Oregon Department of Transportation

TRAFFIC MANUAL

Traffic Engineering Section | Delivery & Ops. Division

June 2024 Edition

Oregon Department of Transportation

Engineering & Technical Services Branch

Traffic Engineering Section, MS#1
4040 Fairview Industrial Drive SE
Salem, Oregon 97302

503-986-3568

Traffic Engineering Website

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Preface

The Traffic Manual provides guidance on traffic engineering policies, establishes uniform methods and procedures, and communicates vital information about traffic engineering and operations on state highways. The intent is to support ODOT's mission of providing a safe and reliable multimodal transportation system that connects people and helps Oregon's communities and economy thrive. The Traffic Engineering Section publishes the Traffic Manual under the authority delegated to the state traffic engineer under Delegation Order EB-06.

This edition supersedes previous editions of the Traffic Manual effective **June 1, 2024**. New content presented in this edition does not imply that existing ODOT facilities, including but not limited to traffic control devices, are unsafe, nor does it mandate the initiation of improvement projects unless otherwise specified.

The Traffic Manual supports and complements the application of sound engineering judgement by transportation professionals. The intended audience of the Traffic Manual is transportation professionals practicing traffic engineering on Oregon state highways.

The Traffic Manual refers to subject specific ODOT publications when appropriate instead of duplicating information. The Traffic Manual does not contain roadway design policies and practices; see the Highway Design Manual for that information.

The state traffic investigations engineer maintains the Traffic Manual. Send comments or questions on this document to eric.s.leaming@odot.oregon.gov, or

State Traffic Investigations Engineer
ODOT Traffic Engineering Section, MS#1
4040 Fairview Industrial Drive SE
Salem, OR 97302

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Introduction

Organization

See **Table 1** for general organization of the Traffic Manual.

Table 1: Traffic Manual Organization

Part	Category	Example Sections
100	General Procedures, Authorities, and Concepts	Delegated Authority, Traffic Manual Updates
200	Safety	Crash Analysis, Safety Corridors, Sight Distance
300	Traffic Control Devices & Features	MUTCD, Interim Approvals, Signs, Markings
400	Intersection Traffic Control & Operations	Intersection Control Evaluation, STOP Signs
500	Other Traffic Operations	Speed-Related Features, Parking, Road Closures
600	Miscellaneous	Legislature, Naming Highway Facilities
Appendices	Appendices	Publications, ODOT Traffic Engineering Structure

Individual sections use a format adapted from NCHRP Report 600. This layout displays information in a concise manner. Some sections build on information in other sections to keep content focused for the benefit of the reader and to reduce redundancy. A cross reference subsection is included, where needed, listing other subjects that the current section is related to.

Main elements include:

Subject Heading

The main subject of the section is at the top of each page.

Introduction

Introduces the subject, including definitions of terms in the section.

Standards & Guidelines

This subsection gives the standards, guidelines, and/or options for the subject using the verbs “shall,” “should,” and “may.” This subsection also typically refers to other ODOT publications that contain standards or guidelines on the subject.

Process & Required Approvals

This subsection lists any needed approvals and processes related to the subject. This includes any state traffic engineer approvals or region traffic engineer approvals.

Special Considerations

This subsection presents special considerations associated with the subject, if needed. If approvals are required related to the subject, this subsection will include items typically addressed in the engineering investigation for that approval process. These special considerations may include:

- design goals of other disciplines (e.g., signal, signing, roadway, etc.),
- interactions with other subjects,
- ways to understand or measure the subject, or
- special performance outcomes related to the subject.

Support

This subsection explains the logic, assumptions, and related literature used to develop the section. The support subsection can take many forms, including a review of applicable literature, references to design practice, or an analysis of relevant information.

The support subsection helps readers understand and explain the subject. Also, because the Traffic Engineering Section revises content as national standards and research is updated, the support subsection helps future manual writers decide how new information can or should be integrated into the Traffic Manual.

The support subsection is for information only and does not convey any degree of mandate, recommendation, authorization, prohibition, or enforceable condition.

Cross References

This subsection lists the subject titles and section numbers of other sections within the Traffic Manual that are relevant to the subject.

Key References

This subsection lists the references cited in the section. Each of these references have a reference number used to note it within the section. The appendix includes a complete list of all references used in the Traffic Manual.

Section Management

This subsection is a table at the end of the section. This shows file codes related to the subject from the ODOT Standard Filing System Manual, when the Traffic Engineering Section last updated or validated the section, and notes related to an update or validation. This subsection does not list changes to Cross References and Key References subsections.

Definitions

Appendix I lists definitions of terms used in the Traffic Manual.

State Traffic Engineer 100.0

The Oregon Transportation Commission has delegated the authority to approve installation of traffic control devices on state highways to the state traffic engineer through OAR 734-020-0410. The chief engineer has also delegated authority to the state traffic engineer through Delegation Order EB-06 to 1) approve and implement traffic and roadway design standards for state highways and 2) implement standards for traffic control devices.

Due to the scope of these responsibilities, the state traffic engineer might consult with various individuals or groups to provide expert or professional advice on a matter before making a final decision.

Standards & Guidelines

01 Devices and features listed in **Table 100.0-A** shall have state traffic engineer approval to be installed on the State Highway System unless otherwise specified.

02 The state traffic engineer retains the authority to require modifications to any traffic control device on the State Highway System, including traffic signals, when deemed necessary for the safety of road users.

03 In the event there are conflicting approvals from the state traffic engineer, the most recent approval shall take precedence.

Process & Required Approvals

Requests for state traffic engineer approval follow this process:

1. The project team provides supporting information and justification to the region traffic engineer for review.
2. The region traffic engineer sends a request with supporting information and recommendations (via a request form) to the state traffic engineer.
3. Traffic Engineering Section staff reviews the request and makes recommendations to the state traffic engineer.
4. The state traffic engineer decides on the request.
5. The Traffic Engineering Section files documents related to the request in FileNet.

The Traffic Engineering Section's goal is to acknowledge receiving the request within three business days of receiving the request and resolve the request or respond with questions within 10 business days. Time to resolve a request depends on how complex the request is, how complete the supporting documentation is, how many other requests are in the queue, and the current workload of Traffic Engineering Section staff.

New approval letters have a unique approval number and are stored in FileNet.

Table 100.0-A: Devices & Features Requiring State Traffic Engineer Approval

#	Subject	Device or Feature	Details of Approval Requirements
S01-01	General	Fixed photo radar camera installations	Section 500.4
S01-02	General	Freeway median crossovers	Section 510.0
S01-03	General	Permanently installed gates for temporary road closures	Includes gates for weather/event closures. Includes manually controlled gates and ITS gates. Does not include railroad gates.
S01-04	General	Added stop lanes at railroad grade crossings as part of the rail crossing order process	Section 308.1
S02-01	Crosswalks	Crosswalk closure or opening an officially closed crosswalk	Section 310.8
S02-02	Crosswalks	New uncontrolled marked crosswalks that will not include all treatments recommended in Table 310.3-A for the applicable conditions.	Section 310.3 See also R02-01 in Section 100.1.
S02-03	Crosswalks	Permanently remove treatments recommended in Table 310.3-A for the applicable conditions, and permanently remove crosswalk treatments that are specified in a marked crosswalk installation approval.	Section 310.3
S02-05	Crosswalks	Textured/colored crosswalks	Section 310.7
S03-01	Illumination	Bridge lighting for beautification	Lighting Policy & Guidelines (*1*)
S03-02	Illumination	Bridge lighting on linear sections	Lighting Policy & Guidelines (*1*)
S03-03	Illumination	Use of high mast lighting	Lighting Policy & Guidelines (*1*)
S03-04	Illumination	Deviations from standards/policies in Illumination Policy & Guidelines	Section 311.0
S04-01	ITS	Highway advisory radio signs	Section 302.3
S04-02	ITS	Public service announcements on VMS	Section 302.1
S04-03	ITS	Traffic control devices with ITS elements	Includes ITS curve warning systems, road condition warning systems with active signing, over length warning systems, etc.
S04-04	ITS	Variable message signs	Section 302.1
S04-05	ITS	Variable speed signs	Section 500.1
S05-01	Markings	2-stage bicycle turn box	Section 300.1

#	Subject	Device or Feature	Details of Approval Requirements
S05-02	Markings	Certain applications of shared lane markings	Traffic Line Manual (*2*)
S05-03	Markings	Colored pavements	Section 310.7
S05-04	Markings	Deviations from standards in the Traffic Line Manual	Traffic Line Manual (*2*)
S05-06	Markings	Red-colored pavement when applied according to the 11th Edition of the MUTCD	Section 300.1
S06-01	Operations	Designation of through highways at intersections of the state highway	ORS 810.110
S06-02	Operations	YIELD signs controlling state highway approaches	Section 401.0
S06-03	Operations	STOP signs controlling state highway approaches, multiway STOP applications, and modifications to STOP configurations	Section 402.0
S06-04	Operations	Roundabouts – conceptual and design approval	Section 403.0
S06-05	Operations	Channelized right turn lanes	Section 405.2
S06-06	Operations	Right turn acceleration lanes	Section 405.3
S06-07	Operations	Median acceleration lanes	Highway Design Manual (*3*)
S06-08	Operations	Shared (or combined) bicycle and right turn lanes	Section 405.4
S06-09	Operations	Transit exceptions to turn lanes	Section 405.5
S06-10	Operations	Dual right or left turn lanes	Section 405.6
S06-11	Operations	Turn prohibitions	Section 405.7
S06-12	Operations	Truck routes and truck prohibitions	Section 506.0
S06-13	Operations	One-way operation for trucks and buses	Section 507.0
S07-01	Rumble Strips	Certain exceptions to justify omitting longitudinal rumble strips	Section 303.1
S07-02	Rumble Strips	Certain transverse rumble strip applications	Section 303.1
S08-01	Signals	Adding speed enforcement to a red-light running camera system	Section 304.1
S08-02	Signals	Authorizing emergency service providers and public transit authorities to use emergency preemption and bus priority systems	Section 404.0
S08-03	Signals	Bicycle signal heads	Traffic Signal Policy & Guidelines (*4*)

#	Subject	Device or Feature	Details of Approval Requirements
S08-04	Signals	Deviations from standard railroad preemption sequence	Signal Design Manual (*5*) Railroad Preemption Design and Operation Guide (*6*) Traffic Signal Policy and Guidelines (*4*)
S08-05	Signals	Exceptions to the Traffic Signal Policy and Guidelines	Section 404.0
S08-06	Signals	Installation and removal of traffic signals and certain modifications to traffic signals	Sections 304.0, 404.0
S08-07	Signals	Intersection bicycle boxes	Section 309.2
S08-08	Signals	New approaches to existing signalized intersections	OAR 734-020-0485
S08-09	Signals	Red light running camera installations	Section 304.1
S08-10	Signals	Traffic signal split phasing	Traffic Signal Policy & Guidelines (*4*)
S08-11	Signals	U-turns at signalized intersections	Section 404.2
S08-12	Signals	Warning beacon supplementing an emergency signal sign	Section 304.2
S08-13	Signals	Bicycle/pedestrian activated warning systems (including at crosswalks, bridges, tunnels, etc.) except as provided in Section 310.3	Section 309.1, 310.3
S08-14	Signals	PREPARE TO STOP WHEN LIGHTS FLASH (OW15-14) sign installations	Traffic Signal Design Manual (*5*)
S09-01	Signs	Logos for ENTERING CITY/COUNTY or WELCOME TO signs	Sign Policy & Guidelines (*7*)
S09-02	Signs	EXCEPT RIGHT TURN signs	Section 402.1
S09-03	Signs	TRUCKS RIGHT TWO LANES ONLY (OR4-5) signs	Sign Policy and Guidelines (*7*)
S09-04	Signs	UNMUFFLED ENGINE BRAKING PROHIBITED (OR22-10 and OR22-11) signs	Sign Policy and Guidelines (*7*)
S09-05	Signs	Signs for city ordinances on state highways	Sign Policy and Guidelines (*7*)
S10-01	Speed	Speed Zones (including school speed zones)	Sec. 500.0, 500.1, 500.2, 500.3
S11-01	Access Mgt.	Grants of Access	OAR 734-051-2020(10)

Requesting Approval

Submit state traffic engineer approval requests in a request form. Submittal instructions are on each form.

- Crosswalk Closures .... Form 734-5150
- Work Zone Speed Reductions .... Form 734-2874
- Maintenance Work Zone Speed Reduction Requests .... Form 734-5223
- All other speed zoning requests .... See the Speed Zone Manual (*8*)
- Temporary Transverse Rumble Strips .... Form 734-2886
- All other traffic requests .... Form 734-5175

Traffic Signals

Oregon Administrative Rules (OAR) 734-020-0400 through -0500 establishes the approval process for installation, modification, or removal of traffic signals under the authority of ODOT. See the ODOT Traffic Signal Policy and Guidelines (*4*) for more information.

Depending on the type of modification, either the state traffic engineer or the region traffic engineer must approve modifications to existing traffic signals on state highways. A "modification" is a change in the operational function of a traffic signal and includes the addition or deletion of signal phases, modifications which provide or remove split phase operation, addition of equipment not normally a part of a traffic signal design, and the addition or removal of through vehicle lanes or crosswalks at the intersection. Signal revisions and normal maintenance activities such as the replacement of detectors, poles, or controllers and timing adjustments that do not affect operation do not constitute a "modification."

Intelligent Transportation System (ITS) Devices

All ITS traffic control device requests must be:

- Reviewed by both Region Traffic Unit and Intelligent Transportation Systems Unit, and
- Approved by the state traffic engineer unless the region traffic engineer approves the device according to **Section 100.1**.

The region traffic engineer sends a request for approval to the state traffic engineer. Traffic Engineering Section staff will coordinate with the ITS Unit. The state traffic engineer will only consider requests for ITS traffic control devices that have concurrence from both the region traffic engineer and the senior ITS engineer.

New Bicycle/Pedestrian Activated Warning System Installations

Contact the Region Traffic Unit on any project considering a bicycle/pedestrian warning system. The Region Traffic Unit will assist the project with preliminary analysis of the location and proposed device and request state traffic engineer approval according to the process above.

Special Considerations

Approval is required for items listed in this section (by the state traffic engineer) and **Section 100.1** (by region traffic engineer) after careful consideration of the pertinent factors, even if the items are listed in an ODOT-approved document (including but not limited to transportation system plans, land use documents, corridor plans, development permits, or other agreements). Other special funding sources – including the Oregon Transportation Commission's approval of STIP projects – does not mean traffic control devices in the project are approved.

State traffic engineer approvals generally expire if the approved changes are not advanced to construction within five (5) years of approval because conditions that inform approval decisions can change over time. If needed, the approval letter specifies this as a condition of approval.

See the Special Considerations section of each section for typical information needed to support a request for state traffic engineer approval. Requests also generally need to answer the following questions:

- What are you seeking to address?
- How are you proposing to change this?
- What alternatives have you considered and why is this proposed change the best?
- What data and/or research support this proposed change?
- Do you plan to deviate from any standards, policies, or guidelines? If so, why?
- Have you worked with a local transportation agency, maintenance district, law enforcement, other agencies, groups, etc. to reach this proposed change? If so, how?
- If there are agreements associated with the proposed change (such as an intergovernmental agreement), what are the agreement numbers?

Support

The goal of the approval process is to improve safety and increase uniformity of traffic control devices on state highways.

ORS 810.210 grants authority over the placement, construction, maintenance, and operation of traffic control devices on state highways to the Oregon Transportation Commission (OTC). Other statutes grant authority over traffic control devices to ODOT's director. The OTC and director delegate the authorities listed in **Table 100.0-B** to the state traffic engineer through OARs or delegation orders.

Table 100.0-B: State Traffic Engineer Authorities

Authority	Citations
Approve the installation of traffic control devices on state highways.	ORS 810.210 OAR 734-020-0410
Approve design and construction of a traffic signal on the State Highway System, regardless of funding source.	ORS 810.200, 810.210 OAR 734-020-0430
Approve installation of traffic signals at locations where ½ mile spacing is inappropriate or infeasible.	ORS 810.200, 810.210 OAR 734-020-0470
Require traffic signal progression analysis based on signal spacing.	ORS 810.200, 810.210 OAR 734-020-0480
Approve removal of traffic signals.	ORS 810.200, 810.210 OAR 734-020-0500
Establish parking or turn prohibitions on state highways for statewide consistency.	ORS 810.160, 810.210 OAR 734-020-0020
Review an interstate highway speed limit.	ORS 810.180 OAR 734-020-0010 (4-c)
Various authorities related to speed zones.	ORS 810.180 OAR 734-020-0015 thru -0018
Evaluate applications for grants of access and recommend approval or denial of the application to the technical services manager (chief engineer).	ORS 374.310-374.314 OAR 734-051-2020(10)
Approve the types of locations, size, shape, lighting, and other characteristics of logo, tourist, and motorist information sign panels desired to be placed by Travel Information Council on state highway right-of-way.	ORS 377.805 Delegation Order DIR-03 #27 Delegation Order D&O-04 #16 Delegation Order EB-06 #2
Take appropriate action for the administration and enforcement of orders and rules adopted by Travel Information Council regarding motorist information signing.	ORS 377.835 Delegation Order DIR-03 #28 Delegation Order D&O-04 #17 Delegation Order EB-06 #3
Approve signs which may be placed in an established scenic area such as underground cable and other warning signs of a public utility and community identification signs. (Signs on highway right-of-way must comply with the standards adopted by the OTC under ORS 810.200.)	ORS 377.510 Delegation Order DIR-03 #35 Delegation Order D&O-04 #20 Delegation Order EB-06 #4
Approve and implement traffic/roadway design standards for state highways.	ORS 366.205 Delegation Order OTC-01 Delegation Order DIR-02 #1 Delegation Order EB-06 #5

State Traffic Engineer 100.0

Authority	Citations
Implement standards for traffic control devices including the marking and signing of state highways adopted by the OTC under ORS 810.200.	ORS 810.200 Delegation Order OTC-01 #24 Delegation Order DIR-03 #16 Delegation Order D&O-04 #9 Delegation Order EB-06 #6

Cross References

Region Traffic Engineer 100.1
Traffic Manual Updates 103.0
Safety Engineering "Quick Fix" Program 200.1
Uniform Traffic Control Devices 300.0
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One-Way Operation for Trucks & Buses 507.0
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Freeway Median Crossovers 510.0

Key References

1. Oregon Department of Transportation. *Lighting Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Lighting-Policy-Guidelines.pdf.
2. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic Engineering Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
3. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.
4. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.
5. Oregon Department of Transportation. *Traffic Signal Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Design-Manual.aspx.
6. Oregon Department of Transportation. *Railroad Preemption Design and Operation*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Railroad-Preemption-Design-Operation-Guide.pdf.
7. Oregon Department of Transportation. *Sign Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx.
8. Oregon Department of Transportation. *Speed Zone Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/TRSDocs/Speed-Zone-Manual.pdf.

File Code	Updated	Notes
COM 04, ORG 05	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Region Traffic Engineer 100.1

The Oregon Transportation Commission has delegated the authority to approve the installation of traffic control devices on state highways to the state traffic engineer through OAR 734-020-0410.

Due to the scope of this responsibility, region traffic engineers are responsible to approve the installation of specific traffic control devices on state highways within their respective region. The state traffic engineer assigns this responsibility to region traffic managers who are registered professional engineers. Region traffic managers may assign this responsibility to senior-level engineers within their respective region traffic unit. Engineers assigned the responsibility of region traffic engineer shall be members of the Traffic Operations & Standards Team. Actual position titles might vary from region to region.

In addition, the Oregon Transportation Commission has delegated to region traffic engineers the authority to establish parking or turn prohibitions on state highways within their respective regions through OAR 734-020-0020.

Standards & Guidelines

01 Devices and features listed in **Table 100.1-A** shall have region traffic engineer approval to be installed on the State Highway System unless otherwise specified.

02 In the event there are conflicting approvals from the region traffic engineer, the most recent approval shall take precedence.

03 Devices and features approved by the region traffic engineer shall conform to the principles outlined in the edition of the MUTCD (*1*) and Oregon Supplement to the MUTCD (*2*) adopted by OAR 734-020-0005 and applicable ODOT policies and guidelines.

04 The state traffic engineer retains the authority to require modifications to any traffic control device on the State Highway System, including traffic signals, when deemed necessary for the safety of road users.

Process & Required Approvals

The Region Traffic Unit documents and files region traffic engineer approvals according to ODOT records management policies.

State traffic engineer approval is required for devices and features listed in **Table 100.1-A** not conforming to ODOT policies, MUTCD (*1*) standard statements, or standard statements in the Oregon Supplement to the MUTCD (*2*).

The region traffic engineer may consult with the state traffic engineer prior to establishing parking prohibitions. The region traffic engineer must notify the state traffic engineer of parking prohibitions (OAR 734-020-0020).

Table 100.1-A: Devices & Features Requiring RTE Approval

#	Subject	Device or Feature	Details of Approval Requirements
R01-01	General	Wrong-way treatments	Section 406.1
R02-01	Crosswalks	Install new uncontrolled marked crosswalk if all treatments recommended in Table 310.3-A for the applicable conditions will be installed with the crosswalk markings.	Section 310.3
R02-02	Crosswalks	Install treatments at an existing uncontrolled marked crosswalk that are recommended or optional in Table 310.3-A for the applicable conditions. Exceptions: signals, raised crosswalks, curb extensions, refuge islands, or reducing number of motor vehicle lanes crossed.	Section 310.3
R02-03	Crosswalks	Installation or removal of crosswalk markings across a stop-controlled approach where part/all the markings are on ODOT right-of-way.	Section 310.2
R03-01	Illumination	Roadway illumination	Section 311.0
R04-01	ITS	Messages other than PSAs on variable message signs	Section 302.1
R04-02	ITS	Non-standard portable changeable message sign (PCMS) messages	Oregon PCMS Handbook (*3*); authority also extended to resident engineers
R04-03	ITS	Vehicle speed feedback sign	Section 302.2
R05-01	Markings	Marking style for crosswalks (e.g., transverse, continental) when the marking style is inconsistent with Traffic Line Manual guidelines.	Section 310.2, Traffic Line Manual (*4*)
R05-02	Markings	Advance stop bars	Traffic Line Manual (*4*)
R05-03	Markings	Bicycle lanes	Section 309.0
R05-04	Markings	No passing zones	Traffic Line Manual (*4*)
R05-05	Markings	Green colored pavement when applied according to 11th Edition of the MUTCD.	Traffic Line Manual (*4*)
R05-06	Markings	Bull nose in two-way left turn lane	Section 405.8
R05-07	Markings	Red raised pavement markers	Section 406.1, Traffic Line Manual (*4*)
R06-01	Operations	Left and right turn lanes at unsignalized intersections	Sections 405.0, 405.1
R06-02	Operations	Parking prohibitions or restrictions	Section 501.0

#	Subject	Device or Feature	Details of Approval Requirements
R06-03	Operations	STOP sign applications on cross streets that are not state highways	Section 402.0
R06-04	Operations	Turn lanes – left-turn lanes, conventional right turn lanes, certain channelized right turn lanes	Sections 405.0, 405.1, 405.2
R06-05	Operations	Turn prohibitions	Section 405.7
R06-07	Operations	YIELD sign applications on cross streets that are not state highways	Section 401.0
R06-08	Operations	Adding parking allowance within a T-intersection	Section 501.0
R07-01	Rumble Strips	Permanent transverse rumble strips associated with Stop Ahead (W3-1) warning signs	Section 303.1
R07-02	Rumble Strips	Certain exceptions to justify omitting longitudinal rumble strips or using sinusoidal rumble strips	Section 303.1
R07-03	Rumble Strips	Portable temporary transverse rumble strips used for intermediate-term work, including night work	TCP Design Manual (*5*), DET4710
R08-01	Signals	Addition or removal of emergency preemption and bus priority systems at existing traffic signals based on prior approval of an emergency service provider or public transit authority by the state traffic engineer to use such systems	Traffic Signal Policy & Guidelines (*6*)
R08-02	Signals	Addition or removal of left-turn lanes, conventional right-turn lanes, or through lanes at existing signalized intersections	Sections 304.0, 404.0
R08-03[A]	Signals	Audible pedestrian signals	Traffic Signal Policy & Guidelines (*6*). See Footnote A
R08-04[A]	Signals	Lane use signing at signalized intersections	Sign Design Manual (*7*) See Footnote A
R08-05[A]	Signals	Left and right turn phase modifications, except split phasing	Sections 304.0, 404.0 See Footnote A
R08-06[A]	Signals	Overlap phasing	Traffic Signal Policy & Guidelines (*6*). See Footnote A
R08-07	Signals	Ramp meters	Section 404.1
R08-08[A, B]	Signals	Replacement of signal poles and pedestals	See Footnotes A and B
R08-09[A]	Signals	Signal heads – change out protected left green arrow only to all arrow, move or realign, programmed, supplemental	See Footnote A

#	Subject	Device or Feature	Details of Approval Requirements
R08-10[A, B]	Signals	Signal timing	Section 404.0 See Footnotes A and B
R08-11	Signals	Intersection control beacon	Traffic Signal Design Manual (*8*)
R08-12	Signals	Speed limit sign beacon	Section 304.2
R08-13	Signals	Stop beacons	Section 304.2
R08-14	Signals	Warning beacon	Section 304.2
R08-15[A, B]	Signals	Work zone modifications to signals – phasing, signal head locations, etc.	Traffic Signal Design Manual (*8*) See Footnotes A and B
R08-16[A]	Signals	Red-signal enforcement lights	Section 304.1 See Footnote A
R09-01	Signs	Custom historic trail signs	Sign Policy & Guidelines (*9*)
R09-02	Signs	Deviations from curve advisory speed guidance	Traffic Sign Design Manual (*7*)
R09-03	Signs	Recreational symbol signs	Sign Policy & Guidelines (*9*)
R09-04	Signs	Sign flag boards in some cases	Sign Policy & Guidelines (*9*)
R09-05	Signs	Signs designed by private parties for temporary events	Sign Policy & Guidelines (*9*)
R09-06	Signs	Special sized SCHOOL DAYS with time-of-day sign	Sign Policy & Guidelines (*9*)
R09-07	Signs	Special sized SCHOOL SPEED LIMIT 20 sign	Sign Policy & Guidelines (*9*)
R09-08	Signs	Use of fluorescent yellow green for bicycle/pedestrian warning signs	Sign Policy & Guidelines (*9*)

[A] May be approved by the region traffic engineer's designee instead of the region traffic engineer. RTE's designee shall be a licensed professional engineer. Send documentation to the Traffic Engineering Section justifying the type of planned modification.

[B] Signal revisions and normal maintenance activities such as the replacement of detectors, poles, or controllers and timing adjustments that do not affect operation do not constitute a "modification" and do not require RTE approval.

Requesting Approval

Submit RTE approval requests in a request form. Submittal instructions are on the form.

- Parking prohibition .... Form 734-2804
- All other requests .... Form 734-5228

Support

The Oregon Transportation Commission delegated the authorities listed in **Table 100.1-B** to the region traffic engineer through administrative rule.

Table 100.1-B: Region Traffic Engineer Authorities

Authority	Citations
Establish parking or turn prohibitions on state highways within their respective regions. The region traffic engineer will notify the state traffic engineer of the prohibition.	ORS 810.160, 810.210 OAR 734-020-0020

Cross References

State Traffic Engineer 100.0
Safety Engineering "Quick Fix" Program 200.1
Uniform Traffic Control Devices 300.0
Interim Approvals 300.1
Signs 302.0
Variable Message Signs 302.1
Vehicle Speed Feedback Signs 302.2
Pavement Markings 303.0
Rumble Strips 303.1
Traffic Signals 304.0
Traffic Signal Enforcement 304.1
Flashing Beacons 304.2
Temporary Traffic Control 306.0
Railroad Crossings 308.0
Bicycle Facilities 309.0
Active Warning Signs at Bridges and Tunnels 309.1
Crosswalks on State Highways 310.0
Spacing of Enhanced Crosswalks 310.1
Controlled Marked Crosswalks 310.2
Uncontrolled Marked Crosswalks 310.3
Textured & Colored Crosswalks 310.7
Crosswalk Closures 310.8
Illumination 311.0
Intersection Control Evaluation 400.0

YIELD Sign Applications 401.0
STOP Sign Applications 402.0
Roundabouts 403.0
Traffic Signal Operations 404.0
Ramp Meters 404.1
Left Turn Lanes 405.0
Right Turn Lanes 405.1
Channelized Right Turn Lanes 405.2
Transit Exceptions to Turn Lanes 405.5
Turn Prohibitions 405.7
Two-Way Left Turn Lanes 405.8
Wrong-Way Treatments 406.1
Speed Zones – General 500.0
School Speed Zones 500.3
Parking 501.0
Freeway Median Crossovers 510.0

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Oregon Department of Transportation. *Oregon Supplement to the Manual on Uniform Traffic Control Devices*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/MUTCD-OR-Supplement.pdf.
3. Oregon Department of Transportation. *Oregon Portable Changeable Message Sign Handbook*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/PCMS-Handbook.pdf.
4. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
5. Oregon Department of Transportation. *Traffic Control Plan Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/TCP-Manual.aspx.
6. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.
7. Oregon Department of Transportation. *Traffic Sign Design Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. http://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Sign-Design-Manual.pdf.
8. Oregon Department of Transportation. *Traffic Signal Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Design-Manual.aspx.
9. Oregon Department of Transportation. *Sign Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx.

File Code	Updated	Notes
COM 04	June 2024	Updated state traffic engineer and Traffic Engineering Section.

Publications 101.0

Table 101.0-A is a list of traffic publications from the Traffic Engineering Section. These are available on ODOT's engineering manuals internet page. Some are only available internally. Check the ODOT engineering manuals page often so you are using the latest editions.

Table 101.0-A: Traffic Engineering Section Publications

Subject	Title	TRS Contact
General	A Guide to School Area Safety (*1*)	Traffic active modes engineer
General	Oregon Supplement to the MUTCD (*2*)	State traffic investigations engineer
General	Traffic Manual (*3*)	State traffic investigations engineer
Illumination	Lighting Policy and Guidelines (*4*)	State traffic illumination engineer
Illumination	Traffic Lighting Design Manual (*5*)	State traffic illumination engineer
Markings	Pavement Marking Design Guidelines (*6*)	Traffic markings & sign engineer
Markings	Traffic Line Manual (*7*)	Traffic markings & sign engineer
Safety	Highway Safety Improvement Program Guide (*8*)	State traffic safety engineer
Safety	Safety Investigations Manual (*9*)	State traffic safety engineer
Safety	Safety Priority Index System (SPIS), Oregon Adjustable Safety Index (OASIS), and Crash Summary Reports (CSR) System User Guide (*10*)	Traffic safety engineer
Signals	2002 Policy Statement for Cooperative Traffic Control Projects (*11*)	State traffic signal engineer
Signals	Red Light Running (RLR) Camera Guidelines (Traffic Manual Appendix A1)	State traffic operations engineer
Signals	Traffic Signal Design Manual (*12*)	State traffic signal engineer
Signals	Signal Inspector's Manual (*13*)	State traffic signal engineer
Signals	Standard Specification for Microcomputer Signal Controller (*14*)	State traffic signal engineer
Signals	Traffic Signal Policy and Guidelines (*15*)	State traffic operations engineer
Signs	Guidelines for the Operation of Highway Advisory Radio and Traveler's Advisory Radio on State Highways (*16*)	Active modes traffic engineer
Signs	Guidelines for the Operation of Permanent Variable Message Signs on State Highways (*17*)	State traffic sign engineer
Signs	Sign Policy and Guidelines for the State Highway System (*18*)	State traffic sign engineer
Signs	Standards for Accessible Parking Places (*19*)	State traffic sign engineer
Signs	Traffic Sign Design Manual (*20*)	State traffic sign engineer

Subject	Title	TRS Contact
Speed Zones	Fixed Photo Radar (FPR) Camera Guidelines (Traffic Manual Appendix A2)	State traffic operations engineer
Speed Zones	Speed Zone Manual (*21*)	Traffic speed zone engineer
Structures	Traffic Structures Design Manual (*22*)	State traffic structures engineer
Work Zones	Oregon Portable Changeable Message Sign Handbook (*23*)	State traffic work zone engineer
Work Zones	Oregon Temporary Traffic Control Handbook (*24*)	State traffic work zone engineer
Work Zones	Traffic Control Plans Design Manual (*25*)	State traffic work zone engineer
Work Zones	Transportation Management Plan (TMP) Guidance Manual (*26*)	State traffic work zone engineer
Work Zones	Work Zone Traffic Analysis Manual (*27*)	Traffic work zone analyst

Key References

1. Oregon Department of Transportation. *A Guide to School Area Safety*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Guide_to_School_Area_Safety.pdf.
2. Oregon Department of Transportation. *Oregon Supplement to the Manual on Uniform Traffic Control Devices*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/MUTCD-OR-Supplement.pdf.
3. Oregon Department of Transportation. *Traffic Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Traffic-Manual.pdf.
4. Oregon Department of Transportation. *Lighting Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Lighting-Policy-Guidelines.pdf.
5. Oregon Department of Transportation. *Traffic Lighting Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Lighting-Design-Manual.pdf.
6. Oregon Department of Transportation. *ODOT Pavement Marking Design Guidelines*. Oregon Department of Transportation, Salem, Oregon. http://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Pavement-Marking-Design-Guide.pdf.
7. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
8. Oregon Department of Transportation. *Highway Safety Improvement Program Guide*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Safety_HSIP-Guide.pdf.
9. Oregon Department of Transportation. *Safety Investigations Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/odot/Engineering/Docs_TrafficEng/Safety-Investigation-Manual.pdf.
10. Oregon Department of Transportation. *Safety Priority Index System and Oregon Adjustable Safety Index System User Guide*. Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/SPIS-User-Guide.pdf.

11. Oregon Department of Transportation. *Policy Statement for Cooperative Traffic Control Projects*. Salem, Oregon, 2002. http://transnet.odot.state.or.us/hwy/trs/Shared%20Documents/2002_policy_statement_for_cooperative_traffic_control_projects.pdf.
12. Oregon Department of Transportation. *Traffic Signal Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Design-Manual.aspx.
13. Oregon Department of Transportation. *Inspector's Manual for Signal Construction*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Construction/Doc_TrafficSignal/00_master_signal_inspector.pdf.
14. Oregon Department of Transportation. *Standard Specification for Microcomputer Signal Controller*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signals.aspx.
15. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.
16. Oregon Department of Transportation. *Guidelines for the Operation of Highway Advisory Radio and Other Travelers Information Stations on State Highways*. Oregon Department of Transportation, Salem, Oregon.
17. Oregon Department of Transportation. *Guidelines for the Operation of Permanent Variable Message Signs*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/VMS-Guidelines.pdf.
18. Oregon Department of Transportation. *Sign Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx.
19. Oregon Transportation Commission. *Standards for Accessible Parking Places*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/DOCS_ADA/ADA_Standards-Accessible-Parking.pdf.
20. Oregon Department of Transportation. *Traffic Sign Design Manual*. Oregon Department of Transportation, Salem, Oregon. http://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Sign-Design-Manual.pdf.
21. Oregon Department of Transportation. *Speed Zone Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/odot/Engineering/Docs_TrafficEng/Speed-Zone-Manual.pdf.
22. Oregon Department of Transportation. *Traffic Structures Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Structures-Design-Manual.pdf.
23. Oregon Department of Transportation. *Oregon Portable Changeable Message Sign Handbook*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/PCMS-Handbook.pdf.
24. Oregon Department of Transportation. *Oregon Temporary Traffic Control Handbook for Operations of Three Days or Less*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/odot/Engineering/Pages/OTTCH.aspx.
25. Oregon Department of Transportation. *Traffic Control Plan Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/TCP-Manual.aspx.
26. Oregon Department of Transportation. *Transportation Management Plan (TMP) Project Level Guidance Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/TMP-Manual.pdf.
27. Oregon Department of Transportation. *Web-Based Work Zone Traffic Analysis Tool Users' Guide*. Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Work-Zone-Analysis-Manual.pdf.

File Code	Updated	Notes
Unassigned	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Traffic Manual Updates 103.0

The Traffic Engineering Section regularly updates the Traffic Manual to stay current with engineering best practices and ODOT policies, practices, plans, and goals.

Standards & Guidelines

01 Traffic Manual content should be updated following the normal update process in **Table 103.0-A**.

02 Traffic Manual content may be updated at any time due to legislation, litigation, direction from regulatory agencies with compliance dates (state or federal), MUTCD interim approvals (*1*) (new interim approvals and termination of existing interim approvals), or other situations determined by the state traffic engineer. These updates should go through the next scheduled normal update process for complete review and comment.

03 Traffic Manual content may be updated at any time to make minor corrections that do not change the intent of what is being edited. The scope of these corrections includes, but is not limited to, formatting, spelling, updated names and contact information or web links, or other corrections determined by the state traffic investigations engineer.

04 A proposed change to the Traffic Manual should support ODOT's mission, vision, values, policies, and adopted plans and be documented with supporting information from one or more of the following sources, in order of preference:

a. National and Oregon state transportation engineering policies and manuals (e.g. MUTCD, A Policy on Geometric Design of Highways and Streets, Highway Safety Manual, ODOT Highway Design Manual, ODOT Traffic Signal Policy & Guidelines, etc.).
b. Recommended practices and guides published by AASHTO, Transportation Research Board, the Institute of Transportation Engineers, or USDOT.
c. Cooperative Research Program reports from the Transportation Research Board (e.g. NCHRP, TCRP).
d. Peer-reviewed articles published in transportation engineering or transportation safety journals (e.g. Transportation Research Record).
e. Other publications from the Transportation Research Board, AASHTO, Institute of Transportation Engineers, or USDOT.
f. Research reports published by a state department of transportation.
g. Research reports published by other universities/colleges in the United States with transportation engineering programs.
h. An engineering study.
i. Engineering judgement.
j. Research reports and manuals from international agencies and universities.
k. Other published research.

Process & Required Approvals

The state traffic engineer sets traffic engineering standards per Delegation Order EB-06. The state traffic investigations engineer maintains the Traffic Manual under the authority of the state traffic engineer. Technical resources contribute based on their area of expertise.

Changes to the Traffic Manual are proposed and documented in a proposed changes form, available from the state traffic investigations engineer.

Updates require approval from the state traffic engineer per Delegation Order EB-06 except for minor corrections that do not change the intent of the edited content. The Traffic Operations & Standards Team advises the state traffic engineer as part of the normal update process.

Table 103.0-A: Normal Update Process

Stage		Approximate Duration	Approximate Schedule
1	Develop proposed changes	As needed to develop the proposal and pass through working groups (if needed)	Throughout the year
2	Submit proposed changes to state traffic investigations engineer	Milestone	Accepted throughout the year. Deadline for next update cycle: April 15
3	Proposals open for comments from Traffic Operations & Standards Team	4 weeks	May
4	Edit based on comments	4 weeks	June
5	Revised proposals open for comments from other disciplines (e.g. maintenance, roadway, active trans.)	4 weeks	July
6	Final edits based on comments	4 weeks	August
7	Revised proposals open for Traffic Operations & Standards Team review	3 weeks	September
8	Changes discussed at Traffic Operations & Standards Team meeting	Milestone	October Traffic Operations & Standards Team meeting
9	State traffic engineer decides on proposal	Milestone	October
10	Final formatting/compiling	4 weeks	October
11	Publication	Milestone	First working day of November
12	Adapting period	8 weeks	November-December
13	Changes effective	Milestone	January 1

Special Considerations

The Traffic Engineering Section cannot update the whole Traffic Manual every year due to the scope of the manual and limited time available for staff to develop updates. Sections are reviewed on a schedule as resources allow so content can be maintained; the latest Traffic Manual edition each section was last updated or validated is shown at the end of each section. Updates might need to be limited in scope and not make a comprehensive review of the content as resources allow.

Support

The Traffic Manual contains the general policies, standards, guidelines, options, and process for traffic engineering at ODOT and affects a wide variety of business lines. Decisions are made based on its contents at high levels and very detailed levels. Contents are also often brought up in litigation. Because of this, the Traffic Engineering Section typically shares proposed changes across ODOT disciplines, groups, or individuals following the principles of the ODOT change framework process.

Past updates to different traffic design manuals have shown that if an update is not regular but advertised with sufficient time for comment, some stakeholders still will not comment because it can be difficult to plan workloads around unpredictable comment periods. Feedback from those update processes suggested a predictable comment period would benefit statewide stakeholders.

After publication, there is a two-month adapting time for manual users to adjust their processes, designs, assumptions, etc. before the new policies and guidelines become effective.

There will be times when the Traffic Engineering Section must update the Traffic Manual outside the normal schedule. Examples include legislative changes, litigation action, direction from regulatory agencies (state or federal) with compliance dates, MUTCD (*1*) interim approvals (new IA's and termination of existing IA's), etc. Flexibility to publish quick updates fills this need until changes can go through the normal update process to allow for full comment and review.

After publication, there may be times when minor edits are need. This includes minor corrections to formatting, spelling, changes to contact information, or web links, etc. that do not change the intent of what is being edited. These changes do not go through the normal process because of the need to make quick updates with a very limited scope.

Cross References

State Traffic Engineer 100.0
Litigation 105.0
Interim Approvals 300.1
Legislature 600.0
Traffic Manual Revision History .... Appendix K

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

File Code	Updated	Notes
Unassigned	June 2024	Updated state traffic engineer and Traffic Engineering Section.

Litigation 105.0

Claims and lawsuits may result from a crash or construction and maintenance activities.

Process & Required Approvals

If a claim for damages involving ODOT is filed against the state, risk management investigates to determine whether the claim should be approved or denied. In some instances, the risk management specialist in charge of processing the claim will contact one of the Traffic Engineering Section's investigators to request a recommendation and/or documentation, or to clarify a policy. If documentation is required, the risk management specialist coordinates with ODOT sections or other public agencies to produce copies of the necessary documents.

Similarly, the Traffic Engineering Section sometimes acts as a liaison for the Oregon Department of Justice when a request is made for information and documents by an assistant attorney general who is defending ODOT in a lawsuit. The Traffic Engineering Section also assists in gathering the information to support ODOT in these claims.

In addition to collecting documents and other evidence, the Traffic Engineering Section may coordinate the acquisition of expert witnesses for testimony at trial. On occasion, a Traffic Engineering Section employee may be required to testify, if he or she possesses specialized knowledge in a relevant area. At the request of the Department of Justice attorney, the Traffic Engineering Section may also produce courtroom displays using mounted photo enlargements, graphics, or video presentations.

Special Considerations

The State of Oregon is self-insured through the Risk Management Division of the Department of Administrative Services.

When there is damage to ODOT facilities, such as a bridge damaged in a crash, ODOT may pursue damages from the party determined to be at fault.

Support

The most effective way to reduce ODOT liability in litigation is to conform as closely as possible to standards, policies, and good engineering during design, construction, inspection, and maintenance, and then to thoroughly document such conformance.

Cross References

Traffic Manual Updates 103.0

File Code	Updated	Notes
LEG 04	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Land Use and Transportation 107.0

The Oregon Highway Plan (*1*) encourages compact development in urban areas while supporting mobility on designated highways segments. Expressway classification supports mobility on designated highways and highway segments by providing for high speed and high-volume traffic with minimal interruption. Special transportation areas (STAs) promote community vitality and livability in downtown areas by encouraging compact development and reducing local trips on the state highway and encouraging more opportunity for walking, bicycling or transit use. Urban business areas (UBAs) and commercial centers improve the connection between the use of the highway and commercial activity and are used in conjunction with STAs and expressways to balance mobility and livability.

Cross References

Vehicle Speed Feedback Signs 302.2
Spacing of Enhanced Crosswalks 310.1
Intersection Control Evaluation 400.0
Traffic Calming 500.5

Key References

1. Oregon Department of Transportation. *Oregon Highway Plan*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/odot/planning/pages/plans.aspx.

File Code	Updated	Notes
Unassigned	June 2024	Corrected grammar.

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Highway Safety Engineering 200.0

Process & Required Approvals

ODOT has placed the responsibilities of Highway Safety Program management with the Traffic Engineering Section. ODOT regions are responsible for fund management within their own regions and gathering information in support of the annual reporting process required by federal HSIP funding.

Special Considerations

All Roads Transportation Safety (ARTS) Program

The mission of the All Roads Transportation Safety (ARTS) Program is to carry out safety improvement projects on all public roads to reduce traffic fatalities and serious injuries. The ARTS website documents program philosophy and the application process for program funding. For purposes of programming safety funds in the Statewide Transportation Improvement Program (STIP), all safety infrastructure improvement projects follow the ARTS guidelines regardless of funding type (federal or state).

Highway Safety Improvement Program (HSIP)

Highway Safety Improvement Program (HSIP) funds are primarily intended for infrastructure safety improvements on state highways, county roads, and city streets. Congress established this federal program in 2005 through the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). Congress has renewed the program in transportation funding bills since then (*1*).

Non-infrastructure highway safety improvements such as education and enforcement programs are administered by ODOT's Transportation Safety Office and are typically funded with separate funding from the National Highway Traffic Safety Administration (NHTSA), the Federal Highway Administration (FHWA), or state funds.

State Strategic Highway Safety Plan

ODOT developed the State Strategic Highway Safety Plan (SSHSP, a federal requirement) to address engineering, management, operation, education, enforcement, and emergency services elements of highway safety. The SSHSP identifies opportunities to improve highway safety by addressing engineering, management, operations, education, enforcement, and emergency management to focus resources on areas of greatest need and coordinate with other highway safety programs. The SSHSP may identify programs of projects, strategies, or other factors to reduce or eliminate fatal and severe injury crashes. The priorities in the SSHSP should be used to address all Safety and HSIP projects.

In response to the SSHSP requirement, Oregon has adopted the Oregon Transportation Safety Action Plan (TSAP) (*1*). The TSAP in conjunction with the safety projects included in the Statewide Transportation Improvement Program (STIP) comprise Oregon's SSHSP.

Safety Priority Index System (SPIS)

The Safety Priority Index System (SPIS) is a method developed in 1986 by ODOT for identifying locations on state highways for further safety investigation and FHWA accepted SPIS as fulfilling the requirements of the HSIP. When Oregon began developing its safety management system in response to the 1991 ISTEA, it identified SPIS as one of several elements. More information on SPIS is available in the SPIS and OASIS User Guide (*2*).

Cross References

Safety Engineering "Quick Fix" Program 200.1
Crash Analysis 201.0
Safety Corridors 202.0
Sight Distance 203.0
Rumble Strips 303.1
Illumination 311.0

Key References

1. United States Department of Transportation. About HSIP. *FHWA Highway Safety Programs*, January 31, 2023. https://highways.dot.gov/safety/hsip/about-hsip. Accessed April 11, 2024.
2. Oregon Department of Transportation. *Oregon Transportation Safety Action Plan*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Safety/Pages/TSAP.aspx.
3. Oregon Department of Transportation. *Safety Priority Index System and Oregon Adjustable Safety Index System User Guide*. Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/SPIS-User-Guide.pdf.

File Code	Updated	Notes
TRA 10-22-01	June 2024	Updated liability neutral language, HSIP history.

Safety Engineering "Quick Fix" Program 200.1

The **Highway Safety Engineering "Quick Fix" Program** is for use by ODOT regions to quickly improve highway safety performance by implementing low-cost safety engineering countermeasures. The program is a small safety fund in the Statewide Transportation Improvement Program (STIP) comprised only of state funds (no federal funds to maximize flexibility). The funds are shared equally between the regions. Projects typically do not exceed $50,000 in total cost.

Candidate location(s) are on the state highway system and identified by an engineering investigation or substantiated by crash data or likelihood of a crash that can be addressed by low-cost engineering countermeasures without going through the formal STIP project development process.

Low-cost engineering countermeasures are engineering tools and treatments identified by the Traffic Engineering Section that can reduce the likelihood and severity of crashes. The Traffic Engineering Section maintains a list of these engineering tools and treatments in a database explaining the application and effectiveness of such countermeasures.

Standards & Guidelines

01 Projects chosen for funding through the Highway Safety Engineering "Quick Fix" Program shall:

a. Demonstrate an immediate need and meet the guidance outlined in the ODOT Highway Safety Improvement Program Guide (*1*) (B/C, SPIS top 5%, or include systematic safety improvements that address a safety area of interest in the Oregon Transportation Safety Action Plan (*2*)), and
b. Meet the primary goal of reducing crash frequency and severity by implementing low-cost engineering countermeasures when and where feasible.

Process & Required Approvals

The Traffic Engineering Section manages the Highway Safety Engineering "Quick Fix" Program, evaluates projects for program eligibility, approves projects, and administers program funding. The state traffic safety engineer coordinates the program for the Traffic Engineering Section.

The Traffic Engineering Section allocates an equal amount of funds to each region every fiscal year. Regions have an equal opportunity to compete for any unused funds released in September.

The Highway Safety Engineering "Quick Fix" Program funds and delivers projects through this process:

1. The Traffic Engineering Section issues an annual notice of availability of program funds for projects to regions and districts.

2. Region Traffic Unit staff coordinates with district, investigates potential projects, and prepares a justification based on the eligibility criteria.
3. Region Traffic Unit staff submits investigations and findings to the Traffic Engineering Section.
4. The Traffic Engineering Section reviews and responds to any requests for traffic control devices that require state traffic engineer approval (see **Section 100.0**).
5. The Traffic Engineering Section informs regions of funding availability and sets up a project expense account (EA) with the Highway Program Office.
6. District administers the project and determines if ODOT forces will complete the work or if work will be contracted out. Region Traffic Unit monitors construction.
7. District informs the Region Traffic Unit and Traffic Engineering Section when the project is complete.
8. The Traffic Engineering Section tracks funds and annually reports progress to the Highway Safety Engineering Committee.

Support

Safety projects programmed in the STIP can take anywhere from two (2) to six (6) years to be programmed into the STIP and delivered in a highway construction project. The Highway Safety Engineering "Quick Fix" Program lets regions use a small, dedicated fund in the STIP to respond to changes in immediate highway safety performance with low-cost engineering countermeasures.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Highway Safety Engineering 200.0
Crash Analysis 201.0
Uniform Traffic Control Devices........ 300.0
Signs........ 302.0
Pavement Markings 303.0
Rumble Strips........ 303.1
Flashing Beacons........ 304.2

Key References

1. Oregon Department of Transportation. *Highway Safety Improvement Program Guide*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Safety_HSIP-Guide.pdf.
2. Oregon Department of Transportation. *Oregon Transportation Safety Action Plan*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Safety/Pages/TSAP.aspx.

Safety Engineering "Quick Fix" Program 200.1

File Code	New	Notes
TRA 10-22	June 2024	Updated STE and Traffic Engr. Section. Updated program description.

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Crash Analysis 201.0

Transportation engineers use crash data to identify and analyze high crash locations, evaluate engineering measures, and identify trends in crash occurrences to develop solutions that improve safety. Engineers can use these data to develop an understanding of the performance of traffic control measures or to study the safety performance at specific sites.

Standards & Guidelines

01 See the ODOT Safety Investigations Manual (*1*).

Process & Required Approvals

When locations are identified for crash analyses the first step is to gather all crash data relevant to the location and applicable time range (for traffic reports and approval requests, typically three to five full years of most recent data from ODOT's Crash Analysis and Reporting Unit). Several reports or tools exist to assist in this step (See Special Considerations subsection). These reports allow data to be summarized by different characteristics, such as date and time, roadside culture, weather conditions, type of crash, types of vehicles, and other information. Preparing collision diagrams to identify patterns can assist the analyst in analyzing the situation. Collecting other data such as volumes and operating speeds can also be helpful.

Site visits and video logs can assist with familiarizing the analyst with physical features, roadway geometry, and other site characteristics. Crash and fatality rates for the section should be compared to the statewide average for similar types of highways.

The Traffic Engineering Section routinely performs crash analysis for environmental documents and corridor studies and can help in the evaluation of specific sites or trends. Contact the highway safety engineering coordinator for assistance.

Special Considerations

When the analyst has identified and completed analysis of the specific site, they can evaluate which corrective actions might be beneficial and cost effective. Several sources exist which are helpful including: Synthesis of Safety Research Related to Traffic Control and Roadway Elements (*2*) and Safety Effectiveness of Highway Design Features (*3*), both published by the Federal Highway Administration.

The following discussion identifies data sources for crash analysis. The statistical treatment of the data and other reference material is contained in the Safety Investigations Manual (*1*). Crash analysis is an important traffic engineering tool used to answer questions about road design, maintenance, and operations. Crash analysis can also be used to learn what questions to ask. The choice and arrangement of the data depend heavily upon the nature of the question, availability of pertinent data, and time available.

Crash data sources readily available to ODOT employees include:

Oregon Motor Vehicle Traffic Crash Database

This is the main database compiled and maintained by the Crash Analysis and Reporting Unit. It covers all state, county, and city roadways. All crashes reported to DMV and forwarded to the Crash Analysis and Reporting Unit are entered into the database if there is property damage exceeding a minimum dollar amount, or if there are any injuries. These data can be queried directly by the Crash Analysis and Reporting Unit to provide lists that meet very selective criteria.

The most recent ten years of crash data can be accessed on the ODOT intranet as part of the Oregon Transportation Management System (OTMS).

Oregon Traffic Crash Summary

This extract from the main database listed above, has been published annually by the Crash Analysis and Reporting Unit of the Transportation Data Section since 1994. Previously, these reports were published by Driver and Motor Vehicle Services Division. These tables provide selected crash tallies for statewide, countywide, and, in some cases, citywide coverage. Subsets for truck, pedestrian, bicycle, and motorcycle crashes were published until 1987. From 1987 to 1996, the subsets were not published, but printouts were provided directly to the Traffic Engineering Section. Beginning in 1989, additional subsets were generated for crashes on state highways and for fatal crashes only. The Oregon Traffic Crash Summary book has included all the subsets since 1996. A separate publication of crash rates on state highways is also available.

Crash Summary Report

This has been produced annually since 1990. This is a database/software combination that generates reports at the request of the user. The summaries generated by this program are frequently helpful because the answers are often sufficient, or time may be too short to permit more detailed analysis. Each set contains three years of simplified crash data for the entire state highway system, plus estimates of traffic volume for each mainline crash site, plus information on SPIS sites. The crash data are extracted from the main database listed above. Traffic volume estimates come from the mileage control tape for the middle year of the three years covered. SPIS numbers are imported and assigned to each rated milepost.

These three-year databases are coupled with a summary program to produce a summary tally that includes an estimate of the crash rate and traffic volume for the selected section. Each summary must be for one continuous portion of one highway for all three years. The estimate of traffic volume is a simple average of all the volume estimates for each crash site. When a short part of the section specified has high volumes and many crashes, but the remainder has low volumes and few crashes, the estimated crash rate will be too low. When appropriate, the crash rate should be corrected manually on the face of the printout using an estimate of overall volume. Alternatively, separate summaries could be generated for each dissimilar segment.

TransGIS Mapping Tool

The TransGIS mapping tool was developed to provide a graphical method to display category 1-5 segment information, SPIS locations, crash data, street and road information, and average daily traffic (ADT) information. TransGIS displays this information on a state map. The user can choose the information that is displayed and can zoom into the map to increase detail, as well as display city and county maps behind this data.

Crash Graphing Tool

The Crash Graph Tool was created to automatically create graphs and summary tables of ODOT crash data in Microsoft Excel directly from the "Direction (Vehicle)" report from the State Highway Crash Reports on the ODOT intranet. The tool is a Microsoft Excel Add-in and can be downloaded from the ODOT intranet. External customers interested in obtaining the Crash Graph Tool should contact the Traffic Engineering Section's highway safety engineering coordinator for additional information.

Hardcopies

These have been generated by the Crash Analysis and Reporting Unit over the years for the State Highway System. These books are extracts of data from the main database listed above. Working libraries of these reports are maintained by the Traffic Engineering Section and other offices. These books contain lists of crash data for one or five years and lists of various crash rates for one or five years. These books are the normal source of data for those years no longer available directly from the main database.

Crash Rate Tables

These have been published annually by the Crash Analysis and Reporting Unit since at least 1948. Tables in the front of the book list statewide crash rates for several categories of the State Highway System. More tables list the crash rates for selected sections of each state highway, as well as a rural/urban breakout. Additional tables list intersection crash data and fatal crash data.

Traffic Volume Tables

These have been published annually by the Transportation Data Section since at least 1939. There are no crash data in this book. It contains volume estimates for the entire state highway system. These volumes can be used for calculating crash rates. Information provided for automatic traffic recorders can be used in some instances to learn about seasonal or about weekend vs. weekday crash rates.

Cross References

Highway Safety Engineering 200.0
Safety Engineering “Quick Fix” Program 200.1
Safety Corridors 202.0
Vehicle Speed Feedback Signs 302.2
Rumble Strips 303.1
Traffic Signal Enforcement 304.1
Uncontrolled Marked Crosswalks 310.3
Crosswalk Closures 310.8
Illumination 311.0
Intersection Control Evaluation 400.0
YIELD Sign Applications 401.0
STOP Sign Applications 402.0
Roundabouts 403.0
Ramp Meters 404.1
Left Turn Lanes 405.0
Right Turn Lanes 405.1
Right Turn Acceleration Lanes 405.3
Wrong-Way Treatments 406.1
Speed Zones – General 500.0
Climbing & Passing Lanes 503.0
One-Way Operation for Trucks & Buses 507.0

Key References

1. Dixon, K. K., and C. M. Monsere. *Highway Safety Investigation Manual for the Oregon Department of Transportation*. Oregon Department of Transportation, Salem, Oregon, 2011. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Safety-Investigation-Manual.pdf.
2. Federal Highway Administration. *Synthesis of Safety Research Related to Traffic Control and Roadway Elements*. Federal Highway Administration, Washington, D.C., 1982. https://trid.trb.org/view/192558.
3. Federal Highway Administration. *Safety Effectiveness of Highway Design Features*. Washington, D.C., 1992.

File Code	Updated	Notes
TRA 03-00-01	June 2024	Updated state traffic engineer and Traffic Engineering Section.

Safety Corridors 202.0

Safety corridors are stretches of state and local highway with a history of higher traffic crash rates than the statewide average for similar roadways. These include “Safety Corridor,” “Truck Safety Corridor,” or similar signs. In the case of a “Truck Safety Corridor,” the incidence of commercial vehicle involvement is high, due to either truck or passenger vehicle error.

Standards & Guidelines

01 See the Oregon Safety Corridor Program Guidelines (*1*).

Process & Required Approvals

Typically, ODOT designates a safety corridor based on a consensus decision by the Transportation Safety Division, Traffic Engineering Section and the local ODOT region and district. The Transportation Safety Division is responsible for program and policy development, law enforcement coordination and oversight as well as media coordination and driver education. The Traffic Engineering Section participates in the data analysis and tracking. The Region Traffic Unit conducts engineering investigations for any engineering measures that may be appropriate and coordinates with the local ODOT district on the selection and implementation of the engineering measures. Safety corridor coordination is also the responsibility of the region transportation safety coordinator. They play a key role in bringing stakeholders together for decisions involving the safety corridor effort as well as coordination of overall implementation.

Analysis of the safety corridor occurs annually. See the Oregon Safety Corridor Program Guidelines (*1*) for more information on this annual review.

Special Considerations

Typical actions taken in safety corridors to increase safety include enforcement that is more frequent, low-cost engineering improvements, and education efforts such as media events, brochures, and poster distribution. The intent is to apply a broad spectrum of immediate and low-cost effort and improvements until the crash rate drops below the statewide average.

A safety corridor designation is an interim solution until such time that the crash rate can be reduced and sustained, or until major improvements are funded. If enforcement becomes unavailable, or local agencies do not maintain substantial commitment, ODOT might remove the safety corridor.

For further information regarding the ODOT Safety Corridor Program, contact the Transportation Safety Division.

Cross References

Highway Safety Engineering 200.0
Crash Analysis 201.0

Key References

1. Oregon Department of Transportation. *Oregon Safety Corridor Program Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Safety/Documents/SafetyCorridorGuidelines.pdf.

File Code	Updated	Notes
TRA 10-18	June 2024	Updated state traffic engineer and Traffic Engineering Section.

Sight Distance 203.0

Sight distance is the length of roadway visible to the road user, either ahead or on intersecting roads.

Standards & Guidelines

01 A Policy on the Geometric Design of Highways and Streets (*1*) details the processes for determining sight distances for stopping sight distance, decision sight distance, and intersection sight distance. The MUTCD (*2*) and Traffic Line Manual (*3*) detail the process for determining passing sight distance.

Special Considerations

Stopping sight distance is the minimum distance for a driver traveling at a particular speed to come to a complete stop after an object on the road becomes visible.

Decision sight distance is the distance for a driver to detect and recognize a situation, make a navigation decision, and complete the maneuver.

Passing sight distance is the distance for a vehicle to pass another vehicle.

Intersection sight distance is the unobstructed line of sight to allow approaching drivers to anticipate and avoid a potential collision at an intersection.

Cross References

Highway Safety Engineering 200.0
Uniform Traffic Control Devices 300.0
Traffic Control Device Visibility 300.3
Signs 302.0
Railroad Crossings 308.0
Railroad Crossings – Added Stop Lanes 308.1
Active Warning Signs at Bridges and Tunnels 309.1
Uncontrolled Marked Crosswalks 310.3
Crosswalk Closures 310.8
Intersection Control Evaluation 400.0
YIELD Sign Applications 401.0
Roundabouts 403.0
Right Turn Lanes 405.1
Channelized Right Turn Lanes 405.2
Right Turn Acceleration Lanes 405.3
School Speed Zones 500.3
Traffic Calming 500.5
Parking 501.0
Access Management 502.0
Climbing & Passing Lanes 503.0
One-Way Operation for Trucks & Buses 507.0

Freeway Median Crossovers 510.0

Key References

1. American Association of State Highway and Transportation Officials. *A Policy on Geometric Design of Highways and Streets*, 7th ed. American Association of State Highway and Transportation Officials, Washington, D.C., 2018.
2. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
3. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.

File Code	Updated	Notes
DES 03	June 2024	Updated liability neutral language.

Uniform Traffic Control Devices 300.0

ORS 810.210 requires traffic control devices installed on highways and public roadways under the jurisdiction of cities and counties to conform to the Manual on Uniform Traffic Control Devices (MUTCD) (*1*) and Oregon Supplement to the MUTCD (*2*) adopted under ORS 810.200 and OAR 734-020-0005.

Standards & Guidelines

01 Devices installed or replaced after the publication date of the Oregon Supplement to the MUTCD (*2*) shall conform to the MUTCD (*1*) and Oregon Supplement to the MUTCD (*2*) upon installation. Unless noted otherwise, existing devices that do not conform shall be replaced at the end of their useful life.

02 Additional design details for signs, markings, and traffic signals are available in the Sign Policy and Guidelines for the State Highway System (*3*), the Traffic Line Manual (*4*), the Traffic Signal Policy and Guidelines (*5*), and the FHWA Standard Highway Signs and Markings publication (*6*).

Process & Required Approvals

The MUTCD (*1*) and Oregon Supplement to the MUTCD (*2*) are adopted through the OAR process and approved by the FHWA.

Special Considerations

The Oregon Supplement to the MUTCD (*2*) supplements the current edition of the MUTCD as adopted by Oregon in OAR 734-020-0005. Consult both the Oregon Supplement (*2*) and the MUTCD (*2*) when researching traffic control issues.

The Oregon Supplement (*2*) conforms to the organization and section numbering of the MUTCD. The two documents interact as follows:

- Unless otherwise noted, language in the Oregon Supplement (*2*) is added to the end of the referenced MUTCD (*1*) section.
- In other cases, the MUTCD (*1*) language is deleted and/or the Oregon Supplement (*2*) language inserted as directed by the instructions in italics.

The MUTCD (*1*) is available on the internet. Printed copies of the MUTCD and cost information are available from the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), and the American Traffic Safety Services Association (ATSSA).

There are no exceptions to the MUTCD. FHWA adopts changes to the MUTCD (*1*) (see Section 1A.10 in the MUTCD (*1*) for the process to request a change). Requests to experiment include consideration of testing or evaluating new traffic control devices (see Section 1A.10 in the MUTCD (*1*)).

Support

The intent of the MUTCD (*1*) is to enhance road safety and operation through uniform, understandable, and effective traffic control devices on Oregon highways.

Deviations to the MUTCD (*1*) are published in the Oregon Supplement to the MUTCD (*2*) and made for instances where Oregon law deviates from the MUTCD (*1*).

