UMATILLA	I84, OLD OREGON TRAIL, 2.56 MILES EAST OF UMATILLA-STANFILED HWY	191.4	6
COMMUTER	SMALL URBAN FRINGE	5	WEEKDAY	12000	STATEWIDE HIGHWAY	**31-003**	UNION	OR82, WALLOWA LAKE HWY, 0.82 MILES EAST OF OLD OREGON TRAIL HWY	1.74	10
RECREATIONAL SUMMER	RURAL	3	WEEKEND	1800	STATEWIDE HIGHWAY	**31-005**	UNION	OR82, WALLOWA LAKE HWY, 0.45 MILES NORTHEAST OF WESTON-ELGIN HWY	20.70	10
INTERSTATE NON-URBANIZED	RURAL	4	WEEKEND	20700	INTERSTATE HIGHWAY	**33-001**	WASCO	I84, COLUMBIA RIVER HWY, 0.72 MILES WEST OF THE ROWENA INTERCHANGE	75.93	2
AGRICULTURAL	RURAL	2	STEADY	2500	REGIONAL HIGHWAY	**33-005**	WASCO	US197, THE DALLES-CALIFORNIA HWY, 0.68 MILES SOUTH OF BOYD MARKET ROAD	10.30	4
COASTAL DESTINATION ROUTE	RURAL	2	WEEKEND	4900	REGIONAL HIGHWAY	**34-004**	WASHINGTON	OR6, WILSON RIVER HWY, 0.75 MILES WEST OF GLENWOOD LANE	38.55	37
COASTAL DESTINATION ROUTE	RURAL	2	WEEKEND	6900	STATEWIDE HIGHWAY	**34-005**	WASHINGTON	US 26, SUNSET HWY, AT VERNONIA ROAD	37.70	47
COASTAL DESTINATION ROUTE	RURAL	4	WEEKEND	21000	STATEWIDE HIGHWAY	**34-007**	WASHINGTON	US 26, SUNSET HWY, 1.00 MILES NORTHWEST OF GLENCOE ROAD INTERCHANGE	56.23	47
INTERSTATE URBANIZED	URBANIZED	8	WEEKDAY	153500	INTERSTATE HIGHWAY	**34-008**	WASHINGTON	I5, PACIFIC HWY, 0.34 MILES SOUTH OF BOONES FERRY ROAD INTERCHANGE	290.14	1
COMMUTER	URBANIZED	4	WEEEKDAY	33000	STATEWIDE HIGHWAY	**34-009**	WASHINGTON	OR8, TUALATIN VALLEY HWY, 0.28 MILES WEST OF N.W. 334TH AVENUE	14.84	29
COMMUTER	SMALL URBAN FRINGE	5	WEEKDAY	34100	STATEWIDE HIGHWAY	**36-004**	YAMHILL	OR99W, PACIFIC HWY WEST, 0.01 MILES WEST OF BRUTSCHER STREET	21.81	91
COMMUTER	RURAL	2	WEEKDAY	5500	REGIONAL HIGHWAY	**36-005**	YAMHILL	OR99W, PACIFIC HWY WEST, 0.37 MILES NORTH OF YAMHILL-POLK COUNTY LINE	47.15	91
SUMMER	SMALL URBAN FRINGE	2	WEEKEND	13600	STATEWIDE HIGHWAY	**36-006**	YAMHILL	OR18, SALMON RIVER HWY, 3.36 MILES SOUTH OF PACIFIC HWY WEST	41.00	39

Corridor Delay Thresholds

Established Corridor Thresholds - as of 11/2010

US 26 / 97 Delay Thresholds

Segment	Segment Boundaries	Area Type	Segment Length (Miles)	Assumed Travel Speed (MPH)	Est. Off-Peak Travel Time (Min.)	Est. Peak Travel Time (Min.)	Calc. Delay Threshold (Min.)
1-A1	OR 212: I-205 to US 26	Urban	12	N/A*	N/A*	N/A*	N/A*
1-A2	US 26: OR 212 too OR 216	Urban	48	55	66	95	10
1-B	OR 216 to OR 126	Other	66	55	72	79	8
1-C	OR 126 to OR 58	Other	74	55	80	88	9
1-D	OR 58 to Hwy 422	Other	54	55	59	65	7
1-E	Hwy 422 to State Line	Other	43	55	47	51	6
						Corridor Total	40

