

# BLUEPRINT FOR URBAN DESIGN

Volume 1 of 2

ODOT's Approach for Design in Oregon Communities







# TECHNICAL SERVICES DIRECTIVE

<small>SUBJECT</small> Blueprint for Urban Design Bridging Document for Design Manuals	<small>FINAL NUMBER</small> TSB19-01(D)	<small>EFFECTIVE DATE</small> 12/15/2019	<small>VALIDATION DATE</small> 	<small>SUPERSEDES</small> New
<small>TOPIC/PROGRAM</small> Update for Urban Design Criteria and Supplement to Design Manuals	<small>WEB LINK(S)</small> <a href="https://www.oregon.gov/ODOT/Engineering/Pages/Technical-Guidance.aspx">https://www.oregon.gov/ODOT/Engineering/Pages/Technical-Guidance.aspx</a>  <small>APPROVED SIGNATURE</small> Original signed by Steven B. Cooley, P.E. Chief Engineer			

## PURPOSE

The ODOT Highway Design Manual (HDM) is the primary document for roadway design on the state highway system and was last updated in 2012. Since it is the urban design concepts that have evolved the most since the last update of the HDM, it is important to incorporate current urban design criteria into ODOT designs as quickly as possible. For expediency in getting this urban design criteria into practice, it was decided to create a “bridging document” that would establish the revised criteria to be used when designing urban projects on the state system. This document is the Blueprint for Urban Design (BUD). This Directive establishes the intended use of the “Blueprint for Urban Design” to act as a bridging document to provide guidance for urban design on Oregon state highways until such time that all Oregon Department of Transportation manuals related to urban design can be updated to include these revised design criteria.

## GUIDANCE

The Blueprint for Urban Design (BUD) encompasses the revised ODOT urban design criteria. It follows federal guidelines and principles utilizing a performance based, context sensitive, practical design approach to provide flexibility where warranted to produce appropriate designs to accommodate all modes of transportation affecting all urban roadway users. Tradeoffs between design elements in urban cross-sections are inevitable when working within the built environment. The Blueprint for Urban Design provides information and criteria to aid project teams to make appropriate choices when developing final project designs to meet established project goals and create the expected outcomes. Every urban project has unique opportunities and the six urban contexts portrayed in the Blueprint for Urban Design, along with their respective design criteria, will allow project teams to better align ODOTs transportation needs with local community aspirations.

Chapter Six, Urban Highway Design (Non-Freeway), of the HDM is specific to urban design. The Blueprint for Urban Design will directly affect the cross-section design criteria listed in the text, tables

and figures within chapter 6. There are numerous references to design criteria for urban locations throughout the rest of the Highway Design Manual as well. In addition to the HDM, references to roadway design criteria appear in many other ODOT manuals. This directive establishes that the Blueprint for Urban Design is the definitive resource for urban design on the Oregon state highway system and it shall be used to plan, design, construct and maintain highways in urban locations under jurisdiction of the state. Urban locations are defined as those described by the six urban contexts found in the Blueprint for Urban design. Where design guidance and criteria in the 2012 Highway Design Manual or other ODOT manuals do not align with design criteria within the Blueprint for Urban Design, the Blueprint for Urban Design shall be the governing guidance and criteria until such time that all other manuals are updated to include the content found in the Blueprint for Urban Design.

## **DEFINITIONS**

Blueprint for Urban Design (BUD) – Bridging document to be used as a companion document to the Highway Design Manual and other ODOT design manuals until all manuals receive updates.

Urban Design Concurrence Document – Form to determine project context, define design criteria and document design decisions.

Highway Design Manual (HDM) – Primary manual for roadway design on the state highway system.

Performance-Based, Practical Design – FHWA backed decision-making approach that helps agencies better manage transportation investments and serve system-level needs and with limited resources focusing on system-wide performance. Goals include context sensitivity, flexibility, asset management, value engineering and practical design.

## **ACTION REQUIRED**

This directive is mandatory for all urban projects planned, designed, constructed and maintained on the state highway system as defined by the six urban contexts within the Blueprint for Urban Design. Authority for decisions concerning the appropriate project and contextual use of the Blueprint for Urban Design will reside in the Region Technical Center. The Region Technical Center Manager shall provide final approval of design concurrence with collaborative input from the region planning, traffic, roadway and maintenance units. Project design decisions shall be documented using the ODOT Urban Design Concurrence document submitted as part of the Design Acceptance Package. Final design elements less than the acceptable range found in the Blueprint for Urban Design will need a design exception using the ODOT design exception process. FHWA review and approval will be required for Projects of Division Interest (PODI). Engineering and Technical Services Branch staff will perform Quality Assurance review of selected region projects.

## RESPONSIBILITIES

### Role

State Traffic/Roadway Engineer

Region Technical Center Manger

Region Planning Manager

Region Maintenance Manager

Region Technical Center,  
Construction, and Maintenance Staff

Engineering and Technical Services  
Branch staff

### Responsibility/Action

- Delegated authority for context based urban design criteria included in the Blueprint for Urban Design
- Regional authority for decisions concerning appropriate project and contextual use of the Blueprint for Urban Design and its content on the state highway system
- Region Planning Section concurrence for appropriate project and contextual use of the Blueprint for Urban Design and its content on the state highway system
- Region Maintenance Section concurrence for appropriate project and contextual use of the Blueprint for Urban Design and its content on the state highway system
- Incorporate the appropriate urban design and contextual criteria included in the Blueprint for Urban Design into all applicable urban project activities on the state highway system including planning, design, construction and maintenance.
- Obtain Concurrence from region roadway and traffic managers for appropriate decisions and application of the Blueprint for Urban Design on urban projects on the state highway system
- Provide support for successful region incorporation of the appropriate urban design and contextual criteria included in the Blueprint for Urban Design into all applicable urban project activities on the state highway system. Perform QA on selected projects.

## **IMPLEMENTATION**

The Blueprint for Urban Design shall be used on all urban projects as defined by the urban contexts listed within it. Implementation for its use is the effective date of this directive in relation to a project's Design Acceptance stage. For all urban projects in planning, scoping or project initiation stages on or after the effective date of this directive that have not completed the Design Acceptance process, use of the Blueprint for Urban Design as the primary design document is required. Projects that were scoped using the Highway Design Manual as the basis for their design prior to implementation of the Blueprint for Urban Design do not need to be re-scoped. However, during the project initiation phase, the Transportation Project Manager or Resident Engineer – Consultant Projects for the project must submit a draft of the Urban Design Concurrence document identifying the project context and anticipated design decisions to the Region Technical Center Manager for initial concurrence before project development may continue. Final approval of the Urban Design Concurrence document is part of the final Design Acceptance Package process.

For projects that have completed the Design Acceptance process and submitted the Design Acceptance Package prior to the effective date of this directive, use of the Blueprint for Urban Design is not required. Continue project development utilizing the Highway Design Manual criteria. A project design team may choose to incorporate concepts from the Blueprint for Urban Design into their project after submittal of the Design Acceptance Package. However, design exceptions will be needed for those design elements that are non-standard with respect to the Highway Design Manual, since it was the basis for the project design at the Design Acceptance Package submittal.

For projects that have not completed the Design Acceptance process, but are in the latter stages and nearing Design Acceptance Package submittal, the State Traffic/Roadway Engineer shall make the decision for the use of the Blueprint for Urban Design as the primary design criteria for the subject project upon region request. Should it be determined that it is not necessary to use the Blueprint for Urban Design for design criteria in these instances, the project would continue development using Highway Design Manual criteria and design exceptions will be needed for any non-standard elements at the Design Acceptance Package submittal. If it is determined the project will continue development using the Blueprint for Urban Design, then the Transportation Project Manager or Resident Engineer – Consultant Projects for the project must submit a draft of the Urban Design Concurrence document identifying the project context and anticipated design decisions to the Region Technical Center Manager for initial concurrence before project development may continue. Final approval of the Urban Design Concurrence document is part of the final Design Acceptance Package process.

## **BACKGROUND**

ODOT's Urban Design policies and practices have continually evolved over the years. In the early 1990s, ODOT instituted "Stakeholder Involvement" as a process to include public outreach in our roadway projects. In the mid-90s in order to better align with nationally recognized terminology,

Stakeholder Involvement became known as “Context Sensitive Design” (CSD), which later became “Context Sensitive Solutions” (CSS). In the late 1990s, ODOT established “Context Sensitive and Sustainable Solutions (CS<sup>3</sup>) as guidance for roadway projects. In 1999, an ODOT cross discipline team partnered with Transportation Growth Management (TGM) staff in the planning section and created the guidance document “Main Street... when a Highway Runs Through It, A Handbook for Oregon Communities” to model context sensitive design concepts. In 2003, ODOT updated the Highway Design Manual (HDM) to provide improved guidance, document the context sensitive approach, and bring the planning and designing processes closer together. The updated HDM included for the first time a separate chapter specifically for Urban Design that included design criteria aligned with the roadway segment designations described in the 1999 Oregon Highway Plan. In 2010, ODOT established a “Practical Design” strategy to efficiently deliver focused improvements to communities and the state transportation system with intent to maximize benefit and minimize cost on roadway projects. The 2012 update to the HDM reflected these enhancements. However, highway design is a continuous evolution and this is particularly true for urban design strategies. In 2016, ODOT embarked on a project to further enhance our urban design policies and practices to align with changing national and federal urban design guidance and direction and to include current terminology in order to be consistent with other states and jurisdictions. That endeavor led to creating the document, Blueprint for Urban Design. Because making large scale updates to ODOT design manuals is a time consuming and resource intensive process, it is intended for the Blueprint for Urban Design to act as a “bridging document”. This document will bridge the gap between the current ODOT design manuals and future versions of those manuals until such time that they can be updated to include the information found in the Blueprint for Urban Design.

## **GUIDELINES/REFERENCE**

### **Federal Guidance and Flexible Design**

In 1991, Congress passed the Intermodal Surface Transportation Act (ISTEA) and in 1995 they passed the National Highway System Designation Act. These acts provided funding and direction around highway design and inclusion of local concerns. Following the federal direction, ODOT has been a leader in shaping the discussion around design flexibility and has not only embraced changes in federal design flexibility over the years, but has also helped shape those changes. In 1997, FHWA published the document *Flexibility in Highway Design*. This was a first attempt at the federal level to acknowledge local concerns and community needs during development of highway projects, particularly in urban areas. This publication was developed to provide guidance for design related provisions of the 1991 and 1995 congressional legislation. Two case studies from Oregon were included. The Historic Columbia River Highway rehabilitation project and the Lincoln Beach Parkway (Lincoln Beach to Fogarty Creek project) on US 101 were used to demonstrate designing to aesthetic and historic values and incorporation of local concerns and needs. ODOT is not new to contextual design concepts.

In recent years, federal guidance for roadway design has been rapidly changing toward even greater flexibility along with inclusion of multimodal, context related design focusing on all road users. The outcome of this is the concept of Performance-based Practical Design. The seventh edition of the Green Book has begun incorporation of these concepts. The eighth edition currently under development will take Performance-based Practical Design even further into national roadway design processes and philosophies as the Code of Federal Regulations, Title 23 continues to evolve.

For federally funded projects and projects on the National Highway System (NHS), the Code of Federal Regulations (CFR), Title 23, Section 625 designates standards, policies and standard specifications that are acceptable to the Federal Highway Administration (FHWA) for application of geometric and structural design of highways. The Code of Federal Regulations is periodically updated to include revised design criteria and best practices as new information becomes available. An example is the change in outlook of the original 13 controlling design criteria that were established in 1985. Recent research has shown that not all of these controlling criteria are as critical to operations and safety as previously thought. In 2016, FHWA reduced the original 13 criteria to the following 10 criteria that are considered by FHWA as controlling for the design of projects:

- Design Speed
- Lane Width
- Shoulder Width
- Horizontal Curve Radius
- Superelevation Rate
- Stopping Sight Distance
- Maximum Grade
- Cross Slope
- Vertical Clearance
- Design Loading Structural Capacity.