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Publications 101.0
Safety Engineering "Quick Fix" Program 200.1
Sight Distance 203.0
Interim Approvals 300.1
New Products 300.2
Traffic Control Device Visibility 300.3
Signs 302.0
Variable Message Signs 302.1
Vehicle Speed Feedback Signs 302.2
Highway Advisory Radio 302.3
Horizontal Alignment Signs 302.4
Pavement Markings 303.0
Traffic Signals 304.0
Traffic Signal Enforcement 304.1
Flashing Beacons 304.2
Temporary Traffic Control 306.0
Railroad Crossings 308.0
Active Warning Signs at Bridges and Tunnels 309.1
Intersection Bicycle Boxes 309.2
Crosswalks on State Highways 310.0
Spacing of Enhanced Crosswalks 310.1
Controlled Marked Crosswalks 310.2
Uncontrolled Marked Crosswalks 310.3
Textured & Colored Crosswalks 310.7
Crosswalk Closures 310.8
Intersection Control Evaluation 400.0
YIELD Sign Applications 401.0
STOP Sign Applications 402.0
EXCEPT RIGHT TURN Sign Applications 402.1
Roundabouts 403.0
Traffic Signal Operations 404.0
Ramp Meters 404.1
U-Turns at Signalized Intersections 404.2
Left Turn Lanes 405.0

Right Turn Lanes 405.1
Channelized Right Turn Lanes 405.2
Right Turn Acceleration Lanes 405.3
Shared (or Combined) Bike and Right Turn Lane 405.4
Transit Exceptions to Turn Lanes........ 405.5
Multiple Turn Lanes 405.6
Turn Prohibitions........ 405.7
Two-Way Left Turn Lanes 405.8
Wrong-Way Treatments........ 406.1
Speed Zones – General........ 500.0
Variable Speed Systems 500.1
Construction Speed Zones 500.2
School Speed Zones 500.3
Speed Safety Cameras........ 500.4
Parking........ 501.0
Climbing & Passing Lanes 503.0
Lane Reduction Transition........ 504.0
Road Closures 505.0
Truck Routes 506.0
One-Way Operation for Trucks & Buses........ 507.0
Freeway Median Crossovers........ 510.0
Special Events 603.0

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Oregon Department of Transportation. *Oregon Supplement to the Manual on Uniform Traffic Control Devices*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/MUTCD-OR-Supplement.pdf.
3. Oregon Department of Transportation. *Sign Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx.
4. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
5. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.
6. Federal Highway Administration. *Standard Highway Signs and Markings*. Federal Highway Administration, Washington, D.C. https://mutcd.fhwa.dot.gov/ser-shs_millennium.htm.

File Code	Updated	Notes
TRA 16-09-02 (Sup.) TRA 16-09-05 (Rev.)	June 2024	Updated liability neutral language.

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Interim Approvals 300.1

Interim approvals allow the interim use, pending official rulemaking by FHWA, of a new traffic control device, a revision to the application or manner of use of an existing traffic control device, or a provision not specifically described in the MUTCD (*1*).

Standards & Guidelines

01 See MUTCD (*1*) Section 1A.10 and the conditions in each interim approval.

Process & Required Approvals

Any jurisdiction that wishes to use an interim approval must request approval from FHWA to use the interim approval. ODOT, through the state traffic engineer, can request to use an interim approval on behalf of all jurisdictions in the state. The state traffic engineer might seek input from the Oregon Traffic Control Devices Committee before making such a request on behalf of all jurisdictions.

State traffic engineer approval might be required to use interim approval devices on state highways. **Sections 100.0** and **100.1** specify which of these devices require approval from the state traffic engineer or region traffic engineer to be installed.

There are currently no statewide interim approvals in Oregon. FHWA terminated all interim approvals under the 2009 MUTCD when the Final Rule for the 11th Edition of the MUTCD (*2*) became effective on January 18, 2024. New installations of devices previously subject to interim approval now must comply with the 11th Edition of the MUTCD (*3*). Existing installations that do not comply with the 11th Edition of the MUTCD must be brought into compliance through systematic replacement and upgrade of traffic control devices.

Table 300.1-A: Interim Approvals Issued Under the 2009 MUTCD

IA #	Description	Scope	Additional Guidance	Status
IA-13	Electric vehicle charging symbol sign	Statewide	Sign Policy & Guidelines (*4*)	Terminated
IA-14	Green colored pavement for bike lanes	Statewide	Traffic Line Manual (*5*)	Terminated
IA-16	Bicycle signal face	Statewide	Signal Policy & Guidelines (*6*) Signal Design Manual (*7*)	Terminated
IA-17	3-section flashing yellow arrow signal face	Statewide	Signal Policy & Guidelines (*6*) Signal Design Manual (*7*)	Terminated
IA-18	Intersection bicycle boxes	Statewide	Traffic Line Manual (*5*) Traffic Manual Section 309.2	Terminated
IA-20	2-stage bicycle turn boxes	Statewide	Traffic Line Manual (*5*)	Terminated
IA-21	Rectangular rapid flashing beacons	Statewide	Traffic Manual Section 310.3	Terminated
IA-22	Red-colored pavement for transit lanes	Statewide	Traffic Line Manual (*5*)	Terminated

Support

State traffic engineer approval is typically required to use an interim approval because:

- the device or use of the device is new and typically needs more attention until it is institutionalized, and
- a standard condition to have interim approval from FHWA is to track installations of interim approval devices. Approval records can serve as an inventory on the state highways.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Publications 101.0
Traffic Manual Updates 103.0
Uniform Traffic Control Devices 300.0
New Products 300.2
Signs 302.0
Pavement Markings 303.0
Traffic Signals 304.0
Bicycle Facilities 309.0
Intersection Bicycle Boxes 309.2
Uncontrolled Marked Crosswalks 310.3
Parking 501.0

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Federal Highway Administration. 23 CFR Part 655 National Standards for Traffic Control Devices; the Manual on Uniform Traffic Control Devices for Streets and Highways; Revision. *Federal Register*, Vol. 88, no. 242, December 2023, pp. 87672-87696. https://www.govinfo.gov/content/pkg/FR-2023-12-19/pdf/2023-27178.pdf.
3. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 11th ed. Federal Highway Administration, Washington, D.C., 2023. https://mutcd.fhwa.dot.gov/index.htm.
4. Oregon Department of Transportation. *Sign Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx.
5. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
6. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.
7. Oregon Department of Transportation. *Traffic Signal Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Design-Manual.aspx.

File Code	Updated	Notes
TRA 16-09	June 2024	Updated state traffic engineer and Traffic Engineering Section.

New Products 300.2

Process & Required Approvals

Testing of many new products is performed in conjunction with the ODOT Construction Section, Federal Highway Administration, and/or manufacturers. The Traffic Systems Services Unit, Traffic Standards and Asset Management Unit, and the Traffic Engineering Services Unit tests products and evaluates traffic control devices and equipment. Manufacturers and suppliers can contact the Traffic Engineering Section for information related to the proper process to obtain product approvals.

Special Considerations

All products approved for traffic signal construction are contained in the Blue (*1*) and Green (*2*) Sheets. The Blue Sheets contain field-qualified equipment and materials while the Green Sheets list conditional qualified controller equipment.

The Traffic Standards and Asset Management Unit reviews new traffic signal products in cooperation with other units and adds new products to the Blue (*1*) or Green (*2*) Sheets with related special provisions amended as necessary. The Blue and Green Sheets for signal equipment are available from the state traffic signal engineer of the Traffic Standards and Asset Management Unit.

Cross References

Uniform Traffic Control Devices.......300.0
Interim Approvals.......300.1
Signs.......302.0
Pavement Markings.......303.0
Traffic Signals.......304.0
Temporary Traffic Control.......306.0

Key References

1. Oregon Department of Transportation. Blue Sheets: Prequalified Products and Submittals for Qualification of Electrical Equipment and Materials. *Signal Design Guidance Materials*, https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/BlueSheets.pdf. Accessed June 21, 2019.
2. Oregon Department of Transportation. Green Sheets: Conditionally Prequalified Products and Submittals for Conditional Qualification of Controller Equipment. *Signal Design Guidance Materials*, https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/GreenSheets.pdf. Accessed June 21, 2019.

File Code	Updated	Notes
MAT 00-02	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Signs 302.0

Signs are traffic control devices intended to communicate specific information to road users through word, symbol, and/or arrow legends. Signs do not include highway traffic signals, pavement markings, delineators, or channelization devices.

Standards & Guidelines

01 See Part 2 of the MUTCD (*1*), the ODOT Sign Policy and Guidelines (*2*), and ODOT Sign Design Manual (*3*).

Process & Required Approvals

See the ODOT Sign Policy and Guidelines (*2*), the ODOT Sign Design Manual (*3*), and **Section 100.0** and **100.1** for signs that require state traffic engineer and region traffic engineer approval.

The Region Traffic Unit reviews and designs special signs requested by district sign crew supervisors. The Region Traffic Unit approves orders and sends them to the sign shop for fabrication.

Special Considerations

ODOT is responsible for furnishing and maintaining directional, regulatory, warning, and informational signs on the state highway system. ODOT's sign policy is a combination of Oregon Revised Statutes, Oregon Administrative Rules, Federal Highway Administration rules and guidelines, and engineering judgment. The Oregon Transportation Commission has adopted the MUTCD (*1*), Oregon Supplement to the MUTCD (*4*), and Oregon Temporary Traffic Control Handbook (*5*) as the sign manuals for the State of Oregon. The Sign Policy and Guidelines for the State Highway System (*2*) deal exclusively with items not included in the MUTCD (*1*) or items that need further clarification with respect to their use on the state highway system.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Publications 101.0
Safety Engineering "Quick Fix" Program 200.1
Sight Distance 203.0
Uniform Traffic Control Devices 300.0
Interim Approvals 300.1
New Products 300.2
Traffic Control Device Visibility 300.3
Variable Message Signs 302.1
Vehicle Speed Feedback Signs 302.2
Highway Advisory Radio 302.3

Horizontal Alignment Signs 302.4
Traffic Signal Enforcement 304.1
Flashing Beacons 304.2
Temporary Traffic Control 306.0
Bicycle Facilities 309.0
Active Warning Signs at Bridges and Tunnels 309.1
Intersection Bicycle Boxes 309.2
Uncontrolled Marked Crosswalks 310.3
Crosswalk Closures 310.8
Accessible Parking Spaces 312.0
Intersection Control Evaluation 400.0
YIELD Sign Applications 401.0
STOP Sign Applications 402.0
EXCEPT RIGHT TURN Sign Applications 402.1
Wrong-Way Treatments 406.1
Speed Zones – General 500.0
School Speed Zones 500.3
Speed Safety Cameras 500.4
Lane Reduction Transition 504.0
Freeway Median Crossovers 510.0
Historical Markers 602.0

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Oregon Department of Transportation. *Sign Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx.
3. Oregon Department of Transportation. *Traffic Sign Design Manual*. Oregon Department of Transportation, Salem, Oregon. http://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Sign-Design-Manual.pdf.
4. Oregon Department of Transportation. *Oregon Supplement to the Manual on Uniform Traffic Control Devices*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/MUTCD-OR-Supplement.pdf.
5. Oregon Department of Transportation. *Oregon Temporary Traffic Control Handbook for Operations of Three Days or Less*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/odot/Engineering/Pages/OTTCH.aspx.

File Code	Updated	Notes
TRA 16-04	June 2024	Updated state traffic engineer and Traffic Engineering Section

Variable Message Signs 302.1

A variable message sign (VMS) is a traffic control device (permanent or portable) whose message can be changed to provide motorists with information about traffic congestion, traffic crashes, travel time, maintenance operations, adverse weather conditions, roadway conditions, organized events, or other highway features.

Standards & Guidelines

01 For permanent VMS, see the ODOT Guidelines for the Operation of Variable Message Signs on State Highways (*1*).

02 For temporary changeable signs, see the Oregon Portable Changeable Message Sign Handbook (*2*).

Process & Required Approvals

According to OAR 734-020-0410, the state traffic engineer is responsible for exercising authority with respect to the use of traffic control devices. Since variable message signs are traffic control devices, their operation is under the authority of the state traffic engineer.

Installation and location of a permanent VMS on state highways requires consultation with the Intelligent Transportation Systems Unit, region traffic engineer, and the approval of the state traffic engineer. For new installations including signs associated with variable speed zones, approval of the state traffic engineer should be obtained by DAP. If a VMS is part of a project, the project shall not be released for construction under any circumstance without state traffic engineer approval to install the VMS. Permanent signs may also display public service messages with approval from the state traffic engineer.

Once the state traffic engineer receives a request for installation of a permanent VMS, Traffic Engineering Section staff will coordinate review with Intelligent Transportation Systems Unit staff and will make a recommendation to the state traffic engineer. The state traffic engineer may request additional information from both the Region Traffic Unit and Intelligent Transportation Systems Unit before any approval decision.

If the VMS is planned to be part of a variable speed zone system (i.e. to inform road users of road conditions, in addition to the variable speed signs), the submittal to the state traffic engineer shall include all deliverables found in the variable speed zones section of this manual (**Section 500.1**).

The region traffic engineer has the responsibility to approve messages displayed on permanent VMS in his or her region; however, the state traffic engineer has retained the authority to approve public services messages, which may be displayed on permanent variable message signs only.

Special Considerations

The following considerations that should be addressed in the approval request submitted to the state traffic engineer. These considerations should not be interpreted as pass/fail criteria for installation of a permanent VMS. Rather, they are important considerations when proposing permanent VMS installations on state highways:

- Signs should be placed far enough in advance of a decision point (e.g. interchange, major intersection, merge section at the end of a passing lane, etc.) to allow drivers enough time to read and understand the message before having to refocus their attention on the driving task. Generally, signs should be located at least 1 mile in advance of decision points on non-freeway installations and 1½ to 3 miles for freeway installations. In urban contexts, VMS locations might need to be more closely spaced to decision points.
- The availability of power and communications should be noted in all requests for permanent VMS installations.

A full matrix color VMS can display advisory or regulatory information that replicates static signs in accordance with Chapter 2L of the MUTCD (*3*). Applications include displaying advisory or adjusted regulatory speeds based on congestion, weather, and/or road surface conditions.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Publications 101.0
Uniform Traffic Control Devices 300.0
Traffic Control Device Visibility 300.3
Signs 302.0
Vehicle Speed Feedback Signs 302.2
Horizontal Alignment Signs 302.4
Temporary Traffic Control 306.0
Variable Speed Systems 500.1

Key References

1. Oregon Department of Transportation. *Guidelines for the Operation of Permanent Variable Message Signs*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/VMS-Guidelines.pdf.
2. Oregon Department of Transportation. *Oregon Portable Changeable Message Sign Handbook*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/PCMS-Handbook.pdf.
3. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

Variable Message Signs 302.1

File Code	Updated	Notes
TSO 04, TSO 05	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Vehicle Speed Feedback Signs 302.2

A vehicle speed feedback sign displays the speed that an approaching driver is traveling. This is a type of changeable message sign that can be installed with a speed limit sign.

ODOT has adopted goals in the Transportation Safety Action Plan to eliminate fatal and serious injury crashes for users of all modes. Speeding is the most common behavioral issue associated with fatal and serious injury crashes in Oregon (*1*). Measures that reduce speed in the event of a crash can help move ODOT closer to its adopted safety goals.

Speed feedback signs can be one part of a larger strategy to reduce fatal and severe injury crashes at a location or along a corridor. These signs generally decrease speed by 2 to 4 mph, depending on the context of the surrounding roadway and land use.

Scope

Unless otherwise specified in an approval from the region traffic engineer or state traffic engineer, the standards and guidelines in this section apply to ground-mounted vehicle speed feedback signs installed or replaced on state highways after January 1, 2023. For vehicle speed feedback signs installed or replaced before then, the standards and guidelines in this section apply when the sign is replaced.

Unless otherwise specified by an ODOT district office, the standards and guidelines in this section apply to trailer-mounted vehicle speed feedback signs parked on a state highway on or after July 1, 2023.

Standards & Guidelines

01 A vehicle speed feedback sign that displays the speed of an approaching vehicle back to the vehicle operator may be used to provide warning to drivers of their speed in relation to a speed limit or horizontal alignment advisory speed.

02 When used as a warning to motorists of their speed in relation to the posted speed, the vehicle speed feedback sign shall be mounted below a speed limit sign.

03 When used to supplement a horizontal alignment advisory speed, the vehicle speed feedback sign should be mounted below a combination horizontal alignment/advisory speed sign (W1-1a or W1-2a) near the point of curvature of a horizontal curve.

04 The legend YOUR SPEED shall be a black legend on a yellow retroreflective background. The changeable legend displaying the speed of the approaching vehicle shall be a yellow luminous legend on a black opaque background (see **Figure 302.2-1** for example).

Figure 302.2-1: Vehicle Speed Feedback Sign Examples

05 The vehicle speed feedback sign shall not flash, strobe, change color, or use other dynamic elements integrated into the changeable legend display. When no vehicles are approaching, the changeable display shall not display a legend.

06 When the approaching vehicle's speed exceeds 10-15 mph over the posted speed, the changeable display shall show "SLOW DOWN" or not display a legend instead of displaying the approaching vehicle speed.

07 The changeable portion of the vehicle speed feedback legend should be approximately the same height, width, and stroke of those on the speed limit sign it supplements or is mounted below.

08 The vehicle speed feedback sign should be approximately the same width of the speed limit sign it is mounted below.

09 See the ODOT Traffic Signal Design Manual (2) for design and installation details of vehicle speed feedback signs.

Process & Required Approvals

The process for vehicle speed feedback signs depends on the type and duration of installation. A ground-mounted sign is installed on a sign support. Trailer-mounted signs are temporarily parked at a location and are typically owned and operated by city police departments or county sheriff's offices. Examples of both are shown in **Figure 302.2-2**.

If a speed feedback sign is used only as part of mobile photo radar enforcement activities under ORS 810.438 and 810.439, an agreement with ODOT is typically not needed to use the sign on a state highway; however, if the sign interferes with highway work or an activity allowed by a permit, the law enforcement agency may need to relocate the sign or enforcement location.

Figure 302.2-2: Examples of Ground-Mounted and Trailer-Mounted Speed Feedback Signs

Ground-Mounted Sign **Trailer-Mounted Sign**

Ground-Mounted Signs – Installation

Except as provided in this subsection, region traffic engineer approval is required to install a ground-mounted vehicle speed feedback sign. If the installation will deviate from standards ("shall" statements), then state traffic engineer approval is required.

If the sign is part of a fixed photo radar enforcement installation, no additional engineering study or approval is required to install the speed feedback sign. ORS 810.444 requires these signs for fixed photo radar enforcement and these enforcement systems require state traffic engineer approval for installation. See **Section 500.4** for more information about fixed photo radar.

Document the following in the request for region traffic engineer approval for a ground-mounted vehicle speed feedback sign.

1. Proposed location of the vehicle speed feedback sign. Note whether it will be installed on a new or existing speed limit sign support, school speed limit sign support, or horizontal alignment warning sign support.
2. Posted speed(s) within 0.25 miles in either direction of the proposed location along the highway.
3. A feature(s) that drivers should slow for on the highway other than posted speed within 0.25 miles downstream from the proposed location (e.g. uncontrolled marked crosswalk, intersection SPIS site, curve, school crossing).

Additional information may be included in the request as determined by the region traffic engineer. For example, the following may be included as supplemental information in the engineering study.

- Last available 5 years of crashes from the ODOT crash data system within 0.25 miles in either direction of the proposed location along the highway. If more recent preliminary crash data are available, this may be included in addition to the finalized data.

For each crash, note the location of the crash, whether the crash was speed-related, and applicable errors noted in the crash data. For data from the ODOT crash data system, this may be done by attaching a de-coded version of the PRC report to the engineering study. The Crash Decoder Tool is available on ODOT's ARTS website under Analysis Tools & Forms.

- A spot speed check at or near the proposed location following procedures in the ODOT Speed Zone Manual (*3*) or probe-based speed data documenting similar summary statistics of a spot speed check. If the sign will be installed with a school speed limit sign, gather speed data when children are arriving to or leaving from the school.

Install vehicle speed feedback signs listed on ODOT's Green Sheets for vehicle speed feedback signs. Green Sheet specifications are set up to meet the design and operation requirements in the MUTCD and meet the needs of ODOT maintenance crews. See Oregon Standard Details DET4451, DET4455, and DET4456 for installation details.

If a local jurisdiction wants to install a ground-mounted vehicle speed feedback sign on a state highway, ODOT approval is required. ODOT approval is usually done through an agreement or permit. Agreements typically apply to permanent installations or installations with shared responsibilities but may also be used for temporary installations. A permit issued by the ODOT district office may be used for temporary installations with no shared responsibilities.

ODOT approval is coordinated between the region traffic office and district maintenance office. ODOT permission for a ground-mounted vehicle speed feedback sign typically establishes:

- the type of equipment,
- time the sign may remain in place,
- compliance with standards and guidelines related to design and operation, and
- responsibilities for cost, installation, and maintenance.

Ground-Mounted Signs – Removal

Region traffic engineer approval is required to permanently remove a ground-mounted vehicle speed feedback sign. Permanent removal does not include moving the sign to a different pre-approved location as part of a rotation program. Signs that were installed without ODOT permission may be removed without region traffic engineer approval.

Document the following in the request for region traffic engineer approval to remove a ground-mounted vehicle speed feedback sign.

1. Changes in the posted speed(s) from when the sign was first installed within 0.25 miles in either direction of the sign. For example, if the sign was originally part of a transition area but the transition area is moving or has moved.
2. Changes in a feature(s) that drivers should slow for on the highway other than posted speed from when the sign was first installed. The feature(s) should be within 0.25 miles downstream from the sign. For example, if the sign was originally part of a school zone but the school has permanently closed, or the sign was originally a treatment for a safety corridor, but the safety corridor has been decommissioned.
3. If the sign was installed under a permit or agreement, then whether the conditions of the permit or agreement were upheld by the outside entity. For example, if the outside entity fails to operate and maintain the sign in good working order, if that was a condition of the permit or agreement.

Additional information may be included in the request as determined by the region traffic engineer. For example, a comparison of mean speed, 85th percentile speed, and percent exceeding posted speed while the sign is in service to while the sign is covered or removed may be included as supplemental information in the engineering study.

Trailer-Mounted Signs

If a local jurisdiction or other entity wants to park a trailer-mounted vehicle speed feedback sign on a state highway, this is typically coordinated with ODOT through the local ODOT district office; region traffic engineer approval is not needed.

ODOT permission for the trailer-mounted sign typically

- describes the location,
- duration the sign may remain in place, and
- that the sign must operate according to the standards and guidelines in this section.

Note: the MUTCD prohibits these signs from including advertising, animation, rapid flashing, dissolving, exploding, scrolling, strobe lights, or other dynamic elements. This includes flashing displays and strobe lights like simulated police light bars, changing colors, flashing speed displays, and other unconventional messages or graphics displayed with the speed numbers.

Special Considerations

Many studies have examined the effectiveness of speed feedback signs in a wide range of contexts with varied results. An August 2021 meta-analysis (6) of 57 other studies examining the effectiveness of 204 vehicle speed feedback sign installations found these signs consistently lower mean speed, 85th percentile speed, and percent exceeding posted speed at the sign and downstream of the sign (both compared to upstream of the sign).

The analysis estimated a 2-4 mph reduction in mean speed at the sign across all vehicle types and across different contexts compared to upstream of the sign. Contexts included curved sections, school zones, transition zones, and work zones. Most studies examined effects within 12 months after installation.

For temporary installations, the few studies that examined speeds after the sign was removed showed mean speeds remained approximately 2 mph lower at the sign's former site than before installation. However, there were too few studies to assess the statistical significance of this effect and the analysis did not discuss how long this reduction was expected to last after removal.

While there was much variability in how data were collected across the 57 studies, the meta-analysis found three factors that appear to reduce the effectiveness of the sign:

- The sign will be less effective if drivers do not perceive a need to reduce their speed.
- The sign will be less effective if drivers are already traveling at the posted speed. In some cases where speeds were low to begin with, observed speeds increased, though the increase generally stayed within the posted speed limit.
- The sign will be less effective at reducing truck speeds than other vehicle speeds. In these cases, authors concluded this was because truck drivers were on average traveling slower to begin with compared to drivers of passenger vehicles.

While 2-4 mph may be relatively small, even small speed reductions can improve the survivability of a crash involving a person walking. A 2019 meta-analysis (*4*) of 15 studies of fatal pedestrian-involved crashes estimated that a 1 kph (0.6 mph) reduction in impact speed reduces the likelihood of a pedestrian fatality by 11% on average. In addition, as speed decreases, drivers tend to yield more frequently to people attempting to cross (*5*, *6*). See **Section 310.3** for more discussion on the relationship between speed and crosswalks.

Support

Some speed feedback signs on the market include red and blue flashing lights to simulate a police light bar and options to change colors, flash, and add other messages. FHWA has clarified that the MUTCD specifically prohibits the use of flashing displays and strobe light technology on vehicle speed feedback signs (*7*), including simulated police light bars, changing colors, flashing numerical speed displays, and other unconventional messages or graphics displayed with the speed numbers (*8*).

Cross References

Region Traffic Engineer 100.1
Publications 101.0
Crash Analysis 201.0
Uniform Traffic Control Devices 300.0
Signs 302.0

Vehicle Speed Feedback Signs 302.2

Variable Message Signs 302.1
Horizontal Alignment Signs 302.4
Temporary Traffic Control 306.0
Speed Zones – General 500.0
School Speed Zones 500.3
Speed Safety Cameras 500.4

Key References

1. Oregon Department of Transportation. *Oregon Transportation Safety Action Plan*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Safety/Pages/TSAP.aspx.
2. Oregon Department of Transportation. *Traffic Signal Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Design-Manual.aspx.
3. Oregon Department of Transportation. *Speed Zone Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/odot/Engineering/Docs_TrafficEng/Speed-Zone-Manual.pdf.
4. Hussain, Q., H. Feng, R. Grzebieta, T. Brijs, and J. Oliver. The relationship between impact speed and the probability of pedestrian fatality during a vehicle-pedestrian crash: A systematic review and meta-analysis. *Accident Analysis and Prevention*, Vol. 129, 2019, pp. 241-249. DOI: https://doi.org/10.1016/j.aap.2019.05.033
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6. Bertulis, T., and D. M. Dulaski. Driver Approach Speed and Its Impact on Driver Yielding to Pedestrian Behavior at Unsignalized Crosswalks. *Transportation Research Board of the National Academies*, Vol. 2464, no. 1, January 2014, pp. 46-51. DOI: https://doi.org/10.3141/2464-06
7. Kehrli, M. R. Interpretation Letter 2(09)-79 (I) - Radar Speed Feedback Signs. *Manual on Uniform Traffic Control Devices*, October 22, 2013. https://mutcd.fhwa.dot.gov/resources/interpretations/2_09_79.htm. Accessed February 3, 2020.
8. Kehrli, M. R. (2020, March) Official Ruling 2(09)-166(E) - Speed Feedback Signs and Pictograms (DENIED). [Online]. https://mutcd.fhwa.dot.gov/documents/pdf/2_09_166_ex.pdf.
9. Fisher, D. L., A. Breck, O. Gillham, and D. Flynn. Effectiveness of Dynamic Speed Feedback Signs Volume I: Literature Review and Meta-Analysis. Washington, D.C., DOT HS 813 170-A, 2021. https://rosap.ntl.bts.gov/view/dot/57513.

File Code	Updated	Notes
TRA 16-04	June 2024	Update state traffic engineer and Traffic Engineering Section.

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Highway Advisory Radio 302.3

The Federal Communications Commission (FCC) licenses state and local agencies and government-affiliated agencies, such as airport authorities, to use low-power roadside transmitters to provide motorists with up-to-the-minute travel information via their AM/FM radios. These systems, which the FCC calls Travelers Information Stations (TIS), can provide warnings, advisories, directions, or other non-commercial material of importance to motorists. The FCC issues these licenses and ODOT must operate the licenses in compliance with federal rule 47 CFR Chapter I, Part 90.242.

TIS operated by ODOT are highway advisory radio (HAR). ODOT utilizes HAR to supplement messages provided on standard highway signs or variable message signs.

Standards & Guidelines

01 These signs must be installed in accordance with the guidelines given in ODOT's Sign Policy and Guidelines for the State Highway System (*1*) .

02 The "Guidelines for the Operation of Highway Advisory Radio and Traveler's Advisory Radio on State Highways" (*2*) provides all the guidelines and requirements for installing and operating HAR stations on state highways.

Process & Required Approvals

For ODOT HAR, the ITS Unit works with the Wireless Group of the Maintenance and Operations Branch to obtain and maintain the required FCC licenses. A license is specific to a transmitter location and broadcast area for permanent HAR installations.

The FCC requires an area license for temporary HAR, which allows use on any state highway or for a specific corridor. ODOT does not maintain any license for temporary HAR; any temporary installations must obtain the required FCC license.

For TIS operated by other state agencies and local agencies with an established FCC license, advance signs may be posted on a state highway with state traffic engineer approval.

Special Considerations

HAR are permanently installed at locations where communication with travelers may be critical and may be temporarily installed in some work zones to provide travelers with timely information about a construction or maintenance project. Advance signs are posted to inform motorists about the availability of a HAR.

Messages, which are usually less than a minute in length, are recorded for continuous repetition. The message length is adjusted to permit the driver to receive the message at least twice while passing through the station's coverage zone.

Examples of TIS uses other than for state highway information include severe weather alerts, port traffic instructions, event management and local road construction or other detours.

Cross References

State Traffic Engineer 100.0
Uniform Traffic Control Devices 300.0
Signs 302.0
Temporary Traffic Control 306.0
Special Events 603.0

Key References

1. Oregon Department of Transportation. *Sign Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx.
2. Oregon Department of Transportation. *Guidelines for the Operation of Highway Advisory Radio and Other Travelers Information Stations on State Highways*. Oregon Department of Transportation, Salem, Oregon.

File Code	Updated	Notes
TRA 27-08	June 2024	Updated state traffic engineer and Traffic Engineering Section.

Pavement Markings 303.0

The traveling public relies heavily on pavement markings for guidance, positioning, and navigation. Uniform application of pavement markings improves roadway safety and efficiency. Road users have limited attention and ability to process information, and they primarily respond to markings based on what they have previously experienced; design standards can enhance learned behavior expectations (*1*) (*2*). Pavement markings have some limitations, but they have the advantage of communicating information to road users without diverting their attention away from the roadway.

Standards & Guidelines

01 The Traffic Line Manual (*3*) contains the ODOT policy and guidelines for installation of pavement markings. See the Pavement Marking Design Guidelines (*4*) and Traffic Line Manual (*3*) for information on developing pavement marking plans.

Process & Required Approvals

See the Traffic Line Manual (*3*) for specific processes and approval requirements related to pavement markings.

Special Considerations

The Pavement Marking Design Guidelines (*4*), based on the Oregon Standard Specifications for Construction and ODOT project delivery process, provide information to assist designers in the preparation of striping plans.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Safety Engineering “Quick Fix” Program 200.1
Uniform Traffic Control Devices 300.0
Interim Approvals 300.1
New Products 300.2
Traffic Control Device Visibility 300.3
Railroad Crossings 308.0
Bicycle Facilities 309.0
Intersection Bicycle Boxes 309.2
Crosswalks on State Highways 310.0
Controlled Marked Crosswalks 310.2
Uncontrolled Marked Crosswalks 310.3
Roundabouts 403.0
Right Turn Lanes 405.1
Channelized Right Turn Lanes 405.2
Right Turn Acceleration Lanes 405.3

Multiple Turn Lanes 405.6
Two-Way Left Turn Lanes 405.8
Wrong-Way Treatments........ 406.1
Climbing & Passing Lanes 503.0
Lane Reduction Transition........ 504.0

Key References

1. Campbell, J. L., M. G. Lichty, J. L. Brown, C. M. Richard, J. S. Graving, J. Grahm, M. O'Laughlin, D. Torbic, and D. Harwood. *NCHRP Report 600: Human Factors Guidelines for Road Systems*. Transportation Research Board of the National Academies, Washington D.C., 2012. http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_600second.pdf.
2. American Association of State Highway and Transportation Officials. *Highway Safety Manual*, 1st ed. AASHTO, Washington, D.C., 2010.
3. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
4. Oregon Department of Transportation. *ODOT Pavement Marking Design Guidelines*. Oregon Department of Transportation, Salem, Oregon. http://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Pavement-Marking-Design-Guide.pdf.

File Code	Updated	Notes
TRA 16-02	January 2020	Removed sections covered in the Traffic Line Manual.

Rumble Strips 303.1

Longitudinal rumble strips are an engineering treatment designed to alert drivers of a lane departure through vibration and noise created when a vehicle's tires contact the rumble strip.

Transverse rumble strips, placed perpendicular to the direction of travel, enhance other traffic control devices, and warn road users of an unusual situation.

Standards & Guidelines

01 See the Traffic Line Manual (*1*) for standards and guidelines on longitudinal and permanent transverse rumble strips.

02 Longitudinal rumble strips shall be installed on STIP projects according to the Traffic Line Manual (*1*).

03 When installing new or modifying existing rumble strips, public outreach should be completed explaining the purpose of the rumble strip installation.

04 See the Traffic Control Plan Design Manual (*2*) for standards and guidelines on temporary transverse rumble strips.

Process & Required Approvals

Construction Section's Pavement Services Unit shall be contacted early in the project planning process for all rumble strip installations to evaluate impacts to pavements. The Pavement Services Unit will develop pavement-related recommendations on the installation of rumble strips in collaboration with the district manager and the region traffic engineer.

Pavement-related recommendations should consider road user safety as the top priority; pavement condition, potential impacts on pavement condition and/or increased likelihood of pavement failure by installing rumble strips are additional considerations.

Funding sources for longitudinal rumble strip work on STIP projects is listed in **Table 303.1-A**.

Table 303.1-A: Longitudinal Rumble Strip Funding on STIP Projects

Work	Funding Source
Initial installation of rumble strips during STIP paving projects.	Eligible to use safety funds. Projects must engage the ARTS project selection process to qualify for safety funds.
Initial installation of pavement markings placed over new or reinstalled edge line and centerline rumble strips.	Eligible to use safety funds. Projects must engage the ARTS project selection process to qualify for safety funds.
Reinstallation of rumble strips during STIP projects.	Project primary funding source (in the same manner as pavement markings that are removed and reinstalled due to preservation work).

Region traffic engineer approval is required to omit longitudinal rumble strips, adjust minimum clear shoulder widths, or use sinusoidal rumble strips in certain circumstances detailed in the Traffic Line Manual (*1*). State traffic engineer approval is required to omit longitudinal rumble strips or adjust minimum clear shoulder widths in circumstances not detailed in the Traffic Line Manual.

Region traffic engineer approval is required for installation of permanent transverse rumble strips associated with a Stop Ahead (W3-1) warning sign on state highways or local public road approaches to a state highway. State traffic engineer approval is required for all other permanent transverse rumble strips on state highways.

See the Traffic Control Plan Design Manual (*2*) for information on process and required approvals for temporary transverse rumble strips.

Special Considerations

Permanent milled-in *transverse* rumble strips can be used on new or existing bituminous pavement where crash history indicates intersection crashes that would be treatable with transverse rumble strips. To retrofit transverse rumble strips on existing pavement, the pavement should be in sufficiently good condition to accept the milling process without raveling or deteriorating. Otherwise, the pavement should be upgraded prior to milling. If installed near residential areas, consider the noise impacts.

Support

Longitudinal Rumble Strips

A roadway departure crash occurs after a vehicle crosses an edge line or a centerline or otherwise leaves the traveled way. Roadway departure crashes are the most common type of fatal and serious injury crash on Oregon’s rural highways. Between 2009 and 2013, approximately 53 percent of all fatal and serious injury crashes in Oregon included a roadway departure, contributing to 1,188 fatalities and 3,745 serious injuries. About 73 percent of these crashes were in a rural environment (*3*).

Rumble strips are a highly effective and cost-efficient method of reducing roadway departure crashes. See **Table 303.1-B** for NCHRP Report 641 (*4*) estimates of safety effectiveness for traditional rumble strips based on roadway functional classification:

Table 303.1-B: Estimated Crash Reduction using Traditional Rumble Strips

Facility Type	Rumble Strip Location	All Roadway Departure Crashes	Fatal & Injury Roadway Departure Crashes
Rural freeway	Shoulder	11% (SE=6)	16% (SE=8)
Rural multi-lane divided highway	Shoulder	22% (SE not reported)	51% (SE not reported)
Rural 2-lane highway	Shoulder	15% (SE=7)	29% (SE=9)
Rural 2-lane highway	Centerline	30% (SE=5)	44% (SE=6)
Urban 2-lane highway	Centerline	40% (SE=17)	64% (SE=27)

The objective of ODOT's rumble strip policy is to reduce lane departure crashes by installing rumbles strips on as many rural state highways as practical. Implementation of this policy for new rumble strips is incremental as STIP projects address highway sections and as safety funds through the All Roads Transportation Safety (ARTS) program allow. See the Traffic Line Manual (*1*) for additional supporting information.

Transverse Rumble Strips

Transverse rumble strips help make drivers aware of an approaching condition, but the rumble strips themselves do not communicate what action the driver needs to make in response to the condition (*5*).

Milled-in transverse rumble strips can be effective at reducing fatal and serious injury crashes at minor road stop-controlled intersections (*6*). These rumble strips might increase property-damage-only crashes, though the reason for this increase is not clear (*6*). One theory is the rumble strips increase speed variability, which might increase rear-end crashes (*5*) (*7*).

Transverse rumble strips generally do not have a practical effect on reducing vehicle speed at approaches to stop-controlled intersections (≤1-2 mph) (*5*) (*8*) (*9*) and in speed transition zones (*10*).

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1

Rumble Strips **303.1**

Highway Safety Engineering 200.0
Safety Engineering "Quick Fix" Program 200.1
Crash Analysis 201.0
Temporary Traffic Control 306.0
STOP Sign Applications 402.0

Key References

1. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
2. Oregon Department of Transportation. *Traffic Control Plan Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/TCP-Manual.aspx.
3. Oregon Department of Transportation. *Oregon Transportation Safety Action Plan*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Safety/Pages/TSAP.aspx.
4. Torbic, D. J., J. M. Hutton, C. D. Bokenkroger, K. M. Bauer, D. W. Harwood, D. K. Gilmore, J. M. Dunn, J. J. Ronchetto, E. T. Donnell, H. J. Sommer III, P. Garvey, B. Persaud, and C. Lyon. *NCHRP Report 641: Guidance for the Design and Application of Shoulder and Centerline Rumble Strips*. Transportation Research Board of the National Academies, Washington, D.C., 2009.
5. Brian, R., W. Kittleson, J. Knudsen, B. Nevers, P. Ryus, K. Sylvester, I. Potts, D. Harwood, D. Gilmore, D. Torbic, F. Hanscom, J. McGill, and D. Stewart. *NCHRP Report 613: Guidelines for Selection of Speed Reduction Treatments at High-Speed Intersections*. Transportation Research Board of the National Academies, Washington, D.C., 2008. http://www.trb.org/Publications/Blurbs/160046.aspx.
6. Srinivasan, R., J. Baek, and F. Council. Safety Evaluation of Transverse Rumble Strips on Approaches to Stop-Controlled Intersections in Rural Areas. in *2010 Annual Meeting of the Transportation Research Board*, Washington, D.C., September 2010.
7. Isebrands, H., S. Hallmark, and N. Hawkins. Effects of Approach Speed at Rural High-Speed Intersections: Roundabouts Versus Two-Way-Stop Control. *Transportation Research Record: Journal of the Transportation Research Board Online*, Vol. 2402, 2014, pp. 67-77. http://trrjournalonline.trb.org/doi/abs/10.3141/2402-08. DOI: https://doi.org/10.3141/2402-08
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9. Yang, L., H. Zhou, L. Zhu, and H. Qu. Operation Effects of Transverse Rumble Strips on Approaches to High-Speed Intersections. *Transportation Research Record: Journal of the Transportation Research Record Online*, Vol. 2602, 2016, pp. 78-87. http://trrjournalonline.trb.org/doi/abs/10.3141/2602-10. DOI: 10.3141/2602-10
10. Torbic, D. J., D. K. Gilmore, K. M. Bauer, C. D. Bokenkroger, D. W. Harwood, L. M. Lucas, R. J. Frazier, C. S. Kinzel, D. L. Petree, and M. D. Forsberg. *NCHRP Report 737: Design Guidance for High-Speed to Low-Speed Transition Zones for Rural Highways*. Transportation Research Board of the National Academies, Washington, D.C., 2012. http://www.trb.org/Publications/Blurbs/168309.aspx.

File Code	Updated	Notes
RES 08-02	June 2024	Updated state traffic engineer and Traffic Engineering Section.

Traffic Signals 304.0

Standards & Guidelines

01 See the Traffic Signal Policy and Guidelines (*1*) and Signal Design Manual (*2*).

Process & Required Approvals

Before proceeding to the traffic signal approval process, complete a comprehensive intersection traffic control study. The study must compare reasonable alternatives to a traffic signal such as stop control, roundabout, intersection relocation or reconfiguration, and possibly grade separation. Traffic signal projects being considered for inclusion in the STIP should be identified as an "intersection improvement" project rather than a traffic signal, roundabout, or other type of traffic control until such time that an intersection traffic control study has been conducted and consensus has been reached on the proper traffic control solution for the intersection.

The state traffic engineer has been delegated the authority through administrative rule to approve the installation of traffic control devices on state highways. The traffic signal approval process is established in OAR 734-020-0400 through 734-020- 0500. The state traffic engineer must approve the installation of all temporary and permanent traffic signals on state highways, including those in the STIP or any other funding source.

All submittals for approval of a traffic signal on a state highway should come through the region traffic engineer. The region traffic engineer should submit a letter with an intersection traffic control study to the state traffic engineer. Traffic Engineering Section staff will review the request. One or more of the warrants identified in Part 4 of the MUTCD (*3*) must be met unless the traffic signal meets the criteria for special applications. The satisfaction of a warrant or warrants, however, is not in itself justification for a traffic signal. The intersection traffic control study must indicate that the installation of a traffic signal will improve the overall safety and operation of the intersection and be the preferred intersection control alternative.

If approved, the region traffic engineer will receive a letter of approval signed by the state traffic engineer. The letter will include guidance regarding the proposed lane configuration and phasing. If a traffic signal is not advanced to construction within five years after approval, the approval is automatically rescinded.

Whether ODOT staff or a consultant under contract to ODOT or another public or private entity designs a signal, all signals planned for construction on a state highway must meet all applicable MUTCD (*3*) and ODOT standards. The signal design must be consistent with specific elements outlined in the operational approval.

The Traffic Engineering Section must still approve the signal plans and specifications for all work on state highways. Submit design plans to the Traffic Standards and Asset Management Unit for review at all major milestones (i.e. DAP, preliminary, advanced, plans-in-hand). That unit must approve the final design.

Modifications

An intersection traffic control study that includes the applicable elements is required to support a modification request sent to the state traffic engineer. Traffic signal modifications approved by the region traffic engineer (see **Section 100.1**) should be documented and a copy of the documentation forwarded to the state traffic engineer.

Removal

A request to remove an existing traffic signal should be documented in an engineering investigation or intersection traffic control study. Removal of a signal requires a review of warrants, public notification, and interim control of the intersection. Other conditions may be applicable. See the Traffic Signal Policy and Guidelines (*1*) for details.

Temporary Traffic Signals

Temporary traffic signals are short-term installations, yet their appearance, design, and operation follow the same standards as permanent signals. The state traffic engineer must approve temporary signals. The installation of temporary signals must meet all applicable MUTCD (*3*) and ODOT standards. See the Traffic Signal Design Manual (*2*) for details.

Turn Lanes at Signalized Intersections

Policies and guidance for turn lanes at signalized intersections are included in both the Traffic Signal Policy and Guidelines (*1*) and in other sections of the Traffic Manual. Please refer to the Left-Turn Lanes, Multiple Turn Lanes, and Right-Turn Lanes sections of this manual.

Audible Pedestrian Signals

Region traffic engineer approval is required to install audible pedestrian signals. Follow the policies set forth in the Traffic Signal Policy and Guidelines (*1*). The state traffic engineer must approve exceptions to the policy.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Uniform Traffic Control Devices 300.0
Interim Approvals 300.1
New Products 300.2
Traffic Control Device Visibility 300.3
Traffic Signal Enforcement 304.1
Flashing Beacons 304.2
Temporary Traffic Control 306.0

Traffic Signals 304.0

Railroad Crossings 308.0
Intersection Bicycle Boxes 309.2
Controlled Marked Crosswalks 310.2
Crosswalk Closures 310.8
Intersection Control Evaluation 400.0
Roundabouts 403.0
Traffic Signal Operations 404.0
Ramp Meters 404.1
U-Turns at Signalized Intersections 404.2
Left Turn Lanes 405.0
Right Turn Lanes 405.1
Channelized Right Turn Lanes 405.2
Multiple Turn Lanes 405.6

Key References

1. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.
2. Oregon Department of Transportation. *Traffic Signal Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Design-Manual.aspx.
3. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

File Code	Updated	Notes
TRA 16-06	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Traffic Signal Enforcement 304.1

The two primary safety countermeasures used to reduce red-light running crashes are red-light running cameras and red-signal enforcement lights.

Standards & Guidelines

01 See the Red-Light Running Camera Guidelines for State Highways (Traffic Manual Appendix A1). Refer to ORS 810.434 through 810.437 for statutes about red light cameras. See the Sign Policy and Guidelines for the State Highway System (*1*) and the MUTCD (*2*) for signs associated with red light camera installations.

02 Red-signal enforcement lights shall be colored white.

03 The local law enforcement agency should be committed to an enforcement plan and obtain judicial support for citations based on enforcement lights prior to deploying red-signal enforcement lights.

04 Red-signal enforcement lights shall be positioned to be visible to downstream enforcement officers while not visible on the upstream approach. Ideal locations would allow officers to see the intersection's upstream stop bar from the downstream staging location.

05 Red-signal enforcement lights should be high enough to be seen over tall vehicles and out of reach of vandals.

Process & Required Approvals

State traffic engineer approval is required for red light running camera installation and operation at all state-owned intersections, including adding speed enforcement to an existing RLR installation, regardless of operation or maintenance responsibilities. See the Red Light Running Camera Guidelines for State Highways (Traffic Manual Appendix A1) for approval procedures on state highways.

Region traffic engineer approval is required to add red-signal enforcement lights at a traffic signal.

Special Considerations

Red-light running camera systems are used primarily to reducing red-light running crashes. Oregon law also allows these camera systems to enforce speed limits, though this functionality is secondary to reducing red-light running crashes.

Red-signal enforcement lights are only effective when combined with red-light running enforcement efforts.

Red-signal enforcement lights have many other names including red light indicators, signal indicator lights, enforcement lights, white enforcement lights, rat lights, or tattletale lights.

The red-signal enforcement light activates simultaneously with the red signal phase, providing an enforcement officer located downstream from an intersection with a visible indication of the upstream red phase so they can determine when a vehicle has violated the red phase. The enforcement lights are mounted on the rear of a traffic signal and are directly wired into the signal head for accurate red-signal indication.

The Oregon Standard Details give installation details for red-signal enforcement lights.

Support

Red light running is a serious intersection safety issue in Oregon. According to the Oregon Intersection Safety Implementation Plan (*3*), from 2005-2010 there were more than 55,000 reported crashes at signalized intersections resulting in 145 fatalities and 1,452 serious injuries. The Insurance Institute for Highway Safety (IIHS) reports that half of the people killed in red-light running crashes are not the signal violators. They are drivers and pedestrians hit by red-light runners (*4*) . Additional statistics about red-light running include:

- 97% of drivers feel that other drivers running red lights are a major safety threat (*5*).
- 1 in 3 people claim they personally know someone injured or killed in a red-light running crash (*6*).

Red-signal enforcement lights can enhance safety at signalized intersections by improving red-light compliance when combined with an aggressive enforcement strategy, resulting in a reduction of red-light running violations. They are auxiliary lights connected to a traffic-control signal to help law enforcement officers more efficiently and safely issue citations for drivers who violate the red phase of the signal. They are colored white because white has no traffic control meaning; multiple road authorities in Oregon are using blue under experimental approvals for bicycle detection confirmation.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Crash Analysis 201.0
Uniform Traffic Control Devices........ 300.0
Signs........ 302.0
Traffic Signals........ 304.0
Traffic Signal Operations 404.0
Speed Safety Cameras........ 500.4

Key References

1. Oregon Department of Transportation. *Sign Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx.
2. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

3. Oregon Department of Transportation. Oregon Intersection Safety Implementation Plan. Salem, Oregon, 2012. https://www.oregon.gov/ODOT/Engineering/TRSDocs/Intersection_Safety_Implementation_Plan.pdf.
4. Insurance Institute for Highway Safety. Red Light Cameras in Philadelphia All But Eliminate Violations. *Status Report*, Vol. 42, no. 1, January 2007. http://www.iihs.org/iihs/sr/statusreport/article/42/1/1.
5. Royal, D. Volume II: Findings: National Survey of Speeding and Unsafe Driving Attitudes and Behavior. The Gallup Organization, Washington, D.C., DOT HS 809 688, 2003. https://www.nhtsa.gov/people/injury/drowsy_driving1/speed_volII_finding/SpeedVolumeIIFindingsFinal.pdf.
6. Porter, B. E., T. D. Berry, J. Harlow, and T. Vandecar. A Nationwide Survey of Red Light Running: Measuring Driver Behaviors for the "Stop Red Light Running" Program. Old Dominion University, Norfolk, Virginia, 1999. https://trid.trb.org/view/636152.

File Code	Updated	Notes
TRA 16-30-31	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Flashing Beacons 304.2

Flashing beacons include intersection control beacons, warning beacons, speed limit sign beacons, and stop beacons.

Standards & Guidelines

01 See Part 4 of the MUTCD (*1*) and the Signal Design Manual (*2*).

Process & Required Approvals

The installation or removal of a warning beacon as a supplemental emphasis to existing warning signs (except for emergency signal signs) requires region traffic engineer approval. The installation or removal of a warning beacon as a supplement to emergency signal signs requires the approval of the state traffic engineer.

Special Considerations

All flashing beacons are supplemental to the appropriate warning or regulatory signing.

Intersection Control Beacon

ODOT takes a conservative approach to installing an intersection control beacon at intersections with a history of crashes involving disregard of existing STOP or YIELD signs. A warning beacon installed as supplemental emphasis to an intersection warning or stop ahead sign may be more effective in warning traffic of an upcoming intersection than an intersection control beacon. In addition, a stop beacon installed above the STOP sign on a stop-controlled side street approaching the state highway is an effective and less costly safety measure to install when compared to an intersection control beacon.

Several research studies have tried to establish the effectiveness of an intersection control beacon in reducing crashes at intersections. All such studies have been inconclusive. Some states have established policies for removing an intersection control beacon at a two-way stop-controlled intersection due to confusion for drivers approaching the intersection from the stop-controlled side street. Drivers from the stop-controlled side street can see that all approaches of traffic have an indication but cannot see the color of the indications for the other approach directions. Therefore, drivers from the stop-controlled side street might assume that all approaches have red indications and must stop. Regardless, it does not appear the installation of an intersection control beacon alone is an effective safety measure.

Installation of an intersection control beacon should only be considered if safety improvements at an intersection still leave some doubt as to the visibility of the intersection or type of intersection control.

Warning Beacon

See Part 4 of the MUTCD (*1*) for typical applications of warning beacons and the standards, guidance, and options that apply to such installations.

Speed Limit Sign Beacon

ODOT has limited use of the speed limit sign beacon on state highways to only those conditions covered by school speed limit assemblies in Part 7 of the MUTCD (*1*) and in accordance with Oregon Revised Statute 811.111. Further guidance on the use of speed limit sign beacons is contained in A Guide to School Area Safety (*3*). While use of a speed limit sign beacon to indicate children arriving at or leaving school does not require the approval of the state traffic engineer, the use of a speed limit sign beacon may be required as a condition of the school speed zone by the state traffic engineer.

Stop Beacon

Use of a stop beacon installed above the STOP sign on a stop-controlled side street approaching the state highway can be an effective and less costly safety measure to install when compared to an intersection control beacon. Consult Part 4 of the MUTCD (*1*) for standards associated with the installation of a stop beacon.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Safety Engineering “Quick Fix” Program 200.1
Uniform Traffic Control Devices 300.0
Signs 302.0
Traffic Signals 304.0
Active Warning Signs at Bridges and Tunnels 309.1
Uncontrolled Marked Crosswalks 310.3
STOP Sign Applications 402.0
School Speed Zones 500.3

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Oregon Department of Transportation. *Traffic Signal Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Design-Manual.aspx.
3. Oregon Department of Transportation. *A Guide to School Area Safety*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Guide_to_School_Area_Safety.pdf.

File Code	Updated	Notes
TRA 16-06-42	June 2024	Updated state traffic engineer and Traffic Engineering Section.

Temporary Traffic Control 306.0

The primary function of temporary traffic control is to provide safe and efficient movement of road users through or around work zones while protecting workers and emergency response personnel.

Standards & Guidelines

01 See the MUTCD (*1*) and the following publications:

a. Traffic Control Plan Design Manual (*2*),
b. Work Zone Traffic Analysis Handbook (*3*),
c. Oregon Temporary Traffic Control Handbook (*4*),
d. Transportation Management Plan Guidance Manual (*5*),
e. Oregon Portable Changeable Message Sign Handbook (*6*),
f. Traffic Signal Policy and Guidelines (*7*),
g. Traffic Signal Design Manual (*8*),
h. Sign Policy and Guidelines (*9*), and
i. Mobility Procedures Manual (*10*).

Process & Required Approvals

The Traffic Engineering Section serves as an internal consultant on temporary traffic control by providing recommendations on lane usage, detours, signal timing, staging, and feasibility of project plans. See the Traffic Control Plan Design Manual (*2*) for processes and approvals related to temporary traffic control on state highways. See the Oregon Portable Changeable Message Sign Handbook (*6*) for approval requirements for use of PCMS and messages displayed on PCMS.

Some elements of a temporary traffic control plan require state traffic engineer approval. These include:

- Temporary or portable signals
- Temporary pedestrian activated beacons (e.g. RRFB)
- Work zone speed reduction, and
- Temporary transverse rumble strips.

See the Traffic Control Plan Design Manual (*2*) for considerations of these elements.

Temporary modifications to existing signals for temporary traffic control, including but not limited to phasing, timing, and signal head locations, requires region traffic engineer approval.

Portable traffic signals are subject to testing by the Traffic Systems Services Unit and shall be certified as having passed ODOT laboratory tests. The region traffic engineer must approve timing of all signal intervals.

Special Considerations

Typical Deliverables

Traffic control plans will vary depending on project complexity. However, every traffic control plan for an ODOT project (developed internally or externally) typically includes the following deliverables:

Temporary Pedestrian Accessible Route Plan (TPARP)

The TPARP is a written and drawn plan within the temporary traffic control plan for providing safe, effective, and accessible routes for pedestrians through or around the work zone. See Technical Directive TSB17-01(D) (*11*) for more information about TPARPs, including the types of projects that apply to TPARPs.

Work Zone Decision Tree (WZDT)

The WZDT is a decision matrix to help temporary traffic control designers vet design considerations. See Highway Directive TRA 10-16 (*12*), Oregon Work Zone Safety Executive Steering Committee Guiding Principle (*13*), and the TCP Design Manual (*2*) for more information about the WZDT.

Transportation Management Plan (TMP)

A TMP is a documented set of coordinated transportation management strategies used to manage the impacts of work zones. See Highway Directive TRA 10-16 (*12*), TCP Design Manual (*2*), and TMP Project Level Guidance Manual (*5*) for more information about TMPs.

Work Zone Traffic Analysis

A WZTA is an estimate of work zone impacts to traffic flow (e.g. during lane closures, shoulder closures, and detours). See the Work Zone Traffic Analysis Handbook (*3*) for more information about WZTA.

Oregon Temporary Traffic Control Handbook

The Oregon Temporary Traffic Control Handbook (OTTCH) (*4*) provides a reference for the principles and standards for temporary traffic control zones in place continuously for three days or less on public roads in Oregon. It is based on the principles set forth in Part 6 of the MUTCD (*1*) and is officially recognized as the standard for temporary traffic control zones of three days or less in Oregon in accordance with OAR 734-020-0005.

For work keeping devices in place longer than three days, a site-specific traffic control plan based on the principles in Part 6 of the MUTCD (*1*) and the publications listed in the

Standards and Guidelines subsection is required. In addition, OR-OSHA has the authority to set and enforce worker safety standards.

The OTTCH (*4*) is applicable to all public roads in Oregon. Each road jurisdiction (city, county, or state) may have additional or more restrictive requirements and might require permits to work in their public right of-way. Contact the appropriate road jurisdiction prior to planning or beginning any work within their jurisdiction.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Uniform Traffic Control Devices 300.0
New Products 300.2
Traffic Control Device Visibility 300.3
Signs 302.0
Variable Message Signs 302.1
Vehicle Speed Feedback Signs 302.2
Highway Advisory Radio 302.3
Rumble Strips 303.1
Traffic Signals 304.0
Illumination 311.0
Traffic Signal Operations 404.0
Construction Speed Zones 500.2
Road Closures 505.0

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Oregon Department of Transportation. *Traffic Control Plan Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/TCP-Manual.aspx.
3. Oregon Department of Transportation. *Web-Based Work Zone Traffic Analysis Tool Users' Guide*. Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Work-Zone-Analysis-Manual.pdf.
4. Oregon Department of Transportation. *Oregon Temporary Traffic Control Handbook for Operations of Three Days or Less*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/odot/Engineering/Pages/OTTCH.aspx.
5. Oregon Department of Transportation. *Transportation Management Plan (TMP) Project Level Guidance Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/TMP-Manual.pdf.
6. Oregon Department of Transportation. *Oregon Portable Changeable Message Sign Handbook*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/PCMS-Handbook.pdf.
7. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.

8. Oregon Department of Transportation. *Traffic Signal Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Design-Manual.aspx.
9. Oregon Department of Transportation. *Sign Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx.
10. Oregon Department of Transportation. *Mobility Procedures Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/MCT/Documents/MobilityProcedureManual.pdf.
11. Oregon Department of Transportation. *Technical Services Directive TSB17-01(D): Traffic Control Plan Design*. Oregon Department of Transportation, Salem, Oregon, 2017. https://www.oregon.gov/ODOT/Engineering/Doc_TechnicalGuidance/TSB17-01D.pdf.
12. Oregon Department of Transportation. *Highway Directive TRA 10-16: Guiding Principle for Work Zone Safety*. Oregon Department of Transportation, Salem, Oregon, 2016. https://www.oregon.gov/ODOT/Engineering/Doc_TechnicalGuidance/TRA10-16d.pdf.
13. Oregon Department of Transportation; Oregon Trucking Associations, Inc.; Associated General Contractors Oregon Columbia Chapter; Oregon State University; AAA; Oregon State Police. Oregon Work Zone Safety Executive Steering Committee Guiding Principle. December 7, 2015. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Work-Zone_Guiding-Principle.pdf. Accessed May 31, 2019.

File Code	Updated	Notes
TRA 10-16	June 2024	Updated state traffic engineer and Traffic Engineering Section.

Railroad Crossings 308.0

Railroad crossings, including traffic control devices and roadway elements within the crossing influence area, are under the jurisdiction of ODOT Commerce and Compliance Division (includes the staff formerly known as Rail Division). ODOT Commerce and Compliance Division jurisdiction extends a distance equal to the safe stopping distance for the posted or statutory speed, measured back from the location of the stop clearance lines at the highway-rail grade crossing (OAR 741-100-0005). Safe stopping distance means the design stopping sight distance in Exhibit 3-1 in the 2001 AASHTO Green Book (*1*) (OAR 741-100-0020).

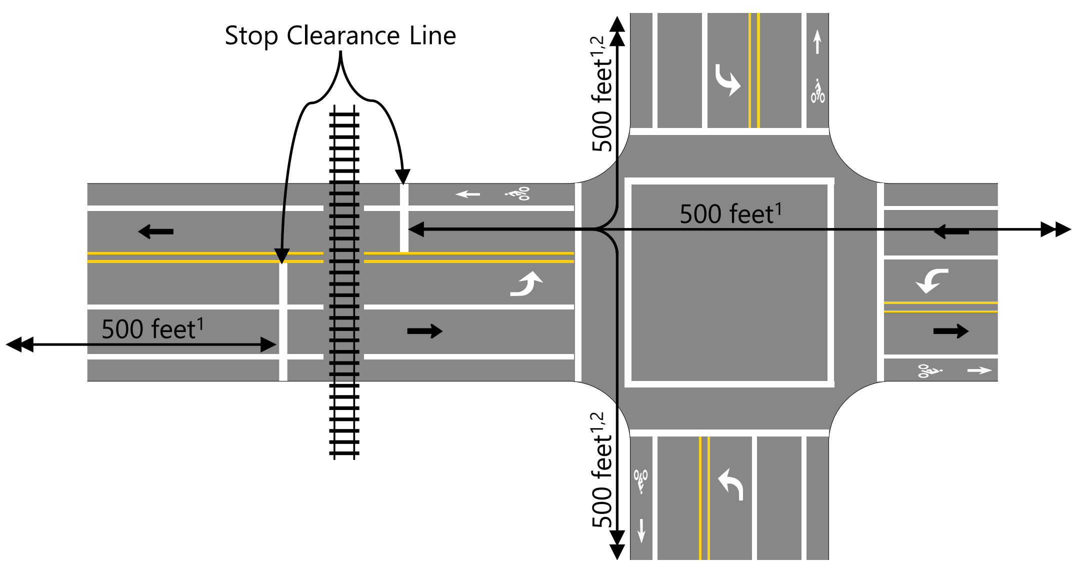
Standards & Guidelines

See the Traffic Signal Design Manual (*2*), Traffic Signal Policy and Guidelines (*3*), Traffic Line Manual (*4*), Oregon Supplement to the MUTCD (*5*), and OAR Chapter 741 for design and operation details for railroad crossings.

Process & Required Approvals

ODOT Commerce and Compliance Division and the ODOT statewide railroad liaison shall be notified of any anticipated work or maintenance located within their jurisdiction. For simplicity, any work within 500 feet of the tracks should be considered within their jurisdiction (see **Figure 308.0-1**). Ample advance notice minimizes impacts to the project's schedule. Contact the rail and crossings safety manager and the ODOT statewide railroad liaison.

Figure 308.0-1: ODOT Commerce and Compliance Division Jurisdiction



[1] ODOT Commerce and Compliance Division jurisdiction extends the safe stopping distance from the stop clearance line (assume 500 feet for simplicity).

[2] ODOT Commerce and Compliance Division jurisdiction extends along the parallel roadway because turns from an intersection near the railroad crossing might have an impact on the railroad crossing.

The rail crossing order process involves strict procedures and timelines to coordinate with the affected railroad company and all other interested parties. Obtaining a rail crossing order typically takes 6 to 18 months, depending on the complexity of the proposed work. **Figure 308.0-2** illustrates the basic process. Contested cases are rare but can occur and take additional time to resolve.