* See Travel Time Threshold Table

I-5 North / OR 58 Delay Thresholds

Segment	Segment Boundaries	Area Type	Segment Length (Miles)	Assumed Travel Speed (MPH)	Est. Off-Peak Travel Time (Min.)	Est. Peak Travel Time (Min.)	Calc. Delay Threshold (Min.)
2-A	WA State Line to Will. River	Urban	26	N/A*	N/A*	N/A*	N/A*
2-B	Will. River to OR 22	Urban	37	60	37	45	5
2-C	OR 22 to US 20	Semi	24	65	22	29	3
2-D	US 20 to OR 58	Semi	44	65	41	53	6
2-E	I-5 to Oakridge	Other	42	55	46	50	6
2-F	Oakridge to US 97	Other	51	55	56	61	7
						Corridor Total	27

* See Travel Time Threshold Table

I-84 Delay Thresholds

Segment	Segment Boundaries	Area Type	Segment Length (Miles)	Assumed Travel Speed (MPH)	Est. Off-Peak Travel Time (Min.)	Est. Peak Travel Time (Min.)	Calc. Delay Threshold (Min.)
3-A1	I-5 to I-205	Urban	6	N/A*	N/A*	N/A*	N/A*
3-A2	I-205 to Sandy River	Urban	12	N/A*	N/A*	N/A*	N/A*
3-B	OR 35 to US 97	Urban	46	60	46	50	5
3-C	US 97 to US 730	Other	40	65	37	41	5
3-D	US 730 to US 395	Other	63	65	58	64	7
3-E	US 395 to OR 82	Other	43	65	40	44	5
3-F	OR 82 to State Line	Other	51	65	47	52	6
3-G	45	Other	116	65	107	118	12
						Corridor Total	40

* See Travel Time Threshold Table

I-5 South Delay Thresholds

Segment	Segment Boundaries	Area Type	Segment Length (Miles)	Assumed Travel Speed (MPH)	Est. Off-Peak Travel Time (Min.)	Est. Peak Travel Time (Min.)	Calc. Delay Threshold (Min.)
4-A	OR 212: I-205 to US 26	Other	69	65	64	70	7
4-B	US 26: OR 212 too OR 216	Other	65	65	60	66	7
4-C	OR 216 to OR 126	Semi	55	65	51	67	7
						Corridor Total	21

Travel Time Thresholds

Segment	Segment Boundaries	Area Type	Segment Length (Miles)	Est. Peak Travel Time (Min.)	Travel Time Threshold (Min.)
1-A1	OR 212: I-205 to US 26	Urban	12	28	28
2-A	US 26: OR 212 too OR 216	Urban	26	50	50
3-A1	OR 216 to OR 126	Other	6	28	28
3-A2	OR 126 to OR 58	Other	12	17	17

FHWA Vehicle Classes with Definitions

1. ***Motorcycles*** -- All two or three-wheeled motorized vehicles. Typical vehicles in this category have saddle type seats and are steered by handlebars rather than steering wheels. This category includes motorcycles, motor scooters, mopeds, motor-powered bicycles, and three-wheel motorcycles.

2. ***Passenger Cars*** -- All sedans, coupes, and station wagons manufactured primarily for the purpose of carrying passengers and including those passenger cars pulling recreational or other light trailers.