To further differentiate designs in higher speed rural locations and lower speed urban locations, FHWA divided the ten controlling criteria into two categories.

1. Projects with Design Speeds of 50 mph or greater
2. Projects with Design Speeds less than 50 mph

For projects on roadways with design speeds of 50 mph and greater, all ten controlling criteria apply and exceptions to these criteria are subject to FHWA approval. For roadways with design speeds below 50 mph only 2 controlling criteria are subject to FHWA design approval – Design Speed and Design Loading Structural Capacity. FHWA still considers the other eight criteria as important as they are still listed in 23 CFR as design parameters, but allows the state transportation agencies to determine how they will be incorporated into lower speed projects with particular focus on urban locations. This provides greater emphasis to incorporate designs for all modes of transportation and allows greater flexibility to provide appropriate and economic solutions for projects when confronted with constraints within the built environment.



In addition to 23 CFR, Section 625 and the controlling criteria, the United States Code (USC), Title 23, Section 109 sets design criteria for highways. 23 USC, 109 Subsection (c) provides that designs for new construction, reconstruction, resurfacing, restoration or rehabilitation projects shall consider:

- (A) the constructed and natural environment of the area;
- (B) the environmental, scenic, aesthetic, historic, community, and preservation impacts of the activity;
- (C) cost savings by utilizing flexibility that exists in current design guidance and regulations; and
- (D) access for other modes of transportation.

Section 1404 of the Fixing America's Surface Transportation (FAST) Act signed in December of 2015 provides direction for incorporating flexibility and the full consideration of community context in transportation projects and amends 23 USC, section 109 to require these considerations. It also expands the list of publications to be considered when developing designs to include the Highway Safety Manual (HSM) and the Urban Street Design Guide published by the National Association of City Transportation Officials (NACTO).

The Blueprint for Urban Design is ODOT's continued recognition and use of federal guidelines for flexibility in urban design on the state highway system.

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# Preface

The Oregon Department of Transportation (ODOT) Blueprint for Urban Design documents the urban design practices and guidance for ODOT facilities and projects. The purpose of the Blueprint for Urban Design is to highlight opportunities for **flexibility in ODOT's current design** criteria. This allows practitioners to determine the effective outcomes for each facility based on the urban context and to identify ways in which design flexibility can accommodate individual community needs.

The Blueprint for Urban Design builds from ODOT existing manuals and existing plans and serves as interim guidance until the principles and guidance can be incorporated during the next update to the Highway Design Manual, Analysis Procedure Manual, Traffic Manual, and other guiding documents. Supported by Planning Section and Statewide Project Delivery Group, the Blueprint for Urban Design has been adopted with proper directives and is to be used to inform urban design contexts for planners and designers moving forward.

The Blueprint for Urban Design was developed by the ODOT Planning Section, Statewide Project Delivery Group and Active Transportation staff with a collaborative approach which included multiple disciplines and region staff. This document was developed with support from the Federal Highway Administration (FHWA) Oregon Division and the transportation engineering consulting firm, Kittelson & Associates, Inc.

Volume 1: Blueprint for Urban Design includes the primary urban design guidance presented in each chapter. Volume 2: Appendices contains supplemental information associated with the chapter content.

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# Blueprint for Urban Design

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*Appendices are in Volume 2 of the Blueprint for Urban Design.*



OREGON DEPARTMENT OF TRANSPORTATION

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# BLUEPRINT FOR URBAN DESIGN

ODOT's Approach for Design in Oregon Communities

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## Chapter 1

# Introduction and Background

January 2020





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## 1.0 INTRODUCTION AND BACKGROUND

The Blueprint for Urban Design applies to urban land use contexts that broadly identify the various built environments along Oregon Department of Transportation (ODOT) roadways. The urban context is based on existing and future land use characteristics, development patterns, and roadway connectivity of an area. The urban context is not limited to places within the current Urban Growth Boundary (UGB). The planning and design principles and guidance provided in this document focus on all roadways within the urban context except for interstates and limited-access freeways (expressways) with interchanges. For design consistency of the urban network adjacent to an interstate or limited access freeway

(expressway), the Blueprint for Urban Design 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 considered part of the urban network and not part of the interstate or freeway crossing it.

### KEY TAKEAWAYS >>

- Supplements and overrides existing HDM and other design manuals on any conflicting guidance
- Planning and design by urban context in addition to existing roadway classification and designation
- Highlights flexibility
- Performance based design
- Starts at highest level of protection for vulnerable users
- New design documentation process

## 1.1 ODOT DIRECTIVE AND EXECUTIVE SUMMARY

### 1.1.1 Message from ODOT Leadership

For many years, ODOT has worked with local governments to develop system plans in the urban context. However, this process often resulted in planned designs that could not be constructed based on current criteria and standards, by which designers are bound. This disconnect was often uncovered well into the design phase. The Blueprint for Urban Design highlights opportunities for **flexibility in ODOT's current design criteria**. This design flexibility can better accommodate individual community needs by determining effective outcomes for each facility based on the urban context.

The Blueprint for Urban Design will not take the place of manuals and existing plans, but will instead serve as interim guidance until its principles can be incorporated during the next update to the Highway Design Manual, Analysis Procedure Manual, Traffic Manual, and other documents. Until those updates are made, The Blueprint for Urban Design supplements and supersedes the Highway Design Manual when determining appropriate urban design elements within the roadway cross-section. With support from Planning and Technical Services Engineering, the Blueprint for Urban Design includes proper directives and is to be used to inform urban design for planners and designers moving forward.

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## 1.1.2 Purpose of the Blueprint for Urban Design

Design guidance has evolved over the years to be more context sensitive and to integrate flexibility, but these features are often underutilized. Additionally, design guidance now considers the various modal needs of a transportation system. This evolution reflects the shift from nominal safety<sup>1</sup> (subjective) to substantive safety<sup>2</sup> (objective). Transportation professionals strive to use guidance and standards to support evolving needs and provide a safe and efficient network.

In an effort to incorporate updated guidance from national perspectives and tailor it to meet the needs of the Agency and local contexts, ODOT founded the Urban Design Initiative. The initiative provides principles and guidance that can be used for both planners and engineers in order to allow flexibility to meet the modal needs of the users in urban communities.

The ODOT Urban Design Initiative recognized ODOT's earlier urban design needs and guidance were not strategically aligned. The Mainstreet Handbook (1999) informs planners but does not reflect the most recent evolution of modal guidance (1). Additionally, planners and designers needed consistent tools that supported the recently adopted modal plans, such as the Bicycle and Pedestrian Plan and Public Transportation Plan. A bridging document, the Blueprint for Urban Design meets these identified needs.

The Blueprint for Urban Design serves as interim guidance on urban design practices until the appropriate manuals in the agency, such as the Highway Design Manual (2), can be updated. This document will be available to designers, and planners, as well as to local agencies, stakeholders, and developers on ODOT facilities in urban areas.

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<sup>1</sup> Nominal safety (Subjective safety): Safety that relies on the perception of user. This assessment will vary between observers and will depend on their perspectives.

<sup>2</sup> Substantive safety (Objective safety): Safety that can be measured or quantified independent of the observer.

### 1.1.3 Summary of Guidance in Blueprint for Urban Design by Chapter

Chapter 1 provides an introduction and overview of the Blueprint for Urban Design. Summaries of ODOT projects and program types provide background on current practice. Practitioners will use Chapter 2 to identify the appropriate urban context, then evaluate and identify the appropriate design elements based on the context outlined in Chapter 3. Practitioners will use ODOT urban design concurrence to document design decisions through an overarching multimodal decision-making framework that embraces performance-based design as provided in Chapter 4.

Applying any section and/or chapter independently will be difficult for practitioners. Project teams should regularly verify and confirm that ongoing project development meets original intended outcomes based on community needs. Table 1-1 provides an overview of each chapter in the Blueprint for Urban Design. Appendix A in Volume 2 of the Blueprint for Urban Design definitions for key terminology used throughout the document.

## How to Use the Blueprint for Urban Design >>

- Chapter 1 – Review document purpose and message from ODOT leadership, and learn background on ODOT program types
- Chapter 2 – Identify the appropriate urban context
- Chapter 3 – Evaluate and identify the design elements based on the context
- Chapter 4 – Use ODOT urban design concurrence to document design decisions based on the multimodal decision-making framework

Table 1-1: Chapter Overview

Chapter Title	Chapter Description and Key Guidance
Chapter 1 Introduction and Background	Chapter 1 introduces the Blueprint for Urban Design and provides clear instructions and guidance through an ODOT Directive. It includes the purpose of this document, its intended audience, and an overview of each chapter. An overview of ODOT programs gives background on current ODOT practices.
Chapter 2 Refining Urban Contexts and Roadway Classifications	The purpose of Chapter 2 is two-fold. First, it provides information on the current urban planning and design practice at ODOT. Second, it provides new guidance to interpret existing land use areas and functional classification categories to more appropriately align with various urban contexts. This guidance enables ODOT to develop a more seamless process to design projects in urban areas that serve all users. The chapter describes six ODOT Urban Contexts and provides examples of each.
Chapter 3 Design Flexibility at ODOT in Urban Contexts	Chapter 3 includes information to help practitioners identify and evaluate trade-offs while considering the operations, safety, and design for urban projects. It introduces the street realms and provides specific considerations to the design elements within each realm as it relates to various urban contexts. In addition, the summary tables provide design guidance recommendations for ODOT urban projects.
Chapter 4 A Multimodal Decision-Making Framework	Chapter 4 focuses on a performance-based approach and a delivery process that supports decision-making from planning through design. Identifying the desired project outcomes and understanding the urban context and primary roadway users can guide practitioners in determining appropriate performance measures to evaluate the trade-offs of various design decisions.

### 1.1.4 Tort Liability Considerations

Tort liability and risks are often seen as impediments to appropriately adapted flexible designs, given urban context. There is a misperception that “designing to standards” inherently improves safety performance and eliminates risks of lawsuits. Practitioners need to understand fundamental elements of tort liability to make informed decisions and learn how to manage risk by documenting the project evaluation and decision-making process. NCHRP Legal Digest 57 provides additional information on tort liability related to design guidance and standards (3).

Documenting the decision-making process when selecting the design for new or reconstructed roadways is an effective way to manage risk. This includes documenting design considerations and evaluated alternatives based on clearly outlined project goals. Chapter 4 of the Blueprint for Urban Design provides a multimodal decision-making framework that guides practitioners through decision-making and notes the importance of using ODOT urban design concurrence for documentation. Chapters 2, 3, and 4 of the Blueprint for Urban Design identify the types of documentation that should occur throughout the project flow. The guidance provided in the Blueprint for Urban Design allows for a diverse range of potential designs. Therefore, the discretionary decisions of project teams must be documented as part of ODOT’s urban design concurrence. The urban design concurrence documentation could provide the justification and evidence necessary to manage tort liability.

## 1.2 HOW ARE URBAN PROJECTS CURRENTLY DEVELOPED AND DELIVERED AT ODOT?

ODOT manages and funds programs related to Oregon's system of highways, roads and bridges, railways, public transportation services, transportation safety programs, driver and vehicle licensing, and motor carrier regulation. Revenue from federal, state, and other sources fund these programs. Each program has unique program requirements, performance measures, and urban project delivery challenges.

### 1.2.1 Who is Currently Involved and How?

Two broad groups deliver transportation projects - ODOT and local agencies, as shown in Table 1-2 by project type and role. The roles and responsibilities below represent a broad overview—they are not static categories and can vary between project and region.