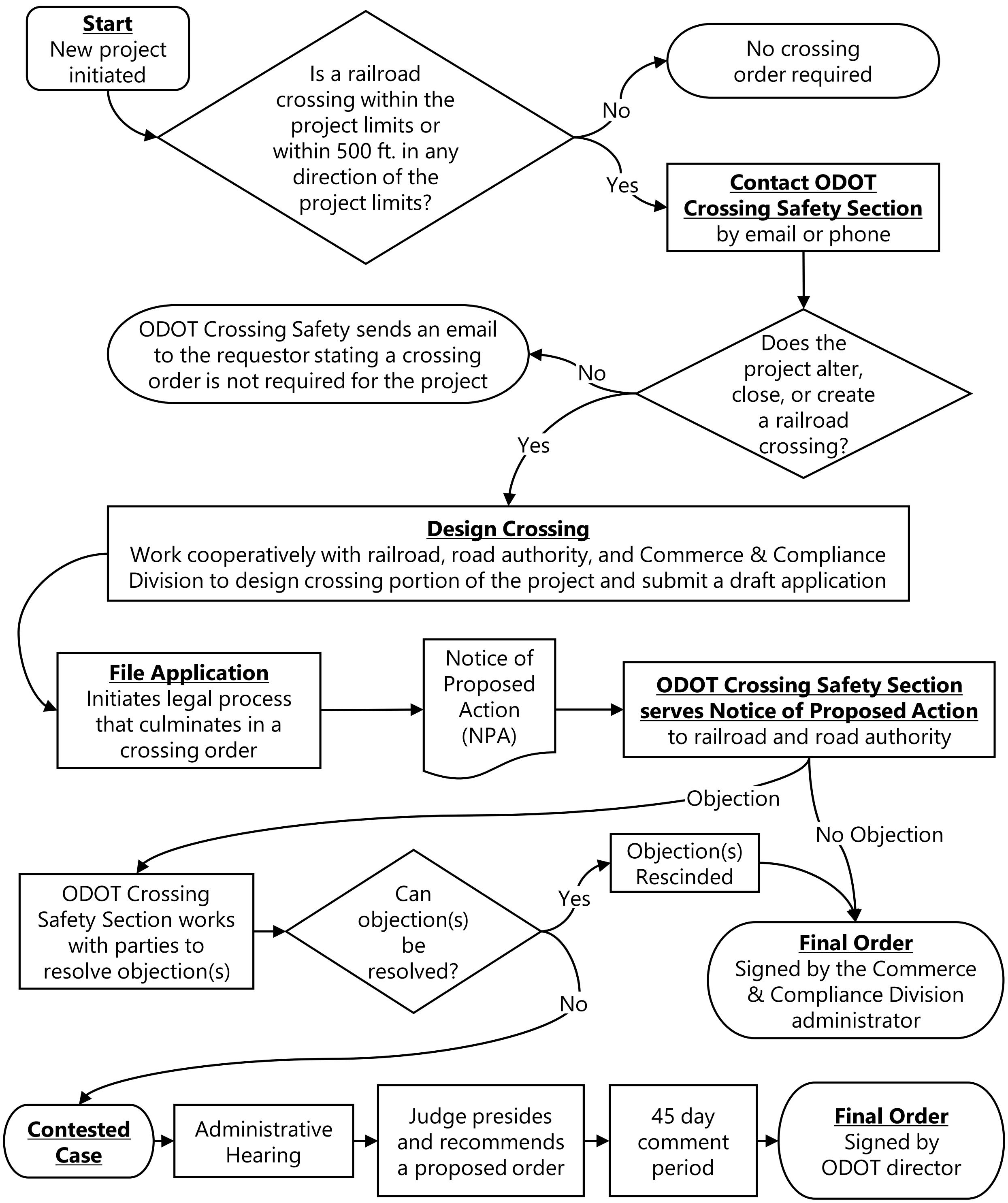
The ODOT statewide railroad liaison is the primary contact during the rail crossing order process and coordinates between the road authority, ODOT Commerce and Compliance Division, and the rail owner. The ODOT statewide railroad liaison helps all parties understand regulations, laws, and safety requirements to get through the process and associated tasks in an efficient manner.

If ODOT Commerce and Compliance Division determines the proposed work or maintenance requires a rail crossing order, the following process typically takes place:

1. Region, district, or the local road authority staff submits an application to ODOT Commerce and Compliance Division on Form 735-9202 for authority to construct, relocate, alter, or close a crossing. See OAR 741-200-0050 for information that must be included in the application. Contact ODOT Commerce and Compliance Division for questions related to the form.
2. ODOT Commerce and Compliance Division and ODOT statewide railroad liaison coordinate a rail diagnostic team meeting to discuss and review the proposed work, typically on-site.
3. ODOT Commerce and Compliance Division produces a Notice of Proposed Action for all interested parties to review.
4. ODOT Commerce and Compliance Division issues the rail crossing order after the review process is complete.
5. Construction or maintenance proceeds in compliance with the rail crossing order.
6. Region, district, or local road authority staff notify ODOT Commerce and Compliance Division of construction schedule and finish date and coordinate any on-site inspection(s) as requested by ODOT Commerce and Compliance Division during construction.
7. ODOT Commerce and Compliance Division inspects finished work for compliance with the rail crossing order.

If a rail crossing order is not required, ODOT Commerce and Compliance Division might still require a less formal method of coordinating and documenting the project work (e.g. email, phone calls, inspection reports, etc.).

Figure 308.0-2: Rail Crossing Order Process



Special Considerations

ODOT Commerce and Compliance Division determines if a rail crossing order is required to construct, relocate, remove, alter, or modify any of the following items within its jurisdiction:

- A railroad crossing.
- Traffic control devices (e.g. signs, pavement markings, traffic signals, etc.).
- Roadway elements (e.g. general footprint, curbs, barrier, etc.).

OAR 741-100-0020 defines "alter" as any change to the roadway or tracks at a railroad crossing that materially affects use of the crossing by railroad equipment, vehicles, or pedestrians. Alterations include, but are not limited to,

- adding or removing tracks,
- changing the width of the roadway,
- installing or removing protective devices,
- creating an additional travel lane,
- changing the direction of traffic flow,
- installing curbs, sidewalks, or bicycle facilities, or
- changing grade, including superelevation, if sufficient to necessitate a change of the grade of the railroad or highway being crossed.

Not all work requires a rail crossing order, but ODOT Commerce and Compliance Division might require other conditions such as being on-site/on-call when work is being done and/or inspection after the work is complete. These are common requirements for traffic signal timing changes that affect preemption operation and equipment maintenance at railroad-interconnected traffic signals. While not all traffic signal timing changes directly affect preemption operation, they may indirectly affect the operation by altering driver expectancy, driver behavior, or queuing. As such, ODOT Commerce and Compliance Division should always be notified when **any** signal timing changes are being considered (preferred) or have been completed. Notification also helps establish and maintain an important relationship with ODOT Commerce and Compliance Division that allows for peer review, documentation, and inspection as deemed necessary.

Table 308.0-A details specific elements, intent, and deliverables of the rail crossing order process.

Table 308.0-A: Rail Crossing Order Vocabulary

Element	Intent	Deliverable
Pre-application	Discussion and sharing information	Application or decision to not initiate a change
Application	Initiation of a legal process	Signed application
Railroad Crossing Safety System (RCSS) database	Data collection and tracking	Docket record
Project manager	Assigns responsibility	Manager name and update of Railroad Crossing Safety System (RCSS)
Docket	Documentation	Folder structure for retention
Railroad agreement	Financial commitment.	Railroad involvement and applicant commitment to cover document expenses for the railroad
Diagnostic	Field design assessment and documentation	Design of changes to a crossing or new crossing including all devices and measurements required
Devices	Listing of design elements	Each device has an intended safety feature per the MUTCD Part 8
Design	Civil design incorporating the devices detailed in the diagnostic or agreed to by the interested parties	An appendix to the order that the Notice of Proposed Action will reference and final order that will be processed, signed, and ordered into law
Notice of Proposed Action	Documentation of agreement between parties per the diagnostic for review	Approved initial proposal of responsibilities for each party for installation and maintenance and the appropriate timeline
Rescind application	Elimination of applications where parties confirm they will not continue with an existing application	Where required, a notification to the applicant and other parties that the original application will not proceed forward. Stops the legal process.
Final order	Approval by parties and a legally binding agreement upon signing	Signed order with an order number and initiation of a final inspection
FileNet	Electronic filing of final orders	Scanned final order placed in FileNet
Schedule a final inspection	Communication with project manager and other parties if necessary	Confirmation of need for inspection for final
Final inspection	Confirmation of devices and design to the order documentation, including appendices	Updating of Railroad Crossing Safety System (RCSS) and email notification to project manager and other parties to the final order

Support

A rail crossing order summarizes the current obligations at the public highway-railroad grade crossing, including but not limited to design, cost, maintenance, signals, signs, and operation requirements for all involved parties.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Sight Distance 203.0
Uniform Traffic Control Devices 300.0
Pavement Markings 303.0
Traffic Signals 304.0
Intersection Control Evaluation 400.0
Railroad Crossings – Added Stop Lanes 308.1
Traffic Signal Operations 404.0
Right Turn Lanes 405.1

Key References

1. American Association of State Highway and Transportation Officials. *A Policy on Geometric Design of Highways and Streets*, 4th ed. American Association of State Highway and Transportation Officials, Washington, D.C., 2001.
2. Oregon Department of Transportation. *Traffic Signal Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Design-Manual.aspx.
3. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.
4. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
5. Oregon Department of Transportation. *Oregon Supplement to the Manual on Uniform Traffic Control Devices*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/MUTCD-OR-Supplement.pdf.

File Code	Updated	Notes
TRA 07-12	June 2024	Updated liability neutral language.

Railroad Crossings – Added Stop Lanes 308.1

Drivers of vehicles listed in ORS 811.460, such as buses and trucks carrying hazardous materials, must stop at all railroad grade crossings. Added stop lanes give these vehicles a space to stop outside the traffic stream.

Standards & Guidelines

See the Oregon Standard Drawings RD400 series and Traffic Line Manual (*1*) for standards and guidelines related to added stop lanes at railroad crossings.

Process & Required Approvals

Installation or removal of an added stop lane is an alteration to the grade crossing (OAR Chapter 741) that requires a rail crossing order. State traffic engineer approval as part of the rail crossing order process is required for installation or removal of an added stop lane. See **Section 308.0** for the rail crossing order process.

Special Considerations

An added stop lane or removal of an existing added stop lane may be considered because of an interested party or local agency request, ODOT staff investigation, ODOT or railroad owner regular inspection, or planned improvement project (e.g. STIP, state force work, etc.). If these treatments are being considered, follow the process described in **Section 308.0**.

Added stop lanes allow trucks to come to a stop, check for approaching trains, and then cross and clear the tracks without conflicting with other traffic. This minimizes the likelihood of rear-end crashes and other kinds of crashes. They are generally appropriate for two-lane highways or for high-speed, multilane highways where a significant volume of trucks must stop (*2*). However, some drivers misuse added stop lanes for high-speed through movements or right-hand passing as the pavement markings can to give the illusion of an additional driving lane. Therefore, if the existing facility has paved shoulders of adequate width to accommodate vehicles that must come to a stop, an added stop lane might not be necessary.

For an added stop lane to function well there should not be any intersections located within the full width or taper sections of the added stop lane as shown in the Oregon Standard Drawings.

The engineering study for an added stop lane should include the following elements:

- average daily traffic volumes,
- number of train movements,
- an estimate of the number of vehicles that must stop,
- a gap study,
- posted speed or 85th percentile speed,
- physical characteristics,
- alignment,

- terrain,
- sight distance, and
- support from the rail diagnostic team.

Cross References

Sight Distance 203.0
Railroad Crossings 308.0

Key References

1. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
2. Ogden, B. D., and C. Cooper. *Highway-Rail Crossing Handbook*, 3rd ed. U.S. Department of Transportation, Washington, D.C., 2019. https://safety.fhwa.dot.gov/hsip/xings/com_roaduser/fhwasa18040/.

File Code	New	Notes
TRA 07-12	June 2024	Updated state traffic engineer and Traffic Engineering Section.

Bicycle Facilities 309.0

Standards & Guidelines

01 ODOT has adopted the AASHTO publication, Guide for the Development of Bicycle Facilities (*1*), to establish bikeway design and construction standards, to establish traffic control devices guidelines for bikeways, and recommend illumination standards.

02 Refer also to Sign Policy and Guidelines for the State Highway System (*2*), Traffic Line Manual (*3*), Oregon Bicycle and Pedestrian Plan, and OAR 734 Division 56.

Special Considerations

Bicycle facilities are covered by OAR 734-020-0055 and OAR 734-020-0060.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Interim Approvals 300.1
Signs 302.0
Pavement Markings 303.0
Active Warning Signs at Bridges and Tunnels 309.1
Intersection Bicycle Boxes 309.2
Illumination 311.0
Intersection Control Evaluation 400.0
Right Turn Lanes 405.1
Shared (or Combined) Bike and Right Turn Lane 405.4

Key References

1. American Association of State Highway and Transportation Officials. *Guide for the Development of Bicycle Facilities*. American Association of State Highway and Transportation Officials, Washington, D.C.
2. Oregon Department of Transportation. *Sign Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx.
3. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.

File Code	New	Notes
LOC 03	September 1997	Reformatted January 2020.

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Active Warning Signs at Bridges and Tunnels 309.1

Standards & Guidelines

01 An active warning system for bicyclists on a bridge should be considered when an engineering study demonstrates their need, and the location meets the following criteria:

a. There are inadequate shoulders or separation from traffic:
   1. For bicyclists: the shoulders are less than 4 feet.
   2. Other situations where motor vehicles may encroach on bicycle space.

b. There is demonstrated bicycle or pedestrian usage (at least 10 pedestrians and/or bicycles per hour for any four hours of the day is the minimum threshold suggested).

c. Public support has been demonstrated by a request from a local government body.

d. There is no other available/practical/safe route, or one cannot be provided at a reasonable cost.

e. Operational techniques (e.g. signing, restriping) cannot improve the situation, or construction measures are not practical or too expensive (e.g. adding sidewalks or providing a separate bridge).

f. A combination of the following criteria creates traffic conditions unacceptable to pedestrians and/or cyclists on the bridge:
   1. Speed.
   2. Motor vehicle volume (include percentage of trucks, and peak hour, when pedestrians and/or bicyclists may be using the bridge).
   3. Sight distance.
   4. Length of bridge.

g. Funding and maintenance have been agreed upon between the district and locals as to who will pay for maintenance and power.

Process & Required Approvals

The Region Traffic Unit should investigate and analyze the criteria and considerations as well as any other pertinent information. Written documentation of the investigation as well as a recommendation should be provided. Submit preliminary design plans to the Traffic Engineering Section for review by the state traffic signal engineer detailing proposed locations of signs, push buttons, or other detection system and electrical connections. Support of the region traffic engineer and approval of the state traffic engineer is required before installation of the signs.

Special Considerations

If the location meets all the above criteria, consider the following factors when providing a flashing warning system:

Historic Character of the Bridge

ODOT classifies many older narrow bridges as historic, and placing a large warning sign might negatively impact aesthetics. Contact Environmental Section as needed.

Sign Placement

Can the sign be placed so motorists can see, understand, react, and adjust their speed? Can it be placed in a maintainable location? For freight routes in the Oregon Highway Plan (*1*), consider mounting the sign overhead on a mast arm for bridges or above the tunnel portal to enhance visibility of the sign. If overhead mounting is not possible on a freight route, then consider dual signs on opposite sides of the highway.

Detection System Placement

Can pedestrians and/or cyclists access the detection system (e.g. push button) and see that the warning lights are active?

Pedestrians

Will pedestrians be crossing the bridge on either side, coming from both directions? If so, consider placing push buttons in all four quadrants at the bridge ends.

Beyond the Bridge

Do pedestrians and/or cyclists have access to the approach roads? This is especially applicable to freeway interchanges and bridges that terminate at intersections.

Local Education

Local education on the meaning and use of the devices may be needed.

Support

ODOT has installed active warning signs at the entrance to tunnels and on narrow bridge approaches at specific locations on state highways. Standard designs for these active warning signs are in the Sign Policy and Guidelines for the State Highway System (*2*). The signs have flashing beacons that are activated when bicyclists push a button as they enter the tunnel or cross the bridge. The device is timed for the average cyclist to travel across the bridge or through the tunnel before the beacons stop flashing. Tunnel applications are limited due to the low number of tunnels on state highways in Oregon. Requests for applications on narrow bridges are more frequent. However, widespread application of these devices on bridges could represent significant installation and maintenance costs (from $5,000 to more than $20,000 for each).

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Sight Distance 203.0
Uniform Traffic Control Devices 300.0
Signs 302.0
Flashing Beacons 304.2
Bicycle Facilities 309.0

Key References

1. Oregon Department of Transportation. *Oregon Highway Plan*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/odot/planning/pages/plans.aspx.
2. Oregon Department of Transportation. *Sign Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx.

File Code	Updated	Notes
TRA 16-06	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Intersection Bicycle Boxes 309.2

An intersection bicycle box is a designated area on the approach to a signalized intersection, between an advance stop bar and the intersection stop bar, intended to provide people on bicycles a space to wait in front of stopped motor vehicles during the red signal phase.

An intersection bicycle box is not a two-stage turn box.

Standards & Guidelines

01 The use of a bicycle box is optional and may be installed on the approach to a signalized intersection where:

a. The posted speed on the approach is 35 miles per hour or less, and
b. Where an engineering study demonstrates a bicycle box will improve operations at the intersection.

02 See Section 9E.12 in the 11th Edition of the MUTCD (*2*) and the Traffic Line Manual (*3*) for additional standards and guidelines, including where a bicycle box is across more than one motor vehicle lane.

Process & Required Approvals

An engineering study and state traffic engineer approval is required for installation of an intersection bicycle box at an intersection on the State Highway System.

Special Considerations

At intersections with high bicycle volumes, bicycle boxes can improve signal operations. Bicycle queues discharge faster because cyclists can queue in a group within the box instead of in a line. In lane configurations like shared right-through lanes to the left of a bicycle lane, this can improve intersection capacity and reduce delay at the intersection (*4*).

At intersections with a receiving bicycle lane and regular bicycle traffic, but where bicycle queues are not significantly impacting signal operations, an advance stop bar and bicycle lane coloring might improve awareness and visibility of cyclists like a bicycle box (*5*).

Bicycle boxes can reduce right-hook conflicts at the onset of the green phase but might not significantly reduce right-hook conflicts once traffic is moving (*6*). Downhill intersection approaches can contribute to people on bicycles overtaking motor vehicles at a higher speed during a green phase, which might increase right-hook collisions or conflicts, regardless of the presence of a bicycle box, after the initial onset of green (*7*).

Support

Bicycle boxes place cyclists at the front of a queue at signalized intersections, which allows cyclists to take a more visible stopping position in front of drivers (*5*, *8*). Through the experimentation process in the United States, bicycle boxes have been shown to reduce conflicts between people on bikes and turning drivers, reduce the number of avoidance maneuvers between road users, and reduce encroachment by cyclists and motorists into crosswalks (*1*).

Unless there are multiple cyclists in the queue, people on bicycles tend to stay aligned with the bicycle lane when stopped in a bicycle box (not in the box directly in front of motor vehicles). This minimizes cyclists' out-of-direction travel and still places them in a visible location to motorists stopped at the advance stop bar (*5*, *8*).

Green colored pavement in the bicycle lane a short distance on the approach to the bicycle box, and in bicycle box itself, might improve operational predictability for all road users. Both cyclists and motorists tend to stop where they are intended to stop more consistently with colored bicycle boxes – i.e. cyclists tend to stop ahead of motor vehicles and stay outside the crosswalk, and motorists tend to stop more consistently at the advance stop bar without encroaching on the bicycle box (*5*, *8*).

On intersection approaches where a bicycle lane ends at the intersection (shared lane on the downstream side of the intersection, especially shared lanes too narrow to operate side-by-side), a bicycle box can reduce merging conflicts in the intersection between cyclists and drivers at the beginning of the green signal phase (*5*). This lets cyclists position themselves at the front of the queue instead of attempting to merge with motor vehicle traffic in the intersection before reaching the narrower roadway section. Bicycle queues still need to be large enough and motor vehicle speeds low enough to support a bicycle box in this situation.

Some installations of bicycle boxes have been used to transition from right-side to left-side bicycle lanes, position cyclists ahead of a left turn lane, or make other cross-intersection movements (*9*). This application typically extends the bicycle box across all approach lanes of the intersection. While the 11th Edition of the MUTCD (*2*) allows this, the ODOT Traffic Line Manual (*3*) does not recommend this at ODOT-owned intersections because it cyclists must judge whether they have enough time during a red phase to maneuver across motor vehicle lanes in the bicycle box before the beginning of the green phase. The MUTCD (*2*) requires use of countdown pedestrian signals for bicycle boxes across multiple lanes to show this remaining time. To accomplish this, signal might need to recall the pedestrian phase every cycle, which can reduce operational efficiency in some cases. This also might not let cyclists make this maneuver near the end of the red phase and through the green phase; cyclists will either need to make a two-stage maneuver with the cross street or merge into motor vehicle lanes (*10*). Other strategies like a bicycle signal or two-stage left turn box (see **Section 300.1**) might allow for safer operations.

Bicycle boxes had statewide interim approval in Oregon under Interim Approval IA-18 (*1*) from February 2017 to January 2024. FHWA incorporated the device into the 11th Edition of the MUTCD (*2*) and terminated IA-18 (*11*). New installations of bicycle boxes must comply with the 11th Edition of the MUTCD instead of IA-18. Bicycle boxes installed under IA-18 must be brought into compliance with the 11th Edition of the MUTCD through systematic replacement and upgrade of the device.

Cross References

State Traffic Engineer 100.0
Interim Approvals 300.1
Signs 302.0
Pavement Markings 303.0
Traffic Signals 304.0
Bicycle Facilities 309.0
Traffic Signal Operations 404.0
Turn Prohibitions 405.7
Capacity Analysis 508.0

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 11th ed. Federal Highway Administration, Washington, D.C., 2023. https://mutcd.fhwa.dot.gov/index.htm.
2. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
3. Monsere, C., M. Figliozzi, S. Thompson, and K. Paulsen. SPR 747: Operational Guidance for Bicycle-Specific Traffic Signals in the United States. Portland State University, Portland, Oregon, FHWA-OR-RD-14-06, 2013. http://www.oregon.gov/ODOT/TD/TP_RES/.
4. Loskorn, J., A. F. Mills, J. F. Brady, J. C. Duthie, and R. B. Machemehl. Effects of Bicycle Boxes on Bicyclist and Motorist Behavior at Intersections in Austin, Texas. *ASCE Journal of Transportation Engineering*, Vol. 139, no. 10, October 2013, pp. 1039-1046. http://dx.doi.org/10.1061/(ASCE)TE.1943-5436.0000584.
5. Hurwitz, D. H., C. Monsere, M. Jannat, J. Warner, and A. Razmpa. Towards Effective Design Treatment for Right Turns at Intersections with Bicycle Traffic. Oregon State University and Portland State University, Salem, Oregon, Final Technical Report FHWA-OR-RD-16-06, 2015. http://www.oregon.gov/ODOT/TD/TP_RES/ResearchReports/SPR767_FinalReport_070815.pdf.
6. Farley, W. R. An Analysis of Bicycle-Vehicle Interactions at Signalized Intersections with Bicycle Boxes. Portland State University, Portland, Oregon, Dissertations and Theses Paper 1618, 2014. http://archives.pdx.edu/ds/psu/11016.
7. Dill, J., C. M. Monsere, and N. McNeil. Evaluation of Bike Boxes at Signalized Intersections. *Accident Analysis & Prevention*, Vol. 44, no. 1, January 2012, pp. 126-134. http://dx.doi.org/10.1016/j.aap.2010.10.030.
8. Arnold, R. E. *MUTCD - Interim Approval for Optional Use of an Intersection Bicycle Box (IA-18)*. Federal Highway Administration, Washington, D.C., 2016. https://mutcd.fhwa.dot.gov/resources/interim_approval/ia18/index.htm.
9. Hunter, W. Evaluation of Innovative Bike-Box Application in Eugene, Oregon. *Transportation Research Record: Journal of the Transportation Research Board of the National Academies*, Vol. 1705, 2000, pp. 99-106. http://trrjournalonline.trb.org/doi/abs/10.3141/1705-15. DOI: http://dx.doi.org/10.3141/1705-15
10. National Association of City Transportation Officials. *NACTO Urban Bikeway Design Guide*, 2nd ed. National Association of City Transportation Officials, New York, New York. http://nacto.org/cities-for-cycling/design-guide/.
11. Federal Highway Administration. 23 CFR Part 655 National Standards for Traffic Control Devices; the Manual on Uniform Traffic Control Devices for Streets and Highways; Revision. *Federal Register*, Vol. 88, no. 242, December 2023, pp. 87672-87696. https://www.govinfo.gov/content/pkg/FR-2023-12-19/pdf/2023-27178.pdf.

File Code	New	Notes
TRA 16-09	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Crosswalks on State Highways 310.0

This section provides direction and guidelines to ODOT staff, consultants, and local agencies on where crosswalks are located on the State Highway System. This section does not give guidance nor direction on curb ramp design.

ODOT staff, consultants, and local agency partners must understand where crosswalks are located so ODOT can work toward achieving its goals related to crosswalks in the Oregon Bicycle and Pedestrian Plan and fulfill its accessibility obligations.

Scope

This section applies to all work on the State Highway System. This includes but is not limited to STIP projects, development projects, maintenance projects, and projects on state highways delivered by local agencies.

Definitions

Definitions in this section primarily refer to Oregon statutes. Definitions in the Highway Design Manual (*1*), AASHTO publications, or the MUTCD (*2*) might be slightly different.

Alley – (ORS 801.110) A street or highway primarily intended to provide access to the rear or side of lots or buildings in urban areas and not intended for through vehicular traffic.

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.

Intersection – (ORS 801.320) the area of a roadway created when two or more roadways join together at any angle, as described in one of the following:

1. If the roadways have curbs, the intersection is the area embraced within the prolongation or connection of the lateral curb lines.
2. If the roadways do not have curbs, the intersection is the area embraced within the prolongation or connection of the lateral boundary lines of the roadways.
3. The junction of an alley with a roadway does not constitute an intersection.
4. Where a highway includes two roadways 30 feet or more apart, then every crossing of each roadway of the divided highway by an intersection highway is a separate intersection. In the event the intersection highway also includes two roadways 30 feet or more apart, then every crossing of two roadways of such highways is a separate intersection.

Marked Crosswalk – (ORS 801.220) Any portion of a roadway at an intersection or elsewhere that is distinctly indicated for pedestrian crossing by lines or other markings on the surface of the roadway that conform in design to the standards established for crosswalks under ORS 810.200. OAR 734-020-0005 adopts the Manual on Uniform Traffic Control Devices

(MUTCD (2)) as those standards. Decorative pavement treatments such as brick, concrete pavers, stamped asphalt, or coloring are not crosswalk markings (see **Section 310.7** for more information on textured and colored crosswalk treatments).

Pedestrian – (ORS 801.385) Any person afoot or confined in a wheelchair.

Pedestrian Access Route –An area for the use of pedestrians to navigate along sidewalks, driveways, curb ramps, crossings, and pedestrian facilities.

Planned Roadway – A planned roadway is not yet improved, designed, or ordinarily used for vehicular travel (ORS 801.450).

Roadway – (ORS 801.450) The portion of a highway that is improved, designed or ordinarily used for vehicular travel, exclusive of the shoulder. In the event a highway includes two or more separate roadways the term "roadway" shall refer to any such roadway separately, but not to all such roadways collectively.

Shoulder – (ORS 801.480) The portion of a highway, whether paved or unpaved, contiguous to the roadway that is primarily for use by pedestrians, for the accommodation of stopped vehicles, for emergency use and for lateral support of base and surface courses.

Sidewalk – (ORS 801.485) The area determined as follows:

1. On the side of a highway which has a shoulder, a sidewalk is that portion of the highway between the outside lateral line of the shoulder and the adjacent property line capable of being used by a pedestrian.
2. On the side of a highway which has no shoulder, a sidewalk is that portion of the highway between the outside lateral line of the roadway and the adjacent property line capable of being used by a pedestrian.

Unmarked Crosswalk – A crosswalk that does not have markings on the surface of the roadway that conform in design to the standards established for crosswalks under ORS 810.200. Sometimes called a crossing in project development.

Vacated Roadway – For the purposes of this section, a roadway is vacated when the governing body passes an ordinance, order, or resolution granting the vacation according to ORS 271.120 for cities or ORS 368.356 for counties.

Standards & Guidelines

Where Crosswalks are Located

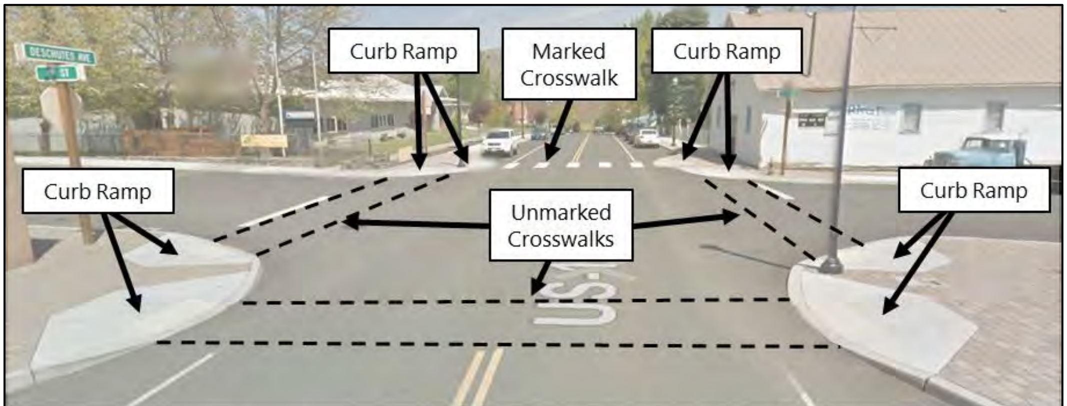
Crosswalks are located:

1. Wherever crosswalk markings conforming to the Manual on Uniform Traffic Control Devices (MUTCD (*2*), adopted in OAR 734-020-0005) are on the roadway surface (Installing marked crosswalks on state highways might require approval. See **Sections 310.2** and **310.3** for requirements related to marked crosswalks on state highways.), or
2. If not marked, then across every leg of an intersection as follows unless a crosswalk is closed or does not exist as described in this section:
    a. Where curb ramps connect across the leg of an intersection (**Figure 310.0-1**), or
    b. If not 2-a, then where a curb ramp connects with a shoulder or sidewalk across the leg of an intersection (**Figure 310.0-2**), or
    c. If not 2-a or 2-b, then where shoulders or sidewalks connect across the leg of an intersection (**Figure 310.0-3**), or
    d. If not 2-a, 2-b, or 2-c, then where shoulders or sidewalks would connect across the leg of the intersection, as if shoulders or sidewalks were present at an intersection (**Figure 310.0-4**).

Unmarked crosswalks are 6 to 20 feet wide (ORS 801.220). The connections described above are within the crosswalk and the crosswalk does not extend into the parallel traveled way.

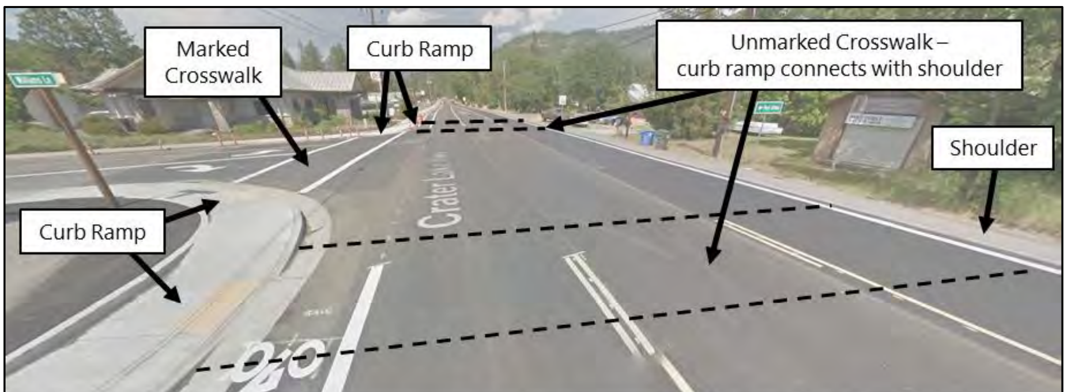
An intersection exists where two or more roadways join at any angle (ORS 801.320). This includes T-intersections (where two roadways join and one of the roadways ends).

Figure 310.0-1: Unmarked Crosswalk Location where Curb Ramps Connect



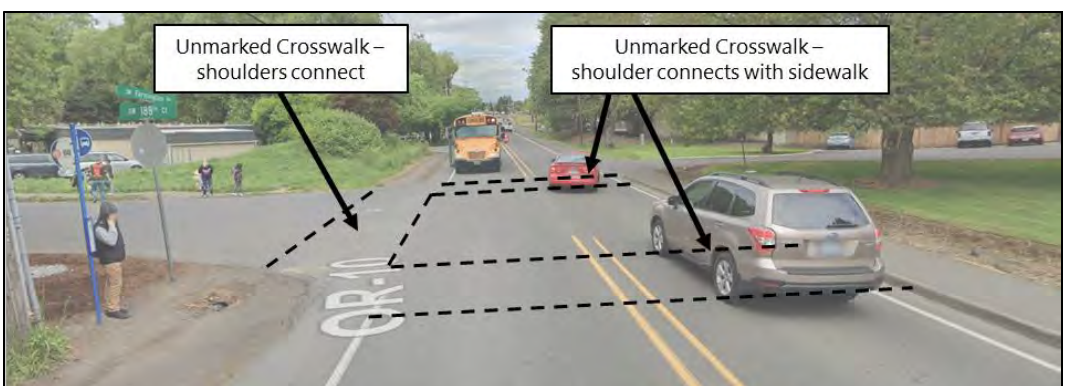
Unmarked crosswalks shown are for illustrative purposes and are not drawn to scale.

Figure 310.0-2: Unmarked Crosswalk Location where Curb Ramp and Shoulder Connect



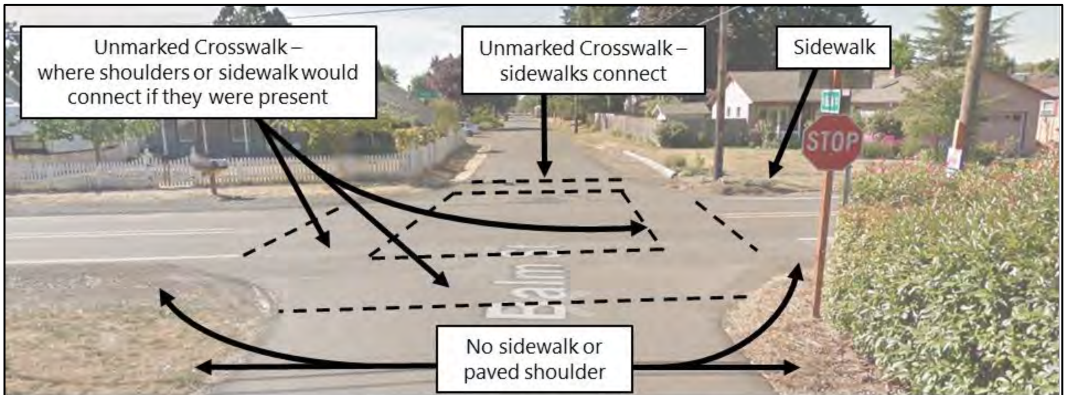
Unmarked crosswalks shown are for illustrative purposes and are not drawn to scale.

Figure 310.0-3: Unmarked Crosswalk Locations where Sidewalks/Shoulders Connect



Unmarked crosswalks shown are for illustrative purposes and are not drawn to scale.
Curb ramps needed and missing at this intersection.

Figure 310.0-4: Unmarked Crosswalk Locations where Sidewalks/Shoulders Not Present

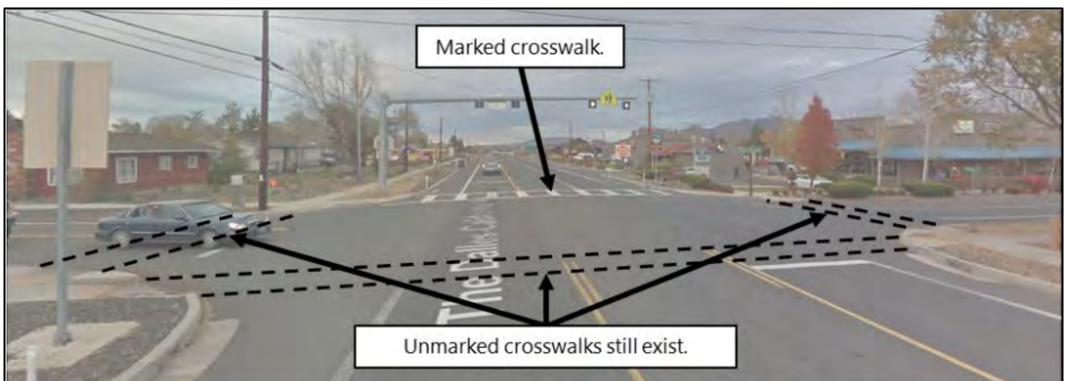


Unmarked crosswalks shown are for illustrative purposes and are not drawn to scale.

Intersections with Marked and Unmarked Crosswalks

A marked crosswalk at an intersection does not change the existence of any other crosswalk at that intersection.[1] For example, the unmarked crosswalks in **Figure 310.0-5** still exist even though one of the crosswalks is marked.

Figure 310.0-5: Marked and Unmarked Crosswalk at an Intersection



Unmarked crosswalks shown are for illustrative purposes and are not drawn to scale.

[1] ORS 801.220 says, "Whenever marked crosswalks have been indicated, such crosswalks and no other shall be deemed lawful across such roadway at that intersection." Some interpretations of this statute have suggested marking one crosswalk at an intersection means the crosswalk on the opposite leg of the intersection no longer exists unless it is marked too. Other interpretations have suggested that because ORS 801.220 describes both marked and unmarked crosswalks, this sentence clarifies that a marked and unmarked crosswalk cannot both exist across the same leg of an intersection – the marked crosswalk takes precedence. Road users generally expect crosswalks at intersections (marked or unmarked, unless a crosswalk is closed), so ODOT is implementing ORS 801.220 this way.

Midblock Crosswalks

A midblock crosswalk is located where crosswalk pavement markings conforming to the MUTCD (2) are present and the location is not an intersection. Unmarked crosswalks only exist at intersections (ORS 801.220).

Channelized Right Turn Lanes

Where a raised island separates a channelized right turn lane from the rest of the intersection, the crosswalks to/from the raised island are located:

1. Where marked (**Figure 310.0-6**), or
2. If not marked, the crosswalks are located as follows unless a crosswalk is closed:
    a. Where the curb ramp on the island connects with the curb ramp on the opposite side of the highway or channelized turn lane (**Figure 310.0-7**), or
    b. If an opposite side does not have a curb ramp, then where the curb ramp on the island connects with the shoulder or sidewalk on the opposite side of the highway (**Figure 310.0-8**).

"Curb ramp" includes where a cut-through pedestrian access route in the island transitions to the roadway, like in **Figure 310.0-8**.

Crosswalks do not begin or end at painted channelizing islands because those types of islands are part of the roadway. Crosswalks might be located through painted channelizing islands, like in **Figure 310.0-9**. Pedestrians with limited or no vision cannot detect painted channelizing islands nor reorient themselves to complete their crossing from those types of islands.

Figure 310.0-6: Marked Crosswalk across a Channelized Right Turn Lane

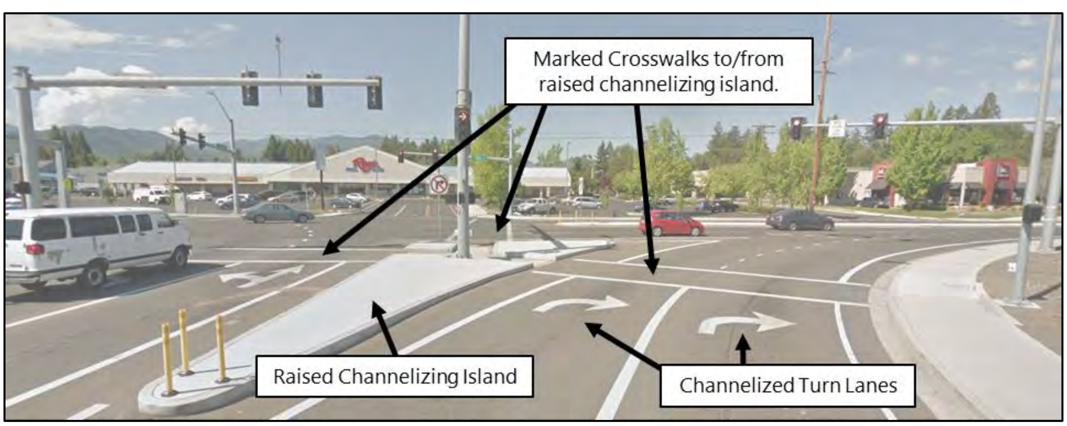
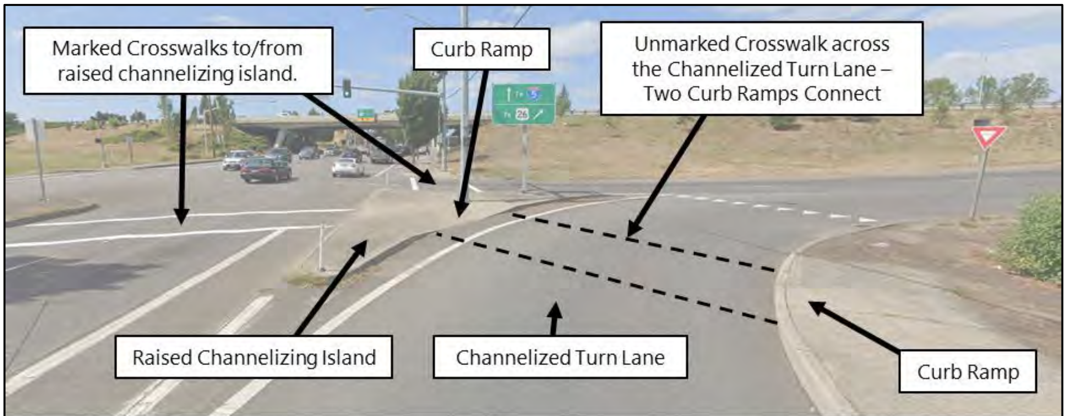
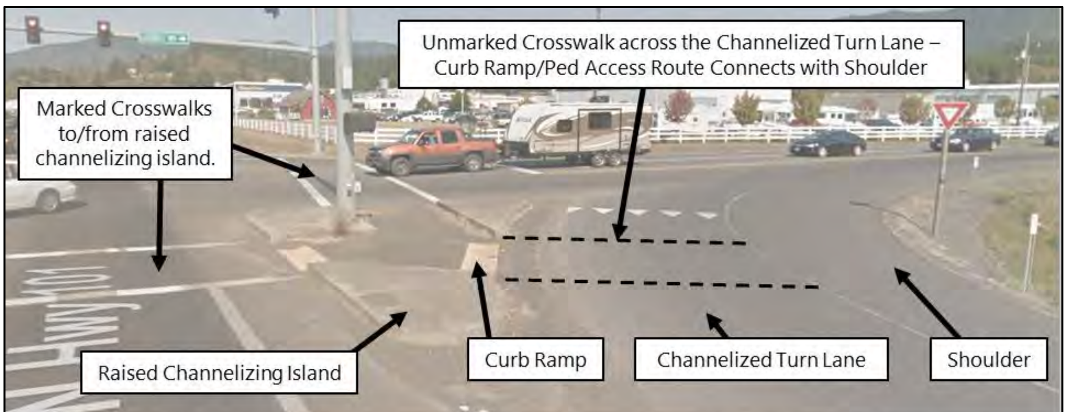


Figure 310.0-7: Unmarked Crosswalk Connecting Curb Ramps across a Channelized Right Turn Lane



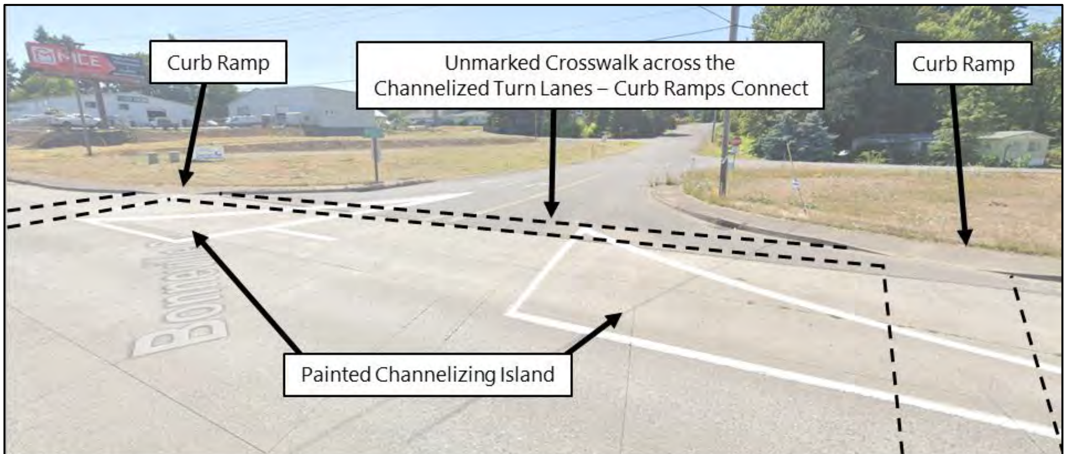
Unmarked crosswalks shown are for illustrative purposes and are not drawn to scale.

Figure 310.0-8: Unmarked Crosswalk Connecting Curb Ramp and Shoulder across a Channelized Right Turn Lane



Unmarked crosswalks shown are for illustrative purposes and are not drawn to scale.

Figure 310.0-9: Unmarked Crosswalk Connecting Curb Ramps across Painted Channelizing Islands



Unmarked crosswalks shown are for illustrative purposes and are not drawn to scale.

Merging/Diverging Interchange Ramps

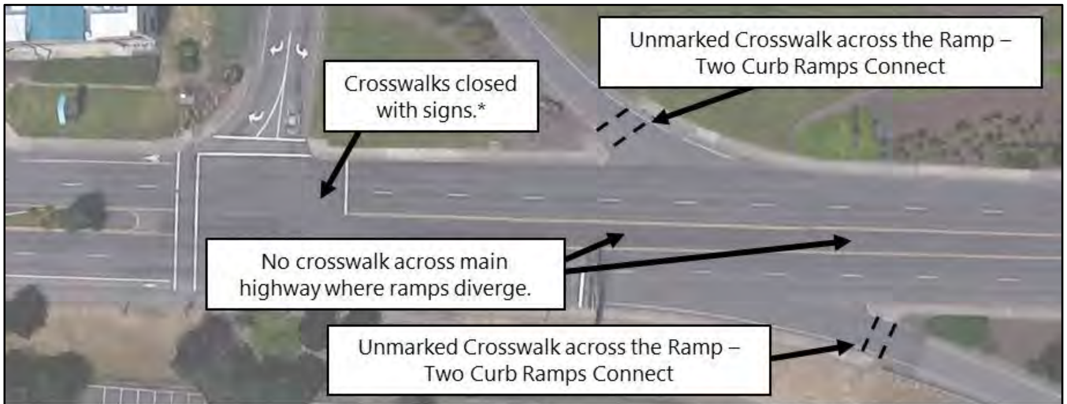
The location where interchange ramps merge and diverge from a main highway is an intersection because this is where two roadways join.

Crosswalks are located across merging and diverging interchange ramps so pedestrians can continue traveling along the main highway. These crosswalks are located according to the discussion under "Where Crosswalks are Located" above, as shown in **Figure 310.0-10**, **Figure 310.0-11**, and **Figure 310.0-12**. Because ramps are tangent to the main highways where they merge or diverge, there are no crosswalks across the main highway.

Figure 310.0-10: Marked Crosswalks across Diverging Ramps

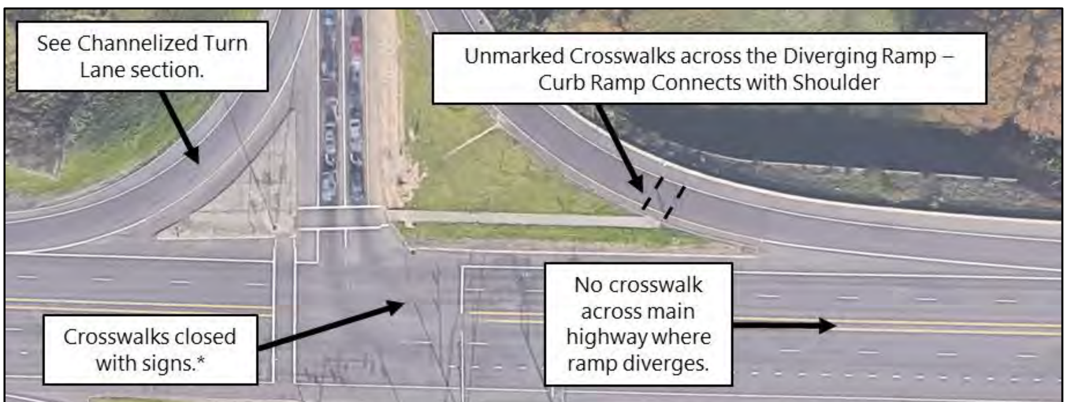
**See Traffic Manual Section 310.8 for crosswalk closures. Closing both crosswalks not typical.*

Figure 310.0-11: Unmarked Crosswalks Connecting Curb Ramps across Diverging Ramps



Unmarked crosswalks shown are for illustrative purposes and are not drawn to scale.
**See Traffic Manual Section 310.8 for crosswalk closures.*

Figure 310.0-12: Unmarked Crosswalk Connecting Curb Ramp and Shoulder across a Diverging Ramp



Unmarked crosswalks shown are for illustrative purposes and are not drawn to scale.
**See Traffic Manual Section 310.8 for crosswalk closures.*

Features that Do Not Create Intersections

There are features where drivers can enter or exit a highway that are not intersections. Unmarked crosswalks are located at intersections. A pedestrian can legally cross the roadway where a crosswalk does not exist (unless prohibited by local ordinance or at a closed crosswalk), but the pedestrian must yield to vehicles on the roadway (ORS 814.040). Drivers must yield to pedestrians on sidewalks (ORS 811.025).

Alleys, Private Driveways, and Private Streets

Private driveways, private streets, and alleys (**Figure 310.0-13**), including driveways to large developments (**Figure 310.0-14**), do not create intersections where they join a roadway, unless a traffic signal, roundabout, or STOP sign controls traffic on the highway at that junction (**Figure 310.0-15**).

Alleys do not create intersections (ORS 801.320). ODOT is treating private streets and private driveways like alleys because private streets and private driveways are primarily intended to provide access to properties and not intended for through vehicular traffic.

Figure 310.0-13: Alley

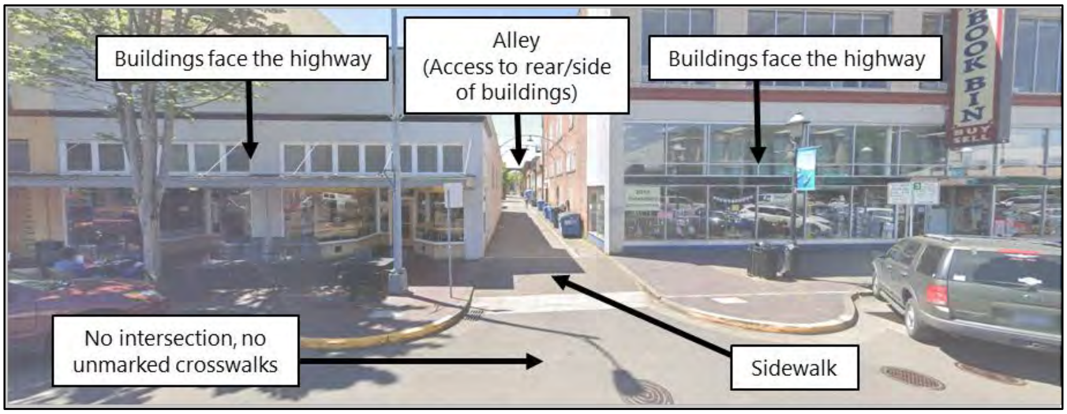


Figure 310.0-14: Private Driveway to Large Development – Highway Uncontrolled

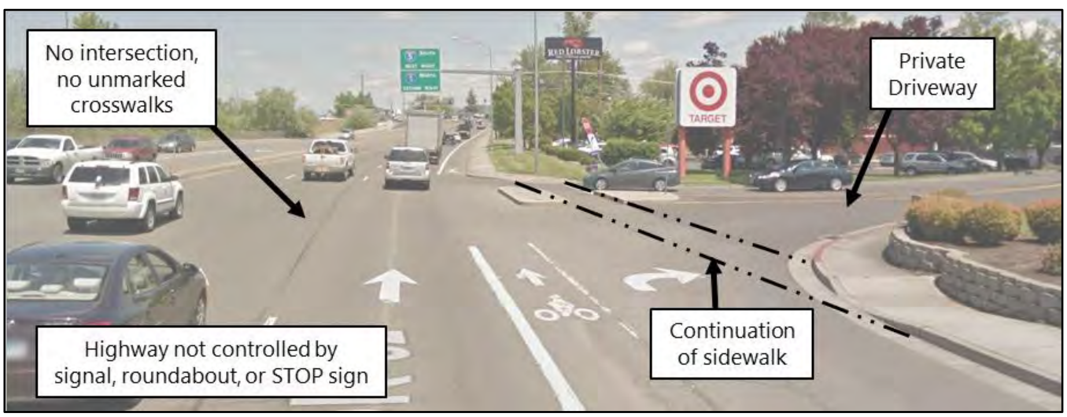
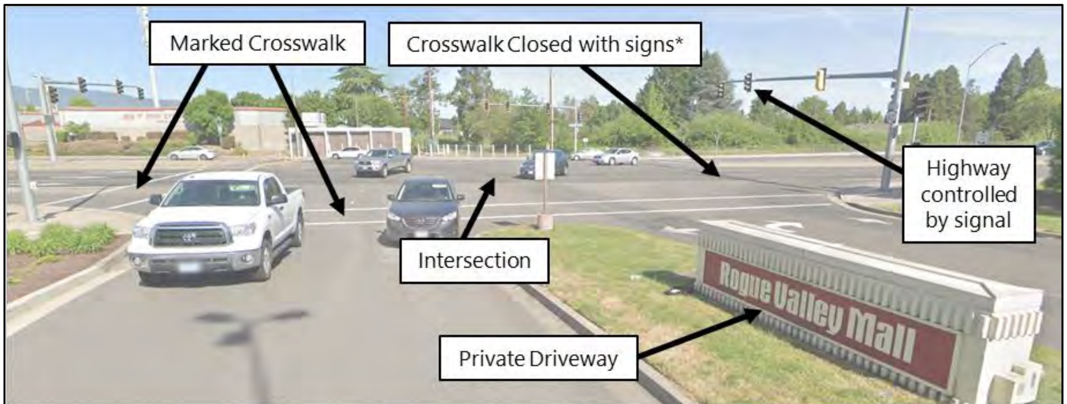


Figure 310.0-15: Private Driveway to Large Development – Highway Signal Controlled



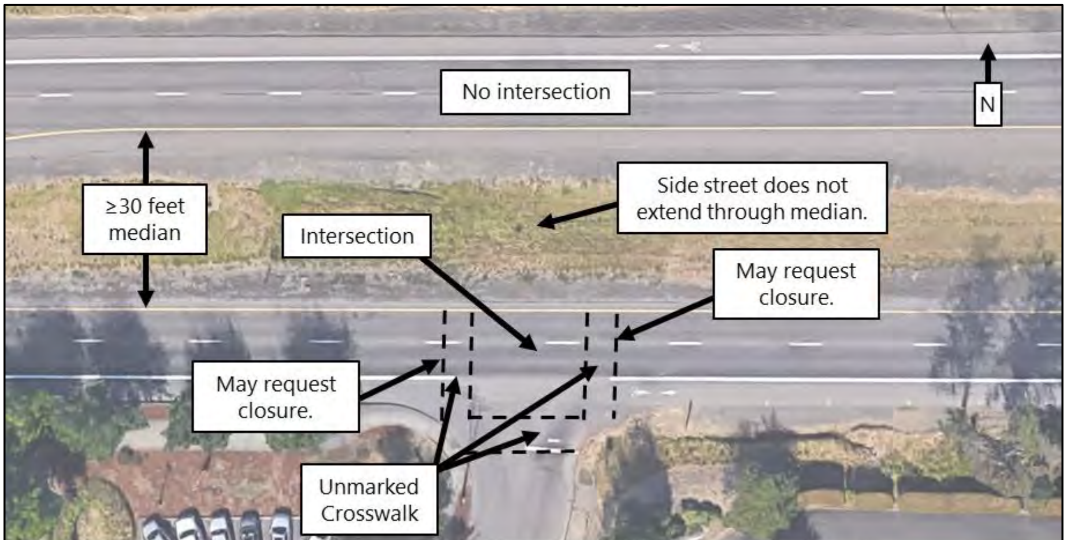
See Traffic Manual Section 310.8 for crosswalk closures.

Wide Medians

Where a roadway intersects with one side of a divided highway that has a median 30 feet or wider, but does not extend through the median to the other side of the divided highway, an intersection exists with one side of the divided highway but not the other side (ORS 801.320). Median width in this context is measured from edge line to edge line.

For example, the highway in **Figure 310.0-16** consists of two roadways separated by a median that is 30 feet or wider, measured from edge line to edge line. A roadway intersects with the eastbound side but does not extend through the median to the westbound side. Because the median is 30 feet or wider, there is no intersection with the westbound side (ORS 801.320) and there are no unmarked crosswalks across the westbound side. Crossing would position pedestrians in the median without a route through the median nor a crosswalk to complete their crossing. The crosswalks across the eastbound side at this intersection may be considered for closure according to the process in **Section 310.8**.

Figure 310.0-16: Highway with Wide Median

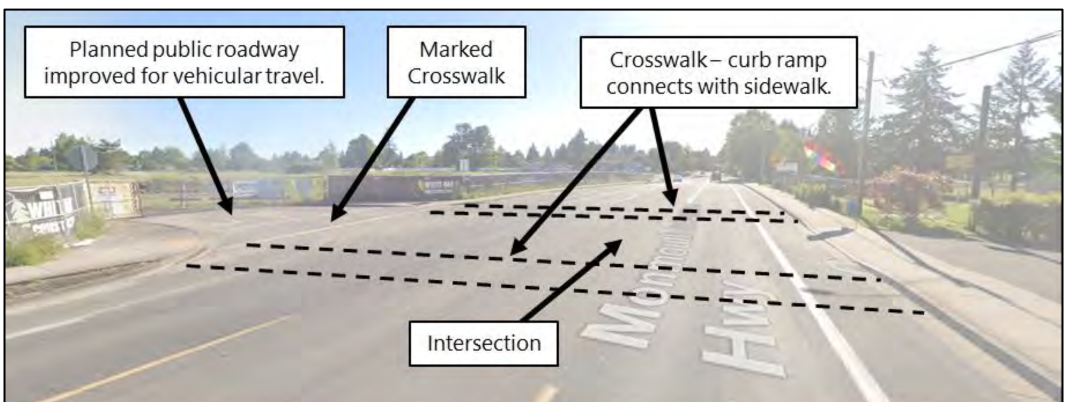


Unmarked crosswalks shown are for illustrative purposes and are not drawn to scale.
See Traffic Manual Section 310.8 for crosswalk closures.

Planned Roadways

A planned or platted roadway does not create an intersection where it is planned to meet another roadway until the planned or platted roadway is improved, designed, or ordinarily used for vehicular travel, like in **Figure 310.0-17**.

Figure 310.0-17: Portion of Planned Roadway Improved for Vehicular Travel



Unmarked crosswalks shown are for illustrative purposes and are not drawn to scale.

Vacated Roadways

A vacated roadway does not create an intersection where it meets another roadway.

A roadway that a governing body vacates is no longer a public roadway. For the purposes of this section, ODOT considers a roadway vacated when the governing body passes an ordinance, order, or resolution granting the vacation according to ORS 271.120 for cities or ORS 368.356 for counties.

Because vacated roadways are primarily intended to provide private access and not intended for through vehicular traffic, ODOT is treating vacated roadways like a private driveway or alley.

Closed Crosswalks

See **Section 310.8** for guidance, direction, and process regarding crosswalk closures.

If it is not appropriate to close a crosswalk and a curb ramp cannot be designed to ODOT standards, seek a design exception through ODOT's Curb Ramp Design Exception process (Form 734-5112).

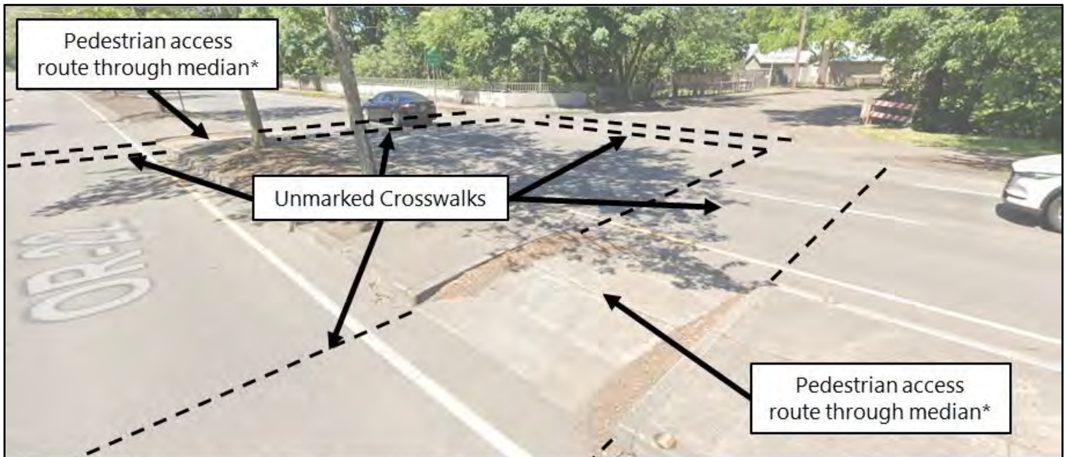
Features that Interrupt Crosswalks

ODOT is responsible for providing pedestrian facilities usable by everyone, including people who have disabilities. ODOT also has a policy to connect pedestrian network gaps, understanding the unique needs of urban, suburban, and rural communities. However, in some cases there are features that interrupt a crosswalk's pedestrian access route, unless access is provided through the feature. These kinds of features include but are not limited to raised medians (**Figure 310.0-18**), unpaved medians, and concrete barriers (**Figure 310.0-19**).

Therefore, where a feature interrupts a crosswalk's pedestrian access route, the crosswalk may be considered for closure following the process in **Section 310.8**. Document why a pedestrian access route should not be installed through the feature. If a crosswalk is closed because it is interrupted, the crosswalk closure should be re-evaluated when substantial changes are made to the intersection.

For example, if the median barrier in **Figure 310.0-19** were broken to provide a 6-foot-wide pedestrian access route, this would reduce the ability for the barrier to redirect an errant vehicle and create barrier ends to protect with crash cushions or impact attenuators. The crosswalks across the highway at this intersection could be considered for closure according to the process in **Section 310.8**, which includes considering the impacts to the surrounding pedestrian network and pedestrian safety at the intersection.

Figure 310.0-18: Pedestrian Access Route through Median



**Pedestrian access routes must meet ODOT's accessibility standards.*
Unmarked crosswalks shown are for illustrative purposes and are not drawn to scale.

Figure 310.0-19: No Pedestrian Access Route through Median

Unmarked crosswalks shown are for illustrative purposes and are not drawn to scale.

Driveways at Intersections

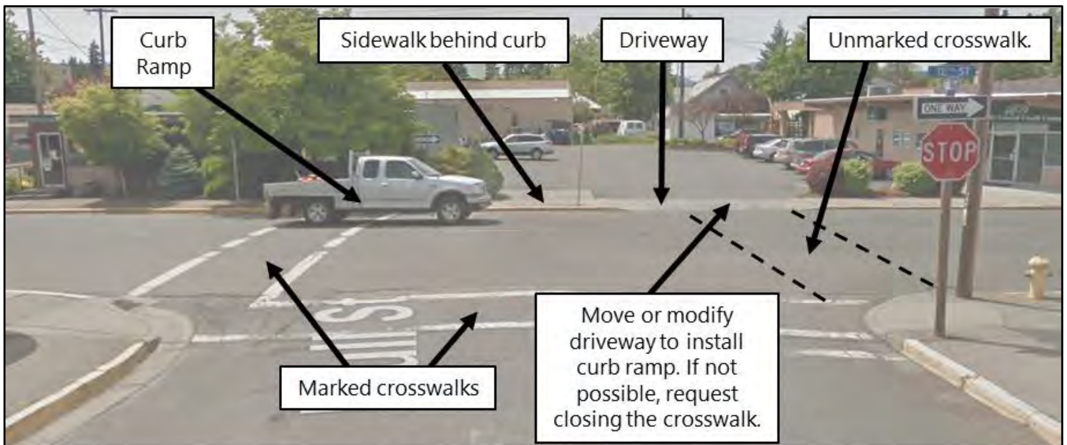
Driveways are sometimes present at intersections. Where this occurs, it is typically at a T-intersection. Where the driveway is along the top of the T, an unmarked crosswalk might align with the driveway.

In these cases, where the pedestrian facility is behind a curb (**Figure 310.0-20**), the curb ramp position on the driveway side of the crosswalk may be offset to serve the crosswalk. The offset should be less than or equal to15 degrees or 10 feet, whichever is less, from the opposite curb ramp. Both curb ramps shall be directional and orient pedestrians toward the receiving curb ramp.

If the curb ramp cannot be located outside the driveway, the driveway should be modified so a curb ramp can be installed to serve the crosswalk. Modifications might include but are not limited to changing the driveway width, moving the driveway, or eliminating the driveway according to access management rules.

If a curb ramp cannot be installed to serve the crosswalk and the crosswalk still aligns with the driveway, then the crosswalk cannot serve all pedestrians. Choosing to provide access to some but not all pedestrians based on physical ability is discrimination. Therefore, request closing the crosswalk following the process in **Section 310.8**. The request for closure shall document why a curb ramp cannot be installed to serve the crosswalk, including options considered to modify the driveway. The crosswalk closure should be re-evaluated when substantial changes are made to the intersection.