3. ***Other Two-Axle, Four-Tire Single Unit Vehicles*** -- All two-axle, four-tire, vehicles, other than passenger cars. Included in this classification are pickups, panels, vans, and other vehicles such as campers, motor homes, ambulances, hearses, carryalls, and minibuses. Other two-axle, four-tire single-unit vehicles pulling recreational or other light trailers are included in this classification. *Because automatic vehicle classifiers have difficulty distinguishing class 3 from class 2, these two classes may be combined into class 2.*

4. ***Buses*** -- All vehicles manufactured as traditional passenger-carrying buses with two axles and six tires or three or more axles. This category includes only traditional buses (including school buses) functioning as passenger-carrying vehicles. Modified buses should be considered to be a truck and should be appropriately classified.

NOTE: In reporting information on trucks the following criteria should be used:

1. Truck tractor units traveling without a trailer will be considered single-unit trucks.
2. A truck tractor unit pulling other such units in a "saddle mount" configuration will be considered one single-unit truck and will be defined only by the axles on the pulling unit.
3. Vehicles are defined by the number of axles in contact with the road. Therefore, "floating" axles are counted only when in the down position.
4. The term "trailer" includes both semi- and full trailers.

5. ***Two-Axle, Six-Tire, Single-Unit Trucks*** -- All vehicles on a single frame including trucks, camping and recreational vehicles, motor homes, etc., with two axles and dual rear wheels.

6. ***Three-Axle Single-Unit Trucks*** -- All vehicles on a single frame including trucks, camping and recreational vehicles, motor homes, etc., with three axles.

7. ***Four or More Axle Single-Unit Trucks*** -- All trucks on a single frame with four or more axles.

8. ***Four or Fewer Axle Single-Trailer Trucks*** -- All vehicles with four or fewer axles consisting of two units, one of which is a tractor or straight truck power unit.

9. ***Five-Axle Single-Trailer Trucks*** -- All five-axle vehicles consisting of two units, one of which is a tractor or straight truck power unit.

10. ***Six or More Axle Single-Trailer Trucks*** -- All vehicles with six or more axles consisting of two units, one of which is a tractor or straight truck power unit.

11. ***Five or fewer Axle Multi-Trailer Trucks*** -- All vehicles with five or fewer axles consisting of three or more units, one of which is a tractor or straight truck power unit.

12. ***Six-Axle Multi-Trailer Trucks*** -- All six-axle vehicles consisting of three or more units, one of which is a tractor or straight truck power unit.

13. ***Seven or More Axle Multi-Trailer Trucks*** **--** All vehicles with seven or more axles consisting of three or more units, one of which is a tractor or straight truck power unit.

Interstate Routes

Route No.	Highway Name	Highway No.
I-5	PACIFIC	1
I-82	MCNARY	70
I-84	COLUMBIA RIVER	2
I-84	OLD OREGON TRAIL	6

Route No.	Highway Name	Highway No.
I-105	EUGENE-SPRINGFIELD	227
I-205	EAST PORTLAND FREEWAY	64
I-405	STADIUM FREEWAY	61

US Routes

Route No.	Highway Name	Highway No.
US 20	ALBANY-CORVALLIS	31
US 20	ALBANY-JUNCTION CITY	57
US 20	CENTRAL OREGON	7
US 20	CORVALLIS-LEBANON	210
US 20	CORVALLIS-NEWPORT	33
US 20	MCKENZIE	15
US 20	MCKENZIE-BEND	17
US 20	PACIFIC HIGHWAY WEST	1W (91)
US 20	SANTIAM	16
US 26	CENTRAL OREGON	7
US 26	JOHN DAY	5
US 26	MADRAS-PRINEVILLE	360
US 26	MT. HOOD	26
US 26	OCHOCO	41
US 26	STADIUM FREEWAY	61
US 26	SUNSET	47
US 26	THE DALLES-CALIFORNIA	4
US 26	WARM SPRINGS	53
US 30	COLUMBIA RIVER	2
US 30	HISTORIC COLUMBIA RIVER	100
US 30	HUNTINGTON	449
US 30	LA GRANDE-BAKER	66
US 30	LOWER COLUMBIA RIVER	2W (92)
US 30	MOSIER-THE DALLES	292
US 30	OLD OREGON TRAIL	6
US 30	OREGON-WASHINGTON	8
US 30	PACIFIC	1
US 30	PENDLETON	67
US 30	STADIUM FREEWAY	61
US 30	THE DALLES-CALIFORNIA	4
US 30	ONTARIO SPUR	493
US 30B	OLDS FERRY-ONTARIO	455
US 30B	ONTARIO SPUR	493