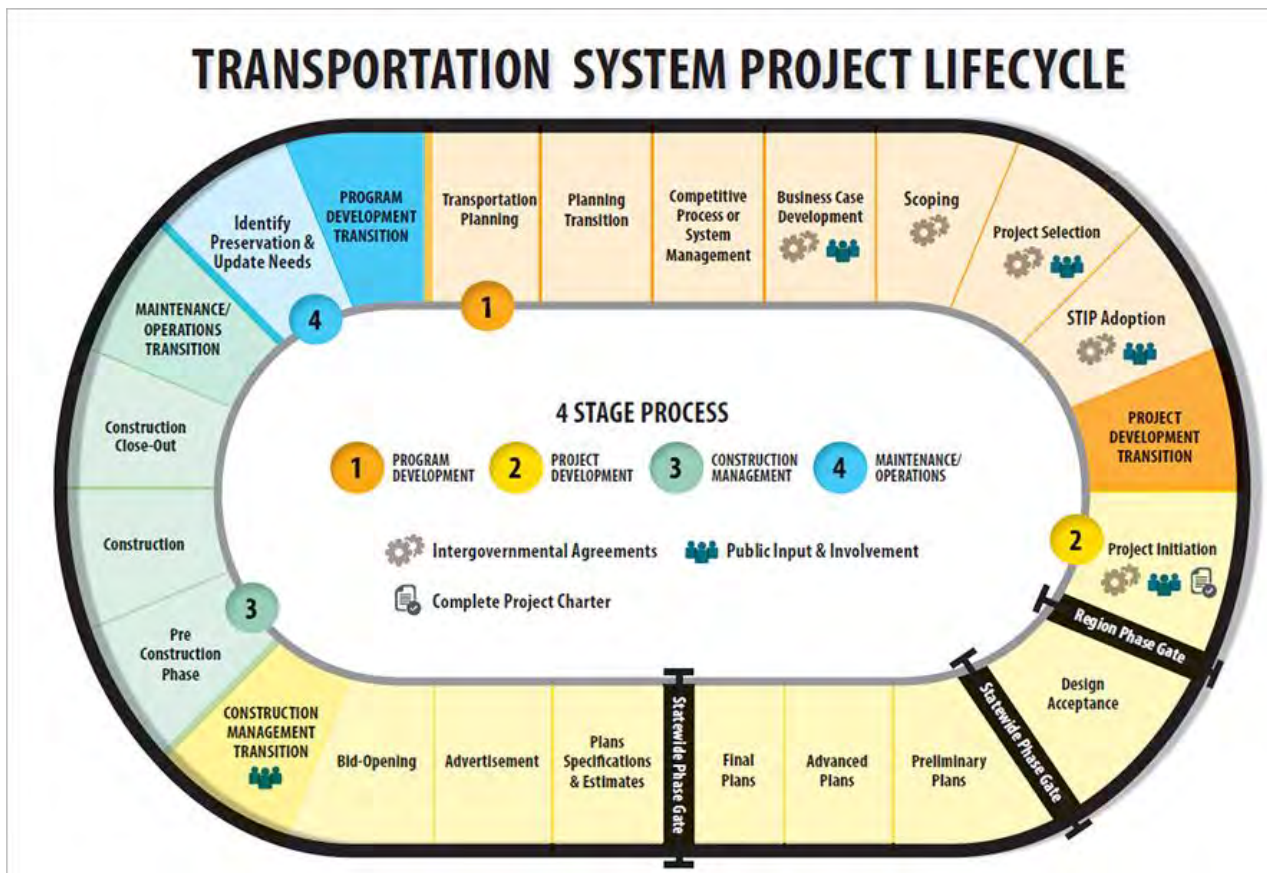
Table 1-2: ODOT Transportation Projects

Agency	Project Type & Role	Description
ODOT	Design: Transportation Project Managers (Project Leaders, and Local Agency Liaisons) Resident Engineers (Consultant Project Managers)	Transportation Project Managers and Resident Engineers are internal ODOT staff that coordinate project teams and manage the design phase of projects, typically from project selection through completion of Plans, Specifications, and Estimates (PS&E). The distinction between roles is that Transportation Project Managers coordinate internal project teams and technical resources, as well as manage local agency projects that cannot be delivered directly by the local agency. Resident Engineers manage external consultant teams and resources. PMs manage the construction phase of an ODOT project, following completion of PS&E for both PL and CPM projects. These projects are usually federally funded and <b>on ODOT's system, though not always.</b>
	Construction: Project Managers (PMs) and sometimes Transportation Project Managers (LALs)	
	Maintenance: District Manager (DM) and staff	DMs and their staff <b>manage maintenance projects on ODOT's</b> facilities. These projects are state-funded.
	Development Review: Maintenance and/or Planning	Maintenance and planning staff manage development review projects. For ODOT facilities, maintenance staff typically manages the permitting process generally, while planning staff often coordinates local agency engagement specifically.
Local Agency	Certified Local Public Agency (CLPA)	CLPAs manage federally funded design and construction projects on their own, and sometimes other agencies' facilities, including ODOT. LALs are the primary ODOT point of contact for CLPAs, but CLPAs lead their own projects and related design decisions. ODOT maintains control of design decisions on its own facilities.
	All Other Local Agencies	ODOT provides state funds to most non-certified local agencies to allow for greater local control and ownership of their projects. The local agency manages the design and construction phases, and <b>these projects are not on ODOT's system. LALs are the primary ODOT</b> point of contact, but local agencies lead their own projects and related design decisions.

The majority of urban transportation projects follow the four stages of the ODOT "Transportation System Lifecycle," as illustrated in Figure 1-1.

- Program Development – transportation planning to identify needs, identifying and scoping potential projects, and selecting projects for funding
- Project Development – project initiation, design, permitting, bid, and award
- Construction Management – constructing the project
- Maintenance/Operations – ongoing maintenance and operation

Figure 1-1: ODOT Transportation System Lifecycle<sup>3</sup>



Within the ODOT Transportation System Lifecycle, there are two major urban design challenges faced by ODOT in the Program Development stage. These include verifying:

- Urban transportation needs are considered, and appropriate solutions are identified early in planning stages, and

<sup>3</sup> The ODOT Project Delivery Guide (<https://www.oregon.gov/ODOT/ProjectDel/Pages/Project-Delivery-Guide.aspx>) provides additional details on the Program and Project Development stages (4).



- Holistic urban design problem/solution statements continue to be carried through the “business case development” and “project selection” steps shown in Figure 1-1.

These can be challenging, given the wide variety of programs that ODOT uses to fund improvements and the tendency for each of these programs to fund only a specific subset of improvements. The “color of money” assigned to a project can often result in key elements of a holistic urban design considered ineligible for funding or out of scope. Additionally, specific program criteria and performance measures can result in implementation of a design other than that identified in the adopted plan, once funding is identified. However, related funding from other programs can supplement design criteria on a project.

Table 1-3 summarizes the primary programs ODOT uses to fund and deliver urban transportation improvements. It includes the focus of the program, how projects are selected, who is involved in project development, and how ODOT has historically used the program to address urban design issues. Subsequent chapters of this document recommend additional urban design principles and guidance for future projects funded through these programs. In addition, federal funding categories should be considered in order to identify design flexibility opportunities and priorities at the federal level.<sup>4</sup>

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<sup>4</sup> United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations ([https://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/guidance/policy\\_accom.cfm](https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/policy_accom.cfm)) emphasizes that projects should accommodate bicycles and pedestrians, and this policy would apply to ODOT programs (5).

Table 1-3: Primary ODOT Programs to Fund and Deliver Urban Transportation Improvements

Program Type	Program Focus	How Are Projects Selected	Urban Design Opportunities <sup>1</sup>	Who Develops Project?
Fix-It Programs	Fix or preserve existing facilities (bridges, pavement, culverts, signals, etc.)	Data-driven, condition of assets	<ul style="list-style-type: none"> <li>Consider low cost opportunities to address needs through innovative design (e.g. lane reconfiguration when repaving)</li> <li>Leverage other funding programs to address other needs in project area</li> </ul>	ODOT or Certified Local Agency
Enhance Programs	Enhance or expand transportation facilities	Legislature, ACTs, and ODOT staff recommend priority investments from state and local plans (can be competitive grants or discretionary).	<ul style="list-style-type: none"> <li>Most flexible to address urban design issues across modes and disciplines</li> <li>Leverage other projects to address multiple needs in project area</li> <li>Can fund stand-alone urban projects (grants and legislative discretionary projects)</li> </ul>	ODOT or Certified Local Agency
Safety Programs	Reduce deaths and injuries on Oregon's roads	Data-driven, maximize safety impact (cost-benefit)	<ul style="list-style-type: none"> <li>Approved safety countermeasures list provides multiple options to encourage context appropriate design solutions</li> </ul>	ODOT or Certified Local Agency
Non-Highway Programs	Improve non-single occupancy vehicle (non-SOV) transportation options (e.g., pedestrian and bicycle, public transportation, ADA, transportation options/demand management)	Legislature, ACTs, and ODOT staff recommend priority investments from state and local plans (can be competitive grants or discretionary).	<ul style="list-style-type: none"> <li>Very flexible to address urban design issues across modes and disciplines</li> <li>Can leverage other projects to address multimodal needs in project area or fund standalone urban projects</li> </ul>	ODOT or Certified Local Agency
Local Government Programs	Direct funding to local governments	Local governments identify priority investments.	<ul style="list-style-type: none"> <li>Very flexible to address local priority urban design issues across modes and disciplines</li> </ul>	MPO or Local Agency (if state funds) ODOT or Certified Local Agency (if federalized)

<sup>1</sup>All projects that receive state and federal funds are required to include at least the minimum bicycle and pedestrian facilities (per ORS 355.514) and ADA accommodation within the project budget. Some funds can be used for stand-alone bicycle, pedestrian and ADA projects or enhanced bicycle and pedestrian facilities within another project.

Table 1-3: Primary ODOT Programs to Fund and Deliver Urban Transportation Improvements (continued)

Program Type	Program Focus	How Are Projects Selected	Urban Design Opportunities <sup>1</sup>	Who Develops Project?
State-Funded Programs	<p>Preserve and/or enhance transportation system (generally smaller projects than STIP Fix-It or Enhance)</p> <p>Examples: Safe Routes to School, Connect Oregon, State Pedestrian/Bicycle Program</p>	<p>Program-specific objectives (e.g., improve safety on school routes, promote economic growth)</p>	<ul style="list-style-type: none"> <li>• Very flexible to address urban design issues across modes and disciplines</li> <li>• <b>Most flexible timeline (e.g., "Quick Fix" Safety or Pedestrian/Bicycle funds can be used for immediate improvements)</b></li> <li>• Not subject to Federal requirements or required to be in STIP</li> <li>• Can leverage other projects to address multimodal needs in project area or fund stand-alone urban projects</li> </ul>	<p>ODOT or Local Agency</p>
Development-Related Projects	<p>Serve demand generated when property develops or redevelops</p>	<p>Part of land use permitting process. ODOT works with local agency (land use authority) and developer to identify needed improvements.</p>	<ul style="list-style-type: none"> <li>• Consider opportunities to incrementally implement improvements in adopted plan and/or dedicate right-of-way for future improvements</li> <li>• Not subject to Federal requirements or required to be in STIP</li> <li>• Consider opportunities to address needs through innovative design and/or to leverage developer funded improvements</li> </ul>	<p>Developer and Local Agency (Land Use Authority)</p>
Local Agency Projects	<p>Locally funded projects</p>	<p>Local governments identify priority investments</p>	<ul style="list-style-type: none"> <li>• Consider opportunities to address needs through innovative design and/or to leverage locally funded improvements</li> </ul>	<p>Local Agency</p>

<sup>1</sup>All projects that receive state and federal funds are required to include at least the minimum bicycle and pedestrian facilities (per ORS 355.514) and ADA accommodation within the project budget. Some funds can be used for stand-alone bicycle, pedestrian and ADA projects or enhanced bicycle and pedestrian facilities within another project.