Figure 310.0-20: Driveway Aligned with Unmarked Crosswalk



Unmarked crosswalks shown are for illustrative purposes and are not drawn to scale. See Traffic Manual Section 310.8 for crosswalk closures.

Process & Required Approvals

See **Sections 310.2 (controlled marked crosswalks)**, **310.3 (uncontrolled marked crosswalks)**, and **310.8 (crosswalk closures)** for process and required approvals related to marked crosswalks and crosswalk closures.

Every intersection is unique and the guidance and direction in this section will not cover all situations.

Where this section does not clarify where a crosswalk is located on the State Highway System, the region traffic engineer may determine where a crosswalk is located with concurrence from the Traffic Engineering Section. In these cases:

1. The region traffic engineer shall complete Form 734-5294 and send it to the Traffic Engineering Section.

2. If the Traffic Engineering Section, in coordination with the Roadway Engineering Section, concurs with the region traffic engineer's determination, the Traffic Engineering Section sends concurrence to the region traffic engineer and the Roadway Engineering Section to keep the ADA curb ramp inventory up-to-date.

If a ramp in the ADA curb ramp inventory is not needed or needs to be verified, request a review by completing Form 734-5390.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Land Use and Transportation 107.0
Uniform Traffic Control Devices 300.0
Pavement Markings 303.0
Spacing of Enhanced Crosswalks 310.1
Controlled Marked Crosswalks 310.2
Uncontrolled Marked Crosswalks 310.3
Textured & Colored Crosswalks 310.7
Crosswalk Closures 310.8
Illumination 311.0
Roundabouts 403.0
Channelized Right Turn Lanes 405.2
Traffic Calming 500.5
Parking 501.0
Access Management 502.0

Key References

1. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.
2. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

File Code	Updated	Notes
TRA 07-11	June 2024	Updated state traffic engineer and Traffic Engineering Section.

Spacing of Enhanced Crosswalks 310.1

An enhanced crosswalk is a crosswalk that has design treatments for crossing pedestrians, selected according to an engineering study, that are appropriate for the roadway conditions to improve safety and visibility of people crossing. At signalized intersections, these are marked crosswalks. At uncontrolled crosswalks, these include treatments selected according to **Section 310.3**.

ODOT has adopted goals in the Oregon Bicycle and Pedestrian Plan (*1*) related to crosswalks, including:

- Eliminate fatalities and serious injuries and improve the overall sense of safety of those who walk.
- Provide a complete walking network that reliably and easily connects to destinations and other transportation modes.
- Support people walking or using mobility devices to move easily on the system.
- Enhance community and economic vitality through walking networks that improve peoples' ability to access jobs, businesses, and other destinations.

State highways in urban areas are often barriers for people walking and biking. Increasing opportunities to cross ODOT's urban facilities can improve access and network connectivity for walking and biking.

Scope

This section applies to projects that require an urban design concurrence document. These projects are on state highways within the urban context except for interstates and limited-access freeways (expressways) with interchanges. For consistency of the urban network adjacent to an interstate or limited access freeway (expressway), this applies to the local, county, or state highway that is the crossroad between the interstate or freeway ramp terminals. Where these ramp terminals connect to urban roadways, the crossroad between the ramp terminals is part of the urban network and not part of the interstate or freeway crossing it.

Process & Required Approvals

On projects that require an urban design concurrence document, region traffic works collaboratively as part of the scoping and/or project development teams to include the following in the urban design concurrence document. This collaboration should begin at scoping; the urban design concurrence document is included in the project's DAP submittal.

1. In the General Project Information section, document spacing and type of existing enhanced crosswalks in the project limits. This helps define the existing urban context.
2. In the Project Goals and Outcomes section, document the project's goals related to installing and/or improving enhanced crosswalks, if any, within the limits of the project's scope, schedule, and budget. If the project goals do not include installing or improving enhanced crosswalks, no further documentation is necessary.

3. If installing or improving enhanced crosswalks is a project goal, document decisions in the Modal Integration section about where the project will install and/or improve enhanced crosswalks to meet the project's goals. This should describe the vicinity of the location without specifying treatments (e.g. "near Main Street" instead of "an RRFB on the north leg of the intersection at Main Street"). Specific locations and treatments should be determined through an engineering study after this step.
    a. If the project cannot meet the spacing targets for enhanced crosswalks in **Table 310.1-A** (under **Special Considerations** below), document why. No further design exceptions or approvals are needed if the project cannot meet the spacing targets.

       The targets in **Table 310.1-A** are a starting point. Evaluate local walking network plans, location of transit stops, and the density and location of land uses and walking trip generators to determine if a lesser or greater spacing is more appropriate for the local walking network. Additional analysis may be needed to identify appropriate crossing locations within the target spacing, such as identifying walking trip pairs or completing a pedestrian volume count to show where people are currently crossing along a corridor.

       Projects may need to prioritize crossings based upon available funding, ability to maintain the enhancements, or other factors. Prioritization of crossing treatments by location and against other project elements should be determined on a project-by-project basis, considering the project's desired outcomes and input from the community.
    b. If a proposed crossing is not located along an expected pedestrian trip path, the project team should document their assumptions about out-of-direction travel and show that pedestrians can be reasonably expected to use another crossing.

After the project has identified where it will install and/or improve enhanced crosswalks, the region traffic office coordinates an engineering study for each location according to this manual to determine what, if any, treatments are appropriate for the enhanced crosswalk. See **Sections 310.2 and 310.3** for more information.

Once installed, maintenance of treatments at enhanced crosswalks is important to sustain their effectiveness. Decisions to install treatments need to be in coordination with district maintenance and consistent with statewide maintenance and operations plans, if applicable. This coordination considers the durability and life cycle maintenance needs for in-service treatments.

Special Considerations

Table 310.1-A gives target spacing for enhanced crosswalks in each ODOT urban context. The ranges allow for flexibility to adjust based on roadway network characteristics (e.g. frequency and spacing of intersections), pedestrian destinations (e.g. transit stops), and cluster of land uses. For example, within a mixed-use area, development may not be distributed uniformly, or practitioners may consider the lower end of the range where land uses are more intense.

The ODOT Highway Design Manual (*2*) defines ODOT's urban contexts.

Table 310.1-A: Target Spacing of Enhanced Crosswalks

ODOT Urban Context	Target Spacing Range (feet)
Traditional Downtown/CBD	250-550
Urban Mix	250-550
Commercial Corridor	500-1000
Residential Corridor	500-1000
Suburban Fringe[1]	750-1500
Rural Community	250-750

[1] The suburban fringe context is typically suburban adjacent to rural areas at the edge of urban development, but often is in the process of developing. For projects in the suburban fringe context zone, practitioners should consider likely future development and consider applying designs for residential corridor, commercial corridor, or urban mix contexts if this type of development is likely to occur.

Support

The spacing targets in **Table 310.1-A** are based on existing guidance from several sources including the City of Portland's PedPDX Crossing Guidance, the ODOT Highway Design Manual (*2*), and ITE's Designing Walkable Urban Thoroughfares (*3*). While the targets are based on existing guidance, there is limited research to support the specific values. Notably, there is limited research on how far pedestrians are willing to travel out-of-direction in various contexts and for different purposes and what types of land uses are most likely to generate and attract walking trips.

A full discussion on how the spacing targets were developed is available in Volume 2 of ODOT's Blueprint for Urban Design (*4*).

Cross References

Crosswalks on State Highways 310.0
Controlled Marked Crosswalks 310.2
Uncontrolled Marked Crosswalks 310.3
Crosswalk Closures 310.8

Key References

1. Oregon Department of Transportation. *Oregon Bicycle and Pedestrian Plan*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Planning/Pages/Plans.aspx#OBPP.
2. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.
3. Institute of Transportation Engineers. *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach*. Institute of Transportation Engineers, Washington, D.C., 2010. https://ecommerce.ite.org/IMIS/ItemDetail?iProductCode=RP-036A.
4. Oregon Department of Transportation. *Blueprint for Urban Design: ODOT's Approach for Design in Oregon's Communities*. Oregon Department of Transportation, Salem, Oregon, 2020. https://www.oregon.gov/odot/Engineering/Pages/Hwy-Design-Manual.aspx#Urban-Design.

File Code	New	Notes
TRA 07-11	January 2023	Clarified process. Updated terminology to "enhanced crosswalk."

Controlled Marked Crosswalks 310.2

A controlled marked crosswalk has crosswalk pavement markings and a signal or STOP sign controls conflicting vehicle traffic.

ODOT has adopted goals in the Oregon Bicycle and Pedestrian Plan (*1*) related to crosswalks, including:

- Eliminate fatalities and serious injuries and improve the overall sense of safety of those who walk.
- Provide a complete walking network that reliably and easily connects to destinations and other transportation modes.
- Support people walking or using mobility devices to move easily on the system.
- Enhance community and economic vitality through walking networks that improve peoples' ability to access jobs, businesses, and other destinations.

State highways in urban areas are often barriers for people walking and biking. Increasing opportunities to cross ODOT's urban facilities can improve access and network connectivity for walking and biking.

Standards & Guidelines

01 Crosswalks shall be marked across all signal-controlled approaches to an intersection unless the crosswalk is closed (see **Section 310.8**).

02 Except as provided in Paragraph 03, a crosswalk may be marked across a stop-controlled approach to an intersection unless the crosswalk is closed.

03 A crosswalk should be marked across a stop-controlled channelized right turn lane if there is a marked crosswalk across an adjacent controlled approach to the same intersection.

04 Transverse crosswalk markings should be used for marked crosswalks across stop-controlled approaches (other than a channelized right-turn lane) and at signalized intersections.

05 See the Traffic Line Manual (*2*) for standards and guidelines related to crosswalk markings at signalized intersections, including marking style and crosswalk markings across channelized right turn lanes.

06 In addition to the standards in MUTCD Section 7B.12, the school crossing assembly (S1-1 with W16-7P) should not be installed on approaches controlled by a signal.

Process & Required Approvals

Region traffic engineer approval is required to install or remove a stop-controlled marked crosswalk where part or all the crosswalk markings are on ODOT right-of-way.

The region traffic engineer may approve using a crosswalk marking style (staggered continental, transverse) other than what is recommended in the Standards & Guidelines subsection as long as the alternate marking style is a standard crosswalk marking style in the ODOT Traffic Line Manual (*2*).

Crosswalk Closures

See **Section 310.8** for the process and required approvals to close a crosswalk. Standard ODOT practice is to mark all crosswalks at signalized intersections (all crossing with pedestrian "WALK/DON'T WALK" indications), unless officially closed (2).

Agreements

If a local jurisdiction wants a controlled marked crosswalk installed on state highway right-of-way, the local jurisdiction typically enters into an agreement with ODOT. The agreement typically establishes responsibilities and costs associated with the crosswalk, including installation and maintenance.

When an agreement specifies the crosswalk is the responsibility of the local jurisdiction to maintain, it will typically describe how this is done –either local jurisdiction resources or reimbursement to ODOT. The agreement typically requires the local jurisdiction to properly maintain the crosswalk to an acceptable standard. If the local jurisdiction fails to maintain the crosswalk, the agreement typically includes provisions that ODOT may remove it or address issues at the expense of the local jurisdiction.

Support

The crosswalk marking, either standard transverse lines or stop bar before longitudinal lines (continental style), show where vehicles are required to stop at a controlled approach.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Pavement Markings 303.0
Traffic Signals 304.0
Crosswalks on State Highways 310.0
Spacing of Enhanced Crosswalks 310.1
Uncontrolled Marked Crosswalks 310.3
STOP Sign Applications 402.0

Key References

1. Oregon Department of Transportation. *Oregon Bicycle and Pedestrian Plan*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Planning/Pages/Plans.aspx#OBPP.
2. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
3. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

Controlled Marked Crosswalks 310.2

File Code	Updated	Notes
TRA 07-11	January 2022	Updated to cover controlled marked crosswalks.

Uncontrolled Marked Crosswalks 310.3

An uncontrolled marked crosswalk has crosswalk pavement markings and conflicting motor vehicle traffic is not controlled by a signal or STOP sign. Uncontrolled marked crosswalks can be located at intersections or mid-block.

ODOT has adopted goals in the Oregon Bicycle and Pedestrian Plan (*1*) related to crosswalks, including:

- Eliminate fatalities and serious injuries and improve the overall sense of safety of those who walk.
- Provide a complete walking network that reliably and easily connects to destinations and other transportation modes.
- Support people walking or using mobility devices to move easily on the system; and,
- Enhance community and economic vitality through walking networks that improve peoples' ability to access jobs, businesses, and other destinations.

State highways in urban areas are often barriers for people walking and biking. Increasing opportunities to cross ODOT's urban facilities can improve access and network connectivity for walking and biking.

Decades of research recommend the systemic application of treatments to improve safety at uncontrolled marked crosswalks – considering several treatments because one treatment alone, especially on high-volume or high-speed highways, does not necessarily result in positive safety outcomes (see the **Special Considerations** subsection below for more information). Therefore, ODOT focuses on enhancing these crosswalks using a variety of treatments tailored to the context of the crosswalk to improve safety and network connectivity for people walking.

Once installed, maintenance of these treatments is important to sustain their effectiveness. Decisions to install treatments need to be in coordination with district maintenance and consistent with statewide maintenance and operations plans, if applicable. This coordination considers the durability and life cycle maintenance needs for in-service treatments.

Scope

This section applies to enhanced crosswalks that are uncontrolled. An enhanced crosswalk is a crosswalk that has design treatments for crossing pedestrians, selected according to an engineering study, that are appropriate for the roadway conditions to improve safety and visibility of people crossing. These include treatments selected according to this section.

This section also applies to uncontrolled school crosswalks.

This section does not apply to every uncontrolled crosswalk described in **Section 310.0**. Traffic control devices, such as crosswalk markings or RRFBs, should fulfill a need and should be used selectively (*2*). This is a basic principle of effective traffic control devices that helps make their presence and message credible and produce desired outcomes.

Crosswalks lacking the treatments described in this section are not automatically candidates for closure. Decisions to close a crosswalk follow a separate process that considers a condition or conditions that degrade safety of people walking and considers how closing the crosswalk affects the walking network. See **Section 310.8** for more information.

This section also does not apply to temporary uncontrolled marked crosswalks. See the ODOT Temporary Traffic Control Plan Design Manual (*3*) for standards, guidance, and process related to temporary uncontrolled marked crosswalks.

Standards & Guidelines

01 Adequate stopping sight distance, as discussed in the ODOT Highway Design Manual (*4*), shall be provided on approaches to a new uncontrolled marked crosswalk.

02 Installing an uncontrolled marked crosswalk shall be based on an engineering study as described in the **Process & Required Approvals** subsection.

03 Engineering studies that consider treatments at a new or existing uncontrolled marked crosswalk should use **Table 310.3-A** as an initial reference for recommended and optional treatments. Each cell in **Table 310.3-A** contains treatment possibilities that can be appropriate for an uncontrolled marked crosswalk. All treatments listed in a cell should not necessarily be installed at a crosswalk.

04 Except as provided in paragraph 05, uncontrolled marked crosswalks should not be installed where the posted speed is 50 mph or higher.

05 Crosswalks should be marked across roundabout entrances and exits if sidewalks or multi-use paths are provided at the roundabout.

Warning Signs + Pavement Markings

06 Staggered continental-style crosswalk markings should be used for all marked crosswalks across uncontrolled approaches, yield-controlled approaches, midblock crosswalks, roundabouts, unsignalized channelized right turn lanes, and crosswalks enhanced with a pedestrian activated beacon (e.g., RRFB).

07 See the Traffic Line Manual (*5*) for standards and guidelines related to pavement marking design at uncontrolled marked crosswalks.

08 See MUTCD (*2*) Sections 2C.50 and 7B.12 for standards and guidelines related to design and placement of pedestrian crossing warning signs and school crossing warning signs.

Table 310.3-A: Uncontrolled marked crosswalk treatments

Lanes Crossed**	Refuge Island	AADT & Posted Speed***														
		<3000 vehicles/day			3000-9000 vehicles/day			9000-12,000 vehicles/day			12,000-15,000 vehicles/day			>15,000 vehicles/day		
		≤30 mph	35 mph	40-45 mph	≤30 mph	35 mph	40-45 mph	≤30 mph	35 mph	40-45 mph	≤30 mph	35 mph	40-45 mph	≤30 mph	35 mph	40-45 mph
1	N/A	[Blue] A* B C E	[Green] 🅐 C E G I	[Yellow] Ⓐ C E 🅖 I	[Green] 🅐 B C E	[Green] 🅐 C E G I	[Yellow] Ⓐ C E 🅖 I	[Green] 🅐 C E G I	[Green] 🅐 C E G I	[Yellow] Ⓐ C E 🅖 I	[Green] 🅐 C E G I	[Green] 🅐 C E G I	[Yellow] Ⓐ C E 🅖 I	[Green] 🅐 C E G I	[Green] Ⓐ C E G I	[Yellow] Ⓐ C E 🅖 I
2	Yes	[Blue] A* B C D E	[Green] 🅐 C E G I	[Yellow] Ⓐ C E 🅖 I	[Green] 🅐 B C D E	[Green] 🅐 C E G I	[Yellow] Ⓐ C E 🅖 I	[Green] 🅐 C D E G I	[Green] 🅐 C E G I	[Yellow] Ⓐ C E 🅖 I	[Green] 🅐 C D E G I	[Green] 🅐 C E G I	[Yellow] Ⓐ C E 🅖 I	[Green] 🅐 C D E G I	[Green] Ⓐ C E G I	[Yellow] Ⓐ C E 🅖 I
2	No	[Blue] A* B C D E F	[Green] 🅐 🅒 E F G I	[Yellow] Ⓐ 🅒 E F 🅖 I	[Green] 🅐 B 🅒 D E F	[Green] 🅐 🅒 E F G I	[Yellow] Ⓐ 🅒 E F 🅖 I	[Green] 🅐 🅒 D E F G I	[Green] 🅐 🅒 E F G I	[Yellow] Ⓐ 🅒 E F 🅖 I	[Yellow] 🅐 🅒 D E F 🅖 I	[Yellow] 🅐 🅒 E F 🅖 I	[Yellow] Ⓐ 🅒 E F 🅖 I	[Yellow] 🅐 🅒 D E F 🅖 I	[Yellow] Ⓐ 🅒 E F 🅖 I	[Red] Ⓐ 🅒 E F 🅘
3	Yes	[Green] 🅐 B 🅒 D E G I	[Green] 🅐 🅒 E G I	[Yellow] Ⓐ 🅒 E 🅖 I	[Green] 🅐 B 🅒 D E G I	[Green] 🅐 🅒 E G I	[Yellow] Ⓐ 🅒 E 🅖 I	[Green] Ⓐ 🅒 D E G I	[Yellow] Ⓐ 🅒 E 🅖 I	[Yellow] Ⓐ 🅒 E 🅖 I	[Green] Ⓐ 🅒 D E G I	[Yellow] Ⓐ 🅒 E 🅖 I	[Yellow] Ⓐ 🅒 E 🅖 I	[Yellow] Ⓐ 🅒 D E 🅖 I	[Yellow] Ⓐ 🅒 E 🅖 I	[Yellow] Ⓐ 🅒 E 🅖 I
3	No	[Green] 🅐 B 🅒 D E F G I	[Green] 🅐 🅒 E F G I	[Yellow] Ⓐ 🅒 E 🅕 🅖 I	[Green] 🅐 B 🅒 D E F G I	[Green] 🅐 🅒 E F G I	[Yellow] Ⓐ 🅒 E 🅕 🅖 I	[Yellow] Ⓐ 🅒 D E 🅕 🅖 I	[Yellow] Ⓐ 🅒 E 🅕 🅖 I	[Red] Ⓐ 🅒 E 🅕 🅘	[Yellow] Ⓐ 🅒 D E 🅕 🅖 I	[Yellow] Ⓐ 🅒 E 🅕 🅖 I	[Red] Ⓐ 🅒 E 🅕 🅘	[Yellow] Ⓐ 🅒 D E 🅕 🅖 I	[Red] Ⓐ 🅒 E 🅕 🅘	[Red] Ⓐ 🅒 E 🅕 🅘
4	Yes	[Green] 🅐 🅒 D E G 🅗 I	[Green] 🅐 🅒 E G 🅗 I	[Yellow] Ⓐ 🅒 E 🅖 🅗 I	[Green] 🅐 🅒 D E G 🅗 I	[Green] 🅐 🅒 E G 🅗 I	[Yellow] Ⓐ 🅒 E 🅖 🅗 I	[Green] Ⓐ 🅒 D E G H I	[Yellow] Ⓐ 🅒 E 🅖 H I	[Yellow] Ⓐ 🅒 E 🅖 H I	[Green] Ⓐ 🅒 D E G H I	[Yellow] Ⓐ 🅒 E 🅖 H I	[Yellow] Ⓐ 🅒 E 🅖 H I	[Yellow] Ⓐ 🅒 D E 🅖 H I	[Yellow] Ⓐ 🅒 E 🅖 H I	[Red] Ⓐ 🅒 E H 🅘
4	No	[Green] 🅐 🅒 E F G 🅗 I	[Green] Ⓐ 🅒 E 🅕 G 🅗 I	[Yellow] Ⓐ 🅒 E 🅕 🅖 🅗 I	[Yellow] 🅐 🅒 E F 🅖 🅗 I	[Yellow] Ⓐ 🅒 E 🅕 🅖 🅗 I	[Yellow] Ⓐ 🅒 E 🅕 🅖 🅗 I	[Yellow] Ⓐ 🅒 E 🅕 🅖 H I	[Yellow] Ⓐ 🅒 E 🅕 🅖 H I	[Red] Ⓐ 🅒 E 🅕 H 🅘	[Yellow] Ⓐ 🅒 E 🅕 🅖 H I	[Red] Ⓐ 🅒 E 🅕 H 🅘	[Red] Ⓐ 🅒 E 🅕 H 🅘	[Red] Ⓐ 🅒 E 🅕 H 🅘	[Red] Ⓐ 🅒 E 🅕 H 🅘	[Red] Ⓐ 🅒 E 🅕 H 🅘

* Treatment "A" recommended for school crosswalks and midblock crosswalks.

** Total motor vehicle lanes crossed to complete the crossing, including TWLTL and left/right turn lanes. Bicycle lanes and refuge islands at least 6 feet wide are not lanes crossed. STE approval required for uncontrolled marked crosswalks across 5+ lanes.

*** See Speed discussion in the Special Considerations subsection. 85th percentile speed may be used instead of the posted speed. Except at roundabouts, uncontrolled marked crosswalks should not be installed where the posted speed is 50 mph or higher.

This table does not apply to temporary marked crosswalks. See the TCP Manual (*3*) for temporary uncontrolled marked crosswalks.

Installation of a treatment(s) at any location is subject to an engineering study that accounts for factors such as sight distance, safety, operations, other field conditions, and local land use.

X = Treatment optional.

🅧 = Treatment recommended.

Ⓧ = Treatment recommended and should be installed with other identified treatments.

The absence of a letter means the treatment is generally not appropriate, but exceptions may be considered through the engineering study and state traffic engineer approval process.

A = Continental-style crosswalk markings, parking restrictions on crosswalk approach (see Table 310.3-B), lighting according to the ODOT Traffic Lighting Design Manual. Crossing warning sign(s) for school crosswalks, midblock crosswalks, or speed ≥30 mph.

B = Raised crosswalk, except on freight routes, emergency response routes, arterial roadways, and snowplow routes.

C = If 2+ lanes in one direction, wide advance stop bar and STOP HERE FOR Pedestrians sign.

D = In-street pedestrian crossing sign (R1-6a). If refuge island present, install on the refuge island.

E = Curb extension.

F = If crossing 2-way traffic, pedestrian refuge island (at least 6 feet wide).

G = Rectangular rapid flashing beacon (RRFB).

H = Reduce number of motor vehicle lanes.

I = Traffic signal or pedestrian hybrid beacon (PHB).

Blue = All treatments shown in category optional. Treatment "A" recommended for school and midblock crosswalks.

Green = Visibility enhancements recommended.

Yellow = RRFB treatment recommended.

Red = Traffic signal or PHB recommended.

Parking Restrictions

09 If present, on-street parking should be set back from the closest edge of a new uncontrolled marked crosswalk according to **Table 310.3-B**.

10 If present, marked on-street parking may be closer to an uncontrolled marked crosswalk than the setbacks shown in **Table 310.3-B** if an engineering study finds available stopping sight distance meets or exceeds the minimums in the ODOT Highway Design Manual (*4*).

Table 310.3-B: Minimum Recommended On-Street Parking Setback from Closest Edge of Marked Crosswalk

Posted speed	Warning sign at crosswalk[1]	No warning sign and no curb extension	No warning sign with curb extension[2]
≤25 mph	50 feet	20 feet	20 feet
30 mph	50 feet	30 feet	20 feet
≥35 mph	50 feet	50 feet	20 feet

[1] ORS 811.550(18) prohibits on-street parking within 50 feet on the approach to a side-mounted traffic control device if the parked vehicle obstructs the view of the traffic control device.

[2] Minimum distance from any crosswalk at an intersection is 20 feet per ORS 811.550(17).

Illumination

11 See the ODOT Lighting Policy & Guidelines (*6*), the ODOT Traffic Lighting Design Manual (*7*), and Technical Bulletin TR22-01(B) (*8*) for standards and guidelines related to illumination at uncontrolled marked crosswalks.

Raised Crosswalk, Curb Extension, Refuge Island

12 See the Highway Design Manual (*4*) for standards and guidelines related to the design of raised crosswalks, curb extensions, and refuge islands.

Advance Stop Bar

13 See the Traffic Line Manual (*5*) for standards and guidelines related to the design and placement of advance stop bars.

In-Street Sign

14 See Section 2B.12 and 7B.12 in the MUTCD (*2*) and Oregon Supplement to the MUTCD (*9*) for standards and guidelines related to in-street signs.

Rectangular Rapid Flashing Beacon (RRFB)

15 Where used permanently, RRFBs shall be placed according to:

a. **Table 310.3-C** where the crosswalk includes a refuge island, or

b. **Table 310.3-D** where the crosswalk does not include a refuge island.

16 An additional RRFB should be installed on the approach to a crosswalk where:

a. drivers approaching the crosswalk do not have a continuous view of an RRFB for at least the minimum distance shown in MUTCD Table 4D-2, or

b. the posted speed is 45 mph or higher and AADT is greater than 20,000 vehicles per day.

17 If advance RRFBs are used as a supplemental conspicuity enhancement on the approach to a crosswalk, they should be located according to MUTCD Table 2C-4.

18 Speed limit sign beacons and RRFBs should be installed at least 200 feet apart.

19 RRFBs activated before January 18, 2024:

a. Shall be reprogrammed as resources allow to operate using the flashing sequence specified in Section 4L.03 in the 11th Edition of the MUTCD (*10*) no later than when the unit is serviced or when the existing signs are replaced, whichever comes first.

b. May remain in place without modification, except for the flashing sequence, until the unit reaches the end of its useful life. Replacement RRFBs shall meet all conditions of the 11th Edition of the MUTCD (*10*).

20 RRFBs activated on or after January 18, 2024, shall operate using the flashing sequence specified in Section 4L.03 in the 11th Edition of the MUTCD (*10*) .

21 See Chapter 4L in the 11th Edition of the MUTCD (*10*) and the ODOT Signal Design Manual (*11*) for additional standards and guidelines related to RRFBs.

Traffic Signals & PHBs

22 See **Sections 304.0** and **404.0**, the Traffic Signal Policy & Guidelines (*12*), Traffic Signal Design Manual (*11*), and MUTCD (*2*) Part 4 for standards, guidelines, and process related to traffic signals and pedestrian hybrid beacons.

Table 310.3-C: RRFB Placement – Refuge Island at Crosswalk

Total Motor Vehicle Lanes Crossed	Left Side	On Refuge Island	Overhead[1]	Right Side
2 or 3	Optional	Required[2]	Optional	Required
4	Optional	Required[3]	Optional	Required
5+	Optional	Required[3]	Optional	Required

[1] If using an overhead RRFB, minimum of one overhead beacon is required on the approach and shall be located over the approximate center of the lanes of the approach or where optimum visibility can be achieved. See the Traffic Signal Design Manual (*10*) and Standard Detail DET 4438 for detailed information on overhead design. On Reduction Review Routes, overhead RRFBs could be subject to ORS 366.215 and OAR 731-012. See ODOT's Statewide Mobility Program website (*13*) for more information on this process.

[2] RRFB may be installed on the left side, overhead, or both instead of on the refuge island. The decision on which to use (left side or overhead or both) is based on engineering judgement. See the Traffic Signal Design Manual (*13*) for placement of push buttons.

[3] RRFB may be installed overhead instead of on the refuge island. Optional to use both overhead and on the refuge island. See the Traffic Signal Design Manual (*13*) for placement of push buttons.

Table 310.3-D: RRFB Placement – No Refuge Island at Crosswalk

Total Motor Vehicle Lanes Crossed	Left Side	Overhead[1]	Right Side
1	Required	Optional	Required
2 or 3	Required	Optional	Required
4	See note 2	See note 2	Required
5+	Required	Required	Required

[1] If using an overhead RRFB, minimum of one overhead beacon is required on the approach and shall be located over the approximate center of the lanes of the approach or where optimum visibility can be achieved. See the Traffic Signal Design Manual (*10*) and Standard Detail DET 4438 for detailed information on overhead design. On Reduction Review Routes, overhead RRFBs could be subject to ORS 366.215 and OAR 731-012. See ODOT's Statewide Mobility Program website (*13*) for more information on this process.

[2] RRFB shall be installed on the left side, overhead, or both left side and overhead. The decision on which to use is based on engineering judgement.

Process & Required Approvals

New Marked Crosswalks

Complete an engineering study as described below. Except when installing a new traffic signal, the region traffic engineer may approve installing a new uncontrolled marked crosswalk if all treatments recommended in **Table 310.3-A** for the applicable conditions will be installed with the crosswalk markings. Otherwise, state traffic engineer approval is required to install a new uncontrolled marked crosswalk.

If the region traffic engineer approves installing a new uncontrolled marked crosswalk, the following conditions shall apply:

1. The region traffic engineer shall send a copy of the approval to the state traffic investigations engineer to maintain the marked crosswalk inventory.
2. Follow ODOT's ADA-related design standards, design exceptions, and inspection process.
3. For RRFBs, the Traffic Engineering Section shall review and approve the final design plans.

Some treatments listed in **Table 310.3-A** may require other approvals besides the region traffic engineer or state traffic engineer. On Reduction Review Routes, refuge islands, curb extensions, raised crosswalks, overhead treatments (like signals or overhead RRFBs), and lane reductions could be subject to ORS 366.215 and OAR 731-012. See ODOT's Statewide Mobility Program website (*13*) for more information on this process.

Engineering Study

Document the following conditions at the proposed location in an engineering study. Attach Form 734-5350 and Form 734-5351 as part of a request for approval from the region traffic engineer or state traffic engineer. For uncontrolled marked crosswalks across channelized right turn lanes (i.e. driver stops/yields to conflicting traffic beyond the marked crosswalk), documenting conditions 6, 7, 8, and 11 is optional.

1. Number and widths of motor vehicle lanes crossed.
2. Total crossing distance.
3. AADT.
4. Posted or statutory speed limit.
5. Whether a raised refuge island at least 6 feet wide will be provided.

6. Where existing marked crosswalks are located by describing the following:
    a. Walking distance from the proposed location to the nearest marked crosswalk in both directions. Describe the pedestrian and bicycle facility used to access those crosswalks (e.g., sidewalk and bike lane; bike lane only; paved shoulder).
    b. How installing a marked crosswalk at the proposed location will help ODOT meet the spacing targets for enhanced crosswalks described in **Section 310.1**.
    c. How installing a marked crosswalk at the proposed location would affect surrounding crosswalks along the corridor (e.g., would other marked crosswalks need to move or receive other treatments?).

    The urban context used to describe spacing targets in the study should be consistent with other documents like the project charter, urban design concurrence document, or planning documents. In the absence of these, select the urban context that most closely aligns with the descriptions in the ODOT Highway Design Manual (*4*). While this prioritizes consistency with previous urban context decisions, the Highway Design Manual broadly defines urban contexts, and contexts can change over time.
7. If transit serves the local community, document the approximate walking distance from the proposed marked crosswalk to the nearest transit stop(s). Transit stops could be located off the state highway, could be an intercity service, and could be different modes (e.g., bus, train, or hubs for micromobility like bike share, scooter share, or rideshare). Note whether the crosswalk would connect different transit lines or services for transfers. If the transit stops are on the state highway, note whether they are upstream or downstream from the proposed marked crosswalk location. If available, boarding and alighting data for the transit stops can help demonstrate that the marked crosswalk will fulfill a need.
8. Approximate distance from the crosswalk to the following features. Measure from the edge of the crosswalk closest to the feature.
    a. Nearest adjacent on-street parking spaces in both directions and on both sides of the highway, if present; and
    b. Nearest driveways in both directions and on both sides of the highway.
9. Existing lighting at the crosswalk according to Technical Bulletin TR22-01(B) (*8*). If lighting levels do not meet the levels for intersections or crosswalks in the Traffic Lighting Design Manual (*7*) and lighting will not be improved as part of the crosswalk installation, explain why.
10. Available stopping sight distance measured according to the ODOT Highway Design Manual (*4*) based on a pedestrian positioned at the back of the detectable

warning surface on both sides of the crosswalk. If present, a refuge island at least 6 feet wide may be considered as one side of the crosswalk.

If there is no detectable warning surface, measure stopping sight distance based on a pedestrian positioned at least 2.5 feet behind the face-of-curb. If there is no curb, then at the edge of pavement.

For vehicle speed in the stopping sight distance calculation, use the design speed if known. Otherwise, use the 85th percentile speed or the posted speed.

11. If the urban context selected in deliverable (6) above is not traditional downtown/central business district, document common walking trip pairs that the proposed crosswalk would connect that are within the distances shown in **Table 310.3-E** from the proposed crosswalk. Include trip pairs that are off the state highway if the proposed crosswalk would connect them. Examples of walking trip pairs include but are not limited to: transit stops that serve different transit lines; a transit stop and employment or government or community services; a neighborhood and a grocery store or a school; a high school and a convenience store; an events venue and restaurants or events parking; a park-and-ride lot and transit stops; or a neighborhood and a park.

12. Latest available 5 years of pedestrian-involved and bicycle-involved crashes from the ODOT crash data system within the distance along the highway in both directions shown in **Table 310.3-E** from the proposed crosswalk.

    If more recent preliminary crash data are available, this may be included in addition to the finalized data. Crash data from surrounding local streets within the distance shown in **Table 310.3-E** may be included as supplemental information.

    For each pedestrian-involved and bicycle-involved crash, note the location of the crash, the direction the crash participants were traveling, and applicable errors noted in the crash data. For data from the ODOT crash data system, this may be done by attaching a de-coded version of the PRC report to the engineering study. The Crash Decoder Tool is available on ODOT's ARTS website under Analysis Tools & Forms.

13. Whether the crosswalk is part of a school route plan. If it is, document:
    a. The grade ranges the school serves,
    b. The school's plan for using adult crossing guards at the crosswalk,
    c. The school's drop-off and pick-up operations, including on-street parking controls, off-street parking facilities, and
    d. The school's bicycle parking location(s).

14. Recommended and optional treatments for the location from **Table 310.3-A** (use Form 734-5351). If a recommended or optional treatment will not be installed, the request for approval should explain why the treatment will not be installed.

Table 310.3-E: Recommended Distance to Document Trip Pairs and Crash History

ODOT Urban Context	Distance from Proposed Crosswalk (feet)[1]
Traditional Downtown/CBD	550
Urban Mix	550
Commercial Corridor	1000
Residential Corridor	1000
Suburban Fringe	1500
Rural Community	750

[1] These values are NOT spacing targets for enhanced crosswalks. See Section 310.1 for target spacing information.

Agreements

If a local jurisdiction wants an uncontrolled marked crosswalk installed on a state highway, the local jurisdiction typically enters into an agreement with ODOT. The agreement typically establishes responsibilities and costs associated with the crosswalk, including installation and maintenance.

When an agreement specifies that maintenance is the responsibility of the local jurisdiction, it will typically describe how this is done – either by local jurisdiction resources or by reimbursement to ODOT. The agreement typically requires that the local jurisdiction properly maintain the crosswalk to an acceptable standard. If the local jurisdiction fails to maintain the crosswalk, the agreement typically includes provisions that ODOT may remove it or address issues at the expense of the local jurisdiction.

Existing Marked Crosswalks

An uncontrolled marked crosswalk is considered existing if it is in ODOT's marked crosswalk inventory and it has not been approved for removal. The marked crosswalk inventory is available on ODOT's TransGIS under the Roadside layers. If an existing marked crosswalk is not shown on TransGIS, check with the state traffic investigations engineer on whether a marked crosswalk is in the current inventory.

Installing raised crosswalks, curb extensions, refuge islands, or reducing the number of motor vehicle lanes do not require approval in this process from the region traffic engineer or state traffic engineer at an existing uncontrolled marked crosswalk.

The region traffic engineer may approve installing any of the following treatments if they are recommended or optional in **Table 310.3-A** for the applicable conditions at an existing uncontrolled marked crosswalk:

- Treatment A – High-visibility treatments
- Treatment C – Wide advance stop bars if 2+ lanes in one direction
- Treatment D – In-street pedestrian crossing sign
- Treatment G – Rectangular rapid flashing beacon (RRFB)

If the region traffic engineer approves installing treatments at an existing uncontrolled marked crosswalk, the following conditions shall apply:

1. The region traffic engineer shall send a copy of installation approval to the state traffic investigations engineer to maintain the marked crosswalk inventory.
2. Follow ODOT's ADA-related design standards, design exceptions, and inspection process.
3. For RRFBs, the Traffic Engineering Section shall review and approve the final design plans.

State traffic engineer approval is required to install a new traffic signal.

Some treatments listed in **Table 310.3-A** may require other approvals besides the region traffic engineer or state traffic engineer. On Reduction Review Routes, refuge islands, curb extensions, raised crosswalks, overhead treatments (like signals or overhead RRFBs), and lane reductions could be subject to ORS 366.215 and OAR 731-012. See ODOT's Statewide Mobility Program website (*13*) for more information on this process.

Changes at existing marked crosswalks might need to be incremental improvements, such as treatments that increase stopping compliance or pedestrian visibility. In these cases, if the crosswalk still does not include all recommended treatments identified in **Table 310.3-A**, then it will continue to be on the list for future investigation described below.

Within STIP Project Limits

During project scoping, the region traffic office shall identify all uncontrolled marked crosswalks within the limits of a STIP project that do not include the recommended treatments in **Table 310.3-A**. If the project will not install recommended treatments from **Table 310.3-A**, the region traffic office shall document why no later than the Design Acceptance Phase (DAP) stage and keep a copy of this documentation according to agency records retention policies.

Investigations

There are over 1000 existing uncontrolled marked crosswalks across state highways in Oregon. In the past, ODOT relied on state traffic engineer approvals to document conditions at the crosswalk and treatment decisions. However, conditions can change over time, such as traffic volume and surrounding land use.

The Traffic Engineering Section annually provides region traffic offices with a list of uncontrolled marked crosswalks prioritized for further investigation. The Traffic Engineering Section should develop and prioritize the list based on data available statewide that affect the safety of people crossing at crosswalks. Safety variables should include but not necessarily be limited to posted speed, number of lanes crossed, pedestrian-involved crash history, AADT, and whether the crosswalk includes the recommended treatments in **Table 310.3-A**.

Region traffic offices should investigate at least the top five percent (5%) of crosswalks identified on the Traffic Engineering Section's prioritized list annually. These investigations should document:

- potential changes, if any, at the crosswalk for future project work,
- estimated costs of potential changes,
- factors that might affect implementing potential changes other than cost, and
- planned projects in the area that could implement the potential changes within the projects' scopes.

Crosswalk investigation reports up to five (5) years old may serve as documentation of an investigation. If a report expires, it can be renewed within one (1) year by noting changes at the crosswalk since the original investigation (e.g., surrounding land use, traffic volumes, speed, pedestrian-involved crash history, etc.), whether the changes identified in the original investigation are still appropriate, and updated costs of potential changes.

The region traffic office should keep records of these investigations according to agency records retention policies and send copies of investigations to the state traffic investigations engineer when completed.

These investigations are meant to provide transition plans and goals for when funding becomes available. The investigation priority list should not be used to prioritize projects. Projects ranked according to the investigation list might not result in the best return on investment.

Removing Treatments

State traffic engineer approval is required to permanently **remove** the following from an uncontrolled marked crosswalk that is in ODOT's marked crosswalk inventory:

- treatments that **Table 310.3-A** recommends for the applicable conditions, and
- treatments that an installation approval specified.

The marked crosswalk inventory is available on ODOT's TransGIS under the Roadside layers. If an existing marked crosswalk is not shown on TransGIS, check with the state traffic investigations engineer on whether a marked crosswalk is in the current inventory.

Document how removing treatments would affect the spacing targets for enhanced crosswalks described in **Section 310.1**. See **Section 100.0** for additional considerations to include in a request.

If seeking to close an existing marked crosswalk, request approval to close the crosswalk according to **Section 310.8**. No additional request to remove markings or other treatments is needed in these cases; the request to close serves as the request to remove treatments.

Special Considerations

Human Factors & Treatment Effectiveness

Many variables affect yielding compliance and safety outcomes at uncontrolled marked crosswalks. A few significant infrastructure-based variables include but are not limited to speed, crossing distance/number of lanes, AADT, presence of a refuge island and the type of crosswalk enhancement (*14*, *15*, *16*, *17*).

Several human factors-based variables also affect yielding compliance and wait times at uncontrolled marked crosswalks. These can include but are not limited to:

- the race of the person walking (*18*, *19*, *20*, *21*), their gender (*19*), clothing color (*22*), assertiveness (*22*, *23*), and noticeable physical disability (*24*, *25*), and
- the affluence of the person driving (*26*, *21*), their speed preference, perceived value of time, vehicle constraints, and awareness of law enforcement (*20*, *23*).

People who cannot drive are more reliant on walking and transit to access services, jobs, and other destinations. These people include children, older adults, people with disabilities, and people with lower incomes (*27*, *28*). Uncontrolled marked crosswalks can provide a critical link for these walking and transit trips.

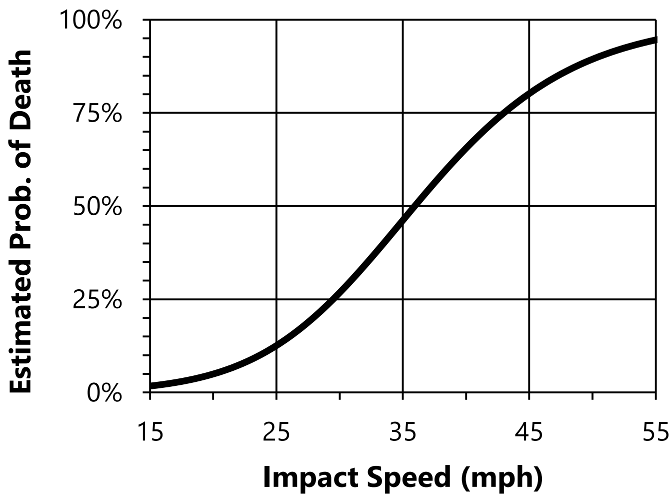
Speed

Speed directly affects two key variables at uncontrolled marked crosswalks:

- As speed increases, people driving tend to yield less frequently to people walking, especially where the posted speed is 35 mph or higher (*14*, *29*).
- As impact speed increases in a crash, the probability that the collision will kill or severely injure the person walking increases non-linearly (*30*), especially if the person walking is an older adult (*31*).

There have been many studies examining this relationship. **Figure 310.3-1** is based on a 2019 meta-analysis (*32*) of 15 studies published 1980-2015 that examined fatal pedestrian-involved crashes from several developed countries. From that meta-analysis, the probability that a person walking will be fatally injured reaches approximately 5% at a vehicle impact speed of 19 mph; 10% at 23 mph, 50% at 37 mph; 75% at 43 mph; and 90% at 50 mph.

Figure 310.3-1: Vehicle Impact Speed vs. Estimated Probability that a Person Walking Will Be Killed



Source: (*32*). Probability of death based on a multivariate meta-regression model based on 15 studies of vehicle speed and probability of death of person walking. Studies published 1980-2015 and examined crashes in the United States, United Kingdom, China, Japan, Germany, and Korea.

While there are other variables contributing to the severity of a pedestrian-involved crash (some of which are discussed in this section), **Table 310.3-A** recommends higher levels of treatment at posted speeds of 35 mph and higher because there is a strong inverse correlation between speed and yielding rate without other enhancements (*14*, *29*) and because of the higher probability of death or severe injury if a crash occurs.

The treatments in **Table 310.3-A** are generally based on a speed limit set near the 85th percentile speed. Updated speed limits in urban areas can be set closer to the 50th percentile under speed zoning administrative rules that were changed in 2020 (OAR 734-020-0015). Using **Table 310.3-A** with a 50th percentile speed could result in lower-level treatments at the crosswalk than national guidance would recommend. Because there is variability in how speeds are posted, **Table 310.3-A** allows flexibility to use the 85th percentile speed instead of the posted speed as part of the engineering study.

Reducing operating speed at the crosswalk can reduce the likelihood of death and severe injury when a crash occurs (*30*). See the ODOT Highway Design Manual (*4*) for recommended design treatments to achieve target speeds in urban contexts. Reducing operating speed can also result in less expensive crosswalk enhancements and improved safety for all road users.

Vehicle Type

Taller vehicles such as SUVs, pickup trucks, and passenger vans significantly increase the probability of death or severe injury compared to sedans because these vehicles tend to cause greater injuries to the middle and upper body instead of lower extremities (*33*, *34*, *35*). This also implies an increase in the probability of death or severe injury for people using wheelchairs, who already have a higher probability of death than the overall pedestrian population (*36*).

The proportion of SUVs, pickup trucks, and passenger vans registered in the United States has been steadily increasing since at least 2012; in 2017, the number of these larger vehicles registered in the United States surpassed the number of cars (*37*). Nationwide, passenger cars and these larger vehicles were involved in approximately the same proportion of fatal frontal collisions with people walking in 2021 (*38*).

Traffic Volume

As traffic volume increases, people driving yield less frequently to people walking and the gaps available to cross the road become smaller and/or less frequent. The gap length people are willing to accept to cross the road also gets shorter, increasing the likelihood of a crash (*14*, *39*).

Pedestrian-involved crash rates are higher at uncontrolled marked crosswalks across multilane highways where AADTs are greater than 12,000 vehicles per day without a refuge island and 15,000 vehicles per day with a refuge island (*40*). Where traffic volume exceeds these thresholds on multilane highways, considering several treatments can improve safety at uncontrolled marked crosswalks.

Crossing Distance/Number of Lanes

As crossing distance and number of motor vehicle lanes increase, the probability of pedestrian-involved crashes increase and the effectiveness of treatments decreases (*40*, *14*, *16*, *41*, *42*, *43*). Longer crossing distances mean people walking must find larger gaps in the traffic stream and are exposed to traffic for a longer time, particularly affecting older people and people with limited mobility (*14*, *44*).

On multilane roads, other vehicles may hide a person crossing or may hide other crosswalk treatments like signs or beacons from approaching drivers. This contributes to multiple-threat crashes. These crashes occur when a vehicle is stopped too close to the crosswalk and hides a person in the crosswalk from a driver approaching in an adjacent lane. Advance stop bars, treatments installed on both sides of approaching traffic, or overhead treatments can help decrease these types of conflicts (*40*, *15*).

Refuge Islands

Refuge islands are raised areas at least 6 feet wide, typically in the median. Refuge islands allow people walking to focus on one direction of traffic at a time as they cross and gives them a place to wait for a gap to complete their crossing.

Refuge islands significantly improve safety for all road users and can reduce pedestrian-involved crashes by 13 to 50 percent (*15*). They also improve the effectiveness of other treatments such as markings, signs, and beacons, especially where AADT exceeds approximately 10,000 vehicles per day (*15*, *45*, *46*). Refuge islands can also significantly reduce delay for people walking (*47*), which can mean fewer people crossing through shorter gaps in traffic.

On reduction review routes, refuge islands could be subject to ORS 366.215 and OAR 731-012. See ODOT's Statewide Mobility Program website (*13*) for more information on this process.

Proximity to Transit

ODOT has adopted a policy through the Oregon Bicycle and Pedestrian Plan of improving access to multimodal connections for walking trips. Uncontrolled marked crosswalks near transit stops play a key part in providing those connections, while also supporting ODOT's policy of providing safe and well-designed streets and highways for people walking (*1*).

Proximity of a marked crosswalk to a transit stop can affect driver yielding at an uncontrolled marked crosswalk (*48*). It is not entirely clear why this is. Some possible explanations include confusion as to whether a person on foot intends to cross or is waiting for a bus, driver distraction due to increased signing at transit stops, or proximity of transit waiting/loading zone to crosswalk curb ramps (*48*). Transit stops upstream of a crosswalk can hide a person crossing the road from approaching drivers and increase the likelihood of a multiple-threat crash on multilane roads (*49*). In addition, people walking might attempt to avoid missing an approaching transit vehicle by accepting smaller gaps in traffic to cross (*50*).

Some of these factors are associated with uncontrolled crosswalks positioned downstream from transit stops. Positioning an uncontrolled marked crosswalk upstream from a transit stop might help reduce some of these effects by separating the boarding/alighting area from the crosswalk (*48*).

Race, Gender, and Income

There is evidence that people who are driving do not yield equally to all people who are walking. For example, one study (*18*) in Portland found that Black people waiting to cross a road were passed by twice as many drivers and experienced wait times 32 percent longer than white people experienced at an uncontrolled marked crosswalk. Other studies in Portland and Las Vegas found similar results – the first person driving in a platoon was more likely to stop for a white person or a female waiting to cross a road compared to a Black person or a male waiting to cross the road (*19*, *21*).

Affluence of the surrounding area and of people driving may also affect yielding behavior – people driving in high-income areas or driving higher-value cars were less likely to yield to a Black person waiting to cross the road in the Las Vegas area in two studies (*20*, *21*). Another study in San Francisco found a similar trend – people driving higher-class cars were significantly more likely to drive through a crosswalk without yielding to a person waiting to cross the road (*26*).

Additionally, when a crash occurs, a pedestrian's race and insurance coverage can be factors that affect a crash's severity. One 2010 study (*51*) of 26,404 vehicle-struck pedestrians, age 16-65, who were hospitalized for severe injuries found those without health insurance generally had higher mortality rates than those who had health insurance. The study also found pedestrians who were Black or Hispanic generally had higher mortality rates than white pedestrians, even when accounting for insurance coverage. The authors cited disparities in healthcare after the crash, among other factors, as a possible explanation for these differences.

These supports using treatments at crosswalks that improve the probability that a driver will see a person on foot waiting to cross the road and treatments that remind the driver of their responsibility to stop for that person. Treatments may include but are not limited to activated beacons, in-street signs, refuge islands, or curb extensions. This is particularly important in areas with more people of color and low-income residents because these areas are likely to have more residents who walk and take transit to meet daily needs (*27*).

Children

See ODOT's Guide to School Area Safety (*52*) for information and considerations related to school crosswalks.

There are numerous and widely varying factors that affect the behavior of children who are walking, up through high school age (*14*, *53*). Young children are more likely to cross at marked crosswalks on multilane roads (*40*). One study in Canada observed that 37 percent of children did not look for traffic before crossing at unsignalized intersections and 42 percent only checked one direction. The same study observed older children were less likely to stop at the curb before crossing (*54*). Even if they do look, younger children, particularly those younger than 10 years old, may not be developmentally able to account for important factors to safely cross the road (*55*). For example, younger children may tend to focus on the distance of a single vehicle and not account for speed, distance, and acceleration of multiple vehicles from multiple directions and the speed they themselves can cross the road (*56*).

The likelihood of severe injury or death of children when considering vehicle speed and type is not statistically known. Studies examining these variables excluded children younger than 14 or 15 years because of very small sample sizes. However, given the height of children, vehicles – especially SUVs, pickup trucks, and passenger vans – are more likely to strike children above their waist, which generally results in more severe injuries (*31*, *57*).

These characteristics support the systemic application of treatments to improve safety at uncontrolled marked crosswalks. Curb extensions and refuge islands can help pedestrians by shortening crossing distances. A refuge island allows them to focus on one direction of traffic at a time and provides a refuge (*15*).

Older Adults

Older adults are more likely to cross at marked crosswalks. However, crosswalk markings alone do not reduce the probability of a crash involving an older person, and when a crash does occur, older people are more likely to be killed or injured (*40*, *14*, *31*, *58*).

Behavioral studies that have looked at age suggest older people are more likely to make decisions that can lead to crashes, especially crossing high-speed, two-way traffic. This is possibly explained by several factors as we age – reduced perception and cognitive abilities, decreased vision, difficulty assessing the speed of approaching vehicles, slower reaction time and decision-making, and reduced mobility (*14*, *59*).

These characteristics support the systemic application of treatments to improve safety at uncontrolled marked crosswalks. Curb extensions and refuge islands can help older people by shortening crossing distances, allowing them to focus on one direction of traffic at a time, and providing a refuge (*15*, *44*).

Treatments

Several treatments can improve driver yielding and reduce the likelihood of a pedestrian-involved crash at an uncontrolled marked crosswalk. Several factors can change the effectiveness of these treatments (see **Human Factors & Treatment Effectiveness** above); they are typically more effective when combined with other treatments, especially a refuge island (*15*, *45*, *46*).

Some treatments that improve driver yielding, such as RRFBs (*45*), may also increase the likelihood of rear-end crashes. However, pedestrians are vulnerable road users. Compared to vehicle occupants hospitalized following a crash, pedestrians hospitalized after being hit by a motor vehicle generally experience more severe injuries, report more continuing medical challenges, and report greater resource use (*60*). Using treatments that reduce pedestrian-involved crashes and improve driver yielding, even if they increase rear-end crashes, supports ODOT’s goal of eliminating pedestrian fatalities and serious injuries.

Visibility Enhancements

ODOT has established a strategy of improving the visibility of people walking at crosswalks to meet its policy of providing safe and well-designed streets and highways for people walking (*1*). These visibility enhancements are some ways to accomplish this strategy.

Warning Signs + Continental Markings

Drivers can see continental crosswalk markings from significantly further away than transverse crosswalk markings (parallel bars) (*61*). Drivers are also more likely to yield to pedestrians at uncontrolled crosswalks marked with a high-visibility pattern, such as continental-style, than transverse crosswalk markings in low volume, low-speed, two-lane contexts (*62*). Driver yielding compliance with a combination of warning signs and crosswalk markings reduces as speed increases, especially where posted speed or 85th percentile speed is 35 mph or greater (*14*, *62*).

See the Traffic Line Manual (*5*) for standards and guidelines related to crosswalk marking types.

See MUTCD Section 2C.50 and 3B.18 for standards and guidelines related to crosswalk warning signs. See MUTCD Section 7B.12 for standards and guidelines related to school crossing warning signs.

Figure 310.3-2: Crosswalk with Warning Signs, Continental Markings, Curb Extensions, Parking Restrictions, Advance Stop Bar

Photo by Google

Parking Restrictions

Removing on-street parking adjacent to a crosswalk (example in **Figure 310.3-2**) improves lines of sight for people walking and driving and improves yielding compliance (*63*).

To provide sufficient stopping sight distance, FHWA (*64*) and AASHTO (*65*) recommend longer parking restrictions as speed increases. ORS 811.550 prohibits parking within 20 feet of a crosswalk at an intersection and within 50 feet on the approach to a flashing signal, stop sign, yield sign, or traffic control device located at the side of the roadway if a parked vehicle will obstruct the view of the traffic control device. The distances listed in **Table 310.3-B** are a combination of values from those sources.

Where advance stop bars are provided, MUTCD (*2*) Section 3B.16 recommends prohibiting parking between the stop bar and crosswalk.

Illumination

ODOT has established a strategy of increasing lighting for people walking at crosswalks to meet its policy of providing safe and well-designed streets and highways for people walking (*1*). Dawn and dusk occur during morning and evening commute times throughout Oregon in the winter and many transit services run after dark even in the summer. Expect that people walking will use uncontrolled marked crosswalks in the dark.

Pedestrian-involved crashes related to crossing the road are more likely in dark conditions (*66*, *67*). Adequate crosswalk lighting can decrease pedestrian-involved crashes (*43*) and most safety research and national guidelines recommend adequate illumination at marked crosswalks (*40*, *14*, *64*).

See the ODOT Lighting Policy & Guidelines (*6*) and ODOT Traffic Lighting Design Manual (*7*) for more information on illumination design at crosswalks.

Raised Crosswalks

Raised crosswalks are ramped speed tables spanning the whole width of the roadway perpendicular to the direction of vehicles (example in **Figure 310.3-3**). They are typically 3.0 to 3.5 inches high with a 10-foot plateau and 6-foot approach ramps on both sides (*68*).

It is currently not clear how raised crosswalks affect motorist yielding and pedestrian-involved crashes. Limited studies have shown reduced vehicle speeds at raised crosswalks and a reduction in vehicle-pedestrian injury crashes. For example, the CMF Clearinghouse estimates a reduction of vehicle-pedestrian injury crashes of 45 percent with raised crosswalks (3-star study). The treatment is expected to reduce crash severity by reducing vehicle speeds because it is flat-topped speed hump designed to be comfortable at lower speeds (*69*, *30*).

A raised crosswalk is typically a candidate treatment for channelized right-turn lanes (*70*) and mid-block crosswalks across 2-lane or 3-lane roads with speed limits of 30 mph or less and AADT below 9000 vehicles per day. A raised crosswalk is generally not appropriate where crossing through lanes on freight routes, emergency response routes, arterial roadways, and commonly plowed routes. The raised crosswalk design needs to accommodate storm water drainage (*64*).

Avoid locating a raised crosswalk near a transit stop because people in the transit vehicle transition between standing and sitting as the vehicle approaches and departs from the transit stop.

On Reduction Review Routes, raised crosswalks could be subject to ORS 366.215 and OAR 731-012. See ODOT's Statewide Mobility Program website (*13*) for more information on this process.

Figure 310.3-3: Raised Crosswalk with In-Street Sign

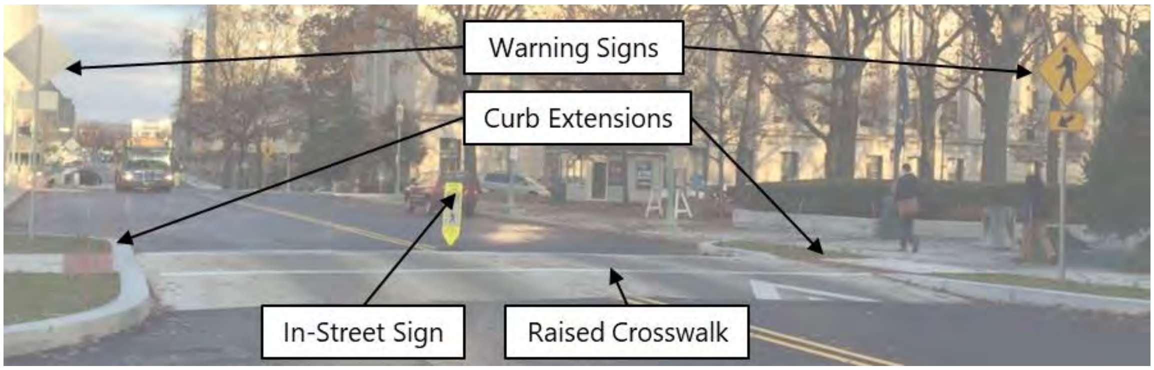


Photo by Pennsylvania Department of Transportation via www.pedbikeimages.org

Advance Stop Bar

Drivers are more likely to stop when they have a clear line of sight to the pedestrian. Crosswalks across multi-lane, uncontrolled approaches are prone to multiple-threat crash types. These crashes occur when a vehicle is stopped too close to the crosswalk and hides a person in the crosswalk from a driver approaching in an adjacent lane. Advance stop bars paired with other treatments (**Figure 310.3-2**) can help reduce this crash type and improve stopping compliance (*15*). Advance stop bars and crosswalk signing are considerably more effective if parking is removed between the crosswalk and advance stop bar by improving sight lines between people walking and driving (*63*, *71*, *72*).

See the Traffic Line Manual (*5*) for standards and guidelines related to design of advance stop bars at uncontrolled marked crosswalks.

In-Street Sign

In-street signs (R1-6a) are placed at a crosswalk on a refuge island (**Figure 310.3-4),** on the centerline, or on the lane line of a road (**Figure 310.3-3)**.

If used, install sign R1-6a (not R1-6) because drivers must stop for pedestrians in crosswalks in Oregon. See MUTCD Section 2B.12 and MUTCD Official Ruling 3(09)-61(I) (*73*) for standards, guidelines, and other information related to this sign.

Effectiveness

These signs are more effective on 2-lane or 3-lane roads with speed limits of 30 mph or less (*64*). When installed with an RRFB in lower-speed contexts (30 mph or less), the signs can further improve driver yielding (*74*).

When used as a gateway-style treatment, these signs can improve yielding rates to levels comparable to RRFBs in some contexts, and can reduce mean speeds (*74*, *75*, *76*, *30*); gateway-style treatments are currently subject to experimental approval from FHWA, but tubular markers may be used instead of additional in-street signs (*73*).

Strategies to Improve Lifespan

The in-street sign has a low initial cost, but it has a short lifespan when placed in the roadway. Coordinate with district maintenance before installing to arrange for prompt replacement of damaged signs.

The following are strategies to improve the sign's lifespan:

If a refuge island is available, placing the sign on the island side closest to approaching traffic (instead of at the center of the island) can prolong the sign's service life while improving the treatment's effectiveness (*77*).

Monitor new installations and adjust the sign's position to find a location at the crosswalk that is less prone to damage (e.g., outside turning radii). The sign's position might need to be adjusted multiple times. For example, if an advance stop bar is present, moving the sign to the stop bar could reduce hits from turning traffic while calling attention to the stop bar. If a stop bar is not present, keeping the sign within 50 feet of the crosswalk could have a similar effect since stop bars are typically installed 20-50 feet from the crosswalk.

The sign might need to be removed annually before winter plowing and reinstalled in the spring. The sign will need to be removed for maintenance of the lane line or center line.

- Keep at least 12 feet of clear width next to the sign for vehicles to pass by (between the edge of the sign and the lane line, face of curb, or other vertical obstruction). In-street signs are 12 inches wide, 36 inches tall, and the top of the sign is mounted up to 4 feet above the road surface (or refuge island surface if installed on an island).

Curb Extension

ODOT has established a strategy of improving visibility of people walking at crosswalks and minimizing crossing distances to meet its policy of providing safe and well-designed streets and highways for people walking (*1*). Curb extensions are one way to accomplish this.

Curb extensions (or “bulbouts,” **Figure 310.3-2 and Figure 310.3-3**) extend the sidewalk or curb line into the street or parking lane thereby reducing crossing length. The crash modification factor for curb extensions is unknown at this time; however, curb extensions can improve sight distance between the people walking and driving, add available space for curb ramps, and can improve motor vehicle operations by reducing the time needed for a person to complete their crossing (*14*, *64*, *78*, *30*).

On Reduction Review Routes, curb extensions could be subject to ORS 366.215 and OAR 731-012. See ODOT’s Statewide Mobility Program website (*13*) for more information on this process.

Refuge Island

ODOT has established a strategy of decreasing crossing distances with treatments like refuge islands to meet its policy of providing safe and well-designed streets and highways for people walking (*1*).

Refuge islands (**Figure 310.3-4**) are raised areas, typically in the median, which allow people walking to focus on one direction of traffic at a time as they cross and gives them a place to wait for a gap to complete their crossing.

AASHTO (*79*, *65*) and the ODOT Highway Design Manual (*4*) recommend a minimum width of six (6) feet. This width allows minimum separation of ADA detectable warning strips, provides adequate refuge for a person using a wheelchair or more than one person walking, and separates the pedestrian staging area from the face of the curb (*79*, *65*). In some cases, a wider refuge island might be needed to accommodate pedestrian volumes, people with bicycles (typical adult bicycle is approximately 6 feet long (*80*)), and placement of ADA detectable warning strips.

Refuge islands significantly improve safety for all road users and can reduce pedestrian-involved crashes by 13 to 50 percent (*15*). They also improve the effectiveness of other treatments such as markings, signs, and beacons, especially where AADT exceeds approximately 10,000 vehicles per day (*15*, *45*, *46*). Refuge islands can also significantly reduce delay for people walking (*47*), which can mean fewer people crossing through shorter gaps in traffic.