Route No.	Highway Name	Highway No.
US 30BY	NORTHEAST PORTLAND	123
US 95	I.O.N.	456
US 95S	WEISER SPUR	491
US 97	SHERMAN	42
US 97	THE DALLES-CALIFORNIA	4
US 97B	KLAMATH FALLS-LAKEVIEW	20
US 97B	KLAMATH FALLS-MALIN	50
US 97B	MCKENZIE-BEND	17
US 97B	REDMOND SPUR	480
US 97B	ESPLANADE SPUR	484
US 101	OREGON COAST	9
US 101B	NEHALEM	102
US 101B	WARRENTON-ASTORIA	105
US 197	THE DALLES-CALIFORNIA	4
US 199	REDWOOD	25
US 395	CENTRAL OREGON	7
US 395	COLUMBIA RIVER	2
US 395	FREMONT	19
US 395	JOHN DAY	5
US 395	JOHN DAY-BURNS	48
US 395	LAKEVIEW-BURNS	49
US 395	MCNARY	70
US 395	OLD OREGON TRAIL	6
US 395	PENDLETON-JOHN DAY	28
US 395	UMATILLA-STANFIELD	54
US 730	COLUMBIA RIVER	2

Oregon Routes

Route No.	Highway Name	Highway No.
OR 3	ENTERPRISE-LEWISTON	11
OR 6	WILSON RIVER	37
OR 7	BAKER-COPPERFIELD	12
OR 7	LA GRANDE-BAKER	66
OR 7	WHITNEY	71
OR 8	TUALATIN VALLEY	29
OR 10	BEAVERTON-HILLSDALE	40
OR 10	FARMINGTON	142
OR 10	PACIFIC HIGHWAY WEST	1W (91)
OR 11	OREGON-WASHINGTON	8
OR 18	SALMON RIVER	39
OR 18	MCMINNVILLE SPUR	483
OR 18B	WILLAMINA-SHERIDAN	157
OR 19	JOHN DAY	5
OR 22	NORTH SANTIAM	162
OR 22	SALEM	72
OR 22	SALMON RIVER	39
OR 22	THREE RIVERS	32
OR 22	WILLAMINA-SALEM	30
OR 27	CROOKED RIVER	14
OR 31	FREMONT	19
OR 34	ALSEA	27
OR 34	CORVALLIS-LEBANON	210
OR 34	CORVALLIS-NEWPORT	33
OR 34	PACIFIC HIGHWAY WEST	1W (91)
OR 35	HISTORIC COLUMBIA RIVER	100
OR 35	MT. HOOD	26
OR 36	MAPLETON-JUNCTION CITY	229
OR 37	PENDLETON	67
OR 37	PENDLETON-COLD SPRINGS	36
OR 37	PENDLETON-JOHN DAY	28
OR 38	UMPQUA	45
OR 39	HATFIELD	426
OR 39	KLAMATH FALLS-LAKEVIEW	20
OR 39	KLAMATH FALLS-MALIN	50
OR 42	COOS BAY-ROSEBURG	35
OR 42S	COQUILLE-BANDON	244
OR 43	OSWEGO	3
OR 46	OREGON CAVES	38
OR 47	MIST-CLATSKANIE	110
OR 47	NEHALEM	102