## 1.2.2 Which Policies Guide Urban Project Development and Delivery?

ODOT project development and delivery are organized by the Project Delivery Guide (2017), which includes both program and project development elements. Transportation planning (part of program development) includes development of the Oregon Transportation Plan and modal/topic plans that provide Oregon's strategic transportation vision and policies. Statewide policy plans also provide guidance and direction for developing more refined transportation system plans.

City and county Transportation System Plans (TSPs), which include the state system within their boundaries, describe existing conditions, identify roadway classification and transportation needs over a 20-year period, and develop priorities for transportation system improvements within a defined geographic area. Generally completed by local cities or counties, TSPs evaluate needs across all modes of transportation and may include portions of whole transportation corridors. Program Managers may consider projects identified in TSPs for inclusion in a future Statewide Transportation Improvement Program (STIP) and should refer to transportation planning documents to help with context and objectives for transportation improvements.

Transportation Policy Planning is high level and includes:

- Oregon Transportation Plan
- Oregon Highway Plan and other modal/topic plans
- Strategic vision, high level policy planning
- A framework to help prioritize investments for all modes of transportation
- Identification of strategic objectives and outcomes from management and investment decisions

Transportation System Planning includes:

- City and/or county TSPs
- ODOT facility plans
- An assessment of future transportation system needs and recommended solutions
- Prioritized investment strategies and projects
- Transportation Management systems used to evaluate highway assets and assist in the selection of projects
- All modes of transportation
- Projects that are prioritized for inclusion in the STIP

The Transportation Planning Section is responsible for managing the statewide policy planning process and the Regional Planning Units are responsible for managing or informing the system planning process. Local Transportation System Plans (TSPs) must follow state statutes when addressing the state highway system within their communities. OAR 366.215 dealing with freight mobility on the state highway system and ORS 374.329 dealing with transfer of state freight routes to

local jurisdiction need to be incorporated when writing TSPs. The Federal Register 23 CFR Part 658 would also apply to National Freight Network roadways within a local TSP.

The following are key policies, rules, and statutes that uniquely inform urban design and will be highlighted in later portions of this document:

- Bicycle and Pedestrian Bill (ORS 366.514)
- Freight Reduction in Carrying Capacity Review (ORS 366.215)
- Transportation Planning Rule (TPR) (OAR 660-012-0060), including Section 8 and Section 10 related to Multimodal Mixed-Use Areas (MMA)
- Oregon Highway Plan mobility standards/targets
- Oregon Highway Plan, Policy 1A – Classification
- Highway segment designations (OHP Policy 1B)
  - Special Transportation Areas (STA), Urban Business Areas (UBA), Commercial Centers (CC)
- Practical Design Strategy (Appendix D of the HDM)
- Applicable Oregon Land Use Law and rules (ORS 197, OAR 660, Division 12, 24, 22)

### 1.2.3 Which Plans Guide Urban Project Development and Delivery?

ODOT has the following statewide planning documents:

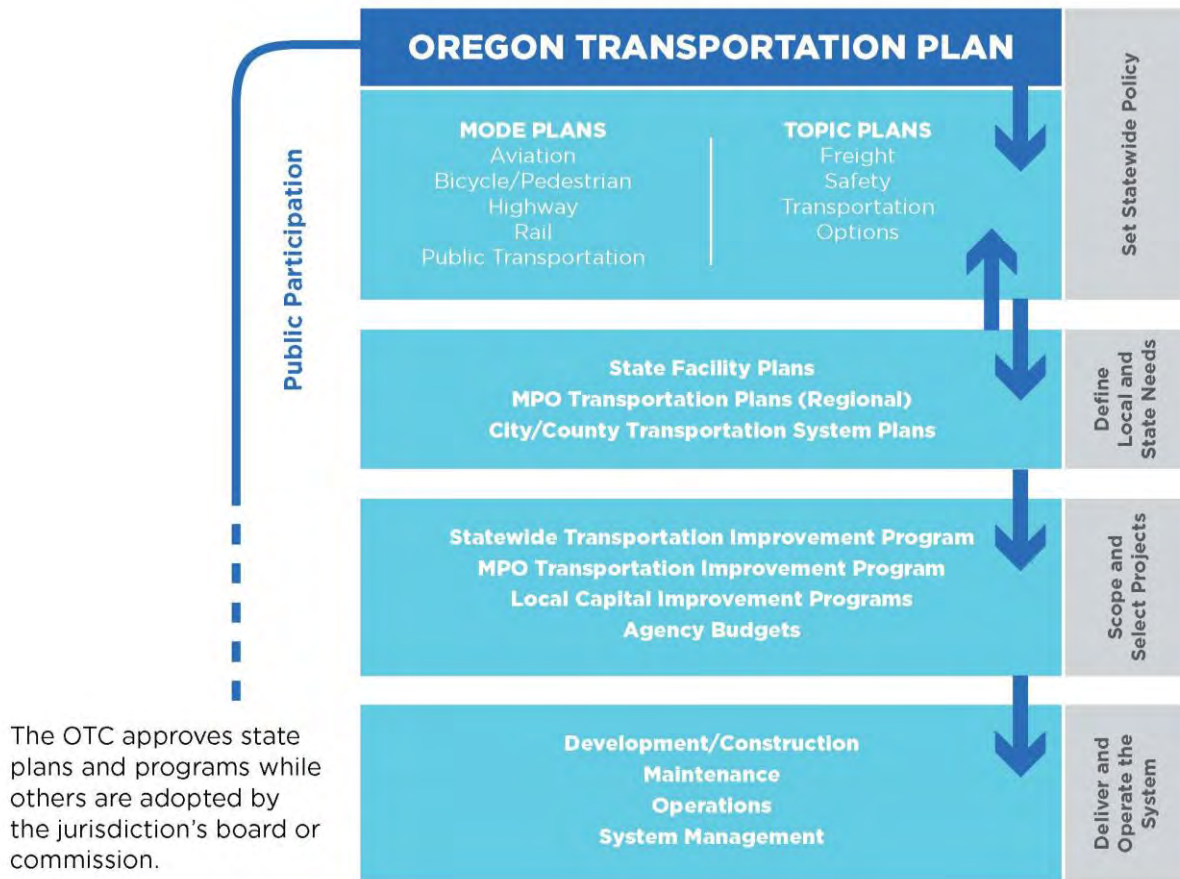
- Oregon Transportation Plan<sup>5</sup>
- Oregon Highway Plan
- Oregon Bicycle and Pedestrian Plan
- Oregon Freight Plan
- Oregon Rail Plan
- Oregon Transportation Options Plan
- Oregon Public Transportation Plan
- Oregon Transportation Safety Action Plan
- Oregon Aviation Plan
- Statewide Transportation Strategy

Figure 1-2 provides an overview of ODOT integrated transportation planning.

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<sup>5</sup> The Statewide Transportation Strategy, which identifies strategies to reduce transportation-related greenhouse gas emissions, was adopted August 2018 by the Oregon Transportation Commission as an amendment to the Oregon Transportation Plan.

Figure 1-2: ODOT Integrated Transportation planning



*Oregon Transportation Plan*

The State Transportation System Plan is composed of the Oregon Transportation Plan (OTP), mode and topic plans, and facility plans. Oregon's statewide policy plans articulate the transportation system and focus ODOT's investments to maintain and improve that system, often by informing system management, project selection, and subsequent planning and design guidance. Oregon's transportation planning documents ultimately derive from and implement the goals and policies of the OTP. It establishes a vision and policy foundation to guide transportation system development and investment. The OTP and its mode and topic plans guide decisions by ODOT and other transportation agencies statewide, and are reflected in the policies and decisions explained in local and regional plans. The OTP's influence on project delivery is primarily from its investment scenarios, which inform how Oregon should prioritize transportation investments across all modes that implement OTP goals in response to current and future funding levels. Most modal and topic plans have similar scenarios and investment guidelines to help inform project investment decisions.

*Mode and Topic Plans*

ODOT uses two categories of statewide plans to implement the OTP: mode and topic plans. Policies and strategies in these plans often lead to further mode or topic studies, planning and design guidance, and guidance for project selection. ODOT's modal plans reflect four distinct

transportation systems: highway, bicycle and pedestrian, rail, and public transit. The Bicycle and Pedestrian Plan (OBPP), for example, guides the state through efforts such as prioritizing projects, developing design guidance, collecting important data and other activities that support walking and biking in Oregon. Similarly, the Oregon Highway Plan (OHP) defines the state highway system and establishes policies for managing and enhancing that system. Both plans inform project delivery primarily by structuring how ODOT prioritizes investments in that mode, and by informing further planning and technical guidance developed by ODOT.

ODOT's topic plans recognize that some challenges and opportunities apply to all modes and require coordinated action outside of any one modal plan. For example, the Transportation Safety Action Plan (TSAP) prioritizes a set of actions to produce a safer transportation system across all modes. The TSAP evaluates safety in planning and design considerations while also informing how ODOT structures its safety project selection process. Similarly, the Oregon Freight Plan's (OFP) policies and strategies improve freight connections to local, state, tribal, regional, national, and international markets. The OFP is a resource designed to guide freight-related operation, maintenance, and investment decisions across all modes. Topic plans inform and focus ODOT's investment priorities (like modal plans) but do so with respect to Oregon's entire transportation system rather than for specific modes. ODOT's topic plans include the Oregon Statewide Transportation Strategy (which includes a 2050 vision for greenhouse gas emission reduction), Transportation Options, as well as the TSAP and OFP.

### *Local Plans*

Mode and topic plans are statewide plans that are part of the OTP. These plans refine and apply OTP policy to specific modes or topics and guide state, regional, and local investment decisions for the parts of the transportation system that they address. Like the OTP, the goals, policies, and strategies of mode and topic plans are further refined in other regional and local plans such as facility plans, local transportation system plans, and other documents.

ODOT planners participate in ODOT scoping and project delivery teams and are responsible for communicating expectations from local plans for projects in urban areas. On development funded projects, developers are expected to construct projects and frontages consistent with local TSPs and ODOT standards. Local plans include:

- Transportation System Plans (TSPs)
- Local Streets Plans
- Safe Routes to School Action Plans
- Facility Plans
- Streetscape Plans
- Active Transportation Plans (ATPs)

## 1.2.4 How is Context and/or Roadway Classification Currently Considered?

The ODOT Highway Design Manual (HDM) prescribes design requirements categorized by the context of the highway (2). Chapters 6 and 7 of the HDM mirror the design guidance in American Association of State Highway and Transportation Officials' (AASHTO) *A Policy on Geometric Design of Highways and Streets* chapters for urban and rural (6). There are many definitions of urban and rural. For this document and for ODOT urban design projects, the focus is on land use context. Within Chapter 6 of the HDM, urban highways are further categorized by whether highway segments are designated as expressways and whether they have other segment designations. Where no segment designation exists, design standards are given based on an assessment of the highway context.

Depending on the decided context of a highway, the ODOT standard for various design elements is different. Design elements affected by context include the width of travel lanes and turn lanes, shoulders and medians, superelevation rates, maximum degree of curvature, maximum grade, bicycle facility and sidewalk type and size, presence of on-street parking, and vertical clearance.