See the Traffic Line Manual (*5*) for standards and guidelines related to marking refuge islands. On Reduction Review Routes, refuge islands could be subject to ORS 366.215 and OAR 731-012. See ODOT’s Statewide Mobility Program website (*13*) for more information on this process.

Rectangular Rapid Flashing Beacon (RRFB)

An RRFB (**Figure 310.3-4**) rapidly flashes rectangular, high-intensity LED lights in a combination wigwag and simultaneous flash pattern when activated. RRFBs are generally associated with a reduced likelihood of pedestrian-involved crashes and improved driver yielding behavior (*15*, *41*, *45*, *81*). The effectiveness of this device depends largely on the context of the crossing, as discussed in the **Human Factors & Treatment Effectiveness** subsection above. For example, RRFBs produce higher levels of yielding when installed on a refuge island, especially where AADT is greater than 12,000 vehicles per day (*15*, *45*).

The RRFB had interim approval under Interim Approval IA-11 from 2008 to December 21, 2017, when FHWA terminated IA-11 because a private company had patented the concept of the RRFB (*82*). Shortly after that, the private company abandoned the patents and FHWA issued Interim Approval for the optional use of RRFBs on all Oregon roads on April 5, 2018, under Interim Approval IA-21 (*83*). FHWA incorporated the device into the 11th Edition of the MUTCD (*10*) and terminated IA-21 on January 18, 2024 (*84*). New installations of RRFBs must comply with the 11th Edition MUTCD instead of IA-21.

This section includes guidelines on where to use an advance RRFB or warning beacon based on speed, volume, and MUTCD (*2*) sight distance standards for signals because the MUTCD (*10*)leaves this decision to engineering judgement and there is limited research (*85*, *86*, *87*) on the effectiveness of supplemental advance RRFBs when there is sufficient sight distance to the crosswalk.

In some cases, an overhead installation could be a supplemental measure to mitigate beacon sight distance issues or be an alternative where vehicles frequently knock down island mounted RRFBs. Most studies examining the effectiveness of RRFBs have tested post-mounted installations. Few have evaluated driver yielding differences between overhead and side-mounted beacons or had sample sizes too small to draw broad conclusions from (*85*, *88*, *89*). FHWA research reports in 2015 and 2016 (*81*, *90*) identified a need for research on overhead RRFB installations and criteria to consider when deciding to install RRFBs overhead and in 2017 NCHRP Report 841 (*15*) acknowledged a lack of data for overhead configurations.

IA-21 changed the RRFB flash pattern and included guidance on updating the flash pattern for RRFBs installed under IA-11. The flash pattern in the 11th Edition of the MUTCD (*10*) matches the flash pattern in IA-21.

The Sign Policy and Guidelines for the State Highway System (*91*) and MUTCD (*2*) Section 7B.15 recommend a minimum spacing of 200 feet between a SCHOOL SPEED LIMIT 20 WHEN FLASHING sign and the crosswalk warning sign.

On Reduction Review Routes, overhead RRFBs could be subject to ORS 366.215 and OAR 731-012. See ODOT's Statewide Mobility Program website (*13*) for more information on this process.

Figure 310.3-4: RRFB, Refuge Island, In-Street Sign, and Continental Markings

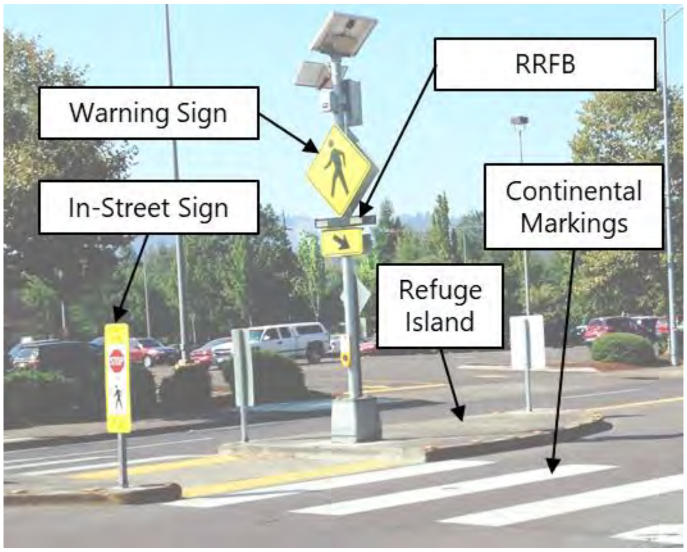


Photo by Lara Justine via www.pedbikeimages.org

Reduce Number of Lanes

ODOT has established a strategy of reducing crossing exposure time by minimizing the number of lanes crossed, when possible, to meet its policy of providing safe and well-designed streets and highways for people walking (*1*). Reducing the number of lanes can reduce the likelihood of pedestrian-involved crashes, improve the effectiveness of crosswalk enhancements, and reduce the cost to implement uncontrolled marked crosswalks, among several other safety benefits for all road users. For more information on how the number of lanes affects pedestrian safety, see the Crossing Distance/Number of Lanes discussion above.

Turn lanes in urban areas can improve intersection capacity and highway throughput; however, this also increases the crossing distance for people walking. See **Section 405.1** for guidelines on where existing right-turn lanes should be evaluated for removal in STIP projects.

Reducing the number of through lanes is a corridor-level treatment that can be successful over a wide range of AADTs (see **Table 310.3-F**). FHWA estimates that four-lane roadways with ADTs up to 20,000 vehicles per day can be good candidates to consider converting to three-lane roadways. Four-lane roadways with less than 10,000 vehicles per day can typically be converted to three-lane roadways without introducing significant congestion or delay. An analysis of peak travel volumes and directions helps determine whether this is feasible to meet the needs of a corridor (*92*).

Table 310.3-F: Traffic Volumes and Candidate Road Diets

<10,000 AADT	10,000-15,000 AADT	15,000-20,000 AADT	>20,000 ADT
Great candidate for Road Diets in most instances. Capacity will most likely not be affected.	Good candidate for road diets in many instances. Intersection analysis and signal timing can determine effect on capacity.	Good candidate for Road Diets in some instances. Corridor analysis typically needed. Capacity may be affected at this volume depending on the “before” condition.	Feasibility study typically needed to determine whether this is a good location for a Road Diet. There are several examples across the country where Road Diets have been successful with ADTs as high as 26,000. Capacity may be affected at this volume.

Source: FHWA (*93*)

Pedestrian Hybrid Beacons (PHBs) and Traffic Signals

The 2009 MUTCD included the PHB as an alternative to control crosswalks when a location does not meet warrants for a standard red-yellow-green traffic signal, specifically Warrant 4 (pedestrian volume) or Warrant 5 (school crossing). FHWA made this change based on recommendations in TCRP Report 112/NCHRP Report 562 (*14*, *94*).

PHBs have the potential to significantly improve safety for people crossing and reduce delay for people driving. This is generally the case where PHBs are common such as Tucson, Arizona (*95*, *96*, *15*). However, where PHBs are not as common, on-street observations and survey results have been less consistent regarding road user understanding of the device (*46*, *88*, *97*). For example, drivers can be confused on how to respond to the beacon’s different displays. This confusion usually occurs during the beacon’s red phases and generally affects road user delay more than pedestrian safety.

Since PHBs are relatively uncommon in Oregon, some agencies in the state that have installed PHBs have tried different strategies to improve road user understanding and operations beyond local education. Examples have included installing supplemental signs explaining the beacon’s operations, not using the wigwag flashing red phase (this phase is required per the MUTCD) and changing PHBs to standard red-yellow-green traffic signals.

An engineering study and state traffic engineer approval is required to install a traffic signal or PHB per OAR 734-020-0430. Where **Table 310.3-A** recommends a traffic signal or PHB but the location will not quite meet warrants for a traffic signal, complete the engineering study considering the need for an enhanced crosswalk and the treatments appropriate for the location. The Traffic Engineering Section is open to considering a traffic signal in these cases in the interest of pursuing ODOT’s goals related to safety and connectivity of the surrounding walking network.

Other Treatments

In-Roadway Lights

In-pavement warning lights line both sides of a crosswalk with flashing lights in the roadway.

ODOT does not use in-roadway warning lights because of relatively high installation costs, potentially high maintenance costs, unproven safety benefits, the need to replace the entire system when repaving, and availability of more effective and less maintenance-intensive treatments. While there is some supporting evidence that stopping compliance and driver awareness may increase with this treatment, there is no confirmation that these devices reduce the likelihood of pedestrian-involved crashes (*15*, *81*).

Circular Warning Beacons

Until RRFBs were common, ODOT used circular or round warning beacons as a pedestrian activated device at uncontrolled marked crosswalks. The beacons flashed in a steady flashing or alternating flashing pattern when activated.

Like RRFBs, speed, crossing distance, AADT, and presence of a refuge island affect yielding compliance for pedestrian-activated circular warning beacons (*14*). ODOT uses RRFBs instead of this type of beacon at new installations because RRFBs can improve yielding compliance more than circular warning beacons (*86*) and for consistency at uncontrolled marked crosswalks.

See **Existing Marked Crosswalks** under the Process & Required Approvals subsection for addressing existing installations of circular warning beacons.

LED-Embedded Warning Signs

ODOT does not install LED-embedded warning signs at crosswalks. This minimizes the variety of equipment ODOT electricians must maintain.

Research available on this device shows the treatment can be effective on roads with lower volumes, lower posted speed limits (30 mph or lower), narrow crossings, and when supplemented with other treatments (*98*). However, RRFBs can improve driver stopping compliance more than LED-embedded warning signs, especially at posted speeds above 30 mph (*99*) and require similar infrastructure (electrical equipment, signpost, push button, etc.).

Support

This subsection provides supporting information on uncontrolled marked crosswalks. The treatments in **Table 310.3-A** were developed based on FHWA's Guide for Improving Pedestrian

Safety at Uncontrolled Crossing Locations (*64*), NCHRP Report 562 (*14*), NCHRP Report 841 (*15*), ODOT RRFB research (*45*), and other pedestrian safety research cited in this section.

Pedestrian Volume

Traffic control devices should fulfill a need (*2*). This is a basic principle of effective traffic control devices that helps make their presence and message credible and produce desired outcomes.

Engineering guidelines have long recommended using minimum pedestrian volumes to show this need for uncontrolled marked crosswalks. For example, in 1987, Smith and Knoblauch (*100*) recommended pedestrian volume thresholds based on AADT, number of lanes, and presence of a refuge island. In 2005, Zegeer et al. (*40*) recommended a minimum pedestrian volume to prioritize locations where they found no practical difference in pedestrian-involved crash rate between marked and unmarked crosswalks (they did not recommend a threshold where they recommended further enhancements).

Road authorities have widely applied these recommendations by requiring that a minimum number of pedestrians must be crossing the road to warrant enhancing a crosswalk regardless of context (the MUTCD (*2*) does not set a minimum pedestrian volume to mark a crosswalk; it does include thresholds for signals). This creates a "chicken or the egg" scenario – a minimum volume of pedestrians must already be crossing the road to warrant installing crosswalk enhancements, yet pedestrians might not feel comfortable crossing the road until enhancements are installed. For example, people who are older and children are sensitive to crosswalk treatments and may not choose to cross until a road authority adequately enhances a crosswalk. Put another way, a travel demand study does not establish the need for a bridge by counting the number of people swimming across a river.

Instead of relying on existing pedestrian volumes to warrant treatments, an engineering study can consider potential or latent demand (people who would cross if there were an enhanced crosswalk) by considering the proximity of the crosswalk to land uses that support pedestrian activity such as transit stops, schools, universities, grocery stores, restaurants, parks, government/community services, etc. (*101*).

There is limited research related to how far pedestrians are willing to travel out-of-direction to an enhanced crosswalk. On-street surveys show it could depend on the context of the crosswalk and the pedestrian's mobility. Pedestrians might be willing to travel further to an enhanced crosswalk as speed, volume, crossing distance, and treatment level increases if they are able to travel that extra distance (*14*).

Consideration of potential or latent demand and the existing pedestrian travel patterns can give an estimate of how the crosswalk treatments will fulfill a need and support ODOT's goals related to pedestrian networks.

Marked Crosswalks and a "False Sense of Security"

A common misconception is crosswalk markings give pedestrians a false sense of security (*40*, *102*). This grew from a 1972 analysis (*103*) of pedestrian-involved crashes in San Diego, California that hypothesized higher crash rates observed at marked crosswalks were a symptom of pedestrians' lack of caution when using marked crosswalks. The study did not conclude that all marked crosswalks increased the likelihood of a crash and did not include school crosswalks; the results have also sometimes been misquoted or misused.

Later studies tried to examine this issue but were not conclusive because of methodology problems or sample size, and others only fueled the disagreement and confusion on the issue (*40*). This led to decades of official and unofficial policies across the United States to remove marked crosswalks at uncontrolled locations or show resistance to installing them in the first place (*102*). In some contexts, this imposes pedestrian mobility restrictions that do not support ODOT's mission and adopted goals related to a complete pedestrian network.

Behavioral studies have found no measurable negative effect on either pedestrian or motorist behavior after marked crosswalks were installed. Crosswalk use increased after marking the crosswalks but pedestrians were no less vigilant or more assertive in the marked crosswalks, speed was slightly reduced at most studied locations, and drivers were more likely to yield to pedestrians in marked crosswalks (*104*, *105*, *106*, *102*). Most of these studies examined crosswalks across 2- or 3-lane roads with relatively low speed limits and low volumes – where Zegeer et al. (*40*) found no significant difference in pedestrian-involved crash rate between marked and unmarked crosswalks.

Despite contradictory findings in various studies over many decades, it is clear marked crosswalks are generally not associated with any statistically significant difference in pedestrian-involved crash probability on 2-lane roads or multi-lane roads with ADT less than 12,000 vehicles per day. National studies and guidelines emphasize using enhancement measures when marking crosswalks on multi-lane roads with ADT of 12,000 vehicles per day or higher. They recommend adding enhancements such as high-visibility treatments and refuge islands as crossing difficulty, crash likelihood, and crash severity increases (*40*, *14*, *64*, *15*, *107*).

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Land Use and Transportation 107.0
Crash Analysis 201.0
Sight Distance 203.0
Uniform Traffic Control Devices 300.0
Interim Approvals 300.1
Traffic Control Device Visibility 300.3
Signs 302.0

Pavement Markings 303.0
Traffic Signals 304.0
Crosswalks on State Highways 310.0
Spacing of Enhanced Crosswalks 310.1
Controlled Marked Crosswalks 310.2
Textured & Colored Crosswalks 310.7
Crosswalk Closures 310.8
Illumination 311.0
Traffic Calming 500.5

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File Code	New	Notes
TRA 07-11	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Textured & Colored Crosswalks 310.7

Textured crosswalk: A surface material at a crosswalk such as brick, concrete pavers, or stamped asphalt, which produces small, constant changes in vertical alignment and aesthetically enhances the crosswalk.

Colored crosswalk: A pavement marking or proprietary product at a crosswalk that contrasts with adjoining paved areas and aesthetically enhances the crosswalk. ODOT does not consider unpigmented portland cement concrete and asphalt concrete to be colored pavements, even when installed as a contrasting treatment within a crosswalk.

Standards & Guidelines

01 If textured or colored crosswalks are used, they should be made of durable non-slip materials, such as stamped concrete, with minimal beveling. The textured surface should be built to adequate strength, with a good base resulting in low maintenance.

02 Colored crosswalks should consist of materials that are red, rust, brown, burgundy, clay, tan, or similar earth tone equivalents, should not degrade the contrast of white transverse pavement markings establishing the crosswalk, and should otherwise conform to FHWA's MUTCD Official Ruling 3(09)-24(I) (*1*).

03 Yellow, blue, and purple shall not be used in colored crosswalks because the MUTCD (*2*) reserves these colors for other purposes.

04 All textured or colored crosswalks shall be supplemented with white crosswalk markings to increase their visibility to motorists.

05 Safety funds should not be used for coloring or pavement texturing of crosswalks.

Process & Required Approvals

State traffic engineer approval is required to install textured and/or colored crosswalks on state highways. Local jurisdictions wishing to texture and/or color crosswalks on state highways within their jurisdiction are required to submit a request for crosswalk texturing or coloring to the region traffic engineer for review.

ODOT typically enters into an agreement with the local jurisdiction to specify who installs and maintains these treatments. The agreement is typically established with the local jurisdiction prior to letting any contracts for work involving the installation or maintenance of textured/colored crosswalks. Where textured/colored crosswalks have been installed without such an agreement, ODOT typically negotiates either 1) entering into an agreement with the local jurisdiction to cover ongoing maintenance and replacement costs OR 2) removal.

Project delivery teams shall coordinate an engineering review with the region traffic engineer for all proposed textured and colored crosswalks. The review shall document the proposed coloring, materials, pattern, funding source, installation, and maintenance plan including consistency with this section's standards and guidelines.

The region traffic engineer shall submit a request to the state traffic engineer for consideration of approval of any previously unapproved textured or colored crosswalks to be included in a project.

District managers or striping supervisors should, whenever possible, identify existing textured and colored crosswalks in advance of re-striping activities and coordinate with the Region Traffic Unit to assess whether the treatment has state traffic engineer approval and who has maintenance responsibilities.

Special Considerations

ODOT does not install textured or colored crosswalks; however, sometimes a local agency wants to install them across a state highway. The perception is oftentimes that the textured or colored crosswalk alone will be more visible than standard crosswalk markings. Oftentimes that is not the case; textured or colored crosswalks can be **less** visible than conventional marked crosswalks (red brick tends to fade to black, especially at times of low visibility) (*1*).

Textured crosswalks can be rough, making it difficult for pedestrians using wheelchairs and walkers to use the crosswalk; prolonged exposure to whole-body vibrations while seated can increase the probability of injury (*3*). Textured crosswalks can become uneven, contributing to the probability of someone tripping, especially for people with limited or no vision. Textured or colored crosswalks typically need more maintenance attention, and some materials might contribute to the probability of someone slipping under some surface conditions. Installation costs are also high compared to conventional marked crosswalks.

Colored truck aprons follow the same coloring guidelines as above. However, where crosswalks traverse new colored truck aprons, ODOT does not typically apply the coloring within the crosswalk, so the crosswalk's color remains consistent for people with visual disabilities.

Support

Textured or colored crosswalk enhancements do not improve safety at crosswalks (*1*). Use of safety funds to pay for textured and colored crosswalks is inappropriate and reduces the availability of these funds to pay for other proven pedestrian safety countermeasures such as curb extensions, raised median islands, illumination, and proper signing.

Portland cement concrete (PCC) and asphalt concrete (AC) are standard roadbuilding materials, and ODOT does not consider them colored pavements when coloring is not added to those materials.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Uniform Traffic Control Devices........ 300.0
Crosswalks on State Highways........ 310.0
Controlled Marked Crosswalks 310.2
Uncontrolled Marked Crosswalks 310.3

Key References

1. Lindley, J. A. (2013, August) MUTCD - Official Ruling 3(09)-24(I) - Application of Colored Pavement. [Online]. https://mutcd.fhwa.dot.gov/resources/interpretations/3_09_24.htm.
2. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
3. Wolf, E., J. Pearlman, R. A. Cooper, S. G. Fitzgerald, A. Kelleher, D. M. Collins, M. L. Boninger, and R. Cooper. Vibration Exposure of Individuals Using Wheelchairs Over Sidewalk Surfaces. *Disability and Rehabilitation*, Vol. 27, no. 23, 2005, pp. 1443-1449. DOI: https://doi.org/10.1080/09638280500264709

File Code	Updated	Notes
TRA 07-11	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Crosswalk Closures 310.8

ODOT has adopted goals in the Oregon Bicycle and Pedestrian Plan (*1*) related to crosswalks, including:

- Eliminate fatalities and serious injuries and improve the overall sense of safety of those who walk.
- Provide a complete walking network that reliably and easily connects to destinations and other transportation modes.
- Support people walking or using mobility devices to move easily on the system; and,
- Enhance community and economic vitality through walking networks that improve peoples' ability to access jobs, businesses, and other destinations.

A decision to close a crosswalk affects ODOT's progress toward achieving these adopted goals. Closing a crosswalk removes a link from the surrounding pedestrian network by prohibiting pedestrians from crossing at that location.

See **Section 310.0** for information on where crosswalks are located on state highways.

Standards & Guidelines

01 Closure treatments shall be installed at closed crosswalks according to the state traffic engineer's crosswalk closure approval.

02 Where used, a CROSSWALK CLOSED (OR22-7) sign should be placed so it is visible to a pedestrian facing the closed crosswalk from either end of the closed crosswalk while they are on the sidewalk, or shoulder if there is no sidewalk.

03 A CROSSWALK CLOSED (OR22-7) sign may be installed separately from detectable closure treatments.

04 See the Highway Design Manual (*2*) for information on detectable crosswalk closure treatments.

Process & Required Approvals

Closing any crosswalk on the State Highway System requires state traffic engineer approval. All requests for crosswalk closures shall be submitted from the region traffic engineer to the state traffic engineer on Form 734-5150. This should be submitted as early as practical in the project development process (up to the design acceptance phase (DAP) during STIP projects) because crosswalk closure decisions affect pedestrian routes, curb ramp design, and the project's footprint, among other impacts.

A crosswalk closure request shall document:

1. A geometric design or operational condition that significantly degrades pedestrian safety and cannot be reasonably mitigated.
2. Other solutions explored to mitigate the condition, why these solutions are not feasible, and why closing the crosswalk is the preferred alternative.

Crosswalk Closures 310.8

3. How closing the crosswalk would affect
   a. ODOT's enhanced crosswalk spacing targets discussed in **Section 310.1**, and
   b. the local bicycle and pedestrian plan if a plan exists.
4. An alternate pedestrian path between the two points of the proposed closure and evaluate challenges along the alternate path (e.g., a sidewalk with a utility pole in the middle of the sidewalk between two curb ramps that might necessitate relocation of the utility pole).
5. A proposed plan for how to close the crosswalk. Include the approximate location, such as corner number, where a CROSSWALK CLOSED (OR22-7) sign(s) and detectable treatment(s) are planned.

See **Table 310.8-A** for the process to close a crosswalk, keep a crosswalk closed, or open a closed crosswalk.

Table 310.8-A: Process for Crosswalk Closures

Current Status	Desired Outcome	Process
Open	Close the crosswalk	**Requires state traffic engineer approval.** Region traffic engineer submits request on Form 734-5150.
Closed before 2001[1]	Keep the crosswalk closed	**Requires state traffic engineer approval.** Even though crosswalk closure signs may be in place, Region Traffic Unit assesses the closure according to the current approval process. Region traffic engineer submits a request on Form 734-5150.
Closed before 2001[1]	Open the crosswalk at a signalized intersection	**Does not require state traffic engineer approval** but notify the Traffic Engineering Section of the decision. On the preliminary signal operations design form sent to the Traffic Engineering Section, note which crosswalk is being opened in the recommended signal design section.
Closed before 2001[1]	Open the crosswalk at an unsignalized intersection	**Does not require state traffic engineer approval** but notify the Traffic Engineering Section of the decision. Send a letter from the region traffic engineer to the state traffic investigations engineer (cc ADA statewide asset specialist lead) stating region will open a crosswalk that was closed by signs that were installed before STRE approval was required to close the crosswalk. Include the following information: • Location (LRM, MP), and • Aerial map or plan showing which crosswalk(s) will be opened. If the opened crosswalk will be marked, approval is required to mark the crosswalk according to Section 310.2 or 310.3.
Closed with state traffic engineer approval of the closure	Open the crosswalk	**Requires state traffic engineer approval.** Send a request from the region traffic engineer on Form 734-5175. Include justification for opening the crosswalk considering why the crosswalk was officially closed.

Crosswalk Closures 310.8

[1] Closed by signs that were installed before state traffic engineer approval was required to close a crosswalk (2001). Check with Region Traffic Unit for closure status.

Special Considerations

Considerations for Closing a Crosswalk

Conditions for closing crosswalks are considered on a case-by-case basis. The presence of one or more condition does not mean the crosswalk should be closed. Examples of conditions where a crosswalk might be considered for closure could include but are not limited to where:

1. Sight distance is less than the minimum desired for conditions and cannot be reasonably mitigated.
2. A project will install significant enhancements for only one crosswalk at an intersection (e.g., activated warning beacon with refuge island and illumination), and conditions at the opposite crosswalk make the enhanced crosswalk the safer crosswalk at the intersection. For example, the opposite leg carries significantly more turning traffic or crosses more motor vehicle lanes, and the opposite leg does not appear to connect pedestrian trip generators or attractors such as transit connections.
3. Physical restrictions on one side of the roadway hinder pedestrian activity on that side of the roadway. An example is no sidewalk and a narrow or no shoulder (less than 4 feet wide) with a vertical obstruction immediately behind the shoulder (e.g., retaining wall, concrete barrier). Other examples include "T" intersections where railroad right-of-way, a drainage canal, expressway, or some other type of obstacle runs across the top of the "T" where pedestrian activity is discouraged and/or prohibited. An exception is where pedestrian trip generators or attractors, like transit connections, are on the opposite side of the roadway.
4. There are no pedestrian destinations between intersections and closing a crosswalk does not affect the shortest walking path between destinations, such as an interchange area.
5. Pedestrians cannot complete the crossing because a barrier in the roadway interrupts the crosswalk, and the crosswalk cannot go through the barrier. Examples of a barrier include but are not limited to a concrete barrier or guardrail that redirects vehicles or a retaining wall. For example, a barrier designed to redirect vehicles is installed between lanes of traffic across a crosswalk. Breaking the barrier for the crosswalk would reduce the ability of the barrier to redirect an errant vehicle and create barrier ends to protect with crash cushions or impact attenuators.
6. A crosswalk aligns with a driveway, the receiving ADA ramp cannot be located outside the driveway, and moving the driveway is outside the scope of the project. In the closure request, document the reason the curb ramp can't be installed to serve the crosswalk, including options considered to modify the driveway.

Crosswalk Closure Treatments

Visual and detectable treatments communicate to pedestrians that a crosswalk is closed. ORS 810.080 requires signs, such as a CROSSWALK CLOSED (OR22-7) sign, to close a crosswalk; this is the visual crosswalk closure treatment. The sign is typically placed so it is visible to a pedestrian as he or she faces the closed crosswalk. See the Sign Policy and Guidelines (*3*) for additional guidance on sign OR22-7.

See the Highway Design Manual (*2*) for information on detectable closure treatments.

Closing a crosswalk might result in removal or reorientation of curb ramps. For example, a curb ramp that only serves the closed crosswalk will need to be removed. Similarly, a curb ramp that serves another crosswalk (diagonal ramp) might need to be rebuilt and reoriented to only serve the remaining crosswalk.

Visual and detectable crosswalk closure treatments are site-specific and generally selected for each corner based on the attributes described above and in the Highway Design Manual (*2*). A site visit during design can help verify proposed treatments and reduce complications during construction and maintenance.

Large vehicles turning at intersections can damage signs and detectable treatments that are installed close to the curb. In some cases, this can block the pedestrian facility, like in Figure 310.8-1. Different closure treatments described in the Highway Design Manual might be necessary to maintain the closure at a particular location with a history of damage.

Figure 310.8-1: Damaged Crosswalk Closure Treatment

Support

ODOT can close a crosswalk using signs according to ORS 810.080. The state traffic engineer approves installation of these traffic control devices for ODOT (see **Section 100.0**).

Cross References

State Traffic-Roadway Engineer 100.0
Region Traffic Engineer 100.1
Sight Distance 203.0
Uniform Traffic Control Devices........ 300.0
Signs........ 302.0
Traffic Signals........ 304.0
Crosswalks on State Highways........ 310.0
Spacing of Enhanced Crosswalks 310.1
Controlled Marked Crosswalks 310.2
Uncontrolled Marked Crosswalks 310.3
Multiple Turn Lanes 405.6

Key References

1. Oregon Department of Transportation. *Oregon Bicycle and Pedestrian Plan*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Planning/Pages/Plans.aspx#OBPP.
2. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.
3. Oregon Department of Transportation. *Sign Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx.

File Code	Updated	Notes
TRA 07-11-06	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Illumination 311.0

Standards & Guidelines

01 All illumination on state highways (both temporary and permanent) shall follow policy set forth in the ODOT Lighting Policy and Guidelines (*1*).

02 Additional guidance on illumination design is provided in the ODOT Traffic Lighting Design Manual (*2*).

Process & Required Approvals

The Region Traffic Unit reviews permanent illumination for policy agreement and statewide consistency before going to the engineer-of-record for incorporation into project plans. Any deviation from statewide policies or standards must be reviewed by the Traffic Engineering Section and submitted to the state traffic engineer for approval.

Determining the need for temporary illumination on construction projects is part of the illumination design process. The engineer-of-record submits requests to the region traffic engineer on highway construction projects where illumination for temporary protection and direction of traffic is recommended. Staff from the Region Traffic Unit investigate and approve the amount of illumination needed based on ODOT Lighting Policy and Guidelines (*1*). Any deviation from statewide policies or standards must be reviewed by the Traffic Engineering Section and submitted to the state traffic engineer for approval.

Special Considerations

Temporary Illumination

A consistent and systematic approach is used which considers, at a minimum, the cost, safety (vehicle traffic, pedestrian, and construction worker), traffic volume and speed, geometric conditions, crash history, weather, length of contract, and the amount and complexity of stage construction. Attention is given to installing proposed permanent lighting as soon in the construction project as practical to serve for temporary protection and direction of traffic purposes.

Permanent Illumination

Roadway lighting warrants are covered in the ODOT Lighting Policy and Guidelines (*1*). ODOT does not use specific illumination warrants to determine whether lighting is provided on a project.

An investigation is conducted and ODOT utilizes engineering judgment of local conditions, considering such factors as availability of funds, traffic and crash data, roadway characteristics, etc., in determining when and where lighting is to be provided.

Lighting maintenance, energy, and construction costs are evaluated when recommending illumination. Policy for illumination cost sharing with cities and counties on state highways is published in the 2002 Policy Statement for Cooperative Traffic Control Projects (3). Region Traffic Unit staff identify locations for illumination in the project development process for incorporation into the State Transportation Improvement Program (STIP).

The Safety Priority Index System (SPIS) and the crash database are used as tools to identify potential locations. The percentage of nighttime crashes and total crash history is considered in the benefits of installing illumination. Sometimes, improvements in traffic control devices, and/or geometric designs, will also serve to cut down on nighttime crashes and lighting may not be needed.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Highway Safety Engineering 200.0
Crash Analysis 201.0
Temporary Traffic Control 306.0
Bicycle Facilities 309.0
Uncontrolled Marked Crosswalks 310.3
Roundabouts 403.0
Wrong-Way Treatments 406.1

Key References

1. Oregon Department of Transportation. *Lighting Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Lighting-Policy-Guidelines.pdf.
2. Oregon Department of Transportation. *Traffic Lighting Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Lighting-Design-Manual.pdf.
3. Oregon Department of Transportation. *Policy Statement for Cooperative Traffic Control Projects*. Salem, Oregon, 2002. http://transnet.odot.state.or.us/hwy/trs/Shared%20Documents/2002_policy_statement_for_cooperative_traffic_control_projects.pdf.

File Code	Updated	Notes
TRA 16-01	June 2024	Updated state traffic engineer and Traffic Engineering Section.

Accessible Parking Spaces 312.0

Standards & Guidelines

01 See the OTC Standards for Accessible Parking Places (*1*).

Special Considerations

In accordance with ORS 447.233, the Oregon Transportation Commission adopted standards for accessible parking spaces, which took effect on January 22, 1992.

Support

The standards comply with 28 CFR Part 36 published by the Department of Justice in the Federal Register.

Cross References

Signs 302.0
Parking 501.0

Key References

1. Oregon Transportation Commission. *Standards for Accessible Parking Places*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/DOCS_ADA/ADA_Standards-Accessible-Parking.pdf.

File Code	Updated	Notes
TRA 16-02	January 2021	Corrected grammar.

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Intersection Control Evaluation 400.0

The purpose of an intersection control evaluation study is to determine the most appropriate form of traffic control at an intersection given the benefits of each alternative and the right-of-way, environmental, cost, and other constraints.

Standards & Guidelines

01 An intersection traffic control study should be completed when significant changes to an intersection are under consideration. An investigation of safety and operations issues should be performed for every proposed new approach to the state highway system and for existing approaches where a change in the type of traffic control for a particular intersection is being considered as part of a State Transportation Improvement Program (STIP) project or operational improvement to the intersection.

02 Potential intersection projects being considered for inclusion in the STIP should be identified as an "intersection improvement" project rather than a roundabout, traffic signal, or other type of traffic control until such time that an intersection traffic control study has been conducted and consensus has been reached on the proper traffic control solution for the intersection.

03 Since vehicular delay and the frequency of some types of crashes are sometimes greater under traffic signal control than under STOP or YIELD control, alternatives to traffic signals should be considered even if one or more of the warrants and other minimum conditions are satisfied.

04 The study should include the following considerations. Additional considerations may be included.

a. Diagram of existing intersection and traffic volumes.
b. Signal warrants analysis.
c. Conceptual design.
d. Safety analysis.
e. Operational analysis.
f. Transportation plan consistency.
g. Other agency support.
h. Justification.
i. Application for state highway approach.

Process & Required Approvals

Region Traffic Unit staff or the applicant requesting the traffic control device may complete the engineering study. If the region traffic engineer concurs with the study, the region traffic engineer documents concurrence and submits a request for state traffic engineer approval with a detailed cover letter.

Special Considerations

One of the common mistakes made in scoping intersection safety and operational improvements is deciding on a solution before a thorough alternatives analysis has been completed. The potential improvements to safety and operations need to be weighed against not only the construction costs but also the ongoing operations and maintenance costs for the expected life of the improvement through a benefit/cost (B/C) analysis.

See Part 4 of the MUTCD (*1*) for a list of possible alternatives to traffic signals. The range of alternatives should address the primary justification for consideration of a traffic signal. The Traffic Manual contains information related to several of common alternatives to traffic signals including:

- Roundabouts (**Section 403.0**).
- traffic signals (**Section 304.0**).
- STOP sign applications (**Section 402.0**).

Refer to these sections for detailed information on ODOT practices for that specific type of intersection traffic control keeping in mind that several alternatives should be considered before deciding on a final solution.

The following describes the considerations to include in the study.

Diagram of Existing Intersection and Traffic Volumes

Using a diagram of the intersection as it currently exists, provide vehicular and pedestrian volumes for the intersection for which the traffic signal is being requested and intersections in the surrounding area. Peak AM and PM traffic volumes, based on 16-hour count data should be provided. Describe the traffic that is present or certain to be present when the traffic signal is operational. Estimate future traffic for at least a 20-year period.

Signal Warrant Analysis

If a traffic signal is being included as an alternative, include the results of a traffic signal warrants analysis (for warrants see Part 4 in the MUTCD (*1*); the preliminary traffic signal warrant analysis form is available on the Analysis Procedures Manual's Analysis Tools website (*2*)). Satisfaction of each MUTCD (*1*) warrant should be evaluated. Warrants 1-8 should be evaluated for existing conditions and traffic that is present or certain to be present when the traffic signal is operational. Satisfaction of Warrant 7, Crash Experience, should be based on the three most recent calendar years for which crash data is available. Only those crash types susceptible to correction by traffic signal control should be considered.

When a traffic signal is part of a roadway improvement project, the request should be based on projected volumes developed according to the methodology in the Analysis Procedures Manual (*3*). The analysis should demonstrate that Warrant 1 would be met within three years after construction. The preliminary traffic signal warrant analysis form can assist this analysis; the form is available on the Analysis Procedures Manual's Analysis Tools website (*2*).

According to the MUTCD (*1*), the traffic signal warrants are *minimum* conditions under which installing traffic signals might be justified. A traffic control signal should not be installed unless the intersection control evaluation study indicates that installing a traffic signal will improve the overall safety and/or operation of the intersection.

See the Traffic Signal Policy and Guidelines (*4*) for a description of MUTCD (*1*) warrants and additional considerations that may support installation of a traffic signal for special applications.

Conceptual Design

Include diagrams or plans of the layout of the traffic control alternatives under consideration. Include the following:

- For traffic signal alternatives, proposed lane usage and signal phasing based on analysis of current and projected volumes, traffic patterns, and safety and operational considerations. Refer to the Traffic Signal Policy and Guidelines (*4*).
- Current and expected posted speed after construction.
- Sight distances.
- Bicycle and pedestrian facilities.
- Conflicting accesses to be moved or closed.
- Current and proposed land uses of the area.
- Railroad or light rail within 500 feet.

Safety Analysis

Identify factors that contribute to the probability of fatal and severe injury crashes and explain how they may be resolved. For example, sight distances, alignment, prevailing speeds (design speed for new construction or posted speed if on system), crash histories, railroad crossings, nearby access movements, etc. Include a qualitative or quantitative assessment of each alternative's anticipated safety performance.

Operational Analysis

Conduct a capacity analysis, queuing analysis, and other types of operational analysis as appropriate for each traffic control alternative. See the Analysis Procedures Manual (*3*) for methodology. Consider the ability to accommodate a variety of users from transit buses, bicycles, pedestrians, and trucks.

If the intersection is within 500 feet of a highway-rail grade crossing, provide information on the impacts of the intersection operations at the crossing. This should include a traffic impact analysis of present and future traffic queues affecting the crossing. The Commerce and Compliance Division's Crossing Safety Section provides direction on railroad crossing changes through crossing orders. Contact the Commerce and Compliance Division early in project development (see **Section 308.0**).

If the proposed location is within ½ mile of an existing or possible future traffic signal, include a traffic signal progression analysis as described in OAR 734-020-0480.

Elements of a traffic signal progression analysis include the following for each requested period:

- A diagram showing the volumes used at each intersection with the year of the projection and the hour covered.
- A time space diagram labeled with the cycle length, the distance between traffic signals, the year of projected volumes, and the hour covered. The diagram should show the green bands for the highway and the progression speeds.
- Supporting documentation showing the green splits and v/c ratio for each of the movements at each of the traffic signals in the system. The inputs such as saturation rate, heavy vehicles, etc. should also be available. This information should be labeled to correspond with the correct time space diagram.
- A statement of the results of the study.

Transportation Plan Consistency

Provide information from pertinent transportation plans (local, regional, and state) to demonstrate consistency between the plan and the proposed intersection improvements. Explain discrepancies between the plans and the proposed improvements.

Other Agency Support

Provide evidence of support of other agencies for the proposed improvements. Provide a description of the proposed funding and maintenance agreements. Include a description of the public input process and any key correspondence with local jurisdiction representatives.

Justification

The study should contain a clear and supported statement of the need for the selected traffic control device. Primary considerations used to select the recommended form of traffic control should be explained.

Application for State Highway Approach

If the request is for a traffic control device at a location subject to Division 51 administrative rules relating to state highway access, include a copy of the application for state highway approach, a statement regarding the status of the application, and a copy of the traffic impact study if one is available.

Support

Intersections are planned points of conflict on the state highway system. When the different crossing and entering movements by drivers, pedestrians, and bicyclists interact, it is easy to see why an intersection is one of the most complex traffic situations that highway users encounter. Complexities are compounded when we add the element of highway users disregarding the traffic controls in place at a particular intersection.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Land Use and Transportation 107.0
Crash Analysis 201.0
Sight Distance 203.0
Uniform Traffic Control Devices 300.0
Signs 302.0
Traffic Signals 304.0
Railroad Crossings 308.0
Bicycle Facilities 309.0
YIELD Sign Applications 401.0
STOP Sign Applications 402.0
Roundabouts 403.0
Traffic Signal Operations 404.0
Left Turn Lanes 405.0
Right Turn Lanes 405.1
Transit Exceptions to Turn Lanes 405.5
Interchange Modification Requests 406.0
Access Management 502.0
Capacity Analysis 508.0
Traffic Impact Studies 508.1

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Oregon Department of Transportation. Technical Tools. *Planning & Technical Guidance*, https://www.oregon.gov/odot/Planning/Pages/Technical-Tools.aspx. Accessed July 28, 2020.
3. Oregon Department of Transportation. *Analysis Procedures Manual*. Oregon Department of Transportation, Salem, Oregon. http://www.oregon.gov/ODOT/Planning/Pages/APM.aspx.
4. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.

File Code	New	Notes
Unassigned	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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YIELD Sign Applications 401.0

YIELD signs can be used to assign right-of-way at low volume intersection where a STOP sign is not necessary.

Standards & Guidelines

01 YIELD signs should be placed in accordance with Part 2 of the MUTCD (*1*).

Process & Required Approvals

The state traffic engineer has delegated authority, in consultation with the region traffic engineer, to approve installation or removal of YIELD signs on state highways. The region traffic engineer may authorize the installation or removal of YIELD signs on cross street that are not state highways.

Special Considerations

Engineering judgment, based on an engineering study, is an important part in the determination of when to use a YIELD sign. There should be sufficient sight distance on the minor street approach to allow a vehicle to take appropriate action at the intersection. Sight triangles for turning left or right from the minor street and for crossing the major street need to be investigated. AASHTO's A Policy on Geometric Design of Highways and Streets (2) contains methods for calculating sight triangles at intersections. In addition to looking at the sight distance for an intersection, traffic engineers should also consider the volumes on the major and minor streets, the approach speeds of the intersection, and the crash history of the intersection.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Crash Analysis 201.0
Sight Distance 203.0
Uniform Traffic Control Devices........ 300.0
Signs........ 302.0
Intersection Control Evaluation 400.0
STOP Sign Applications........ 402.0
EXCEPT RIGHT TURN Sign Applications 402.1
Channelized Right Turn Lanes 405.2

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. American Association of State Highway and Transportation Officials. *A Policy on Geometric Design of Highways and Streets*, 7th ed. American Association of State Highway and Transportation Officials, Washington, D.C., 2018.

File Code	New	Notes
TRA 16-04	June 2024	Updated state traffic engineer and Traffic Engineering Section.

STOP Sign Applications 402.0

Standards & Guidelines

01 The MUTCD (*1*) contains guidelines and criteria for the use of STOP signs in Part 2.

Process & Required Approvals

Region traffic engineer approval is required to install or remove STOP signs on roads intersecting a state highway (i.e. city streets, county roads, or private roads). State traffic engineer approval is required to install or remove STOP signs on a state highway, for multi-way stop applications, or for modifications to stop configurations.

Before requesting approval for installation of STOP signs on state highways, complete a thorough intersection traffic control study showing that a STOP sign was a viable alternative when compared to other types of intersection traffic control. Refer to **Section 400.0** for more detail on how to conduct this type of analysis.

Requests for installation of STOP signs on state highways should originate from the region traffic engineer. Requests should include an investigation stating warrants for the STOP control, crash history, evaluation of factors that contribute to the probability of fatal and severe injury crashes, alternatives, or any other considerations about the proposed installation.

Special Considerations

STOP signs are normally posted on the minor street to stop the lesser flow of traffic. The multi-way stop installation is useful as a safety measure at some locations, including where volumes are approximately equal.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Crash Analysis 201.0
Uniform Traffic Control Devices 300.0
Signs 302.0
Rumble Strips 303.1
Flashing Beacons 304.2
Intersection Control Evaluation 400.0
YIELD Sign Applications 401.0
EXCEPT RIGHT TURN Sign Applications 402.1
Channelized Right Turn Lanes 405.2

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

STOP Sign Applications 402.0

File Code	Updated	Notes
TRA 16-04-08-01	June 2024	Updated state traffic engineer and Traffic Engineering Section.

EXCEPT RIGHT TURN Sign Applications 402.1

The EXCEPT RIGHT TURN (R1-10P) sign is installed below STOP signs to allow right-turning traffic to enter the intersection without stopping. This allows the same operation as the older Oregon-specific RIGHT TURN PERMITTED WITHOUT STOPPING sign.

Standards & Guidelines

01 Refer to the Sign Policy and Guidelines for the State Highway System (*1*) and Section 2B.05 in the 2009 MUTCD (*2*).

02 An existing RIGHT TURN PERMITTED WITHOUT STOPPING sign should be replaced with an EXCEPT RIGHT TURNS sign no later than when it reaches the end of its useful life.

Process & Required Approvals

Using an EXCEPT RIGHT TURN sign requires the approval of the state traffic engineer for installation at an intersection on a state highway. If the intersection's volumes or movements change significantly, the use of the EXCEPT RIGHT TURNS or older RIGHT TURN PERMITTED WITHOUT STOPPING sign should be reconsidered.

Special Considerations

In some cases, the consideration of a YIELD sign may be appropriate (see Part 2 of the MUTCD (*2*)), where there is a separate or channelized right turn lane or the conflicting movements are uncontrolled.

Consideration may be given to installing an EXCEPT RIGHT TURN sign at intersections where the higher volume approaches are at right angles to each other, and the conflicting movements are generally stop controlled. The intersection volumes should generally be less than 18,000 ADT and conflicting movements to the EXCEPT RIGHT TURN movement should be predominantly local traffic. Generally, an EXCEPT RIGHT TURN sign should only be used when the approach has a separate right-turn lane.

The following criteria should be met when considering the EXCEPT RIGHT TURN sign (volume criteria generally refers to daily volumes):

1. If the intersection approach with the right-turn is a single lane approach (right, through and left from a single lane), the right-turn volume should be at least 50% of the total volume for that approach. No minimum volume is necessary if the approach has a separate right-turn only lane.
2. The right-turn volume should be at least twice the volume of all conflicting movements.
3. The existing right-turn volume should be 25% or more of the total intersection entering volume within any eight hours of a day.
4. An engineering study must support the installation of an EXCEPT RIGHT TURN sign.

Support

"Right-Turn Permitted Without Stopping" (RTPWS) signs were first used in Oregon in the 1950's. Research has shown that the operation does not contribute to an increase in crashes and is a viable method of reducing delay at stop-controlled intersections with a predominant right-turn movement. The demonstrated safe operation justifies its use to reduce delay at appropriate stop-controlled intersections. Road users increasingly disregard traffic controls more restrictive than necessary for the situation. Allowing free movement for the predominant move improves the credibility of STOP signs where they are needed for safe operation.

Section 353(a) of the 2009 MUTCD allows use of existing RTPWS signs. ODOT removed the RTPWS (OR3-11) sign from the Sign Policy & Guidelines (*1*) in April 2011 in favor of using the EXCEPT RIGHT TURNS (R1-10P) sign from the MUTCD (*2*). The Sign Policy & Guidelines recommends replacing existing signs with signs conforming to the current Sign Policy & Guidelines when they reach the end of their useful life.

Cross References

State Traffic Engineer 100.0
Uniform Traffic Control Devices 300.0
Signs 302.0
YIELD Sign Applications 401.0
STOP Sign Applications 402.0
Right Turn Lanes 405.1
Channelized Right Turn Lanes 405.2

Key References

1. Oregon Department of Transportation. *Sign Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx.
2. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

File Code	Updated	Notes
TRA 16-04	June 2024	Updated state traffic engineer and Traffic Engineering Section.

Roundabouts 403.0

Standards & Guidelines

01 The primary guidance document for roundabouts on state highways is Highway Division Directive DES 02 (*1*).

Process & Required Approvals

Before proceeding to the roundabout selection criteria and approval process, a thorough alternatives analysis should have been completed in the form of an intersection traffic control study (**Section 400.0**) showing that a roundabout was a viable alternative when compared to other types of intersection traffic control.

In accordance with Highway Division Directive DES 02 (*1*), the state traffic engineer has been delegated the authority to approve the installation of roundabouts on state highways once the expectations and processes outlined in Highway Division Directive DES 02 (*1*) have been met. Requests for roundabout evaluation shall be made through the region traffic engineer in collaboration with the roadway manager in the Engineering & Technical Services Branch. All roundabout requests shall be accompanied by an engineering investigation and address the considerations as described in the subsections below.

The state roadway engineer must approve exceptions to the minimum design life. Exceptions may be granted where analysis shows a single-lane roundabout meets most of the design life and only fails in the outer years at which time expanding the roundabout into a multi-lane roundabout may be desired. See Section 1206.3 in the Highway Design Manual for more information on design life.

Once the state traffic engineer receives a request, Traffic Engineering Section staff will coordinate review with other Engineering & Technical Services Branch staff and will make a recommendation to the state traffic engineer. The state traffic engineer and state roadway engineer may request further analysis before approving the roundabout.

The approval process for roundabouts is divided into two phases: conceptual approval and design approval. The state traffic engineer will make the decision whether roundabouts will receive conceptual approval and move to the next phase. Conceptual approval must follow ODOT procedures that assure the roundabout can accommodate freight movement on the highway and this requires the region to have a process in place to start conversations with the freight industry through the freight mobility committee’s review process (OAR Chapter 731, Division 12). The state roadway engineer will make the final decision on the approval of the geometric design in the Design Approval phase.

Conceptual Approval

Conceptual approval will constitute official approval under the delegated authorities of the state traffic engineer for a roundabout to be used as traffic control at a particular intersection. For conceptual approval, an intersection traffic control study addressing all the considerations and a conceptual design of the intersection as described previously in this section shall be submitted to the state traffic engineer for review by Traffic Engineering Section staff. Conceptual approval will not be granted until Traffic Engineering Section staff verifies that the region has committed to follow the ODOT procedures related to accommodating oversized commercial vehicles found in Highway Division Directive DES 02 (*1*).

Design Approval

Design approval will constitute the final approval phase of the roundabout at a particular intersection. The geometrics of roundabout designs (including channelization plans) must be submitted to the state roadway engineer for review and approval. The approval package should be submitted to the state roadway engineer no later than final plans.

Special Considerations

The FHWA has published several useful guidance documents that can be found on their roundabout internet site. The second edition of the publication entitled Roundabouts: An Informational Guide was published as NCHRP Report 672 in 2010 (*2*). For proposed roundabouts on state highways in Oregon, staff should familiarize themselves with NCHRP Report 672 (*2*), the Highway Design Manual (*3*), and the roundabout selection criteria and approval process.

If a roundabout project is being considered for inclusion in the STIP or other planning-level document it should be identified as an “intersection improvement” project rather than a roundabout, traffic signal, or other type of traffic control until such time that the intersection traffic control study has been conducted and consensus has been reached on the proper traffic control solution for the intersection. Refer to **Section 400.0** for more detail on how to conduct this type of analysis.

Engineering Investigation

A comprehensive intersection traffic control study shall be prepared. Details of crash history, traffic volumes, analysis of roundabout operation, and other factors that contribute to the probability of fatal and severe injury crashes should be included. The investigation should also include comparisons of alternative intersection control (i.e. stop controlled, signal control, etc.) considering the operational aspects, life-cycle costs, and other considerations.

For normal STIP projects use a 20-year Design Life from the date of construction. For development review a minimum 10-year Design Life will be used.

A scale drawing showing the conceptual design of the proposed roundabout should be included to assure appropriate geometry and layout elements can be obtained. Horizontal and vertical geometry must be labeled. Surrounding topography and approximate R/W should also be included.

ODOT has developed a list of considerations that should be addressed in the engineering investigation that is submitted for proposed roundabout locations. These considerations should not be interpreted as roundabout warrants nor pass/fail criteria for installation of a roundabout. Rather, they have been identified as important considerations when proposing roundabout intersections on state highways.

- Freight mobility needs should be sufficiently defined and addressed prior to conceptual approval.
- Non-motorized user mobility needs such as the ability for bicyclists and pedestrians to safely move through the roundabout intersection should be balanced with the mobility needs of other motorized vehicles. Bicyclists should be given the option to use either the circulatory roadway with other vehicles or the crosswalks outside the circulatory roadway. Special design consideration should be given for the crosswalks at the entrances and exits on all legs of the roundabout where vehicles are either decelerating to enter the roundabout or accelerating to exit the roundabout.
- Roundabout design should consider the needs and desires of the local community including speed management and aesthetics.
- Intersection safety performance should be a primary consideration when pursuing a roundabout for intersection control. Predicted reductions in fatal and serious injury crashes should be compared with other types of intersection control such as traffic signals or other alternatives supported by crash modification factors (CMF) found in the Highway Safety Manual (*4*).
- Roundabout entrance geometry, circulating geometry, and exit geometry should be designed to allow the design vehicle to traverse the roundabout in a reasonable and expected manner commensurate with best design practices as shown in NCHRP Report 672 (*2*) and the Highway Design Manual (*3*). This design should utilize a representative template of the design vehicle and the vehicle path should be demonstrated using computer generated path simulation software.
- Roundabouts should meet acceptable v/c ratios for the appropriate design life. (See the design life subsection for possible exceptions to this consideration.)
- Roundabouts proposed for state highways with posted speeds higher than 35 mph have additional design considerations (e.g. longer splitter islands, landscaping, reversing curves approaching the roundabout) to transition the roadside environment from higher to lower speeds approaching the roundabout intersection.
- For roundabouts with more than four approach legs, special design considerations should be made for the layout of the approach legs.

- Roundabout proposals should address how roundabout operations would affect the corridor immediately upstream and downstream from the roundabout intersection. For example, if vehicles exiting the proposed roundabout would be interrupted by queues from signals, railroads, drawbridges, ramp meters, or other operational considerations from left turns or accesses.)

Design Approval Submittal Package

The following items should be in the design approval submittal package:

1. Channelization plans, completed per ODOT's guidance for roundabout striping found in the Traffic Line Manual (*5*) and for splitter islands found in the Highway Design Manual (*3*).
2. A summary of documented decisions including how the requirements of Highway Division Directive DES 02 (*1*) are being met.
3. Identified deviations from design standards where design exceptions might be needed.
4. Roundabout geometric data, including:
    a. Approach design speeds for all approach legs including any bypass legs for right-turning vehicles. Bypass legs should be designed for speeds no more than five (5) mph greater than the design speed of the circulatory roadway to accommodate bicycles and pedestrians crossing the bypass leg.
    b. The design vehicle for each movement.
    c. A table or drawing summarizing the roundabout design details, including inscribed diameter, central island diameter, truck apron designed to accommodate the appropriate design vehicle for the roundabout, and cross slope of the circulating roadway.
    d. Detailed drawings showing the fastest path for each movement, with speed and radius for each curve.
    e. A table summarizing stopping and intersection sight distance on each leg.
    f. Auto turn paths showing design vehicle and largest oversize vehicle movements (The Highway Division Directive DES 02 (*1*) process will help identify the oversized loads that could be expected).
5. Detailed drawings of the splitter islands on each leg.
6. Preliminary signing and illumination plans.

Support

Roundabouts have been proven as a viable and sustainable alternative to traffic signals at many intersections. Compared to other types of intersection traffic control, roundabouts have demonstrated significant safety improvements including (*6*):

- Reductions in fatalities of more than 90%.
- Reductions in injuries of 76%.
- Reductions in all crashes of 35%.
- Increased pedestrian safety due to slower vehicle speeds.

Roundabouts also reduce congestion and delay. They can be efficient during both peak and non-peak hours. Other distinct advantages of roundabouts include the following (*6*):

- Reduced pollution and fuel use through fewer stops and hard accelerations.
- Significant life-cycle cost savings when compared to traffic signals due to no signal equipment installation, power, or maintenance costs.
- Supports urban and rural community values through quieter operation and by providing a traffic control solution that is both functional and aesthetically pleasing.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Crash Analysis 201.0
Sight Distance 203.0
Uniform Traffic Control Devices 300.0
Pavement Markings 303.0
Traffic Signals 304.0
Uncontrolled Marked Crosswalks 310.3
Illumination 311.0
Intersection Control Evaluation 400.0
Traffic Calming 500.5

Key References

1. Oregon Department of Transportation. *Highway Directive DES 02: Roundabouts on State Highway System*. Oregon Department of Transportation, Salem, Oregon, 2017. https://www.oregon.gov/ODOT/Engineering/Doc_TechnicalGuidance/DES_02.pdf.
2. Rodegerdts, L., J. Bansen, C. Tiesler, J. Knudsen, E. Myers, M. Johnson, M. Moule, B. Persaud, C. Lyon, S. Hallmark, H. Isebrands, R. B. Crown, B. Guichet, and A. O'Brien. *NCHRP Report 672: Roundabouts: An Informational Guide*, 2nd ed. Transportation Research Board of the National Academies, Washington, D.C., 2010. http://www.trb.org/Main/Blurbs/164470.aspx.
3. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.

4. American Association of State Highway and Transportation Officials. *Highway Safety Manual*, 1st ed. AASHTO, Washington, D.C., 2010.
5. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
6. Federal Highway Administration. *Roundabouts: A Safer Choice*. https://safety.fhwa.dot.gov/intersection/innovative/roundabouts/fhwasa08006/fhwasa08006.pdf.

File Code	Updated	Notes
TRA 16-10	June 2024	Updated state traffic engineer and Traffic Engineering Section.

Traffic Signal Operations 404.0

Standards & Guidelines

01 See the Traffic Signal Policy and Guidelines (*1*) and the Traffic Signal Design Manual (*2*).

02 Signal timing should be reevaluated on a regular basis. Reviews should be conducted approximately every three years or more frequently if significant development has occurred, if new signals in the immediate area have been added, or if complaints are received from the public or ODOT staff.

Process & Required Approvals

For operational approvals of traffic signals, see **Section 304.0**.

The state traffic engineer must approve exceptions to the Traffic Signal Policy and Guidelines (*1*).

Initial timing of traffic signals and any subsequent change in permanent timing is the responsibility of the region traffic engineer. Traffic Engineering Section staff may assist if requested.

Certified ODOT personnel can make temporary timing changes to compensate for sudden changes in traffic conditions or malfunctioning traffic signal equipment that cannot be repaired or replaced immediately. Record all temporary timing changes according to the Traffic Signal Policy & Guidelines (*1*). Notify the region traffic engineer of any temporary timing changes as soon as possible.

Turn On

The Oregon Standards Specifications for Construction (*3*) covers turn-on procedures during construction projects. The Traffic Systems Services Unit and the region traffic manager coordinate the turn on of new or modified traffic signals. Following construction and prior to scheduling the turn-on, ODOT electricians and a certified traffic signal inspector (CTSI) must complete an inspection of all signal equipment. Before turn-on, the contractor will be responsible for all necessary corrections prior to the signal being placed in service.

The traffic signal turn on consists of a series of tests to check if the signal is ready to be activated. If the tests are satisfactorily completed, then timing data is installed and the signal is put into operation. Operation is observed during different traffic conditions and adjustments are made as necessary.

Each ODOT region may have specific procedures regarding signal turn on. The Traffic Engineering Section may electronically provide preliminary and/or final timing if requested. The Traffic Engineering Section expects regions to provide sufficient advance notice to allow for the preparation of all timing.

Occasionally the Traffic Engineering Section provides traffic engineering functions, at the request of the region traffic engineer or traffic signal operations specialist, when a new traffic signal is placed in service. Such personnel should work closely with the Traffic Systems Services Unit technicians and project inspectors to assure all elements of the plans have been executed. This, in addition to proper signal timing, includes proper sign legends, correct sign placement, proper crosswalk locations, adequate pavement markings, etc. The correct operation of the signal should be observed for the appropriate period(s) of the day.

Maintenance

The ODOT Traffic Systems Services Unit generally maintains traffic signals on state highways, except in Region 1. Services include annual preventive maintenance inspections of all ODOT maintained traffic signals. Inspection checklist items guide technicians through a systematic evaluation of the traffic signal control cabinet and its operational components that include field sensors, poles, signals, pushbuttons, signs, and striping. Checks inside the cabinet include power management components, controller timing and operation including communication, sensor operation, signal output relays, and safeguards to prevent equipment malfunctions. Equipment inventories are updated and in the designated electronic database, which ODOT uses to determine fleet age and locations of features such as those slated for obsolescence.

Signals on state highways within city limits or county boundaries are maintained in accordance with agreements between ODOT and the city or county. The agreements define which agency is responsible for maintenance costs. Signals installed by a private organization are maintained in accordance with an agreement or permit. Some cities do not have the capability to maintain traffic signals. At the request of the signal owner, ODOT may provide regular maintenance for these signals.

See also 2002 Policy Statement for Cooperative Traffic Control Projects (*4*).

Special Considerations

Traffic Signal Policy and Guidelines

The Traffic Signal Policy and Guidelines (*1*) are for the use of individuals involved in the design, operation, or maintenance of traffic signals on the state highway system.

Timing

The official timing record is programmed in the controller in the cabinet at the intersection.

Preemption Systems

Traffic signal preemption systems are traffic control devices that interrupt the normal operation of traffic signals to give priority or preference to special vehicles (trains, emergency vehicles, buses, etc.). Two types of preemption systems are employed in Oregon: failsafe systems and signal preemption device systems.

Failsafe systems are hard wired to the signal controller and operate independently of any other signal function. The default state of a failsafe system is preemption. These systems are used by heavy rail and drawbridge operations and have priority over signal preemption device systems.

Signal preemption device systems installed at the intersection react to a device fixed to, or carried within, a vehicle. The default state of a signal preemption device system is normal traffic signal operation. Emergency, transit, and traffic signal maintenance vehicles use signal preemption device systems.

Details can be found in the Traffic Signal Policy and Guidelines (*1*) and OAR 734-020-0300 through OAR 734-020-0330.

Certified Traffic Signal Inspectors (CTSI)

Effective April 1, 2005, all traffic signal and electrical construction (e.g. illumination, VMS, RWIS, video cameras, other ITS) on state highways requires construction inspection by personnel certified by ODOT as certified traffic signal inspectors (CTSI) (*5*). The CTSI are in addition to and do not eliminate the need for certified electrical inspection in compliance with electrical permits issued by local agencies.

Background

ODOT Traffic Engineering Section provides traffic signal inspector certification training to ODOT staff, local agency staff, and consultants. Those who successfully complete the class are certified for three years.

- Traffic Engineering Section offers self-guided training year-round (except the month of January) and traditional in-person training in February in Salem each year.
- Typically, 100 to 150 people are certified each year.

See the ODOT Inspector Certification Program website (*6*) for more information.

Consultant Inspected Projects (Non-Permit Projects)

Consultant inspectors must be CTSI certified for electrical installations. The contract between ODOT and the consultant should contain language requiring CTSI certified inspectors. Amendments to current contracts should be made to include this requirement.

Installation by Permit for Local Agencies and Developers

Local agency or consultant inspectors must be CTSI certified for electrical installations. This requirement should be included in the permit given by ODOT. The District Permitting Office shall verify this requirement prior to construction. Review the permit fee to cover the electrician's supplemental inspection.

Support

The Traffic Signal Policy and Guidelines (*1*) provide guidance on standard and optional practices relating to signal design and operations. The Traffic Signal Design Manual (*2*) provides specific guidance on plan layout including Oregon Standard Drawings, and checklists.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Uniform Traffic Control Devices 300.0
Traffic Signals 304.0
Traffic Signal Enforcement 304.1
Temporary Traffic Control 306.0
Railroad Crossings 308.0
Intersection Bicycle Boxes 309.2
Intersection Control Evaluation 400.0
Ramp Meters 404.1
Transit Exceptions to Turn Lanes 405.5
Capacity Analysis 508.0

Key References

1. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.
2. Oregon Department of Transportation. *Traffic Signal Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Design-Manual.aspx.
3. Oregon Department of Transportation. *Oregon Standard Specifications for Construction*. Oregon Department of Transportation, Salem, Oregon.
4. Oregon Department of Transportation. *Policy Statement for Cooperative Traffic Control Projects*. Salem, Oregon, 2002. http://transnet.odot.state.or.us/hwy/trs/Shared%20Documents/2002_policy_statement_for_cooperative_traffic_control_projects.pdf.
5. Oregon Department of Transportation. Traffic Signal Inspector Certification. https://www.oregon.gov/ODOT/Construction/Pages/Signal-Inspector-Cert.aspx. Accessed July 8, 2019.
6. Oregon Department of Transportation. Inspector Certification Program. https://www.oregon.gov/odot/Construction/Pages/Inspector-Certification-Program.aspx. Accessed August 16, 2022.

File Code	Updated	Notes
TRA 16-06	June 2024	Updated state traffic engineer and Traffic Engineering Section.

Ramp Meters 404.1

The purposes of freeway entrance ramp control (ramp metering) include 1) reducing merge area turbulence by regulating vehicle flow entering the facility, and 2) regulating total freeway traffic flow through downstream bottlenecks.

Standards & Guidelines

01 Ramp meters may be provided at any freeway entrance ramp regardless of traffic volumes.

02 The Traffic Signal Policy and Guidelines (*1*) provide guidance on standard and optional practices relating to ramp meter design and operations. The Traffic Signal Design Manual (*2*) provides specific guidance on plan layout including Oregon Standard Drawings.

Process & Required Approvals

The region traffic engineer decides whether to install ramp metering on freeway entrance ramps. However, the design process should be a collaborative effort between the Region Technical Center, the Intelligent Transportation Systems Unit, and the Traffic Standards and Asset Management Unit. The Traffic Standards and Asset Management Unit should be involved in plan development and design review for all ramp metering projects to ensure the plans are consistent with ODOT policies and standards.