Route No.	Highway Name	Highway No.
OR 47	SUNSET	47
OR 47	TUALATIN VALLEY	29
OR 51	INDEPENDENCE	193
OR 51	MONMOUTH-INDEPENDENCE	43
OR 52	PAYETTE SPUR	492
OR 53	NECANICUM	46
OR 58	WILLAMETTE	18
OR 62	CRATER LAKE	22
OR 66	GREEN SPRINGS	21
OR 69	BELTLINE	69
OR 70	DAIRY-BONANZA	23
OR 74	HEPPNER	52
OR 78	STEENS	442
OR 82	WALLOWA LAKE	10
OR 86	BAKER-COPPERFIELD	12
OR 86S	BAKER-COPPERFIELD	12
OR 86S	BAKER-COPPERFIELD SPUR	481
OR 99	COOS BAY-ROSEBURG	35
OR 99	GOSHEN-DIVIDE	226
OR 99	PACIFIC	1
OR 99	PACIFIC HIGHWAY WEST	1W (91)
OR 99	REDWOOD	25
OR 99	ROGUE RIVER	60
OR 99	ROGUE VALLEY	63
OR 99	SAMS VALLEY	271
OR 99	UMPQUA	45
OR 99	WILLAMETTE	18
OR 99	GOLD HILL SPUR	486
OR 99E	ALBANY-JUNCTION CITY	58
OR 99E	PACIFIC	1
OR 99E	PACIFIC HIGHWAY EAST	1E (81)
OR 99EB	SALEM	72
OR 99W	BELLEVUE-HOPEWELL	153
OR 99W	HILLSBORO-SILVERTON	140
OR 99W	PACIFIC HIGHWAY WEST	1W (91)
OR 103	FISHHAWK FALLS	103
OR 104	FORT STEVENS	104
OR 104S	FORT STEVENS SPUR	485
OR 120	SWIFT	120
OR 126	BELTLINE	69
OR 126	CLEAR LAKE-BELKNAP SPRINGS	215

Oregon Routes

Route No.	Highway Name	Highway No.
OR 126	EUGENE-SPRINGFIELD	227
OR 126	FLORENCE-EUGENE	62
OR 126	MCKENZIE	15
OR 126	OCHOCO	41
OR 126	PACIFIC HIGHWAY WEST	1W (91)
OR 126	SANTIAM	16
OR 126B	MCKENZIE	15
OR 126B	PACIFIC HIGHWAY WEST	1W (91)
OR 130	LITTLE NESTUCCA	130
OR 131	NETARTS	131
OR 138	ELKTON-SUTHERLIN	231
OR 138	NORTH UMPQUA	138
OR 138	PACIFIC	1
OR 140	FREMONT	19
OR 140	GREEN SPRINGS	21
OR 140	KLAMATH FALLS-LAKEVIEW	20
OR 140	KLAMATH FALLS-MALIN	50
OR 140	LAKE OF THE WOODS	270
OR 140	SOUTH KLAMATH FALLS	424
OR 140	WARNER	431
OR 141	BEAVERTON-TUALATIN	141
OR 153	BELLEVUE-HOPEWELL	153
OR 154	LAFAYETTE	154
OR 164	JEFFERSON	164
OR 173	TIMBERLINE	173
OR 180	EDDYVILLE-BLODGETT	180
OR 194	MONMOUTH	194
OR 200	TERRITORIAL	200
OR 201	CENTRAL OREGON	7
OR 201	OLDS FERRY-ONTARIO	455
OR 201	SUCCOR CREEK	450
OR 201	HOMEDALE SPUR	490
OR 202	NEHALEM	102
OR 203	LA GRANDE-BAKER	66
OR 203	MEDICAL SPRINGS	340
OR 203	OLD OREGON TRAIL	6
OR 204	WESTON-ELGIN	330
OR 205	FRENCHGLEN	440
OR 206	CELILO-WASCO	301
OR 206	JOHN DAY	5
OR 206	WASCO-HEPPNER	300