ODOT embraced context sensitive solutions (CSS) design in the mid-1990s. The 1999 OHP created roadway segment designations to differentiate contexts in urban locations (7). The official segment designations include Special Transportation Area (STA), Urban Business Area (UBA), and Commercial Centers (CC). The 2003 HDM created an urban design chapter to specifically address design for the roadway segment designations described in the 1999 OHP as well as for non-designated context segments that include Urban Suburban Fringe, Developed Areas, and Traditional Downtown/Central Business Districts. In addition to the segment designations, the 1999 OHP also categorized roadway sections into state-determined classifications. These classifications include Interstate Highways, Statewide Highways, Regional Highways, and District Highways. In 2010, ODOT developed a Practical Design Policy that enhanced contextual design. A key component to the policy is SCOPE – Safety, Corridor Context, Optimize the System, Public Support, and Efficient Cost. The 2012 ODOT HDM melded the CSS and Practical Design SCOPE policies together to provide direction for ODOT's urban multimodal design (2).

When determining the context of a roadway section, roadway federal functional classification, state classification, adjacent land use, roadside context, roadway segment designation, and to some extent, traffic volume and number of lanes is considered. Traffic volume, speed, and lane configuration along with classification are indicators of how a roadway section is being used and sets expectations for road users, as well as expectations for adjacent businesses – both existing and future.

With the increasing emphasis on Active Transportation, defining context is even more important for urban design. Therefore, more differentiation within the previously established context categories is needed. As an example, the context defined in the OHP and HDM as "Urban/Suburban Fringe" covers a variety of cross-section types and potentially various land use or roadside context



configurations. Creating greater differentiation in contexts based on more specific parameters along a section of roadway that affect its use can provide flexibility. It also helps prioritize design **elements to better address user and community needs, rather than a “one-size-fits-all” approach.** This is the basis for performance-based design, which focuses on the outcomes of the design decisions as the primary measure of design effectiveness.

The next step in the progression of urban roadway design is performance-based design. National design guidance, including AASHTO's *A Policy on Geometric Design of Highways and Streets*, is moving toward integrating performance-based design that encompasses a focused approach to determine appropriate design with flexibility that better aligns roadway function and user needs based on the context. Performance-based design provides a

Performance-based design is an approach that emphasizes the outcomes of design decisions as the primary measure for design effectiveness.

*NCHRP Report 785*

framework for evaluating trade-offs and creating designs that meet the desired outcomes of the project and roadway users. This type of approach has been applied in many states and integrated into other State Departments of Transportation design manuals. Through the Blueprint for Urban Design, ODOT is working to incorporate performance-based design which is a refinement of ODOT's current practice of Context Sensitive Practical Design. More information about the use of context and performance-based design can be found in subsequent chapters of this document.

### 1.3 RELATION TO NATIONAL DESIGN GUIDANCE POLICIES AND DOCUMENTS

There are national associations and organizations that publish additional planning and design guidance that can support the information provided in the Blueprint for Urban Design. Practitioners should consider and review recent publications from the following sources to supplement the guidance provided in this document.

- American Association of State Highway Transportation Officials (AASHTO)
- National Cooperative Highway Research Program (NCHRP)
- Federal Highway Administration (FHWA)
- Institute of Transportation Engineers (ITE)
- National Association of City Transportation Officials (NACTO)

Section 1.3.1 provides an overview of how ODOT uses the national guidance.

### 1.3.1 How ODOT Uses National Guidance

Federal law dictates the role of national standards for highway facilities in Title 23 of the Code of Federal Regulations (CFR)(8).<sup>6</sup> 23 CFR subchapter 625 requires that each state have standards for new construction (4R) and preservation (3R) of highways that accounts for applicable federal requirements including design exceptions. It identifies the AASHTO *Policy on Geometric Design of Highways and Streets* (Green Book) as the national design standard for NHS highways unless FHWA approves a substitution. The ODOT HDM is patterned after the Green Book and is approved by FHWA for use in Oregon as a replacement for the national standard along ODOT highways.

In addition to 23 CFR section 625, section 1404 of the FAST Act, which amends 23 United States Code (USC) section 109, provides requirements as well as direction for flexibility and access for other modes of transportation in the design process. The revised requirements for flexibility and other modes from 23 USC 109 under section c(1) have been or will be incorporated into 23 CFR 625 with the next update to the CFR.

23 CFR subchapter 655 requires that every state follows a national standard for uniformity in the use of traffic control devices and identifies the *Manual on Uniform Traffic Control Devices* (MUTCD) as the Federal Highway Administration (FHWA) approved source. Oregon adopted the federal manual with a state-specific supplement to the MUTCD. Similar federal requirements exist where a national standard manual is recommended and a state-specific substitute manual is optional. Some examples of these include standards for bridge and illumination design.

23 CFR Part 658 establishes the National Freight Network and provides guidance to states for freight vehicle size and weight allowed to utilize the national network without special permits. It also provides guidance on what can and cannot be restricted concerning freight vehicles operating on the national freight network. Appendices A, B, and C of 23 CFR Part 658 should also be evaluated along with the ODOT Freight Mobility Manual when determining modal priorities for a project.

The United States Department of Transportation (USDOT), led by Congressional action, developed federal policy and directives for states to take action on flexibility in design and addressing flexibility on the core National Highway System (NHS) routes.<sup>7</sup> Additionally, the **Fixing America's Surface Transportation (FAST) Act** requires designs for projects on the NHS to consider all factors in 23 USC 109(c)(1), including cost savings that can be achieved by using flexibility in current design guidance. Based on this support for improved pedestrian and bicycle facilities and flexibility within current design standards, numerous national organizations produced innovative design guides and resources intended to supplement the adopted standards. ODOT issued a letter<sup>8</sup> of support that encourages engineers, planners and designers to reference the growing library of resources that

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<sup>6</sup> <https://www.fhwa.dot.gov/legregs/directives/cfr23toc.htm>

<sup>7</sup> <https://www.fhwa.dot.gov/design/standards/161006.cfm>

<sup>8</sup> <https://nacto.org/wp-content/uploads/2015/10/Oregon-DOT-USDG-Endorsement-092515.pdf>

help “...provide a safe, efficient transportation system that supports economic opportunity and livable communities for Oregonians...” and “...to be at the forefront of the integration of sustainable intermodal transportation...to help form sustainable solutions to today's ever-increasing intermodal transportation challenges...” (9). The design resources referenced in ODOT's letter were those produced by AASHTO, NACTO, and ITE. Since these memorandums, the FHWA grew its library of publications that help encourage and support walking and bicycle use for all ages and abilities. A list of these publications can be found on the FHWA website (10).<sup>9</sup>

In order to solve urban transportation issues through innovation, some concepts may conflict with requirements in the adopted highway standards. There is a process outlined by FHWA to enable innovation by experimenting with new ideas. Through the experimentation process, design standards can evolve, or new standards can be created. When innovative practices are acceptable to ODOT, standards and manuals to support these practices can be updated. FHWA provides a design deviation approach that provides further flexibility with the reduction in number of controlling criteria.<sup>10</sup> However, approval for design deviations or concurrence is still processed at the state level.

Section 1404(a) of the FAST Act also required the Secretary of Transportation, when developing design criteria for the NHS, to consider the *Highway Safety Manual* (HSM), published by AASHTO (11). The HSM is not a design standard, but it presents a variety of methods for quantitatively estimating crash frequency or severity at various locations. It is a foundational manual in the long-term effort to improve the state of the practice for safety prediction tools. The HSM is a key safety reference influencing the development of national design policy. Additionally, the increased use of improved safety production tools in the planning and design process allow improved analysis of safety performance among design alternatives.

Another federal requirement applicable to highways is the Americans with Disabilities Act (ADA).<sup>11</sup> Various resources exist that provide guidance and best practices for implementing accessible pedestrian facilities, but these resources are not uniform in how they interpret the draft accessibility guidelines. Due to the potential liability associated with varying interpretations of accessibility requirements, ODOT has its own standards that incorporate national guidance and best practices. In order to ensure that the standards are current, an Accessibility Consultant with national expertise reviews all of ODOT's ADA policies for accessibility and concurs as part of a federal agreement, which settled a lawsuit regarding ADA facilities for pedestrians.

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<sup>9</sup> [https://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/publications/](https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/)

<sup>10</sup> <https://www.fhwa.dot.gov/design/standards/160505.cfm>

<sup>11</sup> The requirement for accessibility – Section 504 of Rehabilitation Act of 1973. National guidance: UFAS or ADAAG see [https://www.fhwa.dot.gov/civilrights/programs/ada/ada\\_sect504qa.cfm](https://www.fhwa.dot.gov/civilrights/programs/ada/ada_sect504qa.cfm)

While there are fundamental underlying physics and engineering principles that form the foundation for roadway design, it is an ever-evolving practice. There is often innovation and creative ideas, concepts, and techniques emerging for solutions to evolving challenges. ODOT stays up-to-date with the changing trends through participation in research projects at both the state and national level, with staff participating on AASHTO and NCHRP technical panels providing review and input. Participation on these panels provides access to current national and international practices. New publications, documentation, and information are reviewed for applicability to Oregon. Publications vetted through AASHTO and included in the Federal Register are generally adopted for use. Other national publications are considered as endorsements and are available for use when appropriate as supplemental reference guidance to ODOT and AASHTO design criteria.

## 1.4 REFERENCES

1. Oregon Department of Transportation (ODOT). Mainstreet Handbook. 1999.
2. ODOT. Highway Design Manual. 2012.
3. Transportation Research Board (TRB). *NCHRP Legal Research Digest 57: Tort Liability Defense Practices for Design Flexibility*. TRB, Washington, D.C., 2012.
4. ODOT. Project Delivery Guide. 2017.
5. USDOT. United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations. Website: [https://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/guidance/policy\\_accom.cfm](https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/policy_accom.cfm)
6. American Association of State Highway Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets*. AASHTO, Washington, D.C., 2018.
7. ODOT. Oregon Highway Plan. 1999.
8. USDOT. Title 23 Code of Federal Regulations. Website: <https://www.fhwa.dot.gov/legregs/directives/cfr23toc.htm>
9. ODOT. Letter of Directive. Website: <https://nacto.org/wp-content/uploads/2015/10/Oregon-DOT-USDG-Endorsement-092515.pdf>
10. USDOT Publications. Website: [https://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/publications/](https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/)
11. AASHTO. *Highway Safety Manual, First Edition*. AASHTO, Washington, D.C., 2010.

OREGON DEPARTMENT OF TRANSPORTATION

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**BLUEPRINT FOR URBAN DESIGN**  
ODOT's Approach for Design in Oregon Communities

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Chapter 2

Refining Urban Contexts and  
Roadway Classifications

January 2020



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## 2.0 REFINING URBAN CONTEXTS AND ROADWAY CLASSIFICATIONS

Chapter 2 describes the ODOT Urban Context system to differentiate the variety of urban areas and unincorporated communities in Oregon. The urban context of a roadway, together with its transportation characteristics, will provide information about the types of users to expect along the roadway, regional and local travel demand of the roadway, and the challenges and opportunities of each roadway user. The urban context and transportation characteristics of a roadway will determine key design guidance and criteria for state roadways in urban areas, excluding interstates and limited-access freeways.<sup>1, 2</sup> The crossroad or cross street between ramp terminals of an interstate or limited access freeway (expressway) is not considered part of the interstate or freeway, but rather part of the urban network adjacent and therefore applicable to the Blueprint for Urban Design. This chapter describes how to determine the urban context of an ODOT roadway and what additional transportation characteristics should be considered when planning and designing a roadway. This will expand ODOT's context-sensitive approach for planning, design, and operations of projects in urban areas that serve all users.

The urban context and transportation characteristics of a roadway will determine key design guidance and criteria for state roadways in urban areas, excluding interstates and limited-access

### 2.1 URBAN CONTEXTS

This section describes how land use has been integrated into transportation planning, operations, and design in recent years. It outlines six land use contexts (urban contexts) developed for state-owned roadways, and it describes how to determine the urban context of a state-owned roadway.