Special Considerations

There are currently no warrants for freeway entrance ramp traffic control signals, however the MUTCD (*3*) (Chapter 4I) identifies general guidelines for successful application of ramp control. The engineering study for ramp meter installation should include discussion of pertinent geometric elements; ramp and mainline traffic volumes; crash history; and operating speeds, travel time and delay on the freeway and alternate surface routes.

Cross References

Region Traffic Engineer 100.1
Crash Analysis 201.0
Uniform Traffic Control Devices 300.0
Traffic Signals 304.0
Traffic Signal Operations 404.0

Key References

1. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.
2. Oregon Department of Transportation. *Traffic Signal Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Design-Manual.aspx.

3. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

File Code	Updated	Notes
TRA 16-06	June 2024	Corrected grammar.

U-Turns at Signalized Intersections 404.2

ORS 811.365 prohibits U-turns at signalized intersections unless otherwise posted.

Standards & Guidelines

01 Refer to the Traffic Signal Policy and Guidelines (*1*) for guidelines and criteria for approval.

Process & Required Approvals

The state traffic engineer has been delegated the authority to designate specific signalized intersections at which U-turns may be permitted. Investigations into permitting U-turns at signalized intersections should be provided by ODOT region offices.

Special Considerations

U-turns are often considered in areas where access management closes highway medians. Provision for U-turns can minimize out-of-direction travel.

Cross References

State Traffic-Roadway Engineer 100.0
Uniform Traffic Control Devices 300.0
Traffic Signals 304.0
Turn Prohibitions 405.7
Access Management 502.0

Key References

1. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.

File Code	Updated	Notes
TRA 16-04-51	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Left Turn Lanes 405.0

Standards & Guidelines

01 See the Highway Design Manual (*1*) for guidance on the design of turn treatments.

02 For safety reasons, exclusive left-turn bays should be considered at all high-speed rural intersections. Criteria and considerations for left turn lanes are available from the Transportation Planning Analysis Unit in the Analysis Procedures Manual (*2*).

03 The Traffic Signal Policy and Guidelines (*3*) provide guidance for left-turn signalization and warrants for phasing at intersections (see left-turn signal modes).

Process & Required Approvals

Left turn lanes at intersections and driveways, and left turn phase modifications at signals, requires region traffic engineer approval. See **Section 405.6** for process and required approvals for multiple turn lanes (e.g. double left turn lanes).

Support

Left turning vehicles can cause delay, have an impact on intersection operations, and can conflict with other maneuvers. For example, separate signal phases for left-turn movements reduce the amount of green time available for other movements. Left-turn treatments range from prohibiting such movements, to shared lanes, to exclusive left-turn bays and two-way left-turn lanes.

Traffic studies have shown exclusive left-turn bays increase safety at most intersections. On rural facilities, exclusive left-turn bays can reduce rear end collisions and reduce delay to through traffic.

Cross References

Region Traffic Engineer 100.1
Crash Analysis 201.0
Uniform Traffic Control Devices........ 300.0
Traffic Signals........ 304.0
Intersection Control Evaluation 400.0
Multiple Turn Lanes 405.6
Turn Prohibitions 405.7
Two-Way Left Turn Lanes 405.8

Key References

1. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.

2. Oregon Department of Transportation. *Analysis Procedures Manual*. Oregon Department of Transportation, Salem, Oregon. http://www.oregon.gov/ODOT/Planning/Pages/APM.aspx.
3. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.

File Code	Updated	Notes
Unassigned	June 2024	Corrected grammar.

Right Turn Lanes 405.1

Right-turn improvements are commonly categorized into three designs:

- Conventional right-turn lanes
- Channelized right turn lanes (see **Section 405.2**)
- Right-turn acceleration lanes (see **Section 405.3**).

Conventional right-turn lanes are standard turn lanes without a channelizing island or a separate right-turn roadway.

Standards & Guidelines

01 An engineering investigation should be conducted for each site where right-turn lanes are being considered or where existing right-turn lanes might be modified through mitigation resulting from access management actions or as part of STIP project.

02 Right-turn lanes should not be installed at uncontrolled intersections in the following situations:

a. High speed highways (posted speeds of 45 mph or greater) with high traffic volumes where there are infrequent gaps for side street traffic to judge whether they can cross or turn onto the main highway,

b. Low speed urban arterials with multi-modal activity such as high bicycle and pedestrian volumes and/or transit use. These can be existing or planned uses,

c. Multiple driveways or side streets are in the right-turn lane,

d. The skew angle of the side street leads to high speed right turns, or

e. The right-turn lane contributes to a right-of-way constraint that leads to less than adequate bicycle, pedestrian, or transit facilities.

03 Existing right-turn lanes that meet the criteria in Paragraph 02 should be evaluated for removal if they are within the limits of a STIP project.

04 See the Traffic Line Manual (*1*) and Oregon Standard Drawings for guidance on the design of turn treatments. Criteria for right-turn lanes can be found in the Analysis Procedures Manual (*2*). The Traffic Signal Policy and Guidelines (*3*) provides guidance for right turn signalization and warrants for phasing at intersection (see right turn signal warrants).

05 For criteria for conventional right-turn lanes, refer to the Analysis Procedures Manual (*2*). Both the Highway Design Manual (*4*) and the Traffic Line Manual (*1*) give design and striping guidance for conventional right-turn lanes.

Process & Required Approvals

Conventional right turn lanes at intersections and driveways, and right turn phase modifications at signals, requires region traffic engineer approval. See **Section 405.6** for process and required approvals for multiple turn lanes (e.g. double right turn lanes).

Special Considerations

Adding right-turn lanes can reduce motor vehicle crashes and the time motorists are delayed in traffic. However, right-turn lanes also lead to increased conflicts between motor vehicles and bicyclists as motor vehicles must weave across the path of bicycles as they enter the right-turn lane when a bike lane transitions from the curb or shoulder to the left of the right-turn lane in advance of the intersection. Right-turn lanes also lengthen pedestrian crossing distances and left turn movements for vehicles entering the highway from a side street.

The engineering investigation should include a crash history and identification of the type of crash that might be occurring, as well as an examination of design speed, target speed and prevailing speeds, pedestrian volumes and crossing times, bicycle volumes, and the percent of turning traffic in the total approach volume. The engineering investigation should address how conflicts between bicyclists and motor vehicles would be addressed for new right-turn lanes or modifications to existing right-turn lanes. If a safety analysis using Highway Safety Manual (HSM) (*5*) methodologies shows that either installation of a new right-turn lane or modification of an existing right-turn lane would degrade safety at or in the vicinity of the intersection, the right-turn lane should be not be installed or, if existing, shall be considered for removal. Whether signalized or unsignalized, the engineering investigation should consider traffic operations with and without the right turn lane. Sight distance, alignment, and cross-section of the roadway may also be factors to consider in the engineering investigation. Turning volumes, functional class of vehicle, and expected queue length in the through travel lane(s) are the main consideration for the queue storage length of the turn lane.

Support

Right-turn lanes are often considered in the geometric design of intersections and as possible mitigation for development impacts near a congested intersection. Such lanes provide storage as well as a deceleration area for vehicles prior to making the turn or, in the case of right-turn acceleration lanes (**Section 405.3**), an acceleration area to merge into traffic after negotiating the turn. The storage function is particularly useful at railroad grade crossings during preemption of the traffic signal by rail operations.

Cross References

Region Traffic Engineer 100.1
Crash Analysis 201.0
Sight Distance 203.0
Uniform Traffic Control Devices........ 300.0
Pavement Markings 303.0
Traffic Signals........ 304.0
Railroad Crossings 308.0
Bicycle Facilities 309.0
Intersection Control Evaluation 400.0

EXCEPT RIGHT TURN Sign Applications 402.1
Channelized Right Turn Lanes 405.2
Right Turn Acceleration Lanes 405.3
Shared (or Combined) Bike and Right Turn Lane 405.4
Transit Exceptions to Turn Lanes........ 405.5
Multiple Turn Lanes 405.6
Turn Prohibitions 405.7
Access Management........ 502.0
Traffic Impact Studies 508.1

Key References

1. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
2. Oregon Department of Transportation. *Analysis Procedures Manual*. Oregon Department of Transportation, Salem, Oregon. http://www.oregon.gov/ODOT/Planning/Pages/APM.aspx.
3. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.
4. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.
5. American Association of State Highway and Transportation Officials. *Highway Safety Manual*, 1st ed. AASHTO, Washington, D.C., 2010.

File Code	Updated	Notes
Unassigned	June 2024	Corrected grammar.

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Channelized Right Turn Lanes 405.2

A channelized right turn lane is a lane for the exclusive use of right turning vehicles that uses a channelizing island (raised or painted) at the intersection. This does not include right turn lanes separated from adjacent lanes with only a wide white line.

Standards & Guidelines

01 Where the main intersection is signal-controlled, channelized right turn lanes:

a. Shall be signal-controlled.

b. May be stop or yield-controlled if a raised channelizing island separates the channelized right turn lane from the adjacent travel lanes and if an engineering study finds stop or yield control is appropriate for the channelized right turn lane.

02 Where the minor street is stop-controlled and the major street is free-flow, channelized right turn lanes from the minor street onto the major street:

a. Shall be stop-controlled (see **Figure 405.2-1**).

b. May be yield-controlled if an engineering study finds yield control is appropriate for the channelized right turn lane.

03 Where the minor street is stop-controlled, the major street is free-flow, and the channelized right turn lane goes from the major street to the minor street:

a. The channelized right turn lane should be yield-controlled where the "X" distance in

b. **Figure 405.2**-2 is less than 100 feet (Option 1) or an engineering study finds yield control is appropriate for the channelized right turn lane.

c. The intersecting roadway should be yield-controlled where the "X" distance in

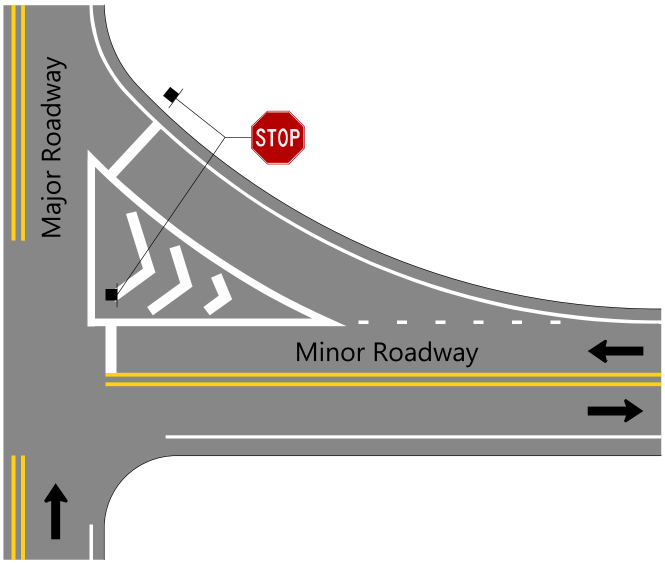
d. **Figure 405.2**-2 is greater than 100 feet (Option 2).

e. The channelized right turn lane may be stop-controlled if an engineering study finds stop control is appropriate for the channelized right turn lane.

04 See **Section 310.3** for standards and guidelines related to marked crosswalks across channelized right turn lanes.

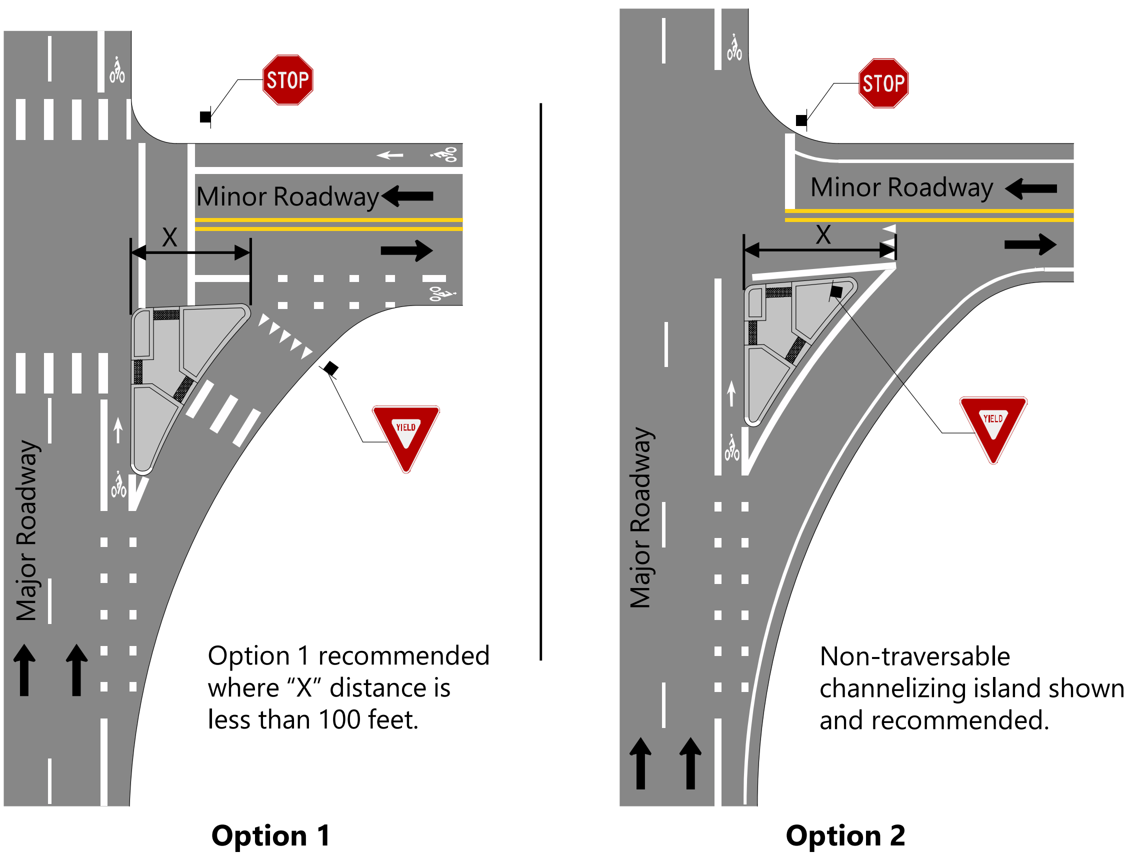
Channelized Right Turn Lanes 405.2

Figure 405.2-1: Typical Unsignalized Control from Minor to Major Roadway



Traversable channelizing island shown. Channelizing island can be non-traversable.

Figure 405.2-2: Typical Unsignalized Control from Major to Minor Roadway



Not to scale. See the Traffic Line Manual (*1*) and Highway Design Manual (*2*) for pavement marking and geometric design requirements and guidelines.

Process & Required Approvals

The decision to use signal, yield, or stop control shall be documented by an engineering study that considers Sections 2B.04 and 4D.34 of the MUTCD (*3*). See Traffic Line Manual (*1*) for typical layouts.

Channelized Right Turn Lanes at Signalized Intersections

State traffic engineer approval is required for all channelized right turn lanes where the main intersection is signalized. The engineering study should be included in the signal approval request.

Channelized Right Turn Lanes from Minor Street (stop-controlled) onto Major Street (free flow)

State traffic engineer approval is required for yield control. The Region traffic engineer approval is required for stop control.

Channelized Right Turn Lanes from Major Street (free flow) onto Minor Street (stop-controlled)

State traffic engineer approval is required for both yield and stop control.

Special Considerations

Well-designed channelized right turn lanes slow turning vehicles, allow drivers and pedestrians to easily see each other, reduce pedestrian exposure in the roadway, reduce the complexity of an intersection by breaking it into manageable parts, and allow drivers to see oncoming traffic as they merge into the receiving roadway. Channelized right turn lanes can be detrimental to pedestrian safety when they allow motorists to maintain high speeds through the turn, do not optimize sight lines to the crosswalk, and do not reduce the crossing distance for pedestrians.

Channelized right turn lanes are most appropriate at signalized intersections where geometrics (e.g. intersections with a significant skew angle beyond 90 degrees) make right turns infeasible for the design vehicle without substantially increasing pedestrian crossing distances. Channelized right turn lanes can also benefit hardware placement allowing use of shorter railroad gate arms and shorter mast arms.

An engineering study shall document the type of traffic control used in conjunction with Channelized right turn lanes. Sections 2B.04 and 4D.34 of the MUTCD (*3*) outline exceptions where YIELD or STOP signs could be used at a signalized intersection.

Well-designed channelized right turn lanes include several key features (*4*):

- The island (sometimes referred to as the "pork chop") that forms the channelized right turn lane is raised and large enough to accommodate waiting pedestrians and accessibility features, such as curb ramps or a cut-through.
- As they enter the right-turn lane, drivers can easily see pedestrians crossing or about to cross the right-turn lane and have enough space to stop completely once a pedestrian is spotted.
- The right-turn lane is as narrow as possible while still enabling the design vehicle to make the turn. Edge lines with cross-hatching can narrow the perceived width of the lane while still accommodating larger vehicles.
- The crosswalk is oriented at a 90-degree angle to the right-turn lane to optimize sight lines and is positioned one car length back from the intersecting roadway to allow drivers to move forward and wait for a gap in oncoming traffic after clearing the crosswalk.
- High-visibility crosswalk striping and/or signage enhances the visibility of the crosswalk to drivers.
- The angle at which the right-turn lane intersects the cross street is relatively low (e.g. closer to 110 degrees, rather than 140 degrees). This feature lowers motor vehicle speeds and makes it easier for drivers to see oncoming traffic.
- The design of the island encourages lower turning speeds and improves the driver's view of pedestrians waiting to cross (see the AASHTO Green Book (*5*) and Highway Design Manual (*2*) for more information on island design).
- Acceleration lanes are not provided where the right-turn lane intersects the cross street. Acceleration lanes enable drivers to navigate the channelized right turn lane at higher speeds than would be possible if drivers had to yield to cross street traffic.
- Consider the needs of pedestrians with limited or no vision in the design.

Support

There is limited research and guidance on the trade-offs between signal, stop, or yield control of channelized turn lanes. Consequently, road authorities have installed a variety of control types at channelized turn lanes where the main intersection is signal-controlled (*6*).

One limited study found more than 50% of drivers treated signal-controlled channelized turn lanes as yield-controlled; less than 5% stopped and remained stopped on red (*7*). The estimated entering volume at two of the three studied intersections were between 16,000 and 20,000 vehicles per day. The authors of that study hypothesized the low compliance might be because drivers did not expect a need to stop in what they perceived as a merge situation or drivers did not view the signal as appropriate control for the situation.

Channelized turn lanes can be difficult for pedestrians with limited or no vision to cross because of high ambient noise levels from adjacent traffic at the main intersection and difficulty discerning turning vehicles from through traffic. Painted channelizing islands do not provide a pedestrian refuge and are not detectable to pedestrians with limited or no vision. See NCHRP Report 674 for more information on crossing solutions in these cases (*8*).

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Sight Distance 203.0
Uniform Traffic Control Devices........ 300.0
Pavement Markings 303.0
Traffic Signals........ 304.0
Crosswalks on State Highways........ 310.0
Controlled Marked Crosswalks 310.2
Uncontrolled Marked Crosswalks 310.3
YIELD Sign Applications 401.0
STOP Sign Applications........ 402.0
EXCEPT RIGHT TURN Sign Applications 402.1
Right Turn Lanes 405.1

Key References

1. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
2. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.
3. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
4. Federal Highway Administration. Pedestrian Safety Guide and Countermeasure Selection System. http://www.pedbikesafe.org/pedsafe/. Accessed January 14, 2019.
5. American Association of State Highway and Transportation Officials. *A Policy on Geometric Design of Highways and Streets*, 7th ed. American Association of State Highway and Transportation Officials, Washington, D.C., 2018.
6. Brown, L. S., and H. G. Hawkins. Addressing the Need for Consistent Traffic Control Devices at Channelized Right Turn Lanes. *Journal of Transportation Engineering*, Vol. 140, no. 10, October 2014, pp. 19-34. DOI: https://doi.org/10.1061/(ASCE)TE.1943-5436.0000737
7. Al-Kaisy, A., S. Roefaro, and D. Veneziano. Effectiveness of Signal Control at Channelized Right-Turning Lanes: An Empirical Study. *Journal of Transportation Safety & Security*, Vol. 4, no. 1, 2012, pp. 19-34. https://doi.org/10.1080/19439962.2011.611925.
8. Schroeder, B., R. Hughes, N. Rouphail, C. Cunningham, K. Salamati, R. Long, D. Guth, R. W. Emerson, D. Kim, J. Barlow, B. L. Bentzen, L. Rodegerdts, and E. Myers. NCHRP Report 674: Crossing Solutions at Roundabouts and Channelized Right Turn Lanes for Pedestrians with Vision Disabilities. Transportation Research Board of the National Academies, Washington, D.C., ISBN 978-0-309-15530-4, 2011. DOI: https://doi.org/10.17226/14473

Channelized Right Turn Lanes 405.2

File Code	Updated	Notes
TRA 07-08	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Right Turn Acceleration Lanes 405.3

A right-turn acceleration lane is an added lane for right-turning vehicles joining the traveled way of the highway from a side street to enable drivers to make the necessary change between the speed of operation on the highway and the lower speed of the turning movement.

A rural expressway is a subset of state highway classifications defined in the Oregon Highway Plan (OHP) (*1*) and located outside of city limits. Their purpose is to provide for high-speed, high-volume travel between cities and connections to ports and major recreation areas with minimal interruptions.

Volume to capacity (V/C) ratio is the ratio of traffic flow rate to capacity of the road to handle that traffic flow, calculated using the Analysis Procedures Manual (*2*) methodology.

Standards & Guidelines

01 The posted speed on the main highway shall be 45 MPH or greater.

02 The V/C ratio of the right-turn movement without the acceleration lane shall exceed the maximum value listed in Tables 6 and 7 of the OHP (*1*) for the corresponding highway category and location.

a. Exception 2a: If trucks represent at least 10% of all right-turning vehicles entering the highway, then the V/C criteria may be waived.

b. Exception 2b: If substandard sight distance exists at an intersection or right-turning vehicles must enter the highway on an ascending grade of greater than 3%, then the V/C criteria may be waived.

c. Exception 2c: If crash data in the vicinity of the intersection shows a history of crashes at or beyond the intersection attributed to right-turning vehicles entering the highway, then the V/C criteria may be waived.

03 The peak hour volume of right-turning vehicles from the side street onto the state highway shall be at least 10 vehicles/hour for rural expressways and 50 vehicles/hour for all other highways.

04 No other access points or reservations of access shall exist on either side of the highway within the design length, taper, and downstream from the end of the taper within the decision sight distance, based on the design speed of the highway. If positive separation between opposing directions of traffic exist such as raised medians or concrete barriers, then access control is only needed in the direction of the proposed acceleration lane.

05 Special consideration should be given to cyclists and pedestrians. Acceleration lanes create an unexpected condition for both pedestrians and cyclists. Every reasonable effort should be made to create conditions that make crossing safer and easier for pedestrians and cyclists.

06 The acceleration lane shall be designed in accordance with the drawing “Right Turn Acceleration Lane from At Grade Intersection” found in the Highway Design Manual (*3*).

07 The pavement markings for the acceleration lane shall be according to standards found in the Traffic Line Manual (*4*).

08 Free-flow acceleration lanes may be considered in rural or suburban areas provided the turning radius is tightened and the angle of approach is kept as close to a right angle as possible. These combined elements will force right-turning drivers to slow down and look ahead, where pedestrians and bicyclists may be present, before turning and accelerating onto the roadway.

Process & Required Approvals

The state traffic engineer shall determine if a right-turn acceleration lane proposal meets the above criteria. Proposals should be submitted to the state traffic engineer and include an engineering investigation with data supporting the above criteria and a drawing encompassing the intersection and design length of the acceleration lane showing all access points and reservations of access to the highway. The state traffic engineer will only consider proposals for right-turn acceleration lanes from public streets. If the state traffic engineer determines that a right-turn acceleration lane proposal meets the above criteria, the proposal will be forwarded to the state roadway engineer for consideration of design standards. Joint approval of the state traffic engineer and state roadway engineer is required for right-turn acceleration lane proposals.

Support

The Traffic-Roadway Section issued a technical bulletin in November 2007 (TR07-11(B), now rescinded) about right-turn acceleration lanes on state highways. At the time, project teams had been requesting design exceptions for non-standard acceleration lanes as part of STIP and OTIA projects. Developers had also been requesting right-turn acceleration lanes as mitigation to traffic impacts associated with residential and commercial development along state highways. The Traffic-Roadway Section developed criteria for right-turn acceleration lanes in response to these requests.

Cross References

State Traffic Engineer 100.0
Crash Analysis 201.0
Sight Distance 203.0
Uniform Traffic Control Devices 300.0
Pavement Markings 303.0
Right Turn Lanes 405.1
Access Management 502.0
Capacity Analysis 508.0

Key References

1. Oregon Department of Transportation. *Oregon Highway Plan*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/odot/planning/pages/plans.aspx.
2. Oregon Department of Transportation. *Analysis Procedures Manual*. Oregon Department of Transportation, Salem, Oregon. http://www.oregon.gov/ODOT/Planning/Pages/APM.aspx.
3. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.
4. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.

File Code	Updated	Notes
TRA 16-04-08	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Shared (or Combined) Bike and Right Turn Lane 405.4

Several cities in Oregon have been using shared bike and right-turn lanes with good results, and ODOT has been experimenting with them.

Standards & Guidelines

01 On preservation projects with bike lanes, where it may be outside the scope of the project to widen the intersection, shared lanes may be considered to carry the bicycle lane through the intersection.

Process & Required Approvals

Shared lanes at state highway intersections require region investigation and approval by the state traffic engineer.

Special Considerations

A shared lane is not the preferred design, but it provides some direction to both motorists and bicyclists.

Shared bike and right turn lanes are used where widening an intersection is not possible due to physical, right-of-way, or financial constraints. The use of the shared lanes is generally limited to locations where right-turn speeds and volumes are low. In locations with higher volumes and speeds of turning vehicles, widening the intersection to include bike lane to the left of the right-turn lane may be necessary.

Consider the following factors:

- The shared lanes may not be suitable for use at signalized intersections and should not be used where there is separate right-turn signalization.
- The use of the shared lanes should be limited to locations where turning vehicle speeds are close to the speed of the bicycles.

Cross References

State Traffic Engineer 100.0
Uniform Traffic Control Devices 300.0
Bicycle Facilities 309.0
Right Turn Lanes 405.1

File Code	Updated	Notes
Unassigned	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Transit Exceptions to Turn Lanes 405.5

ORS 810.130 allows the designation of locations where public transit vehicles may proceed in a direction prohibited to other traffic (see **Figure 405.5-A**).

Process & Required Approvals

ORS 810.130 requires an engineering study indicating that the movement may be made safely in the designated area. State traffic engineer approval is required for transit exceptions to turn lanes.

Figure 405.5-A: Example of Transit Exception to Right Turn Lane

Special Considerations

The typical application is at intersections with exclusive right-turn lanes and bus stops near the intersection. Transit vehicles will block the exclusive right-turn lane while stopped to load and unload passengers at a nearside bus stop or will use the exclusive right-turn lane as a queue bypass to go straight through the intersection to a far-side bus stop. In either case, exception signing allows the transit vehicle to make a movement otherwise prohibited by the lane control signing.

The engineering study should at a minimum document existing conditions, identify proposed signing changes, and provide enough information for the region traffic engineer to evaluate the location for a transit exception request. For additional information on what to include in an engineering study, refer to the definitions section of the MUTCD (*1*).

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Uniform Traffic Control Devices 300.0
Intersection Control Evaluation 400.0
Traffic Signal Operations 404.0
Right Turn Lanes 405.1

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

File Code	Updated	Notes
Unassigned	June 2024	Updated state traffic engineer and Traffic Engineering Section.

Multiple Turn Lanes 405.6

Process & Required Approvals

The installation of multiple left or right turn lanes requires the approval of the state traffic engineer. The Traffic Engineering Section maintains files on all new approved locations. Proposed locations involving traffic on the side streets at the approach to state highways will have as a part of the file a written notification of intent to the local agency.

Special Considerations

Multiple left or right turns are generally installed to accommodate motor vehicle volumes and reduce queue lengths. There are drawbacks such as increased intersection width, signal phasing considerations, and an increased likelihood of sideswipe crashes as drivers navigate the turn side-by-side.

The request for approval may include the following:

- A capacity analysis that demonstrates an improved level of service with multiple turning movements and/or with other considerations not to lower the level of service.
- An assessment of the vehicle delay or queuing on the approach under consideration without implementation of multiple turn lanes. The approach may be that of the local agency street or roadway system at the intersection of the state highway.
- Consideration of truck or other wide turning path vehicles and adequate multiple turning lane widths.
- Consideration of special striping or raised pavement markers (RPM) to delineate the multiple turning movement and placement of advance signing.

Other considerations include the following:

- The receiving roadway typically has a minimum receiving width of 30 feet; a width of 36 feet is preferred.
- In most cases, multiple left turn lanes have protected-only left-turn phasing.
- The design of multiple turn lanes and their interaction with crosswalks might include special traffic signal displays, non-conflicting phase assignments, or crosswalk closure.
- The local jurisdiction should be notified of any multiple turn lane proposals involving roadways under their jurisdiction.

Cross References

State Traffic Engineer 100.0
Uniform Traffic Control Devices 300.0
Pavement Markings 303.0
Traffic Signals 304.0
Crosswalk Closures 310.8
Left Turn Lanes 405.0
Right Turn Lanes 405.1
Capacity Analysis 508.0

File Code	Updated	Notes
Unassigned	June 2024	Updated state traffic engineer and Traffic Engineering Section.

Turn Prohibitions 405.7

Standards & Guidelines

01 OAR 734-020-0020 describes the warranting conditions for turn prohibitions and the MUTCD (*1*) describes the use of turn prohibition signs.

02 Advance notice of an impending traffic control change should be posted when making changes to existing intersections.

Process & Required Approvals

OAR 734-020-0020 requires an engineering investigation to establish turn prohibitions.

The Oregon Transportation Commission has delegated the authority to establish turn prohibitions on state highways to the state traffic engineer for statewide consistency. The region traffic engineer may establish turn prohibitions on state highways within their respective region provided they follow the warranting conditions in OAR 734-020-0020 and notify the state traffic engineer of the prohibitions. These prohibitions include designating intersections where turns are prohibited in any direction, signalized or unsignalized, but do not include intersections where raised medians are used as a positive means of enforcing the allowable movements.

When the turn prohibition is linked to access management action, the region access management engineer, in consultation with the region traffic engineer, may designate unsignalized intersection turn prohibitions consistent with the authority delegated to the region access management engineer under Division 51 of Chapter 734 of the Oregon Administrative Rules. The state traffic engineer approval is required for turn prohibitions at signalized intersections linked to access management action.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Uniform Traffic Control Devices 300.0
Intersection Bicycle Boxes 309.2
U-Turns at Signalized Intersections 404.2
Left Turn Lanes 405.0
Right Turn Lanes 405.1
Access Management 502.0
Truck Routes 506.0

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

File Code	Updated	Notes
Unassigned	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Two-Way Left Turn Lanes 405.8

A two-way left turn lane (also known as a TWLTL, special left turn lane or continuous two-way left-turn lane, CTWLTL) is a type of median reserved for the exclusive use of vehicles turning left.

Standards & Guidelines

01 On facilities with existing TWLTLs, the median should not be converted to a painted median until all private accesses have been removed. This is generally only true on limited access highways.

02 See the Highway Design Manual (*1*) and Traffic Line Manual (*2*) for standards and guidelines related to TWLTLs.

Process & Required Approvals

Region traffic engineer approval is required for use of a striped bull nose in a two-way left turn lane at a minor T-intersection (see Traffic Line Manual (*2*)).

Special Considerations

ORS 811.345 and 811.346 prohibit passing and overtaking or travel by a driver in a TWLTL except to make a left turn.

TWLTL's are used in areas where crashes, primarily caused by left turning vehicles, are correctable or where turning movements from the through lane are decreasing capacity of the facility. These areas are usually characterized by frequent accesses. If TWLTL's are considered in higher speed areas, caution should be taken to assure that vehicles using the TWLTL are unlikely to meet head-on at high speeds (spacing and location of accesses are critical). TWLTL's emphasize access and can encourage direct connections to the highway. A non-traversable median with openings at select local streets can encourage private access to the local street system. See the Highway Design Manual (*1*) for further discussion of medians.

In most cases a non-traversable (curbed or depressed medians) are superior to a TWLTL in terms of safety and operation. On arterials with higher volumes (above 20,000 ADT) and frequent access, it may be advantageous to consider a non-traversable median, rather than a TWLTL. On higher volume or higher speed roadways, the TWLTL loses much of its safety advantage, which the non-traversable medians retain.

Cross References

Region Traffic Engineer 100.1
Uniform Traffic Control Devices 300.0
Pavement Markings 303.0
Left Turn Lanes 405.0

Key References

1. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.
2. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.

File Code	Updated	Notes
TRA 07-08, LEG 10	January 2021	Corrected grammar.

Interchange Modification Requests 406.0

Federal policy requires an interchange modification request (IMR) to justify any new or revised access point on the Interstate System, regardless of funding source.

Standards & Guidelines

01 Interchange modification request procedures are outlined in the Highway Design Manual (*1*).

Process & Required Approvals

The Federal Highway Administration (FHWA) has the authority to approve all new or revised access points to the Interstate System. Requests for new or revised access points on the Interstate System may be associated with planning work and typically includes region traffic and TPAU support, which may ultimately result in an interchange modification request.

Region traffic staff typically participates in the documentation of the policy points that must be addressed in all interchange modification requests. Interchange modification request submittals are coordinated by and sent to FHWA through the Roadway Engineering Section.

Special Considerations

An informational guide is available from FHWA (*2*). Contact the Roadway Engineering Section's interchange engineer for questions or clarification regarding ODOT IMRs.

Cross References

Intersection Control Evaluation 400.0
Wrong-Way Treatments 406.1
Access Management 502.0

Key References

1. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.
2. Federal Highway Administration Office of Infrastructure. *Interstate System Access Information Guide*. Federal Highway Administration, Washington, D.C., 2010. https://www.fhwa.dot.gov/design/interstate/pubs/access/access.pdf.

File Code	Updated	Notes
Unassigned	June 2024	Updated Traffic Engineering Section and Roadway Engineering Section.

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Wrong-Way Treatments 406.1

Standards & Guidelines

01 See Parts 2 and 3 of the MUTCD (*1*), the Sign Design Manual (*2*), and the Traffic Line Manual (*3*) for information on design policies and guidelines for signing and pavement markings to prevent wrong way crashes.

Process & Required Approvals

See the Sign Design Manual (*2*) and Traffic Line Manual (*3*) for element-specific processes and approvals.

Special Considerations

If a freeway on-ramp or other road is suspected of frequent wrong way movements the following steps should be taken:

1. Review crash history, looking primarily for head-on or sideswipe collisions.
2. Check if wrong-way signing is consistent with the MUTCD (*1*) and Sign Design Manual (*2*).
3. Determine if additional signing either at the ramp or on the approach to the ramp or intersection could provide additional guidance.
4. Evaluate the geometric design of the intersection: (i.e. entrance radii, offset ramp terminals) and determine if modifications should be considered. See the Highway Design Manual (*4*) for further discussion.
5. Consider the need for additional illumination in the area.
6. Check if wrong-way pavement markings are consistent with the MUTCD (*1*) and Traffic Line Manual (*3*).
7. Exit and entrance ramp terminals on the crossroad should be offset to encourage drivers to use the entrance ramps and discourage wrong way moves. See the Highway Design Manual (*4*) for further discussion.
8. Consider installation of red reflectors on the backside of guideposts in situations where sign and illumination improvements have not been effective.
9. Due to limited success and maintenance costs of red raised pavement markers, consider use of these markers only where other wrong-way treatments are also installed. These markers require the approval of the region traffic engineer. See the Traffic Line Manual (*3*) for more information.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Crash Analysis 201.0
Uniform Traffic Control Devices........ 300.0
Signs........ 302.0
Pavement Markings 303.0
Illumination 311.0
Interchange Modification Requests........ 406.0

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Oregon Department of Transportation. *Traffic Sign Design Manual*. Oregon Department of Transportation, Salem, Oregon. http://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Sign-Design-Manual.pdf.
3. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
4. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.

File Code	Updated	Notes
TRA 03-01-26, TRA 16-02-04-04, TRA 16-04-76	June 2024	Updated liability neutral language.

Speed Zones – General 500.0

Process & Required Approvals

Various statutes and administrative rules cover speed limits:

- Designating speed limits: ORS 810.180
- Various statutes relating to violating speed limits and penalties for speeding: ORS 811.100 through ORS 811.111.
- Establishing speed zones under normal conditions: OARs 734-020-0014, -0015, -0016, and -0017.
- The rules for establishing Interstate speeds: OAR 734-020-0010.
- Locations of established Interstate speed limits: OAR 734-020-0011.

In Oregon, ODOT and the road authority, for example a city or county, jointly make decisions regarding speed zones.

ODOT has the responsibility to investigate roads for establishing new speed zones or changing existing speed zones. ODOT does these investigations at the request of a city, a county, an agency with a road authority, or a private citizen if the request is for a rural state highway. For rural state highways, requests for an investigation should be made in writing to the region traffic engineer.

If the investigation's recommended speed is of mutual agreement between ODOT and the local road authority, the speed zone is established. If mutual agreement cannot be reached, the speed zone decision is referred to the Speed Zone Review Panel.

When the Traffic Engineering Section approves and distributes a permanent or a short-term speed zone order on a state highway, those who have responsibility for sign installation and removal (including private consultants) must notify the Traffic Engineering Section when the signs are installed and removed.

In 2021, the Oregon Legislature passed HB-3055, which changed ORS 810.180 to allow ODOT to delegate authority for designating speeds to cities and Multnomah and Clackamas Counties. The Legislature added Marion County to that list in 2023 (HB-3188). See the ODOT Speed Zoning Manual (*1*) and speed zoning website for more information on delegating this authority to local agencies.

Special Considerations

Establishing speed zones in Oregon requires an engineering investigation. These investigations are completed in accordance with nationally accepted traffic engineering standards and procedures, which have been established through years of research and experience.

The 85th percentile speed, the speed at or below which 85 percent of the vehicles are traveling, has been a principal factor in setting speeds for many years. The 85th percentile speed was not the only factor used to determine the posted speed. In urban areas, most of the time the speed was set lower than the 85th percentile speed because of the desire to improve safety for vulnerable users.

Previous studies (*2*) suggested posting speeds near the 85th percentile speed minimizes crash occurrence and provided favorable driver compliance. More recent studies (*3*) suggest that posting speeds near the 85th percentiles is more applicable to rural areas and freeways to reduce the likelihood of crashes. The 50th percentile speed may be more appropriate for areas within urban areas where there is developed land and vulnerable road users.

Oregon's procedures provide a consistent and uniform application of techniques to establish speed zoning. Other factors taken into consideration are crash history, roadside culture, traffic volumes, and roadway alignment, width, and surface.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Crash Analysis 201.0
Uniform Traffic Control Devices 300.0
Signs 302.0
Vehicle Speed Feedback Signs 302.2
Variable Speed Systems 500.1
Construction Speed Zones 500.2
School Speed Zones 500.3
Speed Safety Cameras 500.4
Traffic Calming 500.5

Key References

1. Oregon Department of Transportation. *Speed Zone Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/odot/Engineering/Docs_TrafficEng/Speed-Zone-Manual.pdf.
2. Solomon, D. Accidents on Main Rural Highways Related to Speed, Driver, and Vehicle. Washington, D.C., 1964. DOI: https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa1304/2_40.htm
3. Fitzpatrick, K., S. Das, M. P. Pratt, K. Dixon, and T. Gates. NCHRP Report 966: Posted Speed Limit Setting Procedure and Tool: User Guide. Washington, D.C., ISBN 978-0-309-67404-1 , 2021. DOI: https://doi.org/10.17226/26216

File Code	Updated	Notes
TRA 07-02	June 2024	Updated Traffic Engineering Section. Added HB-3188 reference.

Variable Speed Systems 500.1

Variable speed systems dynamically change the advisory or regulatory speed in response to conditions like congestion or adverse weather.

A **variable advisory speed (VAS)** system gives drivers advisory speeds in response to congestion or adverse weather conditions. VAS signs are yellow text on a black background or black text on a yellow background. Typical VAS signs display "ADVISORY SPEED" above the corresponding speed.

A regulatory **variable speed limit (VSL)** system alerts drivers to the maximum regulatory speed for conditions. A typical VSL sign displays "SPEED LIMIT" with a corresponding speed. These regulatory speed signs use white text on a black background or black text on a white background.

Standards & Guidelines

01 See the Oregon Statewide Variable Speed System Concept of Operations (*1*).

Process & Required Approvals

ODOT has statutory authority to establish variable speed systems on public roads in the state.

Requests for variable speed systems on state highways are under state traffic engineer authority and shall be submitted to the state traffic engineer for review and conceptual approval prior to starting any design work. The submittal to the state traffic engineer should include all intelligent transportation systems (ITS) devices anticipated for the project such as variable message signs that require concurrent review and approval by both the state traffic engineer and Intelligent Transportation Systems Unit.

If the system will be a regulatory variable speed limit (VSL), it will require a speed zone investigation that address the items outlined in OAR 734-020-0018. VSL systems require a speed zone order or may require revision to the Oregon Administrative Rules if it is on an Interstate.

Special Considerations

The Oregon Statewide Variable Speed System Concept of Operations (*1*) discusses considerations for choosing between VAS and VSL systems, as well as equipment, operational support, and other considerations.

Cross References

State Traffic Engineer 100.0
Uniform Traffic Control Devices 300.0
Variable Message Signs 302.1
Speed Zones – General 500.0

Key References

1. Oregon Department of Transportation. *Oregon Statewide Variable Speed System Concept of Operations*. Oregon Department of Transportation, Salem, Oregon.

File Code	Updated	Notes
TRA 07-02	June 2024	Updated state traffic engineer and Traffic Engineering Section.

Construction Speed Zones 500.2

Standards & Guidelines

01 See the Traffic Control Plans Design Manual (*1*) for information on construction speed zones, including how to request one from the state traffic engineer.

Process & Required Approvals

The state traffic engineer has the approval authority for a reduced speed in a work zone or other temporary situation.

Cross References

State Traffic Engineer 100.0
Uniform Traffic Control Devices 300.0
Temporary Traffic Control 306.0
Speed Zones – General 500.0

References

1. Oregon Department of Transportation. *Traffic Control Plan Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/TCP-Manual.aspx.

File Code	Updated	Notes
TRA 07-02	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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School Speed Zones 500.3

Standards & Guidelines

01 A school speed zone should be established according to ORS 811.111 subsection 1(e) and ORS 810.200.

Process & Required Approvals

Each road authority (state, county, or city) determines within their own jurisdiction, by performing an engineering study, whether a school speed zone is appropriate and the limits of that zone.

The road authority with jurisdiction establishes all school speed zone exceptions in statutory and basic speed zones. On local jurisdiction roadways, the road authority may establish a school speed zone, including those roadways covered by a speed zone order. School speed zone exceptions on local jurisdiction roadways are no longer included in the speed zone orders.

On state highways inside city limits, the local jurisdiction or school district must request the school speed zone in writing. For state highways outside city limits, the request usually comes through the district manager. The request for a school speed zone should include a copy of the school district's pedestrian route plan, as described in the MUTCD (*1*).

On state highway segments covered by speed zone order, the school speed zone must be approved by the state traffic engineer and included on the speed zone order. On state highway segments not covered by speed zone order (i.e. statutory speed or basic rule sections), a school speed zone may be approved by the region traffic engineer.

The complete report submitted to the state traffic engineer requesting a school speed zone on a state highway shall include:

1. The original correspondence requesting the school zone exception.
2. An engineering study, including an evaluation of the pertinent information (see A Guide to School Area Safety (2)).
3. The entire rewording necessary for the new speed zone order.
4. A map showing the existing speed zone and the new school zone (if applicable).
5. Photographs showing the area from beginning to end. Including sight distance or other roadway conditions that would affect the decision to approve the exception.

The engineering study does not necessarily have to include speed checks but should establish the school ground or school crossing boundaries according to the standards adopted by the state (see the Sign Policy and Guidelines for the State Highway System (*3*) and A Guide to School Area Safety (*2*)).

Special Considerations

ODOT has prepared a publication entitled A Guide to School Area Safety (2) to assist in the placement of traffic controls in school areas.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Sight Distance 203.0
Uniform Traffic Control Devices 300.0
Signs 302.0
Vehicle Speed Feedback Signs 302.2
Flashing Beacons 304.2
Uncontrolled Marked Crosswalks 310.3
Speed Zones – General 500.0

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Oregon Department of Transportation. *A Guide to School Area Safety*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Guide_to_School_Area_Safety.pdf.
3. Oregon Department of Transportation. *Sign Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx.

File Code	Updated	Notes
TRA 16-05-01	June 2024	Updated state traffic engineer and Traffic Engineering Section.

Speed Safety Cameras 500.4

Speed safety cameras, also known as photo speed enforcement, take pictures of vehicles traveling over a certain speed and issues citations by mail.

From 2017 to 2021, 24.8 percent of fatal and serious injury crashes in Oregon were related to speed, meaning a driver was traveling too fast for the conditions or traveling faster than the speed limit. This was the most common driver behavioral issue associated with fatal and serious injury crashes in Oregon (*1*).

ODOT's Transportation Safety Action Plan (*1*) names automated enforcement, such as speed safety cameras, as one way to reduce speeding to reach ODOT's goal of eliminating fatalities and serious injuries.

All cities can enforce speed using speed safety camera systems (mobile and fixed, see **Appendix A2**). All cities can also enforce speed using red light running camera systems as a secondary function to red light running enforcement (See **Section 304.1** and **Appendix A1**).

Standards & Guidelines

01 Refer to ORS 810.438 through 810.444 for speed safety camera statutes. For fixed photo radar cameras, see the Fixed Photo Radar Camera Guidelines for State Highways (**Traffic Manual Appendix A2**). For enforcing speed with red light running camera systems, see the Red-Light Running Camera Guidelines for State Highways (**Traffic Manual Appendix A1**).

02 See the Sign Policy and Guidelines for the State Highway System (*2*), the MUTCD (*3*), and the Oregon Supplement to the MUTCD (*4*) for details on signs associated with speed safety cameras.

Process & Required Approvals

No traffic approvals are required for mobile photo radar on state highways. If the vehicle used for mobile photo radar interferes with highway work or activity allowed by permit, the vehicle and/or other equipment for photo enforcement might need to move.

State traffic engineer approval is required for fixed photo radar camera installation and operation on all state highways regardless of operation or maintenance responsibilities. See the Fixed Photo Radar Camera Guidelines for State Highways (**Traffic Manual Appendix A2**) for approval procedures on state highways. The FPR approval includes approval for vehicle speed feedback signs because Oregon statutes require these signs in advance of FPR installations (see **Section 302.2** for more information about vehicle speed feedback signs).

State traffic engineer approval is required for speed enforcement at RLR cameras on all state highways, regardless of operation or maintenance responsibilities. See the Red-Light Running Camera Guidelines for State Highways (**Traffic Manual Appendix A1**) for approval procedures on state highways.

Special Considerations

Speed safety cameras generally reduce speeding and crashes in the vicinity of the camera (*5*) and multiple federal agencies (NHTSA, CDC, NTSB, FHWA) recognize it as an effective safety countermeasure (*6*, *7*). More information on effectiveness and general considerations when implementing speed safety cameras is available in NHTSA's Countermeasures that Work publication (*5*) and FHWA's Speed Safety Camera Program Planning and Operations Guide (*8*).

National best practice (*9*) for speed safety cameras is to:

- Be transparent and consistent with the public – the public must have knowledge, awareness, and assurance of the systems and the program must be well-documented and monitored to help gain public trust and respect.
- Use it to address a history of speed-related crashes. If the program is not motivated by safety, it will not succeed.
- Use it to supplement – not replace – traditional engineering, enforcement, and education countermeasures.
- Make sure the speed limit is proper for the location (e.g., statutory speeds or designated speeds based on an engineering study).
- Communicate the speed limit to approaching drivers.

Mobile Photo Radar (MPR)

MPR is operated from a vehicle like the one shown in Figure 500.4-1. If the operator detects a speeding vehicle, they take a picture of the driver and license plate. Upon verification by a police officer (or duly authorized traffic enforcement agent in Portland), the vehicle owner then receives a citation in the mail.

Figure 500.4-1: Mobile Photo Radar in a Medford Work Zone

Locations

All cities can operate MPR at their own cost. Cities that choose to operate MPR programs must send a process and outcome evaluation report to the Legislature each biennium.

ORS 810.438 limits where cities can use MPR:

- May be used on streets in residential areas or school zones.
- May be used in other areas if the governing body of the city makes a finding that speeding has had a negative impact on traffic safety in those areas.
- May not be used on controlled access highways.

Under ORS 810.441, ODOT may ask Oregon State Police, or a jurisdiction authorized to operate MPR, to enforce speeds using MPR in highway work zones on state highways or where the configuration of the roadway temporarily changes (e.g., temporary changes to the number of usable lanes, lane width, shoulder width, curvature of the roadway). Police officers can only use the photo radar unit within 100 yards from these conditions. On divided highways, officers can only use the photo radar unit on the same roadway where highway workers are present.

Signs

ORS 810.438, ORS 810.444, the MUTCD (*3*), and the Oregon Supplement to the MUTCD (*4*) requires the following signs posted 100-400 yards upstream of the photo radar unit on the street being enforced:

- A TRAFFIC LAWS PHOTO ENFORCED (R10-18) sign posted at least 2 feet above ground level. If the enforcement location is in a school zone that is not marked by a flashing beacon and the school is in session, a SCHOOL IN SESSION (OS4-9) sign also needs to be posted at the same location.
- A Speed Limit (R2-1) sign.
- A vehicle speed feedback sign (see **Section 302.2**).

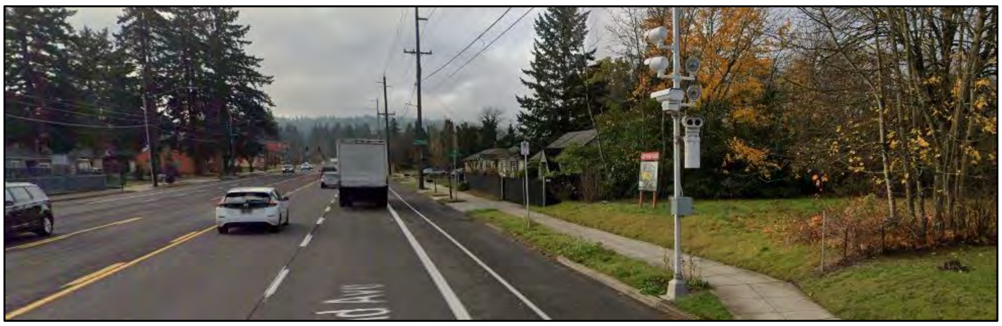
ODOT Guidelines

ODOT does not publish engineering policies or guidelines related to mobile photo radar because cities run mobile photo radar programs and do not install equipment to run these systems.

Fixed Photo Radar (FPR)

FPR is a fixed-camera system that takes pictures of vehicles traveling over a certain speed, like the camera in Figure 500.4-2. Equipment like radar or lidar detect vehicle speeds and if exceeding a preset speed, takes pictures of the vehicle, license plate, and driver. Upon verification by a police officer (or duly authorized traffic enforcement agent in Portland), the vehicle owner then receives a citation by mail.

Figure 500.4-2: Fixed Photo Radar Cameras in Portland



Locations

All cities can operate FPR at their own cost. Cities that choose to operate FPR systems must send a process and outcome evaluation report to the Legislature each biennium.

ORS 810.438 limits where cities can use FPR:

- May be used on streets in residential areas or school zones.
- May be used in other areas if the governing body of the city makes a finding that speeding has had a negative impact on traffic safety in those areas.
- May not be used on controlled access highways.

Signs

ORS 810.438, ORS 810.444, the MUTCD (*3*), and the Oregon Supplement to the MUTCD (*4*) requires the following signs posted 100-400 yards upstream of the photo radar unit on the street being enforced.

- A TRAFFIC LAWS PHOTO ENFORCED (R10-18) sign posted at least 2 feet above ground level. If the enforcement location is in a school zone that is not marked by a flashing beacon and the school is in session, a SCHOOL IN SESSION (OS4-9) sign also needs to be placed at the same location.
- A Speed Limit (R2-1) sign.
- A vehicle speed feedback sign (see **Section 302.2**).

ODOT Guidelines

The Traffic Engineering Section, in coordination with the Oregon Traffic Control Devices Committee, publishes the Fixed Photo Radar Camera Guidelines for State Highways (**Appendix A2 in the ODOT Traffic Manual**). This publication covers process, approvals, and guidelines for FPR systems on state highways. ODOT encourages local jurisdictions to use this guideline off the state highway system or develop their own guidance.

Enforcing Speed at Red-Light Running (RLR) Cameras

Red-light running camera systems, like in Figure 500.4-3, are used primarily to reduce red-light running crashes. ORS 810.434 thru 810.437 also allows these camera systems to enforce speed limits when the system detects a driver traveling at 11 mph or more above the posted speed limit (11 mph higher is a threshold between Class B and Class C traffic violations in ORS 811.109). Enforcing speeds in this way is secondary to reducing red-light running crashes.

Figure 500.4-3: Red Light Running Camera

Locations

ORS 810.434 thru 810.437 authorizes all cities to operate red-light running cameras at their own costs. Jurisdictions that choose to operate RLR programs must send a process and outcome evaluation report to the Legislature each biennium.

Signs

ORS 810.436, 810.437 and the Oregon Supplement to the MUTCD (*4*) requires the following signs.

- A TRAFFIC LAWS PHOTO ENFORCED (R10-18) sign posted on all major routes entering jurisdictions using RLR cameras.
- A Photo Enforced (W16-10P) or PHOTO ENFORCED (W16-10aP) plaque below a Signal Ahead (W3-3) warning sign in advance of the intersection.

ODOT Guidelines

See **Section 304.1** for more information on state highways. The Traffic Engineering Section, in coordination with the Oregon Traffic Control Devices Committee, publishes the Red-Light Running Camera Guidelines for State Highways (**Appendix A1 in the ODOT Traffic Manual**). This covers process, approvals, and guidelines for RLR camera systems on state highways. ODOT encourages local jurisdictions to use this guideline off the state highway system or develop their own guidance.

Other Traffic Cameras

Some signalized intersections have cameras that the traffic signal's controller (a computer) uses to detect vehicles. Some intersections also have cameras that transportation agencies use to check traffic operations and post pictures or video to sites like tripcheck.com. Figure 500.4-4 shows examples of both kinds of cameras. These are not used to enforce traffic laws nor used to issue citations.

Figure 500.4-4: Examples of Cameras Used for Traffic Operations, Not Enforcement

Support

The Oregon Legislature has made several changes to speed safety camera statutes.

- Beginning January 1, 2024, HB-2095 (2023 Legislative Session) allowed all cities to operate mobile photo radar.
- Beginning June 6, 2024, HB-4109 (2024 Legislative Session) allowed all cities to operate fixed photo radar. The bill also removed provisions limiting these cameras to "urban high crash corridors."

Cross References

State Traffic Engineer 100.0
Uniform Traffic Control Devices 300.0
Signs 302.0
Vehicle Speed Feedback Signs 302.2
Traffic Signal Enforcement 304.1
Speed Zones – General 500.0

Key References

1. Oregon Department of Transportation. *Oregon Transportation Safety Action Plan*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Safety/Pages/TSAP.aspx.
2. Oregon Department of Transportation. *Sign Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx.
3. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
4. Oregon Department of Transportation. *Oregon Supplement to the Manual on Uniform Traffic Control Devices*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/MUTCD-OR-Supplement.pdf.
5. Venkatraman, V., C. M. Richard, K. Magee, and K. Johnson. Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, 10th Edition. National Highway Traffic Safety Administration, Washington, D.C., DOT HS 813 097, 2021. https://www.nhtsa.gov/sites/nhtsa.gov/files/2021-09/15100_Countermeasures10th_080621_v5_tag.pdf.
6. Peterman, D. R. Safety Impact of Speed and Red Light Cameras. Contressional Research Service, Washington, D.C., R46552, 2020. https://crsreports.congress.gov/product/pdf/R/R46552.
7. Federal Highway Administration Office of Safety. Proven Safety Countermeasures: Speed Safety Cameras. *U.S. Department of Transportation Federal Highway Administration*, https://highways.dot.gov/safety/proven-safety-countermeasures/speed-safety-cameras. Accessed March 24, 2023.
8. Federal Highway Administration. Speed Safety Camera Program Planning and Operations Guide. FHWA Office of Safety Research and Development, McLean, VA, 2023. https://highways.dot.gov/sites/fhwa.dot.gov/files/Speed%20Safety%20Camera%20Program%20Planning%20and%20Operations%20Guide%202023.pdf.
9. Eccles, K. A., R. Fiedler, B. Persaud, C. Lyon, and G. Hansen. NCHRP Report 729: Automated Enforcement for Speeding and Red Light Running. Washington, D.C., ISBN 978-0-309-25843-2, 2012. DOI: https://dx.doi.org/10.17226/22716

File Code	Updated	Notes
TRA 16-05-01	June 2024	Incorporated changes from HB-4109 (2024).

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Traffic Calming 500.5

Traffic calming techniques can be used to encourage drivers to operate their vehicles at appropriate speeds.

Special Considerations

The selection of traffic calming strategies must consider the nature of the street or roadway, adjacent land use, driver population, emergency vehicle access, ease of implementation and other site-specific factors. If used appropriately, the techniques can encourage drivers to drive at desired speeds, improve the appearance of the roadway, and improve the comfort of pedestrians crossing the roadway and facilitate other modal use of the facility.

Traffic calming for neighborhood streets may include speed bumps, speed humps, and traffic circles. While these may be effective in reducing speeds, they might create additional neighborhood noise, driver discomfort, and longer emergency response times. Street closures may also be used, but this forces traffic onto other streets.

Traffic calming on state highways, primarily arterial streets, involves different types of changes to the roadway environment to cue drivers to the mixed-use environment of people walking, biking, and taking transit. These changes include items such as pedestrian islands, curb extensions, wide sidewalks, and streetscaping. Roundabouts, used in the right places, are another strategy for improving driver behavior on arterial streets. Traffic calming techniques will be different for downtown areas versus transition areas (see Main Street Handbook (*1*)).

Using traffic control devices such as signals or STOP signs for traffic calming is generally ineffective. This may increase crash frequency or severity and may increase conflicts and speeds due to driver frustration or indifference. Vehicular, pedestrian, and bicycle safety depends in large part on public understanding and acceptance of traffic control devices.

Strategies such as narrowing lanes and adding on-street parking may result in lower speeds, and may increase conflicts between parking vehicles and bicyclists, as well as other vehicles. They may also limit sight distance and visibility of vehicles entering the roadway from side streets and other accesses. On-street parking can also act as a buffer between the travel lanes and the sidewalk. Curb extensions can be used to make pedestrians more visible to drivers at crossing points. On-street parking might be appropriate for downtown business areas but may not be in other areas such as transition areas.

Some communities might seek a lower speed limit. Simply posting a lower speed limit does not guarantee that drivers will travel slower, nor reduce the likelihood of fatal or serious injury crashes. Motorists’ speeds are often slowed due to the perception of a changing road culture. When a lower speed appears reasonable to the motorist it is more readily accepted. This results in lower operating speeds, improves speed limit compliance, and improves safety.

Cross References

Land Use and Transportation 107.0
Sight Distance 203.0
Roundabouts 403.0
Speed Zones – General 500.0
Parking 501.0

Key References

1. Oregon Department of Land Conservation and Development. *Main Street.When a Highway Runs Through It: A Handbook for Oregon Communities*. Oregon Department of Land Conservation and Development, Salem, Oregon, 1999. http://www.oregon.gov/LCD/Publications/MainStreet_HighwayThroughIt_1999.pdf.

File Code	New	Notes
Unassigned	June 2024	Liability neutral language edits.

Parking 501.0

Standards & Guidelines

01 See the Highway Design Manual (*1*) for information regarding the appropriateness of on-street parking.

02 The Highway Design Manual (*1*) only allows parallel parking on state highways. Any other type of on-street parking, such as diagonal parking, requires a roadway design exception. See the Highway Design Manual for more information.

03 Parking control on highways is covered in ORS 810.160, ORS 810.200, ORS 811.550, OAR 734-020-0020, OAR 734-020-0080, OAR 734-020-0085, and OAR 734-020-0090.

04 The Region Traffic Unit should maintain a database of parking prohibitions and restrictions that the region traffic engineer has ordered.

05 Parking spaces reserved for persons with disabilities shall meet the minimum requirements found in Oregon Transportation Commission Standards for Accessible Parking Places (*2*).

Process & Required Approvals

The region traffic engineer designates parking prohibitions or restrictions on state highways under ORS 810.160 and OAR 734-020-0020. The region traffic engineer does not need to designate parking prohibitions where parking is already prohibited by statute (ORS 811.550).

Region traffic engineer approval is required when adding traffic control devices (like parking space markings or signs) that allow parking within a T-intersection. Approval requests should note that on-street parking will not interfere with applicable safety and operations considerations, such as sight distance and vehicle turning movement needs for the intersection, and that conflicting crosswalks are closed, if applicable.

A city or county may ask the ODOT region traffic office for a parking prohibition or restriction on a state highway. The ODOT region office then does an engineering investigation per OAR 734-020-0020 using Form 734-2804.

Once the region traffic office completes the investigation, the region traffic engineer reviews it and decides to approve or deny the parking prohibition or restriction. The region traffic engineer's decision shall be forwarded to the Traffic Engineering Section for filing by the state traffic engineer (send to tradminsupport@odot.oregon.gov).

When the region traffic engineer approves a parking prohibition or restriction , the appropriate sign crew will receive instructions to install the signs and to notify the state traffic engineer of the installation date (send to tradminsupport@odot.oregon.gov). The region traffic engineer will also send a letter to the appropriate enforcement agency, notifying them of the prohibition or restriction.

Special Considerations

Engineering Investigation

As a minimum, the investigation should include the following:

- On-site observation of safety and traffic flow conditions, preferably at a time of day when vehicles are parked in the proposed prohibition or restriction zone.
- Photographs of the area from different approaches to show conditions at the site, preferably at a time of day when vehicles are parked in the proposed prohibition or restriction zone.
- Contact, when appropriate, with affected businesses, citizens, police agencies, and local government jurisdictions, to explain the proposed parking prohibition or restriction, and to solicit their input. This can usually be accomplished by a person-to-person conversation, but in some instances may include attending a meeting of the local government authorities or a public hearing.

The following three items should be included in documentation forwarded to the Traffic Engineering Section:

- Completed parking prohibition request form.
- Map or sketch of the vicinity with the proposed locations labeled.
- Photographs taken for the investigation.

Normally, one or more of the following justifications are necessary for approving a request to prohibit parking:

- Safety – this usually, but not always, has to do with sight distance for vehicles entering from a side street or driveway.
- Congestion – vehicles parked in the area impede the flow of traffic.
- Damage to the facility – an example might be if parked vehicles are causing the shoulder to slough off.
- Frequent use of the facility for a purpose not intended – this could be any number of things (unauthorized vending, dumping of trash or sewage, etc.).

In addition to these justifications, limited parking restrictions are sometimes granted as a courtesy to municipalities who request them (time limit, height restriction not related to sight distance, loading zone, parking spaces reserved for persons with disabilities, etc.). These requests are evaluated on a case-by-case basis, and typically with the understanding that the city will be responsible for installation and maintenance of the signs, and for enforcing the restriction.

Metered Parking

ODOT does not have statutory authority to charge fees for parking, except for winter recreation parking permits under ORS 811.600. Depending on a city's ordinances and agreements with ODOT, a city can charge for parking on a state highway routed over a city street.

Parking Within T-Intersections

In some limited cases, such as unsignalized T intersections in low-speed downtown contexts, the city might want on-street parking across the top of the T, such as in Figure 501.0-1.

Figure 501.0-1: Parking Within a T-Intersection

ORS 811.550 prohibits parking within an intersection, on a crosswalk, and within 20 feet of a crosswalk at an intersection, with some exceptions. This prohibition improves visibility of pedestrians and other potential conflicts at the intersection and allows curb ramps to serve the crosswalk without being blocked by vehicles.