Route No.	Highway Name	Highway No.
OR 207	HEPPNER	52
OR 207	HEPPNER-SPRAY	321
OR 207	HERMISTON	333
OR 207	JOHN DAY	5
OR 207	LEXINGTON-ECHO	320
OR 207	SERVICE CREEK-MITCHELL	390
OR 207	WASCO-HEPPNER	300
OR 210	SCHOLLS	143
OR 211	CLACKAMAS	171
OR 211	EAGLE CREEK-SANDY	172
OR 211	WOODBURN-ESTACADA	161
OR 212	CLACKAMAS	171
OR 212	CLACKAMAS-BORING	174
OR 213	CASCADE HWY NORTH	68
OR 213	CASCADE HWY SOUTH	160
OR 213	CLACKAMAS	171
OR 213	EAST PORTLAND FREEWAY	64
OR 214	HILLSBORO-SILVERTON	140
OR 214	PACIFIC HIGHWAY EAST	1E (81)
OR 214	SILVER CREEK FALLS	163
OR 216	SHERARS BRIDGE	290
OR 216	THE DALLES-CALIFORNIA	4
OR 216	WAPINITIA	44
OR 217	BEAVERTON-TIGARD	144
OR 218	SHANIKO-FOSSIL	291
OR 219	HILLSBORO-SILVERTON	140
OR 219	PACIFIC HIGHWAY WEST	1W (91)
OR 221	SALEM-DAYTON	150
OR 222	SPRINGFIELD-CRESWELL	222
OR 223	DALLAS-RICKREALL	189
OR 223	KINGS VALLEY	191
OR 224	CLACKAMAS	171
OR 224	EAST PORTLAND FREEWAY	64
OR 225	MCVAY	225
OR 226	ALBANY-LYONS	211
OR 227	TILLER-TRAIL	230
OR 228	HALSEY-SWEET HOME	212
OR 229	SILETZ	181
OR 230	WEST DIAMOND LAKE	233
OR 233	AMITY-DAYTON	155
OR 233	LAFAYETTE	154

Oregon Routes

Route No.	Highway Name	Highway No.
OR 233	SALMON RIVER	39
OR 234	SAMS VALLEY	271
OR 234	GOLD HILL SPUR	486
OR 237	COVE	342
OR 237	LA GRANDE-BAKER	66
OR 238	JACKSONVILLE	272
OR 240	YAMHILL-NEWBERG	151
OR 241	COOS RIVER	241
OR 242	MCKENZIE	15
OR 244	UKIAH-HILGARD	341
OR 245	DOOLEY MOUNTAIN	415
OR 250	CAPE BLANCO	250
OR 251	PORT ORFORD	251
OR 255	OREGON COAST	9
OR 255	CARPENTERVILLE	255
OR 260	ROGUE RIVER LOOP	260
OR 273	SISKIYOU	273
OR 281	HOOD RIVER	281
OR 282	ODELL	282
OR 293	ANTELOPE	293
OR 331	UMATILLA MISSION	331
OR 332	SUNNYSIDE-UMAPINE	332
OR 334	ATHENA-HOLDMAN	334
OR 335	HAVANA-HELIX	335
OR 339	FREEWATER	339
OR 350	LITTLE SHEEP CREEK	350
OR 351	JOSEPH-WALLOWA LAKE	351
OR 361	CULVER	361
OR 370	O'NEIL	370
OR 380	PAULINA	380
OR 402	KIMBERLY-LONG CREEK	402
OR 410	SUMPTER	410
OR 413	HALFWAY-CORNUCOPIA	413
OR 414	PINE CREEK	414
OR 422	CHILOQUIN	422
OR 422S	CHILOQUIN SPUR	488
OR 429	CRESCENT LAKE	429
OR 451	VALE-WEST	451
OR 452	PARMA SPUR	489
OR 453	ADRIAN-ARENA VALLEY	453
OR 454	ADRIAN-CALDWELL	454

Route No.	Highway Name	Highway No.
OR 501	ALSEA-DEADWOOD	201
OR 528	SPRINGFIELD	228
OR 540	CAPE ARAGO	240
OR 542	POWERS	242
OR 551	WILSONVILLE-HUBBARD	51
OR 569	BELTLINE	69

Web-Based WZTA Tool Users' Guide