#### 2.1.1 Background and Recent Industry Direction

Oregon has been at the forefront of linking land use and transportation planning. Policy 1B in the 1999 OHP recognizes that state-owned roadways can be the main streets of many communities. The policy strives to maintain a balance between serving those main streets and the through traveler (1). The policy sets up three categories to designate highway segments which were later adopted in the ODOT HDM (2):

- Special Transportation Areas (STA): Designated districts of compact development located on a state-owned roadway within an urban growth boundary in which the need for appropriate local access outweighs the considerations of highway mobility except on

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<sup>1</sup> Defined in Oregon Administrative Rule (OAR) 734-020-0147

<sup>2</sup> Bicycle and pedestrian elements on limited access freeways are not addressed in the Blueprint for Urban Design and will be addressed as part of the HDM update. However, the principles throughout the Blueprint for Urban Design show higher levels of protection for urban roadways with high speeds and high volumes. The preferred design solution for urban limited-access freeways is a separated facility.

designated OHP Freight Routes where through highway mobility has greater importance. See Figure 2-2.

- Urban Business Areas (UBA): Existing areas of commercial activity or future nodes and various types of centers of commercial activity within urban growth boundaries or urban unincorporated community boundaries on District, Regional or Statewide Highways where vehicular accessibility is important to continued economic viability. See Figure 2-2.
- Commercial Centers (CC): Large, regional centers or nodes with limited access to the state highway. Commercial Centers are to locate in a community that is the population center for the region and where the majority of the average daily trips to the center originate.

Industry is taking a similar direction, focusing on land use context as a driver for transportation planning and design. "Transect" is a term from biology, where it describes the range of different habitats in nature. As with organisms who prefer to live in or thrive in different habitats, personal preferences, opportunities, constraints, and needs can determine the type of environment in which community members live or work, from a rural place to a city center, and everywhere in between. Land development patterns tend to follow a transect as they transition from rural to urban. Within each transect zone, a predominance of specific types of land uses are expected. For instance, higher density housing and mixed-use buildings are more typical in the more urban transect zones. This prototypical development pattern was first codified in the SmartCode in 2003.

Since then, various agencies have adopted their own versions to help understand the users in each transect zone and the needs of roadway users in each zone. Recent efforts include: the land use contexts in the Pennsylvania and New Jersey Departments of Transportation *Smart Transportation Guidebook*; the Florida Department of Transportation's *Context Classification* system; and most recently, the National Cooperative Highway Research Program (NCHRP) Report 855: *An Expanded Functional Classification System for Highways and Streets* (4, 5, 6). NCHRP Report 855 provides a general starting point for agencies to adopt their own classification of contexts and defines the following five land use contexts:

- Rural: Areas with lowest density of development, few houses or structures (widely dispersed or no residential, commercial, and industrial uses), and usually large setbacks.
- Rural Town: Areas with low-density development but diverse land uses with commercial main street character, potential for on-street parking and sidewalks, and small setbacks.
- Suburban: Areas with medium-density development, mixed land uses within and among structures (including mixed-use town centers, commercial corridors, and residential areas), and varied setbacks. Appropriate roadway designs require an understanding of the function of the roadway within its current and planned future contexts and the needs of the existing and potential roadway users.

- Urban: Areas with high-density development, mixed land uses and prominent destinations, potential for some on-street parking and sidewalks, and buildings with varying setbacks from the roadway.
- Urban Core: Areas with highest density of development, mixed land uses within and among predominately high-rise structures, and small setbacks of buildings from the roadway.

### 2.1.2 ODOT Urban Context Descriptions

In developing a context-sensitive approach to planning and designing roadways in urban areas, ODOT has created a set of six urban land use contexts to describe the variety of urban areas and unincorporated communities in Oregon (see Table 2-1). As mentioned in Chapter 1, the term “urban,” as used throughout this document, is a broad use of the word and is not limited to places within an Urban Growth Boundary (UGB).

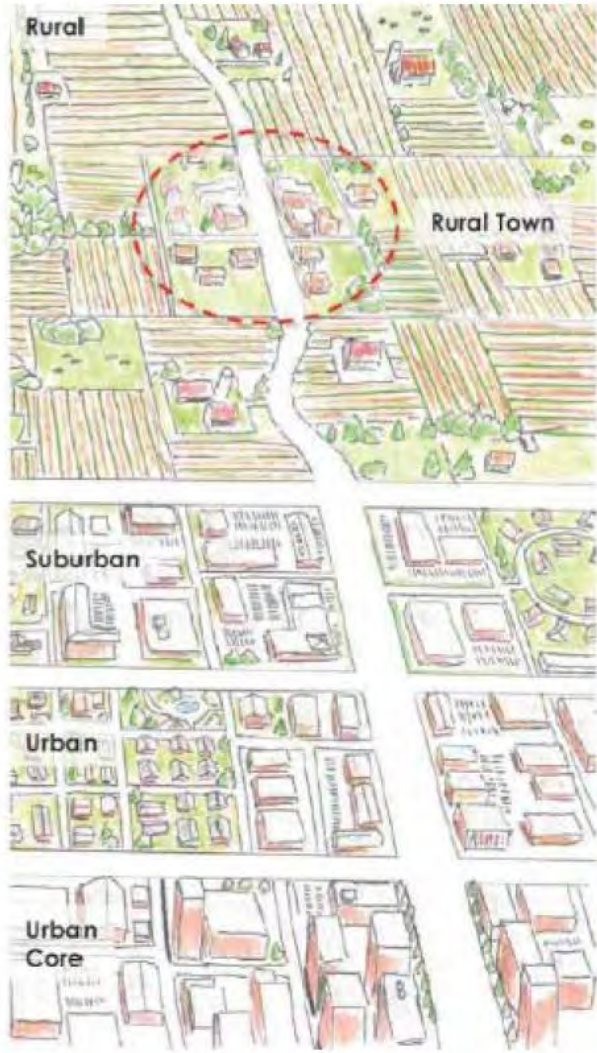
The ODOT Urban Contexts build off of the NCHRP Report 855, with a few changes to reflect Oregon-specific conditions. The suburban context was split into two contexts to distinguish between commercial and residential-focused areas. The Suburban Fringe context was added to draw attention to areas transitioning to a more urban context. The ODOT Urban Contexts and their relationship with the NCHRP Report 855 contexts are shown in Table 2-1. Figure 2-1 illustrates the NCHRP Report 855 contexts compared to the ODOT Urban Contexts.

The six ODOT Urban Contexts shown in Table 2-1 are general and may not fit every project location. The project team determines the appropriate context based on predominate land use, modal priorities, roadway function, or other major considerations, such as anticipation of future planned land use. Additional description and examples are provided in the following pages.

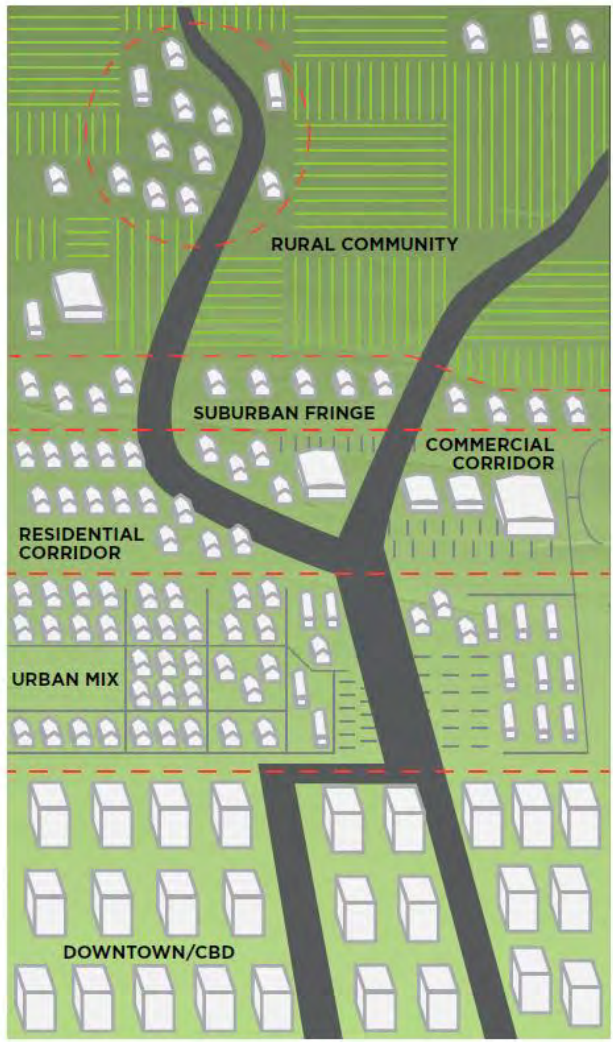
Table 2-1: ODOT Urban Contexts

ODOT Urban Context	NCHRP Report 855 Context
Traditional Downtown/ Central Business District (CBD)	Urban Core/Rural Town
Urban Mix	Urban
Commercial Corridor	Urban/Suburban
Residential Corridor	Urban/Suburban
Suburban Fringe	Suburban/Rural
Rural Community	Rural Town

Figure 2-1: Land Use Contexts



NCHRP Report 855 Contexts



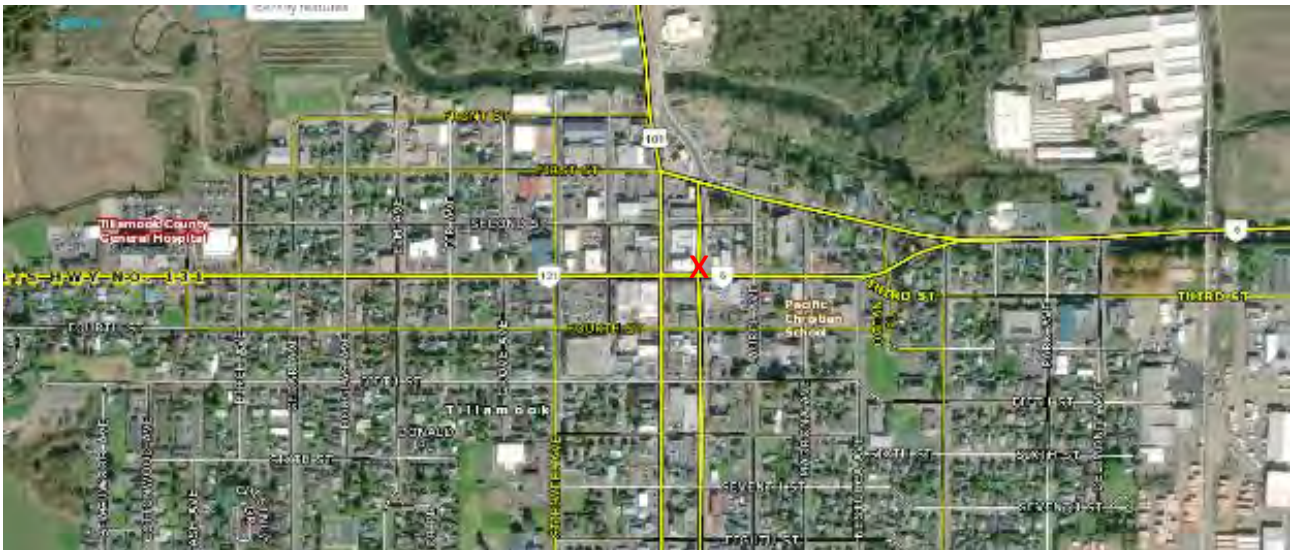
ODOT Urban Contexts

### Traditional Downtown/Central Business District

Areas with the highest development and building heights in an urban area. Typically a few square blocks. Buildings have mixed land uses, are built up to the roadway, and are within a well-connected roadway network.