One exception (ORS 811.560(6)) allows vehicles to park in these areas at the direction of a traffic control device, such as signs and/or pavement markings from the MUTCD (3). This can be considered where the conflicting crosswalk is closed, if applicable, and where on-street parking would not interfere with applicable safety and operations considerations, such as sight distance and vehicle turning movement needs at the intersection.

Requests to close crosswalks at unsignalized T-intersections still follow the process in **Section 310.8**.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Sight Distance 203.0
Uniform Traffic Control Devices 300.0
Interim Approvals 300.1
Uncontrolled Marked Crosswalks 310.3
Accessible Parking Spaces 312.0
Traffic Calming 500.5

Key References

1. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.
2. Oregon Transportation Commission. *Standards for Accessible Parking Places*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/DOCS_ADA/ADA_Standards-Accessible-Parking.pdf.
3. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

File Code	Updated	Notes
TRA 07-01, TRA 07-01-05, TRA 16	June 2024	Updated state traffic engineer and Traffic Engineering Section.

Access Management 502.0

Access management is a comprehensive approach for improving safety and efficiency of traffic operations on transportation facilities, while providing statewide accessibility and mobility.

Standards & Guidelines

01 Criteria for the access management policies and guidelines are covered in the Oregon Highway Plan (*1*) and Chapter 734, Division 51 of the Oregon Administrative Rules.

Process & Required Approvals

Region access management engineers (RAMEs) play a lead role in individual projects and the development review process. Providing key technical support for access management standards, the RAMEs provide a communication link between central staff and region staff.

They also act as an ODOT advisory group along with central staff on access management issues, reviewing standards, policies, and practices and making recommendations.

The Traffic Engineering Section is involved in access management standards and the grants of access process. For example, the state traffic engineer evaluates applications for grants of access and recommends approval or denial to the technical services manager (chief engineer) (OAR 734-051-2020(10)). The Traffic Engineering Section also is involved in the approval and design of traffic signals and other traffic control devices, lane configurations, U-turns, freeways, interchanges, etc. (see **Section 100.0**). Reviewing traffic impact analyses gives the Traffic Engineering Section an opportunity to determine the effects of new signals on traffic signal progression, check for adequate traffic storage and sight distances, and check that designs are consistent with access management standards for the class of road facility. Such reviews can also consider the needs of transit, pedestrians, and bicyclists in the site and vicinity design.

Support

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 established national policy support for considering access management in congestion management and corridor preservation. Standards are established for the different classes of roads in design characteristics such as:

- Freeway/highway access management.
- Interchange spacing.
- Spacing and control of median openings.
- Signal spacing.
- Intersection spacing.
- Driveway spacing and consolidation.
- Provision of turn lanes, and acceleration and deceleration lanes.

These standards usually reflect land-zoning regulations. Implementing access management can separate and reduce conflicts, which may reduce the likelihood of crashes. For example, turn lanes may reduce rear-end crashes and let traffic flow with less interruption. Consistent interchange spacing (together with full access control) can improve driver expectancy and reduce the turbulence caused by merging and diverging freeway traffic. Access management can:

- Reduce crashes.
- Reduce delays.
- Reduce travel times and fuel consumption.
- Improve traffic signal progression by maintaining travel speeds.
- Reduce congestion and environmental pollution and help meet congestion management and air quality (CMAQ) goals.
- Increase capacities of various types of facilities,
- Improve local economies by improving accessibility to businesses and expand their market areas.
- Reduce the urgency and pressure on local governments to build more roads to balance the effects of mismanagement of the existing facilities.

Cross References

Sight Distance 203.0
Intersection Control Evaluation 400.0
U-Turns at Signalized Intersections 404.2
Right Turn Lanes 405.1
Right Turn Acceleration Lanes 405.3
Turn Prohibitions 405.7
Interchange Modification Requests 406.0
Grants of Access 502.1
Capacity Analysis 508.0
Traffic Impact Studies 508.1
Legislature 600.0

Key References

1. Oregon Department of Transportation. *Oregon Highway Plan*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/odot/planning/pages/plans.aspx.

File Code	Updated	Notes
Unassigned	June 2024	Updated Traffic Engineering Section and Grant involvement.

Grants of Access 502.1

A grant of access is required to create a new approach where no right of access (access control) exists between the highway and a portion or all of a property abutting the highway.

Standards & Guidelines

01 See OAR 734-051-2020.

Process & Required Approvals

The issues surrounding the applications for grants of access can be complex. The state traffic-roadway engineer chairs a centralized review committee, the Statewide Grant Review Committee (SGRC), with representatives from various disciplines within ODOT. The role of the committee is to provide consistent and fair decisions across the state, decisions that protect Oregon's highway system and are in the best interests of the traveling public.

When ODOT receives an application for an approach to a state highway, ODOT must determine if an approach (either public or private) is legally permissible and if it meets established policies. If it is determined that the approach is in an area where an approach would not violate established policies but has no legal right of access to the highway, an application for a grant of access may be filed. To approve a grant of access ODOT must determine either that access control is no longer necessary or that the approach would benefit the State Highway System.

Special Considerations

For safety and operational reasons, breaking access control for grants of access is generally difficult to justify.

Cross References

State Traffic Engineer 100.0
Access Management 502.0

File Code	Updated	Notes
Unassigned	January 2020	Corrected grammar.

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Climbing & Passing Lanes 503.0

Passing lanes are distinguished from climbing lanes. Climbing lanes are generally used where grades cause unreasonable reductions in operating speeds of some vehicles. Passing lanes are typically used where there may be inadequate passing opportunities either because of sight distance limitation or as traffic volumes begin to approach capacity.

Standards & Guidelines

01 See the Highway Design Manual (*1*) for more information on climbing or passing lanes.

Process & Required Approvals

The need for a passing or climbing lane may be identified at the district or region level. Transportation Planning Analysis Unit should be contacted to help analyze when and where climbing or passing lanes may be needed. The Region Traffic Unit can assist by requesting or conducting spot speed checks, requesting crash data summaries, and documenting on-site observations.

Climbing and passing lanes are not a delegated authority of the state traffic engineer and do not require the state traffic engineer's approval.

Current ODOT policy does not allow construction of new slow vehicle turnouts unless allowed by a roadway design exception.

Special Considerations

Passing lanes tend to reduce aggressive passing maneuvers and may reduce the likelihood of head-on and sideswipe crashes. The addition of a climbing or passing lane can break up the formation of queues for a limited distance. Typically, queues begin to re-form downstream from a climbing/passing lane within ½ to 1 mile. Note that passing and climbing lanes do not actually add capacity to a facility.

Special consideration should be given for when no passing zones should be established in the single lane direction of 3-lane climbing and passing lanes. Refer to the Traffic Line Manual (*2*) for specific guidance on when no passing zones should be established on 3-lane sections of highway.

Slow vehicle turnouts are not considered adequate opportunities for passing, since they are ineffective without the cooperation of slower vehicles and are generally too short to completely break up an established queue. These should only be considered when a passing lane is not feasible and not as an alternative to a passing lane.

Cross References

Crash Analysis 201.0
Sight Distance 203.0
Uniform Traffic Control Devices 300.0
Pavement Markings 303.0
Lane Reduction Transition 504.0
Capacity Analysis 508.0

Key References

1. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.
2. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.

File Code	Updated	Notes
Unassigned	June 2024	Updated state traffic engineer and Traffic Engineering Section.

Lane Reduction Transition 504.0

Standards & Guidelines

01 When reducing the number of lanes of traffic, the right lane is normally dropped. This practice should be followed whenever possible to match driver expectation and to avoid high-speed traffic making a merge maneuver.

02 In situations where terrain, roadway geometry, or other factors suggest otherwise, the left lane may be dropped.

03 Sign and stripe lane reduction transitions following guidance provided in the Sign Policy and Guidelines for the State Highway System (*1*), Sign Design Manual (*2*), Traffic Line Manual (*3*), and Parts 2 and 3 of the MUTCD (*4*).

Support

Uniform signing and striping reduces driver confusion.

Cross References

Uniform Traffic Control Devices........300.0
Signs........302.0
Pavement Markings........303.0
Climbing & Passing Lanes........503.0

Key References

1. Oregon Department of Transportation. *Sign Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx.
2. Oregon Department of Transportation. *Traffic Sign Design Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. http://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Sign-Design-Manual.pdf.
3. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
4. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

File Code	Updated	Notes
TRA 16-02	January 2018	Resolved conflicts w/MUTCD, TLM, & SDM. Reformat 1/20.

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Road Closures 505.0

Standards & Guidelines

01 Temporary or conditional closure of highways is covered by OAR 734-020-0150.

Special Considerations

The Traffic Engineering Section does not initiate closures but may offer technical assistance.

Cross References

Uniform Traffic Control Devices.......300.0
Temporary Traffic Control.......306.0
Special Events.......603.0

File Code	Updated	Notes
Unassigned	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Truck Routes 506.0

Prior to 2002, designation of local truck routes was allowed per ORS 810.040 designation of truck routes. In general, the statute says that a road authority can designate any of its highways as a truck route and prohibit the operation of trucks upon any other of its highways that serves the same route or area served by the truck route designated.

As the result of a 2002 Supreme Court decision, ORS 810.040 has been preempted to the extent that in an addition to receiving a delegation of state authority to proceed, the local jurisdiction now must also establish a bona fide safety reason to create the truck route and that burden was not created by ORS 810.040. For decision-making purposes, it is necessary to characterize "bona fide safety reasons" and determine how local jurisdictions can show that designation of a local truck route is warranted.

Process & Required Approvals

The authority to designate truck routes or prohibit truck operation is given to the road authority under the provisions of ORS 810.040. On state highways, the Oregon Transportation Commission (OTC) designates truck routes. The state traffic engineer has been given the authority to prohibit truck (large or heavy vehicles) operation under the provisions of ORS 810.030. Based on the outcome of a Supreme Court case, ODOT has established a procedure (*1*) to guide staff and local jurisdictions in establishing truck routes.

To establish a truck prohibition, a request from the region manager must be forwarded to the state traffic engineer following the procedure outlined by the Policy, Data & Analysis Division. The procedure may be obtained by contacting the Planning and Implementation Unit of the ODOT Planning Section.

The Approval Procedure for Local Truck Routes (*1*) is a lengthy process that involves the engagement of several stakeholders including local government, motor carrier interests, residents, businesses, the state traffic engineer, and ultimately the Oregon Transportation Commission (OTC), which denies or approves all local truck route requests associated with redirecting traffic off the State Highway System. Questions about the process should be directed to the Planning and Implementation Unit of the ODOT Planning Section.

Cross References

State Traffic Engineer 100.0
Uniform Traffic Control Devices 300.0
Turn Prohibitions 405.7

Key References

1. Oregon Department of Transportation. ODOT Approval Procedure for Local Truck Routes. https://www.oregon.gov/ODOT/Planning/Documents/LocalTruckRoute_ApprovalProcedure.pdf. Accessed July 8, 2019.

File Code	Updated	Notes
TRA 18	June 2024	Updated state traffic engineer and Traffic Engineering Section.

One-Way Operation for Trucks & Buses 507.0

Standards & Guidelines

01 See OAR 734-020-0125 and 734-020-0130 for further information and the required field data for investigation reports.

Process & Required Approvals

The chief engineer has been delegated the authority to designate sections of highways that allow one-way operation by class or type of vehicle through OAR 734-020-0125. Chief engineer approval is also required to remove an existing one-way operation for trucks and buses.

The state traffic engineer, through region traffic engineers, prepares reports for the chief engineer as needed according to OAR 734-020-0130 for consideration of designating or removing sections of highway for one-way operation of trucks and buses.

Cross References

State Traffic Engineer 100.0
Crash Analysis 201.0
Sight Distance 203.0
Uniform Traffic Control Devices............ 300.0

File Code	Updated	Notes
Unassigned	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Capacity Analysis 508.0

A capacity analysis determines the existing or future quality of operations (level of service) on a part of a transportation system – freeways, rural highways, intersections, etc.

Standards & Guidelines

01 Follow the established Analysis Procedures Manual (*1*) methods to complete a capacity analysis.

Process & Required Approvals

Requests from the regions to the Traffic Engineering Section to carry out a capacity analysis should also be addressed to the state traffic engineer, with all necessary information. Analysis results that influence decisions made at a local level will be returned to the requester. The Traffic Engineering Section will support the regions on the analysis but will normally not take the lead in public meetings that involve these investigations.

Special Considerations

Capacity analysis results are typically used in decisions involving access management issues, construction of a traffic signal, provision of extra lanes, etc. Some of these capacity changes can only be approved by the state traffic engineer under a letter of authority from the chief engineer or through Oregon Administrative Rule. Requests for approval should include all necessary documentation of an investigation and a recommendation from the investigator.

Cross References

State Traffic Engineer 100.0
Intersection Bicycle Boxes 309.2
Intersection Control Evaluation 400.0
Traffic Signal Operations 404.0
Right Turn Acceleration Lanes 405.3
Multiple Turn Lanes 405.6
Access Management 502.0
Climbing & Passing Lanes 503.0

Key References

1. Oregon Department of Transportation. *Analysis Procedures Manual*. Oregon Department of Transportation, Salem, Oregon. http://www.oregon.gov/ODOT/Planning/Pages/APM.aspx.

File Code	Updated	Notes
TRA 16-07-21 TRA 03-00-01	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Traffic Impact Studies 508.1

A traffic impact study (TIS) typically describes, in detail, how a specific development will affect local, or perhaps, regional, transportation systems.

Standards & Guidelines

01 ODOT has established rules covering access management issues. Specific detail on when a TIS is required and the necessary documentation can be found in OAR 734 Division 51, and in the Development Review Guidelines (*1*).

Process & Required Approvals

The Traffic Engineering Section may be asked to review a TIS as part of the developmental review process.

Special Considerations

Many communities as well as ODOT might require a TIS before highway approach permits are granted. A TIS might also precede zoning changes, approvals of site plans or subdivision maps, or the preparation of environmental documents.

The Institute of Transportation Engineers (*2*) recommends that a TIS be prepared for any project that generates more than 100 peak hour trips, or when a development is likely to cause other significant traffic flow impacts.

Cross References

Intersection Control Evaluation 400.0
Right Turn Lanes 405.1
Access Management 502.0

References

1. Oregon Department of Transportation. *Development Review Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Planning/Documents/Development-Review-Guidelines.pdf.
2. Institute of Transportation Engineers. *Transportation Impact Analyses for Site Development*, 2010 ed. Institute of Transportation Engineers, 2010.

File Code	Updated	Notes
TRA 15	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Freeway Median Crossovers 510.0

Freeway median crossovers help facilitate maintenance activities such as snow removal and provide access for law enforcement or emergency responders to reach roadway incidents. OAR 734-020-0100 defines freeway, median, and crossover as used in this section.

Standards & Guidelines

01 Freeway median crossovers may be constructed on freeways and fully access-controlled expressways so that maintenance crews, emergency service providers, and law enforcement officials can avoid traveling long distances to respond to incidents, perform enforcement activities, and maintain highway operations.

02 OAR 734-020-0100 through 734-020-0115 covers criteria for approval of freeway median crossovers, conditions under which crossovers may be utilized, and persons authorized to use crossovers.

03 The AUTHORIZED VEHICLES ONLY (R5-11) sign should be used at freeway median crossovers to direct motorists not to use the crossovers.

04 See the Traffic Line Manual (*1*) for crossover identification layouts.

Process & Required Approvals

The state traffic engineer can approve freeway crossovers if the location meets all criteria and conditions listed in OAR 734-020-0105. The region traffic engineer sends requests to state traffic engineer for review.

If one or more of those criteria are not met, the chief engineer (also called the technical services manager), considering need and safety, may approve installation of a freeway median crossover based on an engineering investigation. The state traffic engineer must review the region's recommendation and submit it to the chief engineer for consideration.

Special Considerations

Although freeway median crossovers can be beneficial to maintenance crews and emergency responders, the region traffic engineer must account for several considerations before submitting a request to the state traffic engineer:

- Is there sufficient width on the inside shoulder and in the median to accommodate a crossover (e.g. allowing authorized vehicles to exit or enter the traffic stream in a safe manner)?
- Is there adequate sight distance for authorized vehicles to enter the freeway from a stopped condition at the proposed location of the crossover? In most cases, this will be intersection sight distance determined according to AASHTO Green Book (*2*) Section 9.5.3 Case B1 – Left Turn from the Minor Road using a single-unit truck design vehicle.

- Are other crossover opportunities located more than three miles in either direction from the proposed crossover location?
- Is the proposed crossover located away from merging and weaving maneuvers associated with a nearby entrance or exit ramp?
- Is the proposed crossover located more than ½ mile away from undercrossing or overcrossing structures that might obscure the sight distance approaching the crossover?
- Has there been communication and coordination between ODOT, local law enforcement, Oregon State Police, and emergency responders on the proposed location of the crossover and the needs of authorized users of the crossover?
- How do maintenance crews and emergency responders currently access the opposite direction and how would having the crossover improve safety and operations?

OAR 734-020-0105 covers many of the considerations listed above. Coordination with Oregon State Police is a key consideration as there are limited crossover opportunities for troopers to engage in enforcement activities or respond to freeway incidents in the opposite direction.

Cross References

State Traffic Engineer 100.0
Region Traffic Engineer 100.1
Sight Distance 203.0
Uniform Traffic Control Devices 300.0
Signs 302.0

References

1. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
2. American Association of State Highway and Transportation Officials. *A Policy on Geometric Design of Highways and Streets*, 7th ed. American Association of State Highway and Transportation Officials, Washington, D.C., 2018.

File Code	Updated	Notes
TRA 16-08-05	January 2021	Corrected grammar.

Legislature 600.0

The Traffic Engineering Section serves as advisor on legislative bills relating to traffic engineering, roadway engineering, contracting, access management, and issues associated with the Oregon Vehicle Code.

Process & Required Approvals

During each session of the Oregon Legislative Assembly, staff from the Traffic Engineering Section are actively involved in reviewing and completing the analysis of such bills. This includes reviewing and tracking bills, identifying potential ODOT impact, preparing for the hearings and providing the fiscal impact and written testimony for each bill and/or amendments.

Participants work through the Delivery & Operations Division coordinators and the ODOT legislative coordinators in presenting ODOT's position on numerous bills. Some of this work extends beyond the annual legislative sessions to include legislative reports and Oregon Administrative Rules that must be developed in response to bills passed during the previous legislative sessions.

The Traffic Engineering Section also initiates legislation to help introduce or clarify traffic issues covered in the Oregon Vehicle Code through legislative concepts developed by the Oregon Traffic Control Devices Committee (OTCDC).

Cross References

Traffic Manual Updates 103.0
Access Management 502.0

File Code	Updated	Notes
LEG 05	January 2021	Updated division title. Corrected grammar.

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Naming Highway Facilities 601.0

The following guidelines are taken directly from the Oregon Transportation Commission's Policy for Naming Highway Facilities (*1*) and are to be case-by-case basis.

Standards & Guidelines

01 The Oregon Transportation Commission generally will not name highway facilities after individuals.

02 The Oregon Transportation Commission may elect to suspend guideline 1 if a requester can show compliance with the following criteria:

a. Demonstrated statewide support for naming a facility.
b. The honored individual shall have made a lasting contribution, with a significant and historic impact on Oregon.
c. The honored individual shall have been deceased for at least one year.
d. The facility is long enough to merit a title, such as a bridge or tunnel more than one half mile long, or a highway section with defined end points, which was completed as a whole.

03 The comments of the Oregon Geographic Names Board will be solicited prior to naming any highway facility. (Any federal recognition will be contingent upon their approval.)

Key References

1. Oregon Transportation Commission. Naming Highway Facilities. *Oregon Transportation Commission - Get Involved*, October 15, 1991. https://www.oregon.gov/ODOT/Get-Involved/OTC/OTCpolicy_naming.pdf. Accessed July 8, 2019.

File Code	Updated	Notes
PUB 17-01	March 2001	Updated to match Commission Policy 05. Reformatted 1/20.

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Historical Markers 602.0

Historical markers are installed in state highway right-of-way to provide road user service signing of historical points of interest.

Process & Required Approvals

The Historical Marker Program has been transferred to the Travel Information Council through an interagency agreement, along with other sign programs of motorist service nature. The Oregon Historical Marker Committee oversees the program and meets on a quarterly basis. A staff member of the Traffic Engineering Section serves on the committee.

Cross References

Signs 302.0

File Code	Updated	Notes
PAR 07-03	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Special Events 603.0

Standards & Guidelines

01 The applicant shall, at their expense, provide a traffic control plan that complies with current standards of the MUTCD (*1*) and with the Oregon Supplement to the MUTCD (*2*). Signs used in conjunction with special events must also comply with the Sign Policy and Guidelines for the State Highway System (*3*).

Process & Required Approvals

Special events held on state highway right-of-way require a permit, issued by the ODOT District office with jurisdiction and in accordance with criteria established by OAR 734-056-0030. The Traffic Engineering Section may be asked to review permit applications.

Cross References

Uniform Traffic Control Devices 300.0
Variable Message Signs 302.1
Highway Advisory Radio 302.3
Road Closures 505.0

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Oregon Department of Transportation. *Oregon Supplement to the Manual on Uniform Traffic Control Devices*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/MUTCD-OR-Supplement.pdf.
3. Oregon Department of Transportation. *Sign Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx.

File Code	New	Notes
TRA 23-37	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Oregon Department of Transportation

Oregon Department of Transportation and Oregon Traffic Control Devices Committee:

Red Light Running Camera Guidelines for State Highways

Engineering & Technical Services Branch

Traffic Engineering Section

June 2024

https://www.oregon.gov/ODOT/Engineering/Pages/Traffic-Roadway.aspx

Review and Revision History

Approved by the state traffic engineer, in consultation with the Oregon Traffic Control Devices Committee, for use on state highways and adopted by the Oregon Traffic Control Devices Committee as a guide to assist Oregon cities in the deployment of red-light running cameras.

Angela Kargel, State Traffic Engineer
June 2024

Major Revisions Included in this Version

1. Changed state traffic-roadway engineer to state traffic engineer, changed Traffic-Roadway Section to Traffic Engineering Section.

Major Revisions Included in Previous Versions

1. Added "duly authorized traffic enforcement agent" as someone who can verify photo evidence before issuing a citation per HB-4105 (2022 Regular Oregon Legislative Session).
2. Added section on using red light cameras for automated speed enforcement.
3. Added paragraph that requires agencies to provide ODOT a copy of legislative report.
4. Revised legislative report requirement from "regular session" to "odd-numbered year" to reflect legislative change in 2013.
5. New bullets in the crash history requirements for the safety and operations report.
6. New section – "Future Changes to the Intersection."
7. Various clarifying changes in the section Procedure for State Highways.
8. New section – Removal procedure for red light running cameras.
9. New section – "Conditions of Approval."
10. New appendix with web link to the Red-Light Running Toolbox.
11. Removed the requirement that the Oregon Department of Transportation provide an executive summary of evaluations of the systems to the Oregon Legislature.
12. Added a requirement that each city that operates cameras present an evaluation of the use and administration of the cameras to the Oregon Legislature.
13. Clarifications for requirements to send ODOT a copy of the biennial report.
14. Clarifications for engineering study to accompany biennial report.
15. Clarification of requirements for engineering study to add speed enforcement to an existing RLR camera with the addition of a checklist.

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Introduction

The Oregon Department of Transportation (ODOT) and the Oregon Traffic Control Devices Committee (OTCDC) have prepared the Red Light Running (RLR) Camera Guidelines to assist local jurisdictions in the deployment of RLR cameras on state highways.

Local jurisdictions should follow this guidance for installation of RLR cameras off state highways or develop their own guidance for application.

Supporting Legislation

In response to what appeared to be a growing disrespect for traffic laws in general and disobeying red traffic signal indications in particular, the Oregon Legislature enacted a law in 1999 to help Oregon communities effectively enforce and reduce red light running. The Legislature has revised and expanded the law several times since.

These guidelines are based on Oregon Revised Statutes (ORS) 810.434 through 810.436. In 2017, the Oregon Legislature revised ORS 810.434 and 810.436 to allow RLR cameras to be used to cite for violating the posted speed.

RLR Camera System Justification

In 2020, 928 people were killed and an estimated 116,000 were injured in crashes that involved red light running in the Unites States. About half of the deaths in red light running crashes are pedestrians, bicyclists, and people in other vehicles who are hit by the red-light runners (*1*). Studies have reported that red light cameras reduce angle and turning crashes but can increase rear-end crashes. Because the types of crashes prevented by red light cameras tend to be more severe than rear-end crashes, research has shown there is also a reduction in the severity of crashes.

The Highway Safety manual (published by AASHTO) quantifies the expected crash reductions of different measures. These measures are only included if there is known statistical stability and reliability. The Highway Safety Manual lists the expected crash effects for installation of red-light cameras as a 25 percent crash reduction in angle crashes and a 15 percent increase in rear-end crashes (*2*).

RLR cameras are not a safety cure-all (see **Appendix A – RLR Toolbox**). RLR cameras have the potential to reduce the number and severity of crashes, but because of the likelihood for increasing rear-end crashes, RLR cameras should be installed only where a history of RLR crashes can be documented within the last five years. When used, they should be a part of a process that considers education, enforcement, and engineering. Reducing fatal and severe injury crashes is the principal goal of RLR camera enforcement programs.

The following are means of improving intersection safety prior to RLR cameras the jurisdiction should consider:

1. Proper sight distance.
2. Speed zones are consistent with engineering practice.
3. The number, size, and location of vehicle heads are consistent with the Manual on Uniform Traffic Control Devices (MUTCD) and ODOT's Traffic Signal Policy and Guidelines.
4. Proper yellow change and red clearance intervals are consistent with ODOT's Traffic Signal Policy and Guidelines or other jurisdictions' adopted policy.
5. Corridor progression timing does not contribute to red light running.
6. Enforcement "tattletale" lights.
7. The traffic signal timing is consistent with traffic volume, speed, and specific intersection design elements.

RLR Camera System Implementation

RLR cameras monitor both the flow of traffic at the stop location and the condition (or color) of the traffic signal indication on the approach. Special detectors, commonly loops cut into the pavement, check for the passage of vehicles into the intersection and if the traffic signal phase condition is red, cause pole mounted cameras to record pictures of the vehicle position, license plate and driver. Upon verification by a police officer or duly authorized traffic enforcement agent, the vehicle owner is issued a citation through the mail. Camera systems should differentiate between vehicles running a red light and those vehicles stopping slightly beyond the stop bar or those vehicles, after stopping, making a legal turn against a red indication.

Typically, RLR camera systems are installed under contract, by a commercial firm that specializes in such systems. These contracts cover the furnishing, installation, and operation of the RLR cameras. The firm may also prepare the evidence for verification by local law enforcement and mail the citation. As compensation, the firm usually collects a predetermined fee for this service when the citation fine is received.

If the candidate location is at a state highway intersection or on a state highway approach, application to and approval of ODOT is required.

Automated Speed Enforcement

Oregon law allows RLR cameras to also detect and issue speeding violations for motorists violating speeds by 11 mph or greater. Cities may not issue a speeding violation concurrently with a red-light running violation, unless the motorist was exceeding the posted speed by more than 20 mph.

The placement of the RLR devices is primarily to reduce red light running crashes and may only be placed at signalized intersections. The placement of RLR cameras should be limited to locations that demonstrate a history of red-light running crashes and not specifically to curtail speed related crashes. The primary consideration will be to reduce severe red light running crashes. Reducing speed related crashes will be a secondary consideration.

When there is also a history of speed related crashes, the Safety and Operations report should account for any pertinent considerations found in the Fixed Photo Radar (FPR) Camera Guidelines (Traffic Manual Appendix A2).

Placement of a RLR camera system is proven to have a favorable effect on traffic safety by reducing severe crashes (3). However, since less severe rear-end crashes are still likely to increase, due to the presence of the RLR camera, it is still necessary to demonstrate that there has been a history of severe red light running crashes that are being mitigated by the RLR camera.

To request adding speed enforcement to an existing RLR camera installation or at the time of installation of the RLR camera complete a RLR Camera Speed Enforcement Request Form (included as part of this guide) and attach appropriate documentation.

Documentation may vary, but typically includes crash data, comments from law enforcement, current speed zone order, and plans for modifications. When adding speed enforcement to an existing RLR if field changes are required to the RLR system this may require additional costs for an ODOT permit and inspection of the device.

Public Information Campaign and Sign Requirements

Oregon law requires that cities provide a public information campaign to inform local drivers about the use of RLR cameras before citations are issued. Educating the public is a critical step in reducing red light running. To effectively improve driving habits, drivers must be made aware that RLR cameras are in use. It is recommended that cities hold well-publicized kickoff events and issue periodic press releases about the effectiveness of RLR camera enforcement within their jurisdictions.

Oregon law also requires that signs be posted, so far as practicable, on all major routes entering the jurisdiction indicating that compliance with traffic control devices is enforced through cameras. The law further requires that signs indicating that a camera may be in operation be posted near each intersection where a camera is installed.

Signs should be of appropriate size to be easily readable at the posted speed. Signs should be placed in such a manner that the motorist can easily see them, without undue visual clutter or obstruction.

If the RLR camera will be used for citing speed violations, consideration should be given to placing speed signs prior to the intersection approach or as near as possible to remind motorists of the posted speed.

Operational Considerations

- RLR cameras shall not affect the display or the operation of the traffic signal.
- Power for RLR camera equipment may be provided from the traffic signal cabinet and should be on its own identified circuit breaker.
- Contact closures, as may be required for red and yellow indications on RLR camera approaches, should be electrically isolated from traffic signal equipment.
- Detection loops for RLR camera equipment should not be wired through the traffic signal cabinet, associated electrical conduit, or junction boxes and shall not interfere with the operation of detector loops used for traffic signal operation. At state highway intersections, segregated wiring is required.
- Traffic signal timing changes shall not be made to increase the possibility of vehicles running red lights. If a review of traffic signal timing prior to RLR camera installation identifies inappropriate yellow change and red clearance interval values that require adjustment, these adjustments shall be made prior to operation of the RLR camera system.
- Traffic signal timing changes may be made in response to substantial changes in approach speed, significant changes to traffic patterns, routine timing reviews, design changes, etc.
- Plans showing the location of all proposed and existing equipment shall be prepared.
- Signs at each city limit, informing the public that compliance with traffic control devices is enforced using cameras, shall be provided if not already in place. An automated enforcement sign on each covered approach shall be installed and should be shown on or as an attachment to the signal plans. Refer to the MUTCD and the Oregon adopted supplements for guidance on signs that should be posted.

Site Considerations

RLR cameras may not be appropriate at locations where:

- Recent geometric or traffic signal design changes have been made. Supporting crash records may not be applicable in the new configuration.
- Traffic signals have been installed within the previous year. Crash history may be too short to support RLR camera use.
- Geometric or traffic signal design changes are scheduled, and an engineering evaluation indicates such changes may substantially alter the need for RLR camera enforcement.
- Road or utility work is anticipated during the first year of RLR operation.

- Traffic pattern changes resulting from development, construction detours or similar events are anticipated during the first year of RLR operation.
- An electrical interconnect with "railroad active warning devices" is provided on the approach.
- Design, operation or maintenance is inconsistent with state or local standards and practices.

Safety and Operations Report

A safety and operations report is required for all RLR camera systems to be installed at intersections on state highways and is strongly recommended for all other locations since it can provide the basis for the process and outcome evaluation required in ORS 810.434(3)(b). It may be desirable to secure the services of a professional engineer to conduct the necessary study.

In addition to a general project narrative, the safety and operations report should address to the extent practical the following:

Crash History

An engineering study of the crash experience at the intersection should be conducted.

- Target crashes for reduction at a RLR installation are angle crashes where the driver of one of the vehicles disregarded the traffic control device. Oregon crash records include codes for driver error and crash cause that describe these crashes (code for Participant Error code 020: "DISREGARDED TRAFFIC SIGNAL" and Crash Cause code 04: "DISREGARDED R-A-G TRAFFIC SIGNAL").
- Target crashes coded to driver inattention may also be included in the study.
- The study should identify target crashes at the intersection and on each approach or movement and compare the occurrence of target crashes with nearby intersections of similar volume, geometry, and traffic control.
- The study shall identify the approaches and movements to the intersections the applicant is requesting to be monitored by a RLR camera. Target crashes should be occurring on or from these approaches.
- Right turn approaches may have a high rate of violation but typically result in low severity or low crash occurrence and should not be included unless there is associated evidence of a significant crash history of high severity.

Other Considerations

Documentation detailing other considerations may be included in the report. These can include, but are not limited to:

- Traffic citation data.

- Complaints.
- Enforcement observations.
- Speeds, traffic volumes, and grades.
- Traffic signal spacing.
- Proximity to freeway or expressway ramp terminals.

Design Operations, and Maintenance Issues

Copies of signal plans showing the location of all proposed and existing equipment should be included. A description of how the RLR camera system will be operated and maintained should be provided. Any design, operations, or maintenance issues that could affect the potential effectiveness of a RLR camera system should be identified.

Public Information Campaign

The public information requirements as outlined in ORS 810.434 (3)(a) should be addressed.

Budget

A budget for system implementation and operation should be developed.

Professional Engineer Certification

The jurisdiction proposing to install a RLR camera system should secure the services of a professional engineer to attest that the traffic signal is operated and maintained in accordance with the MUTCD and appropriate state and local guidelines. This certification should be made available to the enforcing jurisdiction.

Future Changes to the Intersection

While every effort should be made to determine appropriate modifications and changes to the signal system prior to the installation of RLR cameras, land use and traffic patterns may change over time. Such changes may require a road authority to make changes to the signal system that may impact the operations of the RLR cameras equipment. At no time shall the presence of RLR cameras obstruct an agency from making necessary changes to improve the safety of the driving public or the operation of the traffic signal.

When changes are proposed to improve safety at the intersection, such as to improve geometry, remove or add lanes, or change the operational characteristics of the signal system, the RLR camera operations and the associated costs of changing the RLR cameras shall not be taken into account as the reason for not making such changes. Any changes to the RLR cameras and associated costs shall be the responsibility of the commercial firm under contract for operation of the RLR cameras and the jurisdiction overseeing the operation of the RLR camera system, depending on their agreements.

Biennial Report Requirement

Oregon law requires that once each biennium all cities using RLR camera systems must conduct a process and outcome evaluation that includes:

- The effect of the use of cameras on traffic safety.
- The degree of public acceptance of the use of cameras.
- The process of administration of the use of cameras.

Regardless of the jurisdiction in the position of road authority, the jurisdiction overseeing the operation of a RLR camera system shall prepare the biennial report and submit the report by March 1st of the year of each regular session to the legislative assembly. The biennial report should include the following information:

- Name, address, and phone number of person who will be the main RLR contact for this jurisdiction.
- Date of implementation.
- Number of intersections at which RLR cameras are installed.
- RLR contractor name.
- Crash data specific to RLR locations for the 3-year period prior to RLR camera installation and post RLR camera installation data to identify average crash rate and annual change.
- Public information surveys (if available) regarding jurisdiction's use of RLR cameras.
- Copies of media releases sent as a part of the public RLR awareness program.
- Description difficulties administering the RLR camera enforcement program.
- Available information on the local courts ability to handle the increase in citations.
- "Success stories" to share with the legislature about local RLR program such as major reductions in serious injuries and fatalities in the local jurisdiction due to RLR camera systems.

Each city that operates a camera system is responsible for presenting a report to the legislative assembly by March 1st of the odd-numbered year. Each city that operates a camera system on state highways shall provide ODOT with a copy of the biennial report to the legislature.

In addition to the biennial report to the legislature, the city shall submit an engineering report to ODOT once per biennium for each intersection on a state highway where the city operates a camera system and does signal timing for ODOT through an intergovernmental agreement. The report should:

1. Detail the signal timing parameters.
2. Include the engineer's recommendations and indicate whether the signal timing is appropriate for surrounding land uses, speeds, and roadway character.
3. Indicate whether the timing complies with ODOT policies and guidance including the red/yellow clearance times.
4. If the local jurisdiction maintains and manages signal timing for the state highway signal, report any changes to signal timing made during the biennium.

Approval Procedure for State Highways

Approval from the state traffic engineer is required for RLR camera installation and operation at all state-owned intersections, regardless of operation or maintenance responsibilities. The following procedure should be followed.

1. The applicant:
    a. Submits letter to ODOT region requesting authorization to install and operate a RLR camera at a specific state-owned intersection and specific movements monitored.
    b. The letter shall identify a responsible party to whom an ODOT permit will be issued and the point of contact responsible for the construction, operation, and public information requirements.
    c. The letter shall be accompanied by:
        i. The safety and operations report.
        ii. A statement of consistency with the operational considerations.
        iii. A statement of agreement with the conditions of approval.
2. Region traffic:
    a. Reviews RLR design and supporting documents and works with applicant so the RLR Camera Enforcement Installation Checklist (included as part of this guide) is complete.
    b. If supportive of the proposal, prepares all documents for the state traffic engineer with a recommendation to approve.
    c. Receives state traffic engineer response of approval or denial of the RLR camera and any conditions.

d. Leads development of an intergovernmental agreement (IGA), laying out terms of agreement as to the responsibilities and obligations of each jurisdiction for the RLR camera.

3. The district office:
   a. Establishes an account number through ODOT Financial Services identifying responsible party and budget in an order to render service.
   b. Establishes the amount of deposit to be paid by the applicant. If cost is more than the deposit the applicant will charged for the additional cost, if less then reimbursed.
   c. Issues miscellaneous permit to applicant stating conditions of approval. Conditions include the need for state traffic engineer approval.
4. The applicant:
   a. Signs the permit, acknowledging the conditions of approval.
   b. Agrees to pay for all actual costs incurred by ODOT relating to the installation, inspection, or repair, and any incidental costs.
   c. Pays a monetary deposit as determined by the district office. Below are examples of typical costs and services:
      i. Plan review by the Traffic Engineering Section estimated between $200 and $1000 per RLR camera installation.
      ii. Traffic signal cabinet and intersection modifications required to protect ODOT equipment and provide proper communication to RLR equipment estimated at $1000 per intersection.
      iii. Sign installation estimated at $200 per sign, $600 for sign and post.
      iv. Relocation or repair of existing traffic control devices resulting from the installation of RLR equipment (costs are based on time and materials plus any damages).
      v. Inspection of installation estimated between $200 and $1000.
5. The district office:
   a. Upon receipt of signed permit and deposit, forward plans and supporting documents to the region traffic manager.
   b. Notify the electrical crew responsible for the traffic signal and arranges for inspections of permit work.

State traffic engineer approval will be based on review of supporting documents and completion of final, ODOT approved plans and may stipulate further conditions of approval. The state traffic engineer will specify which movements are approved to receive RLR cameras.

Removal Procedure for State Highways

When considering removal of a RLR camera, a study should be performed to determine if the RLR camera should be removed or remain. A RLR camera may be ordered removed by the state traffic engineer for an intersection or a particular approach to an intersection or a particular movement at an intersection.

If for instance the study shows there is little or no reduction in the number, severity, or targeted crashes (i.e., angle crashes) or if similar results can be obtained from engineering countermeasures such as improving sight distance, conspicuity of the signal heads, signal timing or installation of "tattle tale" lights the region traffic engineer may recommend removal to the state traffic engineer.

Intersections where engineering or geometric improvements are proposed may require study of the new intersection geometry and may result in a request to remove RLR camera equipment. The study may include a determination of changes in conflicts, phasing changes to traffic signals, addition of turn lanes or diversions of traffic patterns that change the operations of the traffic signal.

The following procedure should be followed when considering removal of RLR cameras.

1. ODOT region traffic shall conduct a study.
    a. The study shall determine the safety effectiveness of the RLR camera at reducing crashes, severity of crashes and/or types of crashes (especially as they relate to angle crashes vs. rear-end crashes).
    b. The study shall recommend continued operation of the camera, removal of the camera and/or modifications to the operation of the camera or intersection.
    c. Measurements like changes in violations and compliance rates may be considered but are not the primary measure of safety.
    d. The study shall also consider the extent to which other countermeasures had been implemented prior to implementation of the RLR cameras or proposed changes to the intersection.
    e. Other considerations may include traffic volumes and delay, unusual or unique geometry, signal timing, operation and cycle lengths, driver behavior, and other engineering countermeasures to improve safety.
    f. The study shall include any proposed changes to the intersection such as engineering or geometric improvements that reduce or eliminate conflicts or change the operations of the traffic signal.
2. If the recommendation is to remove the RLR camera, ODOT should work together with the jurisdiction responsible for the RLR cameras to come to agreement for how to proceed with the recommendations of the study.

3. Additional input may include the public and/or enforcement to determine support or opposition to the removal.
4. Whether or not an agreement can be reached, ODOT region traffic will submit a recommendation to the state traffic engineer along with the study.
5. The jurisdiction responsible for the RLR camera may submit a recommendation with supporting documentation to the state traffic engineer.
6. The state traffic engineer decisions will be based on review of the study, the recommendations submitted, and any other input received.
7. The state traffic engineer may hold a meeting of interested parties to go over the issues.

The state traffic engineer may approve removal of the RLR camera, may approve the RLR camera remaining, and/or require engineering countermeasures or other changes to the intersection or roadway or cameras. The state traffic engineer's decision is final and will be based primarily on safety.

Upon request of the jurisdiction responsible for the RLR camera, the state traffic engineer may approve removal of the RLR camera without study of the intersection. Typically, this occurs under special conditions such as the vendor of the equipment goes out of business, a political entity passes an ordinance to remove the RLR camera or other circumstances as determined by the state traffic engineer.

References

1. Insurance Institute for Highway Safety. Red Light Running. May 2021. https://www.iihs.org/topics/red-light-running. Accessed March 18, 2022.
2. Bhagwant, P., F. M. Council, C. Lyon, K. Eccles, and M. Griffith. Multijurisdictional Safety Evaluation of Red Light Cameras. *Transportation Research Record: Journal of the Transportation Research Board of the National Academies*, Vol. 1922, no. 1, January 2005, pp. 29-37. DOI: https://doi.org/10.1177%2F0361198105192200105
3. De Pauw, E., S. Daniels, T. Brijs, E. Hermans, and G. Wets. To Brake or to Accelerate? Safety Effects of Combined Speed and Red Light Cameras. *Journal of Safety Research*, Vol. 50, September 2014, pp. 59-65. DOI: https://doi.org/10.1016/j.jsr.2014.03.011

RLR Camera Enforcement Installation Checklist for Non-State Highways

File Code: ________________

Acct. No.: ________________

Street Name: ____

Intersecting Street: ____

RLR Camera Approaches:____

- ☐ Traffic safety need based on crash history and other considerations has been documented.
- ☐ A public information contact has been identified.

  Contact Name: ____

  Address: ____

  Email ______________________________Telephone:________________

- ☐ Location approaches and movements have been identified.
- ☐ Traffic signal indications on the approach are visible from an adequate distance based on field observation. Current MUTCD signal visibility standards are met.
- ☐ Yellow change and red clearance intervals are displayed for at least the recommended time.
- ☐ No significant improvement project is scheduled or planned that would substantially alter the need for an RLR camera.
- ☐ Signs indicating that compliance with traffic control devices is enforced through cameras are posted (or will be provided by this project) on all major routes entering the jurisdiction.
- ☐ Signs indicating that a camera may be in operation will be posted on all approaches where a camera is to be installed.
- ☐ Signs indicating the correct speeds are nearby (in advance of the intersection).
- ☐ No known reason why an RLR camera should not be installed.

Checklist completed by: ______________________________ Date: ________________

RLR Camera Enforcement Installation Checklist for State Highways

File Code: ________________

Acct. No.: ________________

TSSU Location ID: ______________________ Region: ____________ District: __________________

Street Name: ____

Intersecting Street: ____

RLR Camera Approaches: ____

Applicant (city/county) ____

- ☐ Local jurisdiction has identified crash patterns related to red light running.
- ☐ A local jurisdiction point of contact has been identified.

  Contact Name: ____

  Address: ____

  Email ____ Telephone: _______________________

- ☐ Location approaches and movements have been identified.
- ☐ Traffic signal indications on the approach are visible from an adequate distance based on field observation. Current MUTCD signal visibility standards are met.
- ☐ Yellow change and red clearance intervals are displayed for at least the recommended time.
- ☐ No significant improvement project is scheduled or planned that would substantially alter the need for an RLR camera.
- ☐ Signs indicating that compliance with traffic control devices is enforced through cameras are posted (or will be provided by this project) on all major routes entering the jurisdiction.
- ☐ Signs indicating that a camera may be in operation will be posted on all approaches where a camera is to be installed.
- ☐ Signs indicating the correct speeds are nearby (in advance of the intersection).
- ☐ No known reason why an RLR camera should not be installed.

Checklist completed by: ____________________________________ Date: ____________________

Conditions of Approval

The applicant agrees:

1. The cost of any required changes to the RLR camera equipment because of changes or modifications to the intersection, regardless of who implements the changes, shall be the responsibility of the applicant and/or any commercial firm under contract for operation of the cameras.
2. ODOT has the discretion to make changes at the intersection to improve safety, such as modify geometry, remove or add traffic lanes, or change the operating characteristics of the intersections, up to and including ordering the removal of the camera systems or the removal of cameras for particular movements.
3. When ODOT desires to modify an intersection with a RLR camera to improve operations or safety it may do so without consideration to the cost of changes to the camera system or impact to revenue generation on camera system or agreements between the applicant and any commercial firm operating the camera system. ODOT shall not be subject to any costs for changes, modifications, or removals of the camera system.
4. Applicant shall make available to ODOT all reasonable requests for records about the operations of the RLR cameras and the intersection, including but not limited to, number of violations by particular cameras or movements, total violations, distribution of violations, percentages of violations within specific time periods, crash records and/or operating parameters of the RLR camera.
5. Applicant shall ensure that signs at each city limit, informing the public that compliance with traffic control devices is enforced using cameras, are provided if not already in place. An automated enforcement sign on each covered approach shall be provided and shown on or as an attachment to the signal plans.
6. Applicant shall ensure a method for ODOT staff to turn off the camera system to perform routine maintenance of the signal system, including cabinet or controller replacement or timing changes.
7. Failure to comply with any of the conditions of approval listed herein or stipulated by the state traffic engineer shall be sufficient reason for the state traffic engineer to order removal of the RLR camera system.

RLR Camera Speed Enforcement Request Form for State Highways

File Code: ________________

Acct. No.: ________________

TSSU Location ID: ______________________ Region:____________ District:__________________

Street Name: ____

Intersecting Street: ____

Speed Enforcement Approaches:____

Applicant (city/county) ____

☐ Posted speed: ____

Spot Speed Check (only required for new installations of RLR cameras.)

85^{th} Percentile Speed:__________ Mean Speed: _____________ Pace limits:_______________

Percent over posted: __________ Percent 11 mph or more over posted: __________________

☐ A local jurisdiction point of contact has been identified.

Contact Name: ____

Address: ____

Email ____ Telephone:______________________

☐ Local jurisdiction has identified crash patterns related to speed.

☐ Documentation of enforcement observations and support.

☐ Public information campaign efforts to inform public of new enforcement.

☐ Signs indicating the correct speed will be posted on all approaches where enforcing speeds.

☐ Copy of the current speed zone order for the intersection area, if applicable.

☐ Copies of plans for modification of the system, if applicable.

☐ No known reason why speed enforcement should not be used at the RLR camera (review the Fixed Photo Radar Camera Guidelines).

Checklist completed by: ____________________________________ Date: ____________________

Attach documentation to this form and send to the corresponding ODOT region traffic unit.

Appendix A – RLR Toolbox

See the following website for additional information about RLR camera systems.

- Red Light Running Toolbox, Federal Highway Administration – https://safety.fhwa.dot.gov/intersection/conventional/signalized/rlr/rlr_toolbox/
- Speed Enforcement Camera Systems (automated speed enforcement), Federal Highway Administration – https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa09028/resources/Speed%20Camera%20Guidelines.pdf

File Code	New	Notes
TRA 07-06	January 2023	Incorporated 8/2019 edition RLR Guidelines; updated per HB4105(2022).

Oregon Department of Transportation and Oregon Traffic Control Devices Committee:

Fixed Photo Radar (FPR) Camera Guidelines for State Highways

Engineering & Technical Services Branch

Traffic Engineering Section

June 2024

https://www.oregon.gov/ODOT/Engineering/Pages/Traffic-Roadway.aspx

Review and Revision History

Approved by the state traffic engineer, in consultation with the Oregon Traffic Control Devices Committee for use on state highways and adopted by the Oregon Traffic Control Devices Committee as a guide to assist Oregon cities in the deployment of fixed photo radar (FPR) cameras.

Angela Kargel, State Traffic Engineer
June 2024

Major Revisions Included in this Version

1. Updated for changes to Fixed Photo Radar use in HB-4109 (2024 Regular Oregon Legislative Session), changed state traffic-roadway engineer to state traffic engineer, changed Traffic-Roadway Section to Traffic Engineering Section.
2. Corrected ORS reference numbers.
3. Clarified what HB-2095 (2023 Regular Oregon Legislative Session) does for photo speed enforcement in Supporting Legislation section.

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Introduction

This document has been prepared by the Oregon Department of Transportation (ODOT) and the Oregon Traffic Control Devices Committee (OTCDC) to assist cities in the deployment of fixed photo radar (FPR) cameras on state highways.

Supporting Legislation

The Oregon Legislature enacted HB-2621 in 2015 to allow the City of Portland to enforce and reduce speeding using fixed photo radar. The Legislature opened fixed photo radar to all cities in 2024 through HB-4109.

These guidelines are based on Oregon Revised Statutes (ORS) 810.438 and 810.444.

Fixed photo radar is different from mobile photo radar, though the statutes governing both are the same. Mobile photo radar is operated from a vehicle. Fixed photo radar is an automated, fixed-camera system.

FPR Camera Justification

From 2017 to 2021, 24.8 percent of fatal and serious injury crashes in Oregon were related to speed, meaning a driver was traveling too fast for the conditions or traveling faster than the speed limit. This was the most common driver behavioral issue associated with fatal and serious injury crashes in Oregon (*1*).

Speed safety cameras generally reduce speeding and crashes in the vicinity of the camera (*2*) and multiple federal agencies (NHTSA, CDC, NTSB, FHWA) recognize it as an effective safety countermeasure (*3*, *4*). More information on effectiveness and general considerations when implementing speed safety cameras is available in NHTSA’s Countermeasures that Work publication (*2*), FHWA’s Speed Safety Camera Program Planning and Operations Guide (*5*), and NCHRP Report 729 (*6*).

FPR cameras are not a safety cure-all. When used, they should be a part of a process that considers education, enforcement, and engineering. Reducing fatal and severe injury crashes should be the principal goal of a speed safety camera program. Support for such a program can be improved if the speed limit is set consistent with the context of the driving environment. The corridor should also be periodically checked for obscured or missing signs.

FPR Camera Implementation

FPR cameras monitor the flow of traffic along a corridor. Special equipment, commonly radar or lidar, detect passing vehicles. If a vehicle exceeds a preset speed, the camera takes pictures of the vehicle, license plate, and driver. A police officer or duly authorized traffic enforcement agent verifies the evidence, and the vehicle owner is issued a citation through the mail.

FPR cameras may be installed under contract by a company that specializes in such systems. These contracts can cover the furnishing, installation, and operation of the FPR cameras. The company may also prepare the evidence for verification by local law enforcement and mail the citation. As compensation, the company usually collects a predetermined fee for this service when the citation fine is received.

Costs that the local jurisdiction must cover include internal expenses for engineering plan review, site evaluation, and field engineering during the installation phase of the FPR camera system. Local jurisdictions can either custom design or purchase off the shelf systems and install and operate FPR camera systems.

If the candidate location is on a state highway, application to and approval of the Oregon Department of Transportation is required.

Public Information Campaign and Sign Requirements

Educating the public is a critical step in addressing speeding in high crash corridors. To effectively improve driving habits, drivers must be aware that FPR cameras are in use. One way to do this is holding well-publicized kickoff events and issuing periodic press releases about the effectiveness of FPR camera enforcement within a city.

Oregon law also requires that signs indicating “Traffic Laws Photo Enforced” and the driver’s current rate of speed within 100 to 400 yards before the location of the FPR unit (a vehicle speed feedback sign such as “YOUR SPEED XX”). The signs should be of appropriate size to be easily readable at the posted speed limit. Signs should be placed in such a manner that drivers can easily see the signs without undue visual clutter or obstruction. See Traffic Manual **Section 302.2** for more information.

Signs shall conform to the Manual on Uniform Traffic Control Devices and the Oregon Supplement to the MUTCD.

Site Selection

High crash corridors can include any road but most often they are roads with high traffic volumes and speeds, multiple lanes or conflicts, and different modes of users. The crash data should be analyzed to determine the factors associated with the crashes. Measures such as improved markings and signing, and other features can help mitigate speed related crashes. Education of the public can also be targeted at changing speeding behaviors.

Site selection should be done collaboratively between enforcement and engineering, so safety remains the top priority for the program. On state highways, ODOT region staff should be included in the site selection process. The highest priority sites should be located where there is greatest potential for fatal and severe injury crashes that are speed-related. Crash potential should be determined from crash history. The public is likely to perceive an FPR site where speeding is common but crashes are rare as a "speed trap."

FPR cameras may not be used on controlled access highways such as interstates or freeways.

Site selection should consider operational and site considerations, speed zone orders, and a safety and operations report (as shown below).

Operational and Site Considerations

FPR cameras must be operated according to applicable laws. Not all requirements of the law are listed below. The city is responsible for implementing the FPR according to the requirements listed in statute. The following include some requirements from statute and best practices for engineering:

- FPR cameras shall not obscure existing signing or other traffic control devices—this may require the movement of existing signing or the relocations of the camera unit or advance signing.
- Power for FPR camera equipment and advance signing shall be provided separately from existing equipment already installed on state highways.
- Any equipment necessary for FPR operations shall be isolated from existing traffic controls or equipment operated on the state highway.
- FPR cameras may not be appropriate on downhill grades or other similar locations, which may increase the possibility of a higher numbers of vehicle violations.
- Traffic control changes or roadway geometric changes may be made by the ODOT on state highways and operation of FPR cameras shall not be sufficient reason for delaying such improvements.
- FPR camera installations may not be appropriate where geometric or traffic control changes are scheduled, and an engineering evaluation indicates such changes may substantially alter the need for FPR camera enforcement.
- FPR camera installations may not be appropriate where design, operation, or maintenance is inconsistent with state or local standards and practices.
- Plans showing the location of all proposed equipment and signing shall be prepared.
- Signs and locations shall conform to the Manual on Uniform Traffic Control Devices and the Oregon Supplement to the MUTCD.
- Signing shall be spaced sufficiently apart so that motorists may make appropriate decisions.
- On state highways, ODOT will review the plans and may require changes before approval.

Speed Zone Orders

A thorough review of speed zone orders is required pertaining to the segments which cover the FPR operations. All speed zone orders shall have accompanying investigations. Consider reinvestigating speed zone orders if the segment has changed significantly since the last speed zone investigation. The city should determine that all speed zoning is correct per statutes or speed zone orders prior to operating a FPR system on city streets.

On state highways, ODOT will determine if the speed limit signing is correct and the locations consistent with the orders prior to establishing a FPR system on state highways. ODOT may choose to perform a new speed zone investigation of the area. All established speed limits shall meet the requirements in Oregon Administrative Rules for designating speed limits in Oregon.

Safety and Operations Report

A complete safety and operations report is required prior to installing FPR camera systems on state highways and is strongly recommended for locations on non-ODOT facilities. The report can provide the basis for the process and outcome evaluation required in Oregon law. The report shall be stamped by a registered professional engineer.

In addition to a general project narrative, the safety and operations report should address, to the extent practical, the following:

Crash History

An engineering study of the crash history on the FPR corridor shall be conducted on state highways.

- The study shall identify those target crashes to be impacted by FPR enforcement.
- The study shall compare the occurrence of target crashes in the corridor with nearby corridors of similar length, volume, geometry, traffic control, and posted speed.
- The study shall include documentation that the location is in a residential area, in a school zone, or documentation of the finding that the governing body of the city finds that speeding has had a negative impact on traffic safety, or that the location is in a residential area or in a school zone.
- The documentation shall include reportable crashes for the last 5 years of the most recent finalized crash data from the ODOT crash data system.

Safety Considerations

Documentation detailing other safety considerations should be included in the report:

- Traffic citation data.
- Complaints.

- Enforcement observations.
- Speeds, traffic volumes, and grades. Speeds should include percentage exceeding 5 mph and 10 mph over the posted speed limit.
- Traffic signal spacing.
- Proximity to freeway or expressway ramp terminals.
- A review of designated speed zones to assure that all zones are properly documented with speed zone orders and posted correctly per the speed zone order.
- A review of statutory speed zones to assure that there are no improper statutory speed limits (such as neighborhood speed of 25 mph on an arterial).

Design, Operations, and Maintenance Issues

Copies of plans showing the location of all existing and proposed equipment and signing should be included. A description of how the FPR camera system will be operated and maintained should be provided. Any design, operations, or maintenance issues that could affect the potential effectiveness of a FPR camera system should be identified.

Public Information Campaign

A public information and outreach campaign is highly recommended.

Budget

A budget for system implementation and operation should be developed.

PE Certification

A registered professional engineer (PE) in Oregon shall confirm that the FPR and associated traffic controls are installed, operated, and maintained in accordance with the Manual on Uniform Traffic Control Devices and appropriate state and local guidelines.

Future Changes to the Corridor

Every effort should be made to incorporate appropriate geometric and safety improvements on the corridor prior to installing FPR cameras. Over time, land use and traffic patterns may change. Such changes may require a road authority to make improvements to the corridor that may affect the operation of the FPR. At no time shall the presence of FPR cameras obstruct an agency from making necessary changes to improve the safety for the driving public.

When changes are proposed to improve safety in the corridor, such as to improve geometry, remove or add lanes, or change the operational characteristics of the corridor, the FPR camera operations and the associated costs of changing the FPR cameras shall not be considered a reason for not making such changes. Any changes to the FPR cameras and associated costs shall be the responsibility of the company under contract for operation of the FPR cameras and the jurisdiction overseeing the operation of the FPR camera system, depending on their agreements.

Biennial Report Requirement

Oregon law requires that by March 1 of each odd-numbered year, cities shall present to the legislative assembly the outcome evaluation conducted by the city which includes:

- The effect of the use of FPR cameras on traffic safety.
- The degree of public acceptance of the use of FPR cameras.
- The process of administrating the use of FPR cameras.

The report should include the following information:

- Name, address, and phone number of person who is the main FPR contact.
- Date of implementation.
- Number of FPR cameras installed.
- Details of signing installed.
- Any other improvements or changes to the corridor.
- FPR contractor name.
- Crash data specific to FPR locations for the 3-year period prior to FPR camera installation and after FPR camera installation.
- Detail of crash severities and types of crashes and any changes.
- Average crash rate before and after and annual changes.
- Information on the number of citations.
- Public information surveys regarding jurisdiction's use of FPR cameras.
- Copies of media releases sent as a part of the public FPR awareness program.
- Description of challenges or difficulties in administering the FPR camera enforcement program.
- Available information on the local court’s ability to handle the increase in citations.

Approval Procedures for State Highways

State traffic engineer approval is required for FPR camera installation and operation on all state highways regardless of operation or maintenance responsibilities. Typically, a local agency will be applying to ODOT to install FPR on state highways. The following procedure should be followed:

1. The applicant submits a letter to ODOT region:

a. Requesting authorization to install and operate a FPR camera(s) on state highways.

b. Identifying a responsible party to whom an ODOT permit will be issued and the point of contact responsible for the construction, operation, and public information requirements.

c. The letter is accompanied by:

i. The Safety and Operations Report.

ii. A statement of consistency with the operational and site considerations.

iii. A statement of agreement with the ODOT conditions of approval (page A2-15).

iv. Copies of all speed zone orders in the corridor.

2. (On state highways) ODOT region traffic engineer and staff:

a. Reviews FPR design and supporting documents and works with applicant so the FPR camera enforcement installation checklist (see Page A2-14) is complete.

b. Prepares all documents for the state traffic engineer with a recommendation.

c. Receives state traffic engineer response of approval or denial of the FPR camera and any conditions.

d. If region traffic determines an intergovernmental agreement (IGA) is needed, region traffic leads the development, laying out terms of agreement as to the responsibilities and obligations of each jurisdiction for the FPR camera.

3. If approved by the state traffic engineer for state highways, ODOT district office:

a. Establishes an account number through ODOT Financial Services identifying responsible party and budget in an order to render service.

b. Establishes the amount of deposit to be paid by the applicant. If costs are more than the deposit, the applicant will be charged for the additional cost, if less the difference will be reimbursed.

c. Issues miscellaneous permit to applicant including conditions of approval by the state traffic engineer.

4. The applicant:

a. Signs the permit, acknowledging the conditions of approval.

b. Agrees to pay for all actual costs incurred by ODOT relating to the installation, inspection, or repair, and any incidental costs.

c. Pays a monetary deposit as determined by the district office. Below are examples of typical costs and services:

i. Plan review by ODOT region traffic estimated $1000 per corridor for FPR camera installation.

ii. Oversight and inspection of installation estimated at $1000.

5. The ODOT District Office:

   a. Upon receipt of signed permit and deposit, forward plans and supporting documents to the ODOT region traffic engineer.

   b. Oversight and inspection of the permit work.

For state highways, the state traffic engineer approval will be based on review of supporting documents and completion of final, approved plans and may stipulate further conditions of approval.

If ODOT requests FPR cameras to be operated by a local agency on a state highway, ODOT will typically work with that agency to gain concurrence and follow the same procedure above with ODOT bearing the appropriate costs.

Removal Procedures for State Highways

The state traffic engineer may order removal of an FPR camera at a particular location or the entire corridor.

When considering removal of a FPR camera or system, a study should be completed to determine if the FPR camera should be removed or remain. If, for instance, the study shows there is little or no reduction in the number, severity, or targeted crashes or if similar results can be obtained from engineering countermeasures such as traffic calming measures or other improvements, the region traffic engineer may recommend removal to the state traffic engineer.

Corridors where engineering or geometric improvements are proposed may result in a request to remove FPR camera equipment. The study may include a determination of changes in conflicts, improvements for pedestrian safety or diversions of traffic patterns that change the operations and safety of the corridor.

The following procedure should be followed when considering removal of FPR cameras:

1. ODOT region traffic shall conduct a study.

   a. The study shall determine the safety effectiveness of the FPR camera at reducing crashes, severity of crashes and/or types of crashes.

   b. The study shall recommend continued operation of the camera(s), removal of the camera(s) and/or modifications to the operation of the system.

   c. Other safety considerations such as changes in violations and compliance rates may be considered but are not the primary measure of safety.

d. The study shall also consider the extent to which other countermeasures had been implemented prior to implementation of the FPR cameras or proposed changes to the corridor.

e. Other considerations may include traffic volumes and delay, unusual or unique geometry, driver behavior, and other engineering countermeasures to improve safety.

f. The study shall include any proposed engineering or geometric improvements that reduce or eliminate conflicts or improve safety for all users.

2. If the recommendation is to remove the FPR camera, ODOT should work together with the city to come to agreement for how to proceed with the recommendations of the study.
3. Additional input may include the public and/or enforcement to determine support or opposition to the removal.
4. Whether or not an agreement can be reached, ODOT region traffic will submit a recommendation to the state traffic engineer along with the study.
5. The city may submit a recommendation with supporting documentation to the state traffic engineer.
6. The state traffic engineer’s decision will be based on review of the study, the recommendations submitted, and any other input received.
7. The state traffic engineer may hold a meeting of interested parties to go over the issues.
8. The state traffic engineer may approve removal of the FPR camera, may approve the FPR camera remaining, and/or require engineering countermeasures or other changes to the roadway or cameras.
9. The state traffic engineer’s decision is final and will be based primarily on safety.

Upon request of the city, the state traffic engineer may approve removal of the FPR camera without study of the corridor. Typically, this occurs under special conditions such as the vendor of the equipment goes out of business, a political entity passes an ordinance to remove the FPR camera or other circumstances as determined by the state traffic engineer.

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FPR Camera Enforcement Installation Checklist

Street Name/Highway Name: ____

FPR Camera Locations: ____

- ☐ Traffic safety need based on crash history and safety considerations has been documented.
- ☐ A public information contact has been identified.

  Contact Name: ____

  Address: ____

  Email ______________________________ Telephone: ________________
- ☐ Locations have been labeled.
- ☐ The signing is visible from an adequate distance based on field observation.
- ☐ No significant improvement (project) is scheduled or planned that would substantially alter the need for a FPR camera.
- ☐ Signs indicating that compliance with traffic control devices is enforced through cameras are posted (or will be provided by this project) on all major routes entering the jurisdiction.
- ☐ All signs required by statute are present near the FPR installation.
- ☐ No known reason why a FPR camera should not be installed.