Please note these following examples (from page 2-5 through 2-27) illustrate surrounding land use of the urban context and are not examples of suggested highway design.

#### Tillamook: US101: OR131-OR6



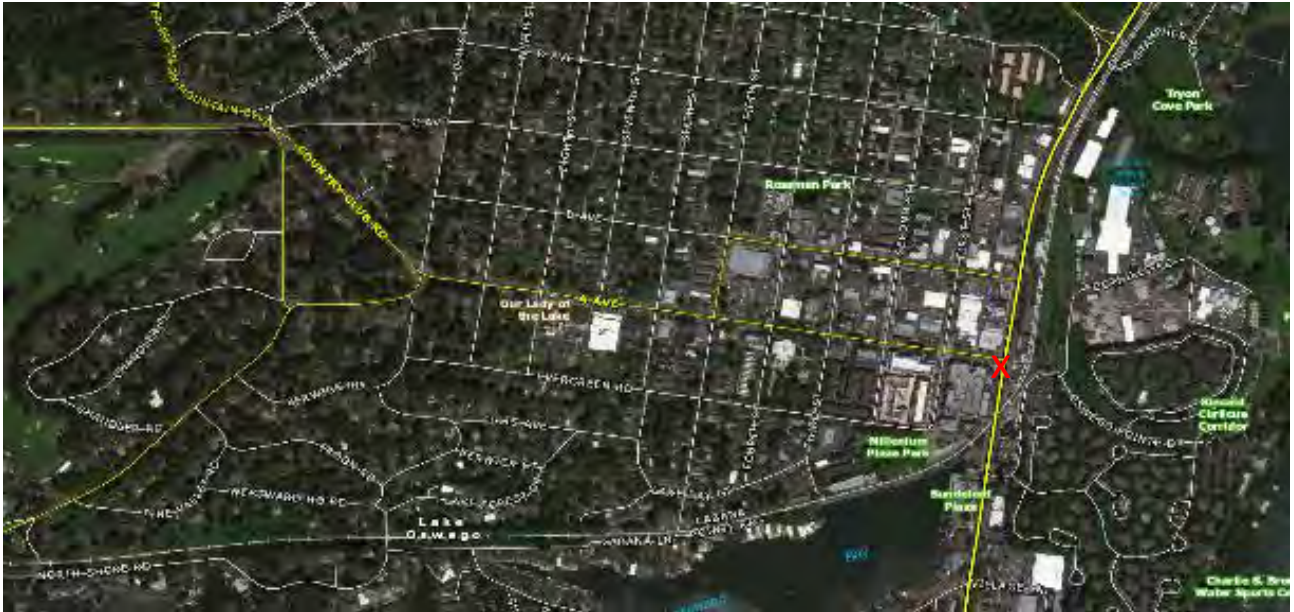
Tillamook via TransGIS



Tillamook: US101 / OR131-OR6 via Google Maps

Traditional Downtown/Central Business District (continued)

Lake Oswego: OR43 from Railroad Tracks to E Avenue



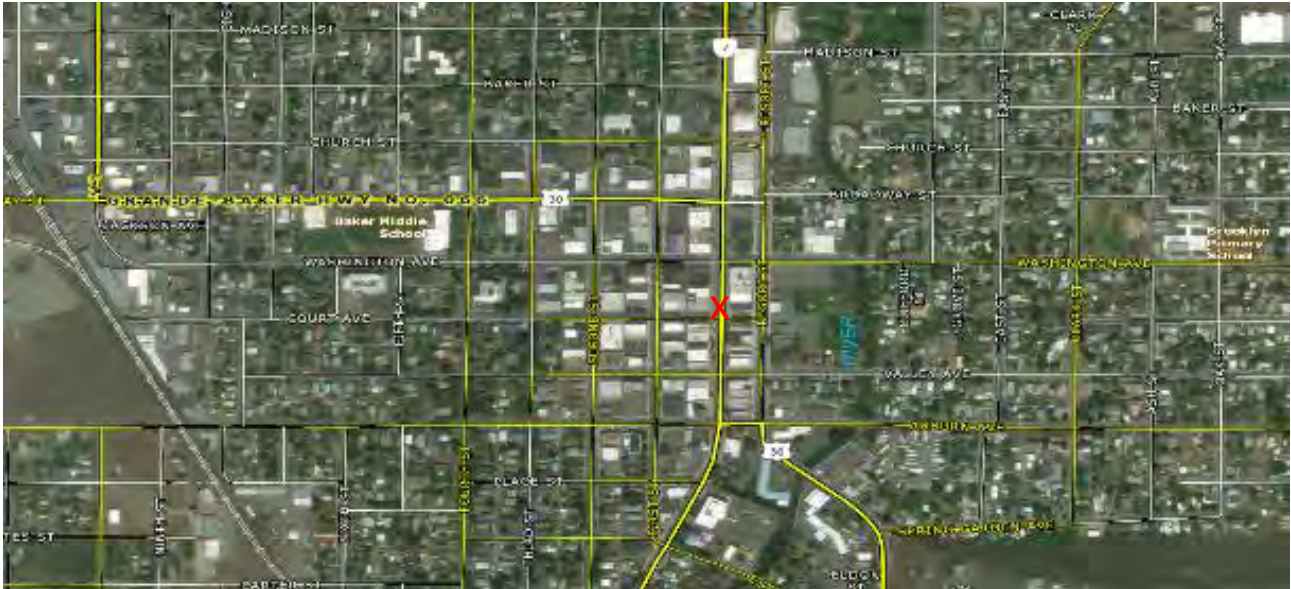
Lake Oswego via TransGIS



Lake Oswego: OR43/ A Ave via Google Maps

Traditional Downtown/Central Business District (continued)

Baker City: US30/OR7 (Hwy 066)



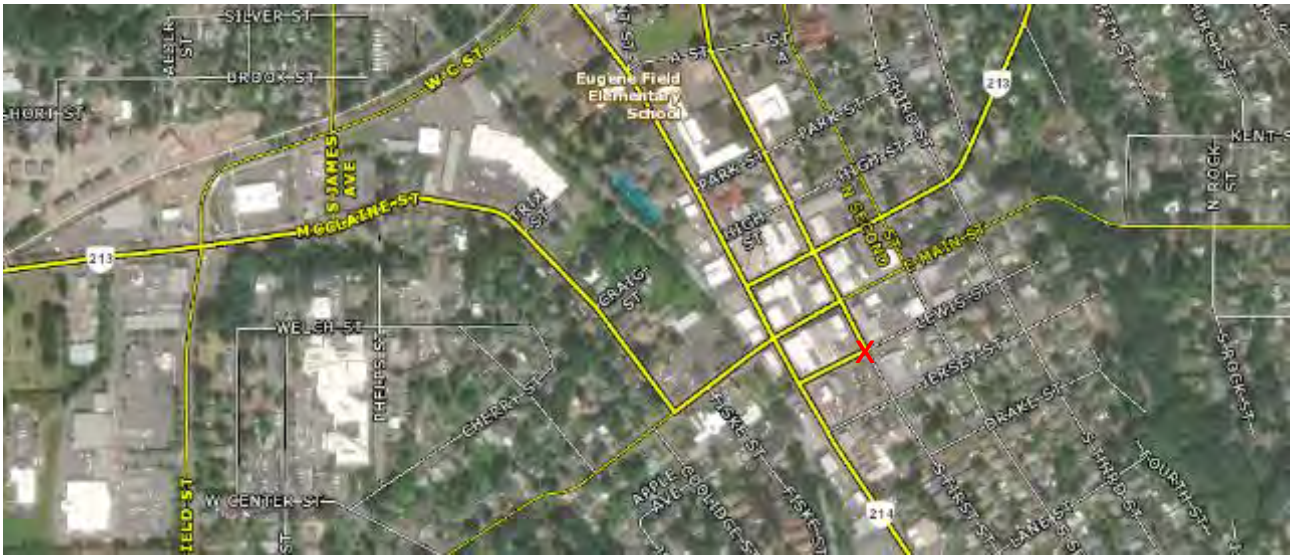
Baker City via TransGIS



Baker City: US30/OR7 (HWY 066) via Google Maps

Traditional Downtown/Central Business District (continued)

Silverton: OR214 (Hwy 140)



Silverton vis TransGIS



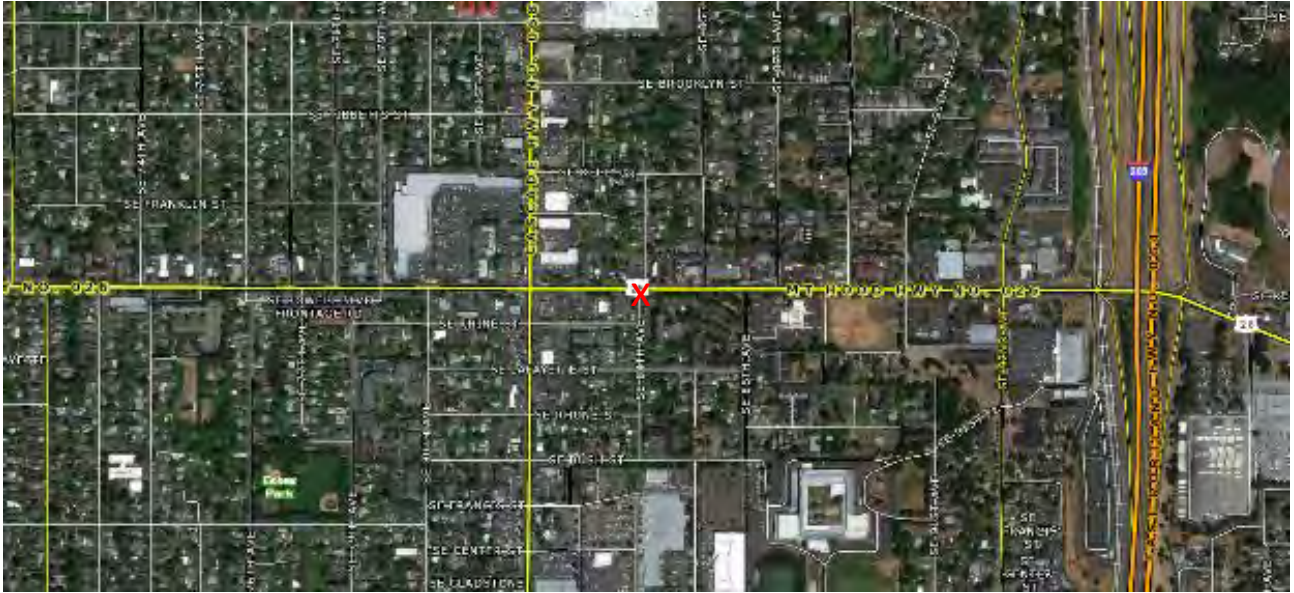
Silverton: OR214 (S First St)/ Lewis St via Google Maps



### Urban Mix

Mix of land uses within a well-connected roadway network. May extend long distances. Commercial uses front the street with residential neighborhoods on top or immediately behind land uses.