Checklist completed by: ______________________________ Date: ________________

Conditions of Approval

The applicant agrees:

1. The cost of any required changes to the FPR camera equipment because of changes or modifications to the corridor or traffic control devices, regardless of who implements the changes, shall be the responsibility of the applicant and/or any commercial firm under contract for operation of the FPR cameras.
2. ODOT has the discretion to make changes in the corridor to improve safety, such as modify geometry, remove or add traffic lanes, or change the operating characteristics of the corridor, up to and including ordering the removal of FPR camera systems.
3. When ODOT desires to modify a corridor or segment of a corridor with a FPR camera to improve operations or safety it may do so without consideration to the cost of changes to the FPR camera system or impact to revenue generation on FPR camera system or agreements between the applicant and any commercial firm operating the camera system. ODOT shall not be subject to any costs for changes, modifications, or removals of the FPR camera system.
4. Applicant shall make available to ODOT all reasonable requests for records about the operations of the FPR cameras, including but not limited to, number of violations by particular cameras, total violations, distribution of violations, percentages of violations within specific time periods, crash records and/or operating parameters of the FPR camera.
5. A FPR camera sign, speed limit sign, and radar reader feedback sign shall be provided between 100 and 400 yards on the approach to the FPR and shown on or as an attachment to the plans.
6. Failure to comply with any of the conditions of approval listed herein or stipulated by the state traffic engineer shall be sufficient reason for the state traffic engineer to order removal of the FPR camera system.

File Code	New	Notes
TRA 07-06	June 2024	Incorporated changes from HB-4109 (2024).

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ODOT Traffic Engineering Structure Appendix B

Traffic Engineering Section

The Traffic Engineering Section is in the Delivery & Operations Division's Engineering & Technical Services Branch. The Traffic Engineering Section's programs affect all ODOT divisions, Oregon State Police, the Public Utilities Commission, cities and counties, Oregon Travel Experience, motorist services providers, the Speed Zone Review Panel, the Oregon Transportation Safety Committee, and all road users on all public roads in Oregon. The Section's programs

- provide statewide policies and guidelines for all traffic control devices.
- develops and maintains standards for traffic signals, illumination, signing, striping, and work zone traffic control.
- provides technical analysis for traffic operation improvements on all state highways.
- administers the federal Highway Safety Improvement Program (HSIP).
- manages programs; manages speed zoning for all public roads.
- monitors traffic speeds.
- optimizes operation of statewide traffic signal systems.

The Traffic Engineering Section includes two units: Traffic Standards and Asset Management Unit and the Traffic Engineering Services Unit. There are several subgroups specializing in different areas of traffic engineering within the Traffic Engineering Section.

Safety

Provides highway safety analyses; maintain the Safety Priority Index System (SPIS); administers the Highway Safety Improvement Program (HSIP) and project safety management system as well as safety tools used within ODOT; and provides coordination and liaison for safety efforts with other parts of ODOT and outside agencies, including the Highway Safety Engineering Committee and the Oregon Transportation Safety Committee.

Lead Engineer: state traffic safety engineer.

Investigations

Provides traffic engineering expertise for research studies, legislative issues, crash analyses, safety reviews, access management issues, review and approval of traffic engineering delegated authorities, speed monitoring, speed zoning, new products, highway litigation and tort liability, and supporting the Speed Zone Review Panel.

Provides expertise for the development and update of traffic engineering policies, procedures, and ODOT manuals. The group also gathers and provides input and recommendations for any proposed changes to the MUTCD, maintains and updates the Oregon Supplement to the MUTCD, and works with the Oregon Traffic Control Devices Committee (OTCDC) to establish statewide traffic control standards.

Lead Engineer: state traffic investigations engineer.

Signs and Pavement Markings

Provides engineering expertise and maintains standards for all highway signs and pavement markings. The team also develops specifications, maintains Oregon Standard Drawings, reviews new products, and develops manuals. The team may provide some designs for ODOT regions.

Lead Engineers: state traffic sign engineer (signs), traffic markings & sign engineer.

Traffic Structures

Provides engineering expertise and designs for sign bridges, cantilever sign supports, traffic signal poles, illumination poles, VMS supports and other miscellaneous traffic structures.

Lead Engineer: state traffic structures engineer.

Work Zone Traffic Control

Develops standards and provides engineering expertise for temporary traffic control. Provides guidance for traffic control plan development for construction projects by communicating standards and best practices for lane reductions, detours, staging, temporary pedestrian accessible routes, and work zone safety.

Lead Engineer: state traffic work zone engineer.

Illumination

Provides engineering expertise, designs, and standards for roadway illumination.

Lead Engineer: state traffic illumination engineer.

Signal Standards

Provides engineering expertise for temporary traffic signals, permanent traffic signals, flashing beacons, ramp meters, and some portions of weigh stations. The team also develops specifications, maintains Oregon Standard Drawings, and maintains qualified products lists. The team also reviews local agency and developer agreements and plans for traffic control devices, reviews new products, maintains asset management databases, and provides annual training and certification for inspectors of traffic signal construction.

Lead Engineer: state traffic signal engineer.

Signal Operations

The signal operations group prepares traffic signal and signal system timing, and provides engineering expertise in traffic signal operation, installation of traffic signals, traffic signal approvals, vehicle detection systems, traffic signal software and communication development, ramp meter operations and railroad preemption systems. The signal operations team also provides engineering support for transportation operations research and analysis, HOV lane applications, and signal mounted preemption system design (for emergency and transit vehicles). The group also provides expertise for the development of traffic engineering policies, procedures, and proposed legislation.

Lead Engineer: state traffic operations engineer.

Region Traffic Units

Region traffic units are part of each region's technical center and report directly to each technical center manager.

Region Traffic Unit staff provide expertise to region and district staff on current traffic policies and procedures. Staff are responsible for overseeing most traffic engineering design including most signal and sign design for region projects. Staff actively participate as members of project development teams to make sure traffic related issues are considered early in the process and provide traffic information to the team. They also act as the traffic liaison to local agencies on behalf of ODOT.

Members of the unit conduct field investigations at the request of the public, local government, or ODOT personnel. When requested, they conduct engineering investigations, determine appropriate solutions, make written recommendations, and when necessary, request approval of the state traffic engineer for installation of traffic control devices or modifications to traffic control.

Engineering investigations for changes to traffic control devices can include requests for signs, signals, striping, parking restrictions and speed reductions. They also conduct field investigations and make recommendations for potential changes. Staff also conduct speed zone investigations and/or oversee consultants performing the work and make recommendations for potential changes to the state traffic engineer based on the results.

Region Traffic Design and Operations

Region Traffic Unit staff oversee design for all region projects containing traffic engineering elements including signing, striping, temporary traffic control, and signals. The units provide expertise in signal timing, operations, and vehicle detection systems. They may also provide expertise for the operation of ramp metering systems. Region traffic unit staff does signal system coordination in Regions 1 and 2. Traffic Engineering Section staff does signal coordination in Regions 3, 4, and 5. Some units oversee signing, striping, and electrical crews for their region.

Region Traffic Analysis & Investigations

Staff reviews traffic studies for developments and land use actions for their impacts to the state highway system and make recommendations regarding access, traffic mitigation strategies, enhanced crosswalks and crosswalk closures, safety (SPIS, Safety Implementation Plan recommendations, and overlapping ARTS projects) and operation of the State Highway System. They also review corridor plans and transportation system plans (TSPs) for traffic-related issues.

Region Transportation Safety Coordinator

Each Region Traffic Unit has a traffic safety advocate (region transportation safety coordinator) who is a technical resource for local safety education and law enforcement efforts, and provides access to safety grant funds, materials, and training. They handle programs regarding education on child occupant protection, DUII, pedestrian, teen driving, bicycle, and work zone enforcement. They also work with local safety committees on traffic issues.

Region Intelligent Transportation System (ITS) Activities

Region Traffic Units often oversee intelligent transportation system (ITS) related activities in their areas. The traffic management and operations centers monitor and control traffic operations through intelligent transportation systems (ITS) technologies to provide transportation system control, communications, monitoring, and information.

Region Access Management

Region Traffic Unit staff are often involved in the access management programs for each region (some regions incorporate access management into the Region Traffic Unit while others incorporate it into planning). Each region has a region access management engineer (RAME) who provides key technical support for access management practices in the region. The RAMEs also provide a valuable communication link between central staff and region staff and act as an ODOT advisory group on access management issues, policies, and practices.

Intelligent Transportation Systems (ITS) Unit

Within the Maintenance and Operations Branch, the Intelligent Transportation Systems (ITS) Unit provides identification, planning, design, specification, and deployment of ITS systems including incident management systems, some communication systems and travelers' information systems. Some of the device types include cameras, weather stations, variable message signs, ramp meters, highway advisory radio (including HAR signs), automatic vehicle location, weather monitoring, and warning systems.

The Intelligent Transportation Systems Unit is also responsible for maintenance and operations of all ITS devices statewide, development of ITS device standards, strategic planning for ITS deployment within the state, and helping the ODOT regions in the identification of local partnerships and the use of ITS technologies. Other activities include researching of emerging technology, promoting technology partnerships with other public and private sectors, and supporting ITS deployment by other modes.

Another key role of the ITS Unit is coordinating all ITS activities with ODOT's Information Systems Branch (ISB). Many ITS devices utilize centralized software such as adaptive signal systems and variable speed zone systems. These software systems are installed on ITS servers supported by ODOT ISB staff. ODOT ISB technicians support even basic traffic signal functions such as establishing a network connection between a roadside traffic signal controller and the ODOT network.

Traffic Systems Services Unit (TSSU)

Within the Maintenance and Operations Branch, the Traffic Systems Services Unit (TSSU) provides support for traffic signal testing, turn-on, inspection, and maintenance. The unit also supports the ODOT Intelligent Transportation Systems (ITS) Program with expert technical support for ITS systems such as road weather information systems (RWIS), highway advisory radio (HAR), bridge cathodics, closed-circuit television (CCTV) surveillance systems, fixed and portable variable message signs (VMS), and data communication networks.

The Traffic Systems Services Unit operates the only approved materials testing laboratory for traffic control products in Oregon. The laboratory operates to ensure compliance with OAR 734-020-0005 that establishes the manual and specifications for traffic control devices within the state and Section 00990.70 of Oregon's Standard Specifications that describes the testing and turn-on procedures for all new traffic systems installations.

Field Applications

Employees of the unit have the responsibility for setting minimum maintenance standards for traffic signal equipment on the state highway system. Employees working with region/district electricians repair and modify all traffic signals maintained by ODOT. The Traffic Systems Services Unit or Region 1 Signal Maintenance Crews are responsible for periodic inspection and maintenance of signal control equipment at signalized intersections while region/district electricians are responsible for performing maintenance on other elements of the traffic signal system. Inspections will assist the project manager in assuring compliance with the project plans and specifications.

Shop Applications

Employees of the unit have the responsibility for maintaining the following records:

- Inventory of all traffic signal control devices.
- Records of inspections of existing traffic signal control devices.
- Maintenance records of all trouble calls.
- Environmental testing chamber and turn on records of control equipment.
- Shop repair records of control equipment.
- Documentation of systematic upgrading of equipment.

Shop applications also include environmental testing of all traffic signal equipment used within Oregon. The Traffic Systems Services Unit also provides repair and testing of state-maintained control equipment modules.

Crash Analysis and Reporting Unit

Within the Transportation Data Section of the Policy, Data & Analysis Division, the Crash Analysis and Reporting Unit provides motor vehicle crash data through database creation, maintenance and quality assurance, information and reports, and limited database access. Fatality Analysis Reporting System is a comprehensive file on fatal crashes in Oregon. The motor carrier file contains detailed information on truck related crashes.

Transportation Systems Monitoring Unit

Within the Transportation Data Section, the Transportation Systems Monitoring Unit is responsible for the Traffic Monitoring Program, which provides vehicle class, occupancy, and traffic volumes for federal, state, local, and private decision makers; they support the Integrated Transportation Information System (ITIS) with traffic, speed limit, parking, and terrain information.

Transportation Planning Analysis Unit

Within the Planning Section of the Policy, Data & Analysis Division, the Transportation Planning Analysis Unit of ODOT is working to determine the present and future needs of the statewide transportation system and evaluate alternative solutions to growing transportation demands. The Transportation Planning Analysis Unit provides a link between long-range planning and project development. The Transportation Planning Analysis Unit also reviews system and corridor plans and provides traffic analysis of existing and future traffic demands for projects. The Transportation Planning Analysis Unit participates in technical advisory committees, citizen advisory committees, and project development teams.

The Analysis Procedures Manual is a key document produced by the Transportation Planning Analysis Unit and provides the current methodologies, practices, and procedures for conducting long-term analysis of ODOT plans and projects. Of particular interest are detailed chapters on how to perform intersection analysis, alternatives analysis, and prepare traffic analysis reports.

File Code	Updated	Notes
Unassigned	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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ODOT Traffic Engineering Teams Appendix C

The Traffic Engineering Section provides expert staff and administrative support to several teams in specific traffic engineering disciplines on the local, regional, state, and national levels.

AASHTO Committee on Traffic Engineering

- Leader: AASHTO
- Membership: state traffic engineer

AASHTO Subcommittee on System Operations and Management

- Leader: AASHTO
- Membership: ITS Unit manager

All-Terrain Vehicle Highway Access Routes Advisory Committee

- Leader: as voted by membership
- Membership: 2 ATV user representatives, 1 city/county representative, 1 law enforcement representative, 1 member at large, 1 non-voting Oregon Parks & Rec. Department (OPRD) representative, 1 non-voting ODOT representative (appointed by ODOT director, currently state traffic standards engineer)
- Focus: reviews potential use of ATVs on state highways and reports findings and recommendations to Oregon Transportation Committee (OTC).

Forest Highway Tri-Agency Committee

- Leader: Federal Highway Administration, Federal Lands Division
- Membership: ODOT & AOC, US Forest Service, Federal Lands Division of FHWA.
- Focus: state traffic engineer represents ODOT and AOC. Representatives from Forest Highway Program, AOC, FHWA, and USFS also attend.

Highway Safety Engineering Committee

- Leader: state traffic engineer
- Membership: Traffic Engineering Section staff, roadway manager, region traffic managers, FHWA, ODOT Safety Division
- Focus: Establish policies and guidance for ODOT safety programs.

MaxTime Software Users Group

- Leader: state traffic operations engineer
- Membership: city, county, ODOT representatives
- Focus: cooperative, interagency team working with Intelight's MaxTime software for traffic signal operations.

National Committee on Uniform Traffic Control Devices

- Leader: voted by membership
- ODOT involvement: technical committee membership. Currently, the state traffic investigations engineer serves on the Markings Technical Committee.
- Focus: Assist developing standards, guidelines, and warrants for traffic control devices and practices. Recommends changes and interpretations to the MUTCD and other national standards to FHWA and other agencies.

Oregon Historical Marker Committee

- Leader: as voted by membership
- Membership: TIC, ODOT, Tourism, Oregon State Parks & Recreation, OCTA, DOGAMI, others
- Focus: in July 1991, the Travel Information Council (TIC) adopted the Historical Marker Program from ODOT through an interagency agreement, along with other sign programs of a motorist service nature.

Oregon Traffic Control Devices Committee (OTCDC)

- Leader: as voted by membership
- Membership: state traffic engineer, three cities, three counties, ODOT Region Traffic, Oregon ITE, OSP.
- Focus: advisory group to the state traffic engineer on uniform standards for traffic control devices in Oregon.

Oregon Travel Experience

- Leader: selected by OTE Council
- Membership: state traffic engineer, representatives of the restaurant, lodging, gasoline, outdoor advertising, and citizens at large appointed by the Governor.
- Focus: administers of Oregon's Tourist Oriented Directional Signing (TODS) Program, the Specific Motorist Services Signing (LOGO) Program, and the Off-interstate Historical and Cultural Sign Program.

Pavement Marking Design Working Group

- Leader: traffic markings & sign engineer
- Membership: Traffic Engineering Section staff, Region Traffic Unit staff, Region Roadway Union staff
- Focus: share best practices, materials, equipment, and policies for pavement marking design.

Safety Investigations Group

- Leader: state traffic investigations engineer
- Membership: Traffic Engineering Section staff, region traffic investigators, region transportation safety coordinators
- Focus: advise staff on setting criteria and guidance for performing highway safety investigations statewide.

Signal Timers Group

- Leader: state traffic operations engineer
- Membership: Traffic Engineering Section staff, region signal timing staff
- Focus: traffic signal operations

Speed Zone Review Panel

- Leader: designated by state traffic engineer
- Membership: county, city, Oregon State Police, Safety Division, ODOT Region, state traffic engineer
- Focus: reviews contested speed zone cases.

Statewide Grant Review Committee

- Leader: state traffic engineer
- Membership: state traffic engineer, district manager or permit specialist, ROW, region access management engineer, roadway, state traffic investigations engineer, others as needed.
- Focus: reviews applications for grants of access to state highways

Statewide Pavement Marking Committee

- Leader: MLT representative
- Membership: traffic markings & sign engineer, maintenance staff, striping crew staff, Construction Section staff
- Focus: share best practices, materials, equipment, and policies for pavement marking design, construction, and maintenance.

Statewide Work Zone Action Group

- Leader: state traffic work zone engineer
- Membership: region TCP designers, Traffic Engineering Section staff
- Focus: solidify the design practices being used by the TCP Designers in the regions

TOAST Walking-Biking Subcommittee

- Leader: state traffic standards engineer
- Membership: Traffic Engineering Section staff, region traffic staff
- Focus: Advise TOAST on issues affecting walking and biking

Traffic Engineering Section/Transportation Safety Division Meeting

- Leader: state traffic engineer, transportation safety manager
- Membership: Traffic Engineering Section staff, TSD roadway safety coordinator, FHWA safety engineer
- Focus: coordinate safety programs and projects of mutual interest.

Traffic Operations and Standards Team (TOAST)

- Leader: state traffic engineer
- Membership: region traffic engineers/managers, Traffic Engineering Section managers and staff
- Focus: discuss and advise on traffic engineering issues and operations.

Traffic Sign Design Working Group

- Leader: state traffic sign engineer
- Membership: Traffic Engineering Section staff, region traffic sign design staff
- Focus: share best practices, policies, design for traffic signs

Traffic Signal Design Working Group

- Leader: state traffic operations engineer
- Membership: Traffic Engineering Section staff, region traffic signal design staff, region traffic signal operations staff
- Focus: share best practices, policies, designs for traffic signal systems.

Traffic Structures Design Working Group

- Leader: state traffic structures engineer
- Membership: Traffic Engineering Section staff, region traffic staff, region bridge designers
- Focus: share best practices, policies, designs for traffic structures.

TransPort Committee

- Leader: co-chaired by ODOT Region 1 and Metro
- Membership: ODOT, Clackamas County, Multnomah County, Washington County, City of Portland, Tri-Met, Metro (non-voting)
- Key Stakeholder Agencies: City of Gresham, City of Beaverton, Port of Portland, City of Vancouver, Portland State University, FHWA, City of Hillsboro, City of Lake Oswego, City of Tigard, City of Wilsonville, City of Vancouver, Clark County WA, C-Tran, RTC, and WSDOT.
- Focus: provides a forum for ITS planning and deployment across the agencies in the Portland metropolitan area.

File Code	Updated	Notes
Unassigned	June 2024	Updated STE and Traffic Engr Section. Added NCUTCD. Alphabetized.

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Traffic Engineering Programs Appendix D

The Traffic Engineering Section administers several traffic engineering related programs that are described below.

Blue Star Memorial Program

At the request of the Oregon State Federation of Garden Clubs, the 1947 Oregon Legislature adopted a resolution designating certain state highways as Blue Star Memorial Drives. The legislature further resolved that ODOT shall erect along said highways suitable tablets and ornamentations to perpetuate the resolution.

This is a program put in place to honor and memorialize men and women of Oregon who served in the armed forces of the United States. This program began in the 1940's and was inspired by the blue stars that mothers put in their windows to signify that they had a son or daughter serving in WWII. The program is part of a national program that is sponsored by the National Council of State Garden Clubs, Inc. The original designation consisted of one transcontinental east and west route and seven north and south routes and was normally assigned one to a state. They were designated throughout their length, or for a considerable distance, generally involving more than one state. These were through routes rather than short sections in one state only.

List of Blue Star Memorial Highways

The following is a list of highways that have been adopted by the Oregon Transportation Commission and are referred to as Blue Star Memorial Highways. Included are the highway routes and their adoption dates by the commission.

Highway Name	Route	Adoption Year
Pacific Highway	OR 99	1948
Pacific Highway East	OR 99E	1948
Pacific Highway West	OR 99W	1948
The Dalles-California Highway	US 97	1959
Pacific Highway	I-5	1967
Columbia River/Old Oregon Trail	I-84	1977
Oregon Coast Highway	US 101	1980
East Portland Freeway	I-205	2000

Establishment of Blue Star Memorial Highways

The Blue Star Memorial Highways are commemorated with a bronze marker mounted on a support post. The local garden club that sponsors the marker usually enhances the landscape with a small garden at the foot of the marker. The program currently has about 30 markers in place.

ODOT has historically been responsible for installing the marker and the Oregon State Federation of Garden Clubs has been responsible for the furnishing and maintaining the marker/ landscaping.

The site for new markers along these routes is to be worked out with the maintenance district. Common practice has been to place markers in areas of high visibility, such as a highway rest area, which promotes higher visibility and reduced vandalism. The landscaped areas provide rest and relaxation for the weary traveler.

Impaired Driving Victim Memorial Signing

Upon the request of the family of a victim of an impaired driving crash and when certain criteria are met, a sign can be installed on the State Highway System at the site of a fatality caused by an impaired driver.

ODOT established its own Impaired Driving Victim Memorial Signing Program in 1995. The first sign was installed in October 1995 in Tillamook County. As of December 2013, 48 signs have been installed.

Guidelines

The current guidelines were revised and approved by a program review committee on June 8, 2006:

1. A sign can be installed at the site of a fatal crash that was caused by a driver who has been convicted of negligent homicide or manslaughter in the first or second degree and was driving under the influence of intoxicants (either a blood alcohol content of 0.08 or greater and/or a DUII conviction is required). A sign can also be installed at the site of a fatal crash that was caused by a deceased driver who had a blood alcohol content of .08 percent or greater.
2. Signs installed will be black on white, 36” X 48” with a legend, which reads “DON’T DRINK AND DRIVE,” below which will be a 36” X 12” plaque with the message “IN MEMORY OF (victim’s name).” For cases involving controlled substances or inhalants, the legend will read “DON’T USE DRUGS AND DRIVE.” Normally up to three names can be listed, but more than one name will require a larger plaque.
3. Each successful applicant will be entitled to one sign assembly as described above, mounted on one side of the post only (no back-to-back signs), facing oncoming traffic, and only on the side of the road nearest the lane of that oncoming traffic. In special situations where a sufficiently large turnout or wayside is available (as determined by region traffic operations staff), and if acceptable to the applicant, a sign may be mounted parallel to the roadway rather than facing oncoming traffic.

4. Signs will be installed on state highways only if the sign location will meet ODOT standards shown in the Sign Policy and Guidelines for the State Highway System.
5. Signs will not be installed on the Interstate System, freeways, or their ramps.
6. ODOT has no jurisdiction on county roads or city streets and thus cannot provide signs along these roadways.
7. The sign must be requested by the family of the victim or other sponsor and be paid for by the victim's family or the sponsor. The sponsor need not be a family member, but any proposed installation must include agreement with an appropriate member of the victim's family. If a given crash resulted in more than one fatality, and those fatalities were from different families, the applicant must contact the families of those other victims before application is made and get written concurrence on whether the sign should even be applied for, which names should appear on the sign, and how much each family will contribute toward the cost of the sign. Only one sign will be installed for any given crash.
8. Signs will cost $600. This amount is intended to cover expenses incurred, such as time spent on review of the application by the program coordinator, investigation of the proposed site by region personnel, manufacture of the sign by the ODOT sign shop, and installation by the maintenance district sign crew. Only one $600 check or money order will be accepted as payment for any successful application.
9. Region traffic operations staff will investigate all proposed installation sites and make a recommendation to the state traffic engineer regarding sign placement. If the investigation determines that a location other than the one requested in the application is more appropriate, as much as one half mile away will be acceptable, with variations as approved by the state traffic engineer. In no case, however, will the alternate location be on a highway other than the one on which the crash occurred.
10. The state traffic engineer will approve or deny requests received and sign an agreement with sponsors and family members on those that are approved.
11. Signs will remain in place until they are weathered (usually seven to ten years). At that time, they will be removed. If a sign in serviceable condition is stolen, vandalized, or otherwise badly damaged, it will be replaced one time at ODOT expense. After a sign has been removed due to weathering, the original applicant may renew installation of the original sign by paying another $600.

Application Procedure

Persons wishing to sponsor a memorial sign should submit a written request to:

State Traffic Engineer
Oregon Department of Transportation
4040 Fairview Industrial Drive SE
Salem, OR 97302-1142

The request should include the following information:

1. Name, address, and telephone number of applicant and relationship to victim.
2. A brief description of the crash.
3. Date and location of the crash — This should include the highway name or route number, as well as direction and distance in feet from the nearest green milepost paddle, and distance and direction from any other nearby landmarks (such as an intersecting road, or a bridge over a named stream).
4. Names of all parties involved in the crash.
5. Proof of conviction (unless driver is deceased) and blood alcohol or drug level of driver (from court, police, or medical examiner's records)
6. Name or names, as they should appear on the sign.
7. Commitment to provide $600 for installation of sign — payment will be requested once a sign is approved.

For more information, contact the program coordinator at 503-986-3609.

File Code	Updated	Notes
TRA 24-01-14	June 2024	Updated state traffic engineer and Traffic Engineering Section.

Related Oregon Revised Statutes (ORSs) & Oregon Administrative Rules (OARs) Appendix E

The descriptions provided in this appendix are a summary. See the full text of statutes on the Oregon Legislature's website and rules on the secretary of state's website.

Topic	Reference	Description
Crosswalks	ORS 801.220	Defines crosswalks
Crosswalks	ORS 811.010, 814.040	Apply to crosswalks and pedestrians.
Delegation of Authority	ORS 184.635 ORS 366.205 OAR 734-020-0410	OTC delegation to chief engineer and state traffic engineer
Emergency Vehicle Preemption	ORS 815.440	Proper use of emergency vehicle preemption (traffic control signal operating)
Emergency Vehicle Preemption	OAR 734-020-0300 thru 0330	Standards for installation, operation811.106
Freeway Median Crossovers	OAR 734-020-0100 thru 0115	Process and criteria for establishing freeway median crossovers
Incident Management	OAR 734-020-0145 OAR 734-020-0147 OAR 734-020-0150	Direction for the management of incidents or related activities
Jurisdiction	ORS 810.010	Designates the bodies responsible for exercising jurisdiction over highways when the vehicle code requires the exercise of jurisdiction by the road authority. Does not define maintenance responsibility.
Multiple Turns at Highway Intersections	OAR 734-020-0135 thru 0140	Criteria for establishing multiple right and left turns at highway intersections
One-way Operation, Transit Exceptions	ORS 810.130	Allows road authorities to designate specific lanes or highways for one-way operation and allows road authorities to designate where public transit vehicles can proceed in a direction prohibited by other traffic.
Parking Prohibitions	ORS 810.160	Authority to regulate, control, and prohibit parking.
Parking Prohibitions	OAR 734-020-0020, OAR 734-020-0080 thru 0090	Process for establishing parking prohibitions or restrictions
Restrictions by vehicle type or weight	ORS 810.030	Allows the road authority to impose restrictions on highway use, by any or all vehicle types or weight classes, to protect the highway from damage or to protect the interest and safety of the public.

Related Oregon Revised Statutes (ORSs) & Oregon Administrative Rules (OARs)

Appendix E

Topic	Reference	Description
Restrictions by vehicle type or weight	OAR 734-020-0045	Prohibit non-motorized vehicles on certain highways
Restrictions by vehicle type or weight	OAR 734-020-0080	Establish restrictions on non-overnight parking (non-emergency) on state highways
Restrictions by vehicle type or weight	OAR 734-020-0100 thru 0115	Provide for use of freeway median crossovers
School Zones	ORS 801.462	Definition of school zone
School Zones	ORS 810.243 ORS 811.111 ORS 811.124 ORS 811.235	School speed zones
Speed Zones	ORS 810.180 ORS 811.100 thru 811.111 OAR 734-020-0014 thru 0018	Establishment of speed zones in Oregon
Appropriate driver response to traffic control device	ORS 811.260	Appropriate driver response to traffic signal indications, lane direction signs, stop signs, and yield signs
Appropriate driver response to traffic control device	ORS 811.360	Turns made against a red indication
Appropriate driver response to traffic control device	ORS 811.455	Appropriate response to railroad crossing signals
Traffic Signal Approval Process	OAR 734-020-0400 thru 0500	Process for installation or removal of traffic signals on state highways
Transit and HOV Lanes	ORS 810.140	Allows road authority to designate bus or HOV lanes
Transit and HOV Lanes	OAR 734-020-0035 thru 0043	Contains the orders establishing transit and HOV lanes
Turn Prohibitions	ORS 810.210	Authorizes turn prohibitions
Turn Prohibitions	OAR 734-020-0020	Describes the warrants and criteria for establishing U-turns at signalized intersections and turn prohibitions

Related Oregon Revised Statutes (ORSs) & Oregon Administrative Rules (OARs)

Appendix E

Topic	Reference	Description
Uniform Standards and Placement	ORS 810.200 ORS 810.210 ORS 366.205	Establishes uniform standards and placement of traffic control devices
Uniform Standards and Placement	OAR 734-020-0005	Adopts the MUTCD, Oregon Supplement to the MUTCD, and OTTCH
U-Turn Designations	ORS 810.130	Authorizes designation of U-Turns
U-Turn Designations	OAR 734-020-0025	Description of warrants and criteria for establishing U-turns at signalized intersections

File Code	Updated	Notes
Unassigned	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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File Codes Appendix F

The Administrative Management Section maintains files for use by the Traffic Engineering Section. These files include subject files with appropriate coding to differentiate between files. The two main codes used for Traffic Engineering Section documents in the subject files are TRA (Traffic Engineering and Safety) and TSO (Transportation Systems Operations). The table below lists the major codes in these files. Individual files often contain extensive additional levels of code beyond those listed.

Code	Topic
TRA 01	Traffic engineering policies and procedures
TRA 02	Highway Information Tracking Systems
TRA 03	Crash analysis
TRA 04	Traffic crashes – monthly crash data-state police
TRA 05	Traffic Congestion Management System (CMS)
TRA 06	Load limitations
TRA 07	Highway operations – traffic (arranged by highway number and section)
TRA 07-01	Parking
TRA 07-02	Speed limits and zones (alphabetical by city name)
TRA 07-03	Traffic control signs
TRA 07-04	Traffic routing (alphabetical)
TRA 07-06	Traffic control signal lights (case file by location)
TRA 07-07	Cattle passes
TRA 07-08	Channelization (general)
TRA 07-09	Guard fences
TRA 07-10	Highway lighting, luminaries
TRA 07-11	Crosswalks (includes safety islands)
TRA 07-12	Railroad crossings (general)
TRA 07-13	School crossings
TRA 07-14	Sidewalks and footpaths
TRA 07-15	Vertical clearances
TRA 07-16	Traffic Operations Improvement Program
TRA 08	(file code discontinued)
TRA 09	Photo-log System (road log)
TRA 10	Traffic safety
TRA 10-01	Traffic hazards
TRA 10-02	National Safety Council

Code	Topic
TRA 10-03	Hitchhiking
TRA 10-04	Bicycle safety
TRA 10-05	Traffic safety improvement studies
TRA 10-06	Signing and flagging (temporary)
TRA 10-07	Periodic Motor Vehicle Inspection Program
TRA 10-08	Driving under the influence of intoxicants
TRA 10-09	Occupant protection
TRA 10-10	Motorcycle safety
TRA 10-11	Operations Traffic Safety Team
TRA 10-12	Network of employees for traffic safety
TRA 10-13	Transportation Safety Action Plan (TSAP)
TRA 10-14	Youth safety issues
TRA 10-15	Pedestrian safety
TRA 10-16	Work zone safety
TRA 10-17	Community traffic safety program
TRA 10-18	Corridor Safety Improvement Program
TRA 10-19	Transportation safety data
TRA 10-20	Emergency Management System
TRA 11	National trails
TRA 12	Special equipment
TRA 13	Traffic Operations Program
TRA 14	Vehicle miles and ton miles
TRA 15	Traffic studies
TRA 15-01	Traffic counts
TRA 15-02	Traffic trend data
TRA 15-03	Origin-destination studies
TRA 15-04	Traffic density studies
TRA 15-05	Traffic counters
TRA 15-06	Traffic counters on bicycle trails
TRA 15-07	Traffic speed and time studies
TRA 15-08	Truck volume studies
TRA 15-09	Special traffic studies
TRA 16	Traffic control data (general) (includes study, test, design)
TRA 16-01	Illumination

Code	Topic
TRA 16-02	Pavement markings
TRA 16-03	Curb markers
TRA 16-04	Traffic control signs
TRA 16-05	Speed zoning
TRA 16-06	Signals
TRA 16-07	Testing and research of traffic control devices
TRA 16-08	Median/shoulder barriers
TRA 16-09	Manual on Uniform Traffic Control Devices
TRA 16-10	
TRA 16-11	Barricades
TRA 17	Highway map revisions
TRA 18	Road inventory
TRA 19	Road life studies
TRA 20	Vehicle safety and equipment
TRA 21	Vehicle inspections
TRA 22	Vehicle and traffic safety
TRA 23	Directional and informational signing
TRA 24	Logo signing
TRA 25	TODS
TRA 26	Interstate cultural and historical signs
TRA 27	Brown sign program
TRA 28	Southern Oregon regional signing study
TRA 29	Travel publications
TRA 30	Grants of access
TSO 01	Intelligent transportation systems (ITS) – general
TSO 02	ITS reference material – general
TSO 03	ITS organizations
TSO 04	ITS standards and specifications
TSO 05	ITS vendor information
TSO 06	ITS planning
TSO 08	ITS
TSO 09	ITS
TSO 10	ITS projects

File Code	Updated	Notes
Unassigned	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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File Code	Updated	Notes
Unassigned	June 2024	Updated list for June 2024 edition.

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Acronym Glossary Appendix H

Acronym	Meaning
AAA	American Automobile Association
AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
AATMS	Advanced Area-wide Traffic Management System (see ATMS)
ACVOS	Advanced Commercial Vehicle Operations Systems (see CVO)
ADA	Americans with Disabilities Act
ADT	Average Daily Traffic
AGT	Automatic Guideway Transit
AHC	Automatic Headway Control
AHS	Automated Highway System
AIDS	Automated Information Directory System
AMTICS	Advanced Mobile Traffic Information and Communication System
AOC	Association of Oregon Counties
API	Automatic Personal Identification (see PIN)
API	Applications Programmer Interface
APTS	Advanced Public Transit Systems
APTS	Advanced Passenger Transport Systems
AQMP	Air Quality Maintenance Plan
ASAP	As soon as possible
ASC	Automatic Steering Control
ASC	Actuated Signal Controller
ASCII	American Standard Code for Information Interchange
ASK	Amplitude Shift Keying (digital AM)
ASN	Abstract Syntax Notation
ATCS	Automated Traffic Control System (NEMA)
ATIS	Advanced Traveler Information Systems (formerly ADIS, for Driver)
ATMS	Advanced Traffic (Transportation) Management Systems
ATR	Automatic Traffic Recorder
ATS	Advanced Transportation Systems (Subcommittee of AASHTO)
AVC	Automatic Vehicle Classification
AVCS	Automatic Vehicle Control Systems
AVI	Automatic Vehicle Identification
AVL	Automatic Vehicle Location

Acronym	Meaning
AVLC	Automatic Vehicle Location and Control
AVM	Automatic Vehicle Monitoring
AWDT	Average Weekday (Traffic) - also AWD
BER	Bit Error Rate
BER	Byte Encoding Rate
BER	Basic Encoding Rules
BESI	Bus Electronic Scanning Indicator
Bit	Binary digit
BIU	Bus Interface Unit (NEMA)
BMS	Bridge Management System (ISTEA)
BPR	Bureau of Public Roads (see FHWA)
BPS	Bits Per Second
BRT	Bus Rapid Transit
CA	Controller Assembly (NEMA)
CAA(A)	Clean Air Act (Amendment)
CAD	Call / Active Display (Model 170 Microprocessor Traffic Controllers)
CAD	Computer Aided Design (Drafting)
CAD	Computer Aided Dispatching
CADD	Computer Aided Drafting and Design
CalTrans	California Department of Transportation
CAO	Chief Administrative Officer
CAR	Crash Analysis and Reporting
CAT	Countermeasure Analysis Tool
CBD	Central Business District
CCTV	Closed Circuit Television Camera(s)
CDL	Commercial Driver’s License
CD-ROM	Compact Disk - Read Only Memory
CFR	Code of Federal Regulations
CHEMTREC	Chemical Transportation Emergency Center
CMAQ	Congestion Management Air Quality
CMS	Changeable Message Sign(s) (see VMS - preferred)
CMS	Congestion Management System (ISTEA)
COATS	California Oregon Advanced Transportation Systems
COP	City of Portland (Prineville)

Acronym	Meaning
COTS	Commercial Off-the-Shelf computer software and/or hardware
CPFF	Cost Plus Fixed Fee
CPU	Central Processing Unit
CRC	Cyclic Redundancy Check
CSR	Crash Summary Report
CTWLTL	Continuous Two Way Left Turn Lane
CU	Controller Unit (NEMA)
CVISN	Commercial Vehicle Information Systems and Networks
CVO	Commercial Vehicle Operations
DBMS	Data Base Management System
DBS	Direct Broadcast Satellite
DCE	Data Circuit Terminating Equipment (typically a modem)
DLSAP	Data Link Service Access Point
DLSDU	Data Link Service Data Unit
DMS	Dynamic Message Sign (See VMS)
DMV	Driver and Motor Vehicle Services
DR	Dead Reckoning
DRIVE	Dedicated Road Infrastructure for Vehicle Safety in Europe
DSRC	Dedicated Short Range Communication
DTE	Data Terminal Equipment
DTR	Data Terminal Ready signal
DUII	Driving Under the Influence of Intoxicants
DW	"DON'T WALK" pedestrian signal indication
EIA	Electronic Industries Association
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EMS	Emergency Medical Services
EPROM	Erasable Programmable Read Only Memory
ETTM	Electronic Toll and Traffic Management
FAA	Federal Aviation Administration
FAQ	Frequently Asked Questions
FARS	Fatality Analysis Reporting System
FAST Act	Fixing America's Surface Transportation Act
Fax	Facsimile

Acronym	Meaning
FCC	Federal Communications Commission
FCS	Frame Check Sequence
FDW	Flashing "DON'T WALK" pedestrian signal indication
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
FMCS	Fleet Management and Control Systems
FMOC	Freeway Management Operations Center (see TMOC)
FO	Fiber Optic
FONSI	Finding of Non-Significant Impacts
FPR	Fixed Photo Radar
FSK	Frequency Shift Keying
FTA	Federal Transit Administration (formerly UMTA)
FTMS	Freeway Traffic Management System
FTP	File Transfer Protocol
GIS	Geographic Information System
GIS-T	Geographic Information Systems for Transportation
GPO	Government Printing Office
GPS	Global Positioning System
GVW	Gross Vehicle Weight
HAR	Highway Advisory Radio
HCM	Highway Capacity Manual
HDLC	High-level Data Link Control
HDV	Heavy Duty Vehicles
HELP	Heavy vehicle Electronic License Plate
HOV	High Occupancy Vehicle
HSIP	Highway Safety Improvement Program
HSM	Highway Safety Manual
HUD	Head-Up Display
IEEE	Institute of Electrical and Electronics Engineers
IESNA	Illumination Engineering Society of North America
IIHS	Insurance Institute for Highway Safety
IM	Incident Management
IMS	Intermodal Management System (ISTEA)
IP	Internet Protocol

Acronym	Meaning
ISDN	Integrated Services Digital Network
ISMS	Information Safety Management System
ISO	International Standards Organization
ISTEA	Intermodal Surface Transportation and Efficiency Act
ITE	Institute of Transportation Engineers (pre-1971 formerly Institute of Traffic Engineers)
ITIS	Integrated Transportation Information System
ITS	Intelligent Transportation Systems (see IVHS)
ITS – America	Intelligent Transportation Society of America (see IVHS - America)
ITS – Oregon	Intelligent Transportation Systems for Oregon
ITWG	ITS Technical Working Group
IVHS	Intelligent Vehicle Highway System (see ITS)
IVHS-America	Intelligent Vehicle Highway Society of America (see ITS-America)
JPACT	Joint Policy Advisory Committee on Transportation
KSA	Knowledge, Skills, and Abilities
LAN	Local Area Network
LCD	Liquid Crystal Display
LDT	Light Duty Trucks
LED	Light Emitting Diode
LLC	Logical Link Control
LOC	League of Oregon Cities
LOI	Level Of Importance
LOS	Level of Service
LRM	Linear Reference Method (identifies highway, connection, or frontage road). The 12-character alphanumeric string has these components: • Place holder 0 • Highway number 001 to 499 • Highway suffix 00 or AA-ZZ • Roadway Identifier (1, 2, 5) • Mileage type (0, Z) • Overlap mileage code (0-9) • Jurisdiction code (S) • Two place holders 00
LRT	Light Rail Transit

Acronym	Meaning
LRS	Linear Reference System (identifies highway, connection, or frontage road). The 8-character alphanumeric string has these components: • Highway number 001 to 499 • Highway suffix 00 or AA-ZZ • Roadway identifier (I, D) • Mileage type (Z, P) • Overlap mileage code (0-9)
LRV	Light Rail Vehicle
LVA	Linked Vehicle Actuated
MACS	Metropolitan Area Corridor Study
MAP-21	Moving Ahead for Progress in the 21st Century
MDI	Model Deployment Initiative
MIB	Management Information Base
MIS	Management Information System
MMU	Malfunction Management Unit (NEMA)
MODEM	Modulate - Demodulate
MOVA	Modernized Optimized Vehicle Actuation
MPO	Metropolitan Planning Organization
MPR	Mobile Photo Radar
MUTCD	Manual on Uniform Traffic Control Devices
NCAP	New Car Assessment Program
NCHRP	National Cooperative Highway Research Program
NCTRP	National Cooperative Transit Research Program
ND	Negative Declaration
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NHTSA	National Highway Traffic Safety Administration
NIST	National Institute of Standards and Technology (Formerly the National Bureau of Standards of the U.S. Department of Commerce.)
NMS	Network Management System
NTCIP	National Transportation Communications for ITS Protocol
NTP	National Transportation Policy
NTSPS	National Transportation Strategic Planning Study
NVT	Network Virtual Terminal (also NVT-ASCII)
OAR	Oregon Administrative Rules

Acronym	Meaning
OASIS	Oregon Adjustable Safety Index System
OBC	Onboard Computer
ODOT	Oregon Department of Transportation
OEDD	Oregon Economic Development Department
OERS	Oregon Emergency Response System
OHP	Oregon Highway Plan
OID	Object Identifier
ORS	Oregon Revised Statutes
OSI	Open System Interconnect
OSI-RM	Open System Interconnect – Reference Model (also RM-OS)
OSM	On Street Master (Controller software)
OSP	Oregon State Police
OSRM	On Street Ramp Master (Controller software)
OTC	Oregon Transportation Commission
OTCDC	Oregon Traffic Control Devices Committee
OTE	Oregon Travel Experience (formerly Oregon Travel Information Council)
OTIA	Oregon Transportation Investment Act
OTIC	Oregon Travel Information Council (also TIC)
OTMS	Oregon Transportation Management System
OTP	Oregon Transportation Plan
PAM	Police Allocation Manual
PASSER	Progression Analysis and Signal System Evaluation Routine (Computer Software)
PCM	Pulse Code Modulation
PCMS	Portable Changeable Message Sign
PCOI	Pedestrian Clear-out Interval
PCU	Passenger Car Unit
PDT	Project Development (or Design) Team (also PT – Project Team)
PDU	Protocol Data Unit
PER	Packed Encoding Rules (a variation of BER for use with low bandwidth.)
PIN	Personal Identification Number
PMPP	Point to Multi-Point Protocol
PMS	Pavement Management System (ISTEA)
PPP	Public/Private Partnership
PROMETHEUS	Program for European Traffic with Highest Efficiency and Unprecedented Safety

Acronym	Meaning
PS&E	Plans, Specifications and Estimates
PSA	Public Service Announcement
PSMS	Project Safety Management System
PT	Project Team (also PDT - Project Development Team)
PTMS	Public Transportation Management System (ISTEA)
PTR	Part Time Restriction
RACS	Road - Automobile Communications System
RADAR	Radio Detecting and Ranging
RAM	Random Access Memory
RAME	Region Access Management Engineer
RDC	Rural Development Center
RDSS	Radio Determination Satellite Services
RF	Radio Frequency
RFP	Request for Proposal
RFQ	Request for Qualifications
RFRS	Road Features Rating System
RLR	Red Light Running
RM-OS	See OSI-RM
ROM	Read Only Memory
ROR	Run-off-road
RPG	Roadway Peer Group (Formerly Roadway Leadership Team, RLT)
RSA	Road Safety Audit
RSPA	Research and Special Projects Administration (USDOT)
RTE/M	Region Traffic Engineer/Manager
RTP	Regional Transportation Plan
RTPWS	Right Turn Permitted Without Stopping
RWIS	Road Weather Information System
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SAP	Service Access Point
SCC	Surveillance Communication and Control
SCOOT	Split Cycle and Offset Optimization Technique
SDLC	Synchronous Data Link Control
SDO	Standards Development Organization

Acronym	Meaning
SDU	Service Data Unit
SGRC	Statewide Grant Review Committee
SHRP	Strategic Highway Research Program
SIP	Safety Improvement Program or State Implementation Plan (Air Quality)
SLG	Synchronous Longitudinal Guidance
SMS	Safety Management System (ISTEA)
SNMP	Simple Network Management Protocol (Version 2 – SNMPv2)
SOV	Single Occupant Vehicle
SP	Standards Publication
SPIS	Safety Priority Index System
SRE	State Roadway Engineer
SSVS	Super Smart Vehicle System
STA	Special Transportation Area
STE	State Traffic Engineer
STIP	Statewide Transportation Improvement Program
STIP	State Transportation Improvement Program
STMF	Simple Transportation Management Framework
STMP	Simple Transportation Management Protocol
STRE	State Traffic-Roadway Engineer (changed to State Traffic Engineer 2024).
SZRP	Speed Zone Review Panel
TAC	Technical Advisory Committee
TBC	Time Based Coordination
TBC	Time Base Control (NEMA)
TCM	Transportation Control Measure (Air Quality)
TCP	Traffic Control Plans
TCP	Transmission Control Protocol
TDM	Time Division Multiplexing
TDM	Transportation Demand Management
TEA-21	Transportation Equity Act for the 21st Century
TESU	Traffic Engineering Services Unit
TF	Terminals and Facilities (NEMA)
TFP	Technology For People
TIA	Telecommunications Industries Association
TIP	Transportation Improvement Program

Acronym	Meaning
TIR	Traffic Impact Report
TIS	Transit Information System
TIS	Traffic Impact Study
TLV	Type, Length, Value encoding
TMA	Transportation Management Area
TMC	Traffic Management Center (see also TMOC and FMOC)
TMDD	Traffic Management Data Dictionary
TM-H	Traffic Monitoring for Highways
TMOC	Transportation Management Operations Center (see FMOC)
TOAST	Traffic Operations and Standards Team (formerly Traffic Operations Leadership Team (TOLT) and Traffic Operations Group (TOG))
TOC	Traffic Operations Center
TOD	Transit Oriented Development
TODS	Tourist Oriented Direction Signs
TPAC	Transportation Policy Advisory Committee
TPAU	Transportation Planning and Analysis Unit
TPR	Transportation Planning Rule
TPST	Traffic Project Services Team
TRANSYT	Traffic Network Study Tool (Computer Software)
TRB	Transportation Research Board
TRL	Time Reference Line
TRRL	Transportation and Road Research Laboratory
TRS	Traffic-Roadway Section
TSAMU	Traffic Standards and Asset Management Unit
TSM	Technical Services Manager
TSM	Transitway Simulation Model
TSM	Transportation System Management
TSO	Telephone Service Order
TSO	Transportation System Operations
TSP	Transportation System Plan
TSSU	Traffic Systems Services Unit
TTI	Texas Transportation Institute
TWLTL	Two Way Left Turn Lane (CTWLTL for Continuous Two Way Left Turn Lane)
UBA	Urban Business Area

Acronym	Meaning
UDP	User Datagram Protocol
UHF	Ultra-High Frequency (300MHz to 3GHz)
UMTA	Urban Mass Transit Administration (see FTA)
USDOT	United States Department of Transportation (also DOT)
UTC	Urban Traffic Control
VCOI	Vehicle Clear-out Interval
VHF	Very High Frequency (30 to 300MHz)
VICS	Vehicle Information Communication System
VIPS	Vehicle Identification and Priority System
VMS	Variable Message Sign (preferred – see also CMS, DMS)
VMT	Vehicle Miles of Travel (Vehicle Miles Traveled)
WAN	Wide Area Network
WIM	Weigh In Motion

File Code	Updated	Notes
Unassigned	June 2024	Added MPR, FPR, SRE. Updated STE and STRE.

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Definitions Appendix I

MUTCD Section 1A.13, as modified by Section 1A.13 in the Oregon Supplement to the MUTCD, defines terms used in the Traffic Manual that this appendix does not define.

1. **Bicycle lane** – See ORS 801.155.
2. **Bicycle path** – See ORS 801.160.
3. **Bottleneck** – A link (or section) in a transportation system having a maximum carrying capacity significantly less than the adjoining links. A link represents a continuous section between major nodes. Major nodes may include interchanges (or specific entrance or exit ramps) on controlled access highways and transitways, public road intersections on non-controlled access highways, and guideway junctions on fixed guideway systems. Major nodes on any system may also be defined as a point of geometric change, such as in vertical or horizontal alignment, lane width, etc., which results in significantly reduced operating characteristics. The capacity of the link downstream from the bottleneck must be equal to, or greater than that of the upstream link.
4. **Capacity** – The maximum number of vehicles (vehicle capacity) or passengers (person capacity) that can pass over a given section of roadway or transit line in one or both directions during a given period under prevailing roadway and traffic conditions.
5. **Commercial vehicle** – See ORS 801.210.
6. **Crossover** – See OAR 734-020-0100.
7. **Crosswalk** – See Section 310.0. See also enhanced crosswalk.
8. **DUII** – Driving under the influence of intoxicants. (See impaired driving victim memorial signing.)
9. **Emergency vehicle** – See ORS 801.260
10. **Enhanced crosswalk** –A crosswalk that has design treatments for crossing pedestrians, selected according to an engineering study, that are appropriate for the roadway conditions to improve safety and visibility of people crossing. At signalized intersections, these are marked crosswalks. At uncontrolled crosswalks, these include treatments selected according to Section 310.3.
11. **Freeway median** – See OAR 734-020-0100.
12. **Highway** – See ORS 801.305.
13. **Intersection** – See ORS 801.320
14. **Median** – A continuous divisional island that separates opposing traffic and may be used to separate left turn traffic from through traffic in the same direction as well. Medians may be designated by pavement markings, curbs, guideposts, pavement edge, or other devices. See also non-traversable medians and traversable medians.

15. **Non-traversable medians** – Medians that are designed to impede traffic from crossing the median. Examples include curbed medians or concrete barrier medians, also included are depressed grass or landscaped medians.
16. **Occupancy** – (1) The amount of time motor vehicles are present in a detection zone expressed as a percent of total time. This parameter is used to describe vehicle density, a measure of highway congestion.

    (2) The number of passengers in a vehicle, which when used in conjunction with vehicular volume, provides information on the total number of persons accommodated on a transportation link or within a transportation corridor.
17. **OR route** – A route system established and regulated by the Oregon Transportation Commission to facilitate travel on main highways throughout the state. Not all OR routes are on state highways and not all state highways have an OR route number.
18. **Principal arterial (urban, controlled access)** – A street or highway in an urban area which has been identified as unusually significant to the area in which it lies in terms of the nature and composition of travel it serves. The principal arterial system is divided into three groups: Interstate freeways; other freeways and expressways; and other principal arterials (with no control of access).

    Principal arterials should form a system serving major centers of activity, the highest traffic volume corridors, and the longest trip desires; and should carry a high proportion of the total urban area travel on a minimum of mileage.
19. **Region traffic engineer** – Registered professional engineer(s) responsible to approve the installation of specific traffic control devices on state highways within their respective region. The state traffic engineer assigns this responsibility to region traffic managers who are registered professional engineers. Region traffic managers may assign this responsibility to senior-level engineers within their respective region traffic unit. Engineers assigned the responsibility of region traffic engineer shall be members of the Traffic Operations & Standards Team. Actual position titles may vary from region to region.
20. **Region electrical supervisor** – Person responsible for electrical maintenance in the region or district.
21. **Road authority** – See ORS 801.445.
22. **Roadway** – See ORS 801.450.
23. **Signal mounted preemption systems** – Preemption systems that include the installation of a traffic signal-structure-mounted preemption detector, which reacts to a remote triggering device. The default state of a signal-mounted system is normal signal operation.
24. **Shoulder** – See ORS 801.480.
25. **Special event** – Any planned activity that brings together a community or group of people for an expressed purpose, including, but not limited to, parades, bicycle races, road runs

and filming activity that may result in total or partial closure of state highways or state highway sections.

26. **State highway** – The State Highway System as designated by the Oregon Transportation Commission, including the Interstate System.
27. **State highway index number** – An Oregon Transportation Commission approved identifier assigned to a highway. Every state highway has a state highway index number, commonly referred to as a state highway number.
28. **State highway name** – An Oregon Transportation Commission approved name used in conjunction with a state highway index number to identify a state highway.
29. **Throughway** – See ORS 801.524.
30. **Traffic control device** – See ORS 801.540.
31. **Traffic management program** – A systematic process that collects and analyzes traffic operation information on a real time basis and provides for implementation of one or more of the following, reasonably available operational management strategies:
    - Traffic surveillance and control systems
    - Motorists' information systems
    - Transit information systems
    - Freeway ramp metering
    - Traffic control centers
    - Computerized traffic signal systems
    - High occupancy vehicle (HOV) ramp meter bypass lanes
    - Bus bypass (queue jump) lanes
    - Park and ride facilities
    - Access management techniques
    - Incident management systems and equipment
32. **Traversable medians** – Medians that are typically built to provide a separation between opposing traffic but do not impede traffic from crossing the median. Examples include painted islands such as two-way left-turn lanes. Note a median marked with two double yellow lines and "crosshatching" transverse median bars is considered a "highway divider" in ORS 811.430. See the Traffic Line Manual for more information.
33. **US route** – A route system established by the US Congress to facilitate travel on main highways throughout the nation. An AASHTO committee regulates this route system.

File Code	Updated	Notes
Unassigned	June 2024	Updated state traffic engineer and Traffic Engineering Section.

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Forms Appendix J

Previous editions of the Traffic Manual included various forms in the appendix of the manual. Forms are now on ODOT's Highway Forms website.

File Code	Updated	Notes
Unassigned	January 2020	Referred readers to ODOT's Highway Forms website.

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Traffic Manual Revision History Appendix K

This appendix lists revisions made in the last three normal updates to the Traffic Manual.

Date	Section	Notes	Update Proposal
06/2024	500.4 – Speed Safety Cameras	Updated to address immediate need following changes from HB-4109 (2024).	2024-02-Q
06/2024	Appendix A2 – Fixed Photo Radar Guidelines	Updated to address immediate need following changes from HB-4109 (2024).	2024-02-Q
06/2024	Multiple sections	Changed state traffic-roadway engineer to state traffic engineer. Changed Traffic-Roadway Section to Traffic Engineering Section and Roadway Engineering Section as appropriate. Liability neutral language updates. Minor grammar corrections.	2024-03-Q
02/2024	100.0 – STRE	Updated red transit lane reference from IA-22 to 11th Edition of the MUTCD.	2024-01-Q
02/2024	100.1 – RTE	Updated green bicycle lane reference from IA-14 to 11th Edition of the MUTCD.	2024-01-Q
02/2024	300.1 – Interim Approvals	Updated for FHWA's termination of all IAs under 2009 MUTCD for the 11th Edition of the MUTCD.	2024-01-Q
02/2024	309.2 – Intersection Bicycle Boxes	Updated interim approval status and refer to 11th Edition of the MUTCD.	2024-01-Q
02/2024	310.3 – Uncontrolled Marked Crosswalks	Updated RRFB references from IA-21 to 11th Edition of the MUTCD.	2024-01-Q
01/2024	100.1 – RTE	Added R06-08 – adding parking allowance within a T-intersection.	2023-04
01/2024	100.1 – RTE	Updated R07-02 (rumble strips) per edits in the January 2024 Traffic Line Manual on sinusoidal rumble strips.	N/A
01/2024	101.0 – Publications	Revised introduction paragraph for clarity.	N/A
01/2024	303.1 – Rumble Strips	Updated content on sinusoidal rumble strips to be consistent with edits in the January 2024 Traffic Line Manual.	N/A
01/2024	310.0 – Crosswalks on State Highways	Incorporated Tech Bulletin RD21-01(B) and adapted to fit within the Traffic Manual.	2023-03
01/2024	310.3 – Uncontrolled Marked Crosswalks	Updated references to research/guidance on effectiveness of LED-embedded warning signs and high-visibility crosswalk marking styles.	2023-05

Date	Section	Notes	Update Proposal
01/2024	310.8 – Crosswalk Closures	Added guidance and considerations for closure treatments. Moved detectable closure treatment info to Highway Design Manual. Incorporated parts of RD21-01(B) – Location of Crosswalks.	2023-02
01/2024	403.0 – Roundabouts	Added cross-reference to Section 1206.3 in the Highway Design Manual for information on design life.	N/A
01/2024	500.4 – Speed Safety Cameras	Comprehensive update. Updated section name. Incorporated changes from HB-2095 (2023). Updated information on all forms of speed safety cameras per current statutes.	2023-01
01/2024	Appendix A2 – Fixed Photo Radar Guidelines	Added clarifying information about what HB-2095 (2023) does related to fixed photo radar. Updated research citations on speed safety camera effectiveness. Other grammar/readability corrections.	2023-01
01/2024	Appendix E – ORS/OAR	Updated statutes listed for school zones and school speed zones.	N/A
07/2023	500.4 – Photo Speed Enforcement	Quick update. Comprehensive update to address immediate need following HB-2095 and questions ODOT is receiving; normal update expected in 01/2024 edition.	2023-01-Q
01/2023	100.0 – STRE	Added S11-01; updated Table 100.0-B for Grants of Access. Updated use of “crosswalk” and “crossing.”	2022-04
01/2023	101.0 – Publications	Updated publication list.	2022-04
01/2023	302.2 – Vehicle Speed Feedback Signs	Comprehensive update.	2022-01
1/2023	304.1 – Traffic Signal Enforcement	Updated reference for Red-Light Running Camera Guidelines to Appendix A1.	2022-02
01/2023	310.1 – Enhanced Crosswalk Spacing	Clarified process. Updated use of “crosswalk” and “crossing.” Changed section title to “enhanced crosswalk spacing.”	2022-04
01/2023	310.3 – Uncontrolled Marked Crosswalks	Update marking style guidance. Update engineering study deliverables for channelized right turn lanes and lighting study. Update NHTSA crash statistics. Other clarifications.	2022-03

Date	Section	Notes	Update Proposal
01/2023	310.3 – Uncontrolled Marked Crosswalks	Updated use of “crosswalk” and “crossing.” Use crossing for 1) rail grade crossings, or 2) the act of crossing (use crossing as a verb instead of a noun). Use crosswalk for the legal facility a pedestrian uses to cross a highway.	2022-04
01/2023	310.7 – Textured & Colored Crosswalks	Updated use of “crosswalk” and “crossing.” Use crossing for 1) rail grade crossings, or 2) the act of crossing (use crossing as a verb instead of a noun). Use crosswalk for the legal facility a pedestrian uses to cross a highway.	2022-04
01/2023	310.8 – Crosswalk Closures	Updated use of “crosswalk” and “crossing.” Use crossing for 1) rail grade crossings, or 2) the act of crossing (use crossing as a verb instead of a noun). Use crosswalk for the legal facility a pedestrian uses to cross a highway.	2022-04
01/2023	403.0 – Roundabouts	Updated use of “crosswalk” and “crossing.” Use crossing for 1) rail grade crossings, or 2) the act of crossing (use crossing as a verb instead of a noun). Use crosswalk for the legal facility a pedestrian uses to cross a highway.	2022-04
01/2023	404.0 – Traffic Signal Operations	Updated CTSI class information.	2022-04
01/2023	405.4 – Shared (or Combined) Bike and Right Turn Lane	Corrected grammar.	2022-04
01/2023	500.0 – Speed Zones	Updated per 2022 speed zoning OAR/manual updates.	2022-04
01/2023	502.0 – Access Management	Corrected grammar.	2022-04
01/2023	Appendix A1 – Red Light Running Guidelines	Added Red Light Running Guidelines to Appendix A. Updated for HB-4105 (2022 regular Oregon legislative session). Updated formatting.	2022-02
01/2023	Appendix A2 – Fixed Photo Radar Guidelines	Added Fixed Photo Radar Guidelines to Appendix A. Updated for HB-4105 (2022 regular Oregon legislative session). Updated formatting.	2022-02
01/2023	Appendix B – TE Structure	Updated use of “crosswalk” and “crossing.” Use crossing for 1) rail grade crossings, or 2) the act of crossing (use crossing as a verb instead of a noun). Use crosswalk for the legal facility a pedestrian uses to cross a highway.	2022-04

Date	Section	Notes	Update Proposal
01/2023	Appendix H – Glossary	Updated LRM, added LRS.	2022-04
01/2023	Appendix I – Definitions	Updated use of “crosswalk” and “crossing.” Use crossing for 1) rail grade crossings, or 2) the act of crossing (use crossing as a verb instead of a noun). Use crosswalk for the legal facility a pedestrian uses to cross a highway.	2022-04
7/2022	302.2 – Vehicle Speed Feedback Signs	Quick update. Comprehensive update to address immediate need; normal update expected in 01/2023 edition.	2022-01-Q
01/2022	100.0 – STRE	Updated S02-02, S02-03, S08-13. Updated authority delegation citations.	2021-02
01/2022	100.0 – STRE	Combined S02-04 with S02-02 and S10-01.	2021-01
01/2022	100.1 – RTE	Added R02-01, R02-02, R02-03. Modified R05-01.	2021-01
01/2022	100.1 – RTE	Added R05-07.	2021-02
01/2022	302.2 – Vehicle Speed Feedback Signs	Added fixed photo radar statute reference.	2021-02
01/2022	310.0 – Crosswalks on State Highways	Renamed section. Moved old content to other sections.	2021-01
01/2022	310.1 – Spacing of Pedestrian Crossings	Renamed section. Incorporated crossing spacing targets from the Blueprint for Urban Design.	2021-01
01/2022	310.2 – Controlled Marked Crosswalks	Renamed section. Updated to cover controlled marked crosswalks.	2021-01
01/2022	310.3 – Uncontrolled Marked Crosswalks	Renamed section. Comprehensive update to cover uncontrolled marked crosswalks.	2021-01
01/2022	310.4 – Marked School Crossings at Uncontrolled Locations	Moved content to 310.3. Section 310.4 now vacant.	2021-01
01/2022	310.6 – Pedestrian Activated Warning Lights/Beacons	Moved content to 310.3. Section 310.6 now vacant.	2021-01
01/2022	310.8 – Crosswalk Closures & Removals	Moved removal process to Sections 310.2 and 310.3; grammar fixes.	2021-01
01/2022	405.2 – Channelized Right Turn Lanes	Formatting corrections to paragraph 03 in Standards & Guidelines.	N/A
01/2022	406.1 – Wrong Way Treatments	Updated red RPM considerations.	2021-02
01/2022	500.0 – Speed Zones-General	Added paragraph describing changes from HB-3055 (2021 legislative session).	2021-02

Traffic Manual Revision History Appendix K

Date	Section	Notes	Update Proposal
01/2022	500.4 – Photo Radar Speed Enforcement	Added vehicle speed feedback reference.	2021-02
01/2022	Appendix G – References	Updated to references used in January 2021 edition.	N/A
01/2022	Appendix I – Definitions	Added pedestrian crossing. Referenced Section 310.0 for crosswalk.	2021-01

File Code	Updated	Notes
Unassigned	June 2024	Added updates for June 2024 edition.

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