Portland: US26 Powell Blvd from SE 82nd Avenue to I-205



SE Portland via TransGIS



SE Portland: US26 (Powell Blvd)/ SE 84<sup>th</sup> Ave via Google Maps

Urban Mix (continued)

Springfield: OR126 couplet east of downtown



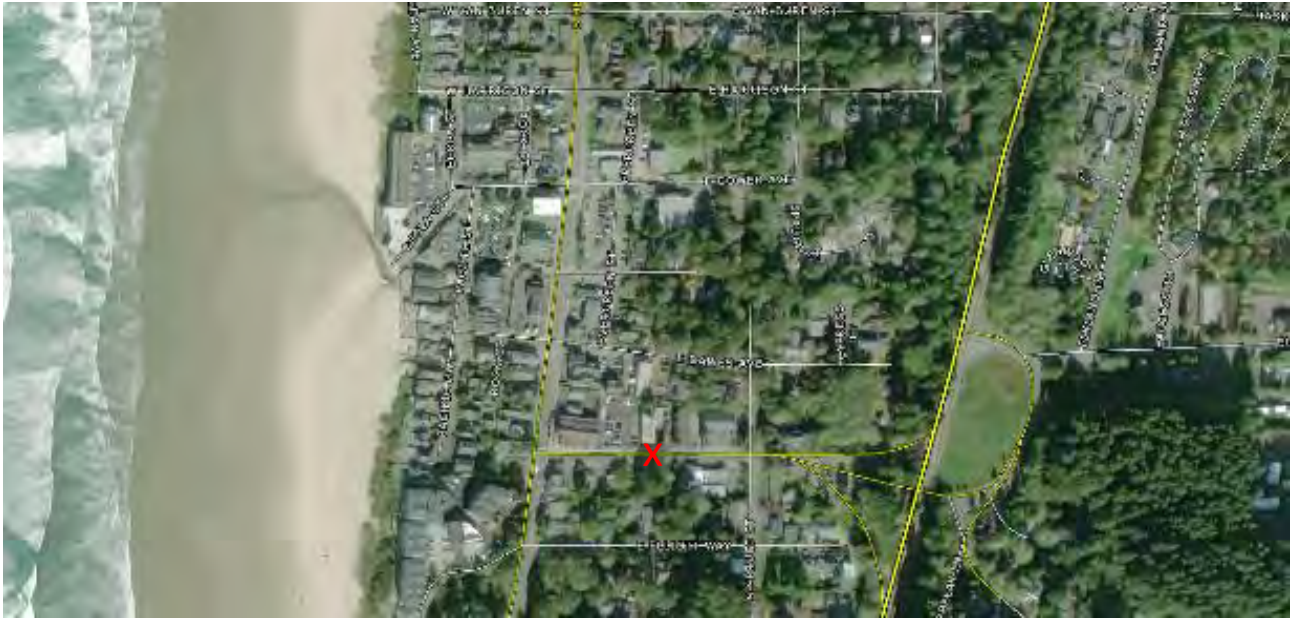
Springfield via TransGIS



Springfield: OR126/ S 15<sup>th</sup> St via Google Maps

Urban Mix (continued)

Cannon Beach: Sunset Blvd (Hwy 009AG)



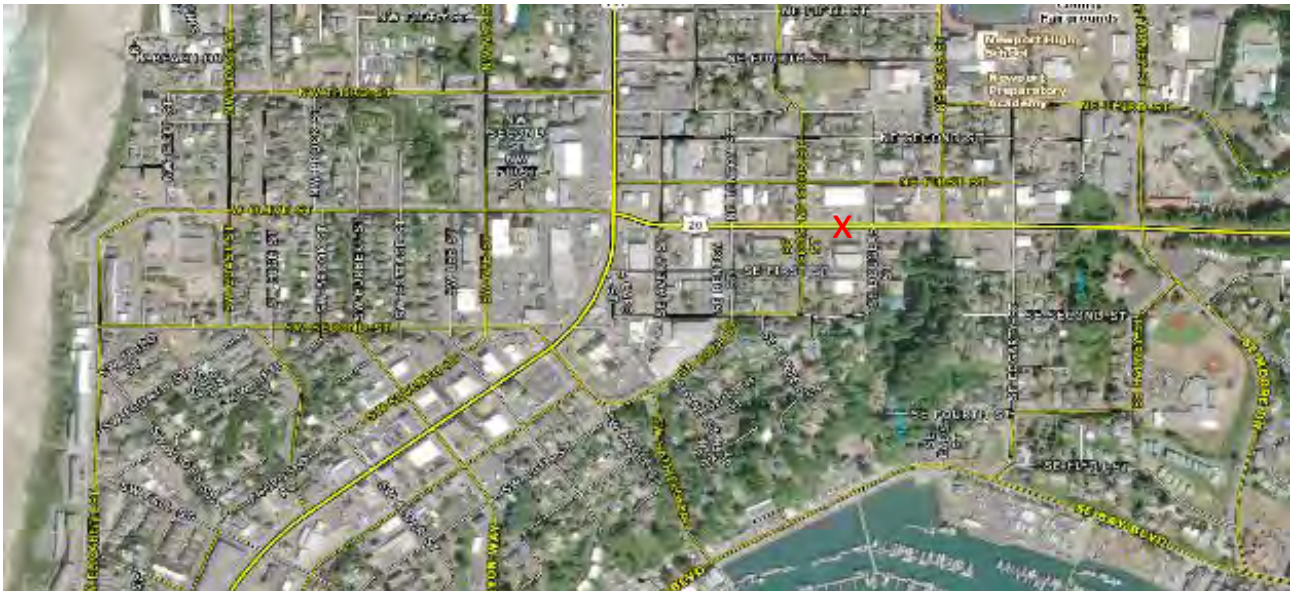
Cannon Beach via TransGIS



Cannon Beach: US101 (Sunset Blvd/ HWY 009AG) via Google Earth

Urban Mix (continued)

Newport: Olive St US20 (Hwy 033)



Newport via TransGIS

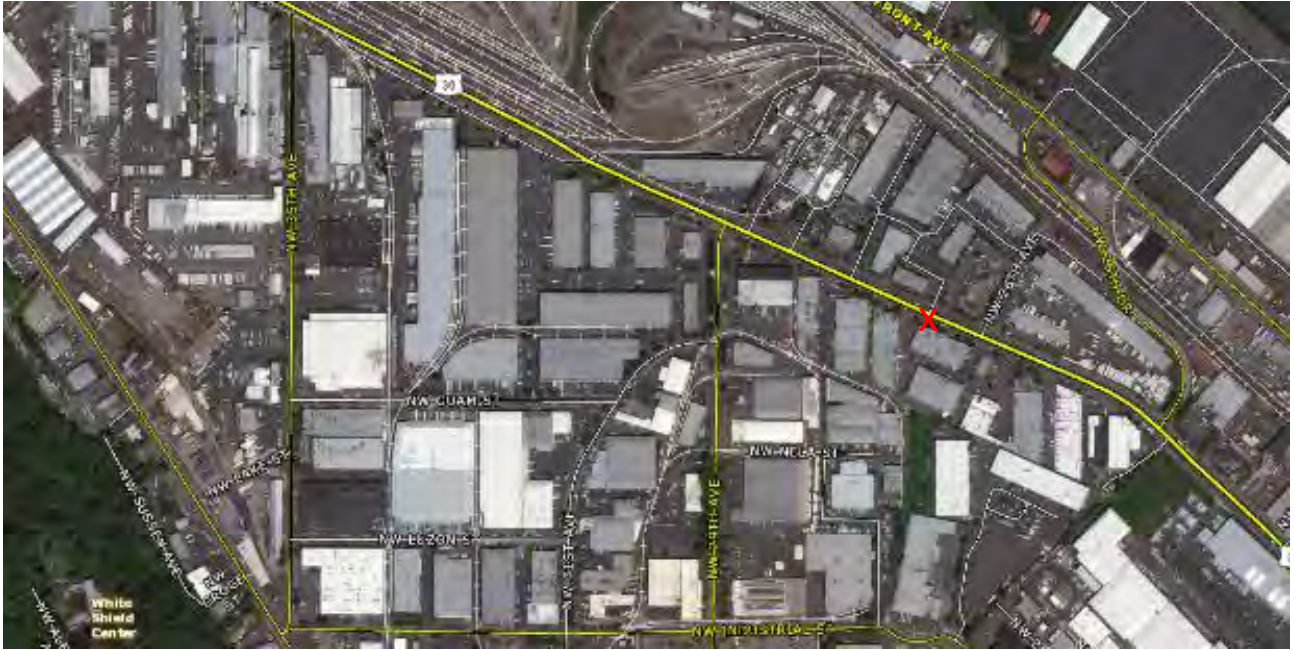


Newport: US20 off of US101 via Google Maps

*Commercial Corridor*

Mostly commercial and industrial uses with large building footprints and large parking lots set within large blocks and a disconnected or sparse roadway network.

*Portland: US30, Nicolai - Kittridge*



NW Portland via TransGIS



NW Portland: US30/ NW 26<sup>th</sup> Ave via Google Maps

Commercial Corridor (continued)

South Redmond: US97



Redmond via TransGIS



South Redmond: US97/ SW Yew Ave via Google Ave

Commercial Corridor (continued)

Brookings: US101



Brookings via TransGIS



Brookings: US101/ Gerlach Ln via Google Maps

Commercial Corridor (continued)

Klamath Falls: OR39 6th Street (Hwy020)



Klamath Falls via TransGIS



Klamath Falls: OR39/ Kane St via Google Maps



*Residential Corridor*

Mostly residential uses within a well-connected or somewhat connected roadway network. May extend long distances. Single-family homes may have direct access to the state roadway.

Salem: Wallace Rd (Hwy 221)



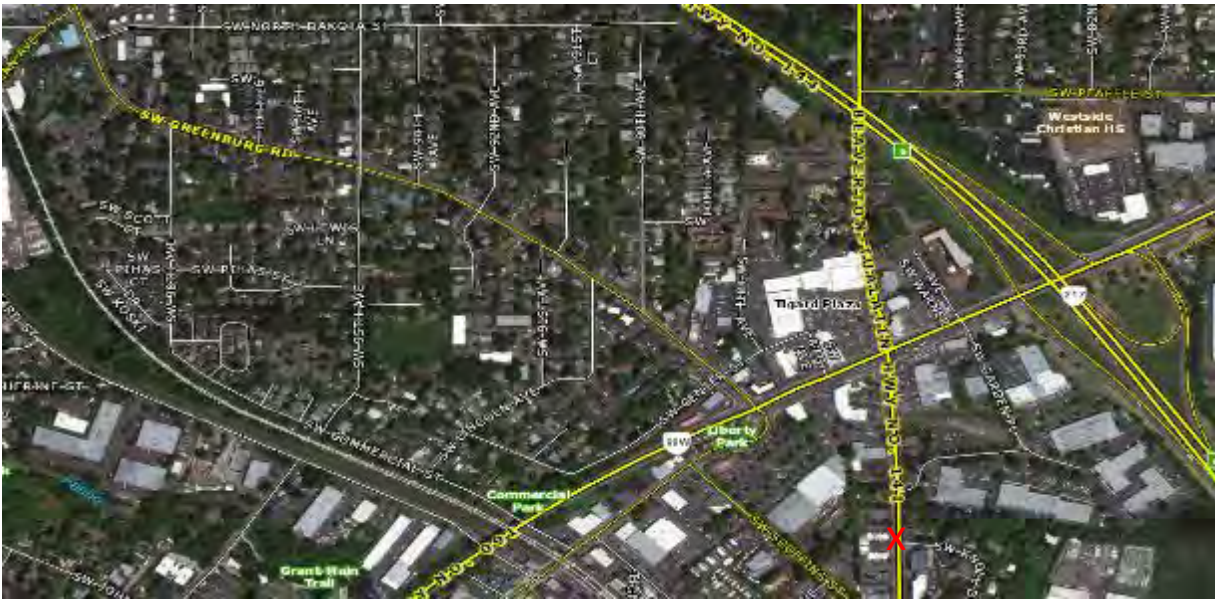
NW Salem via TransGIS



NW Salem: Highway 221/ Lynda Ln NW via Google Maps

Residential Corridor (continued)

Tigard: Hall Blvd (Hwy 142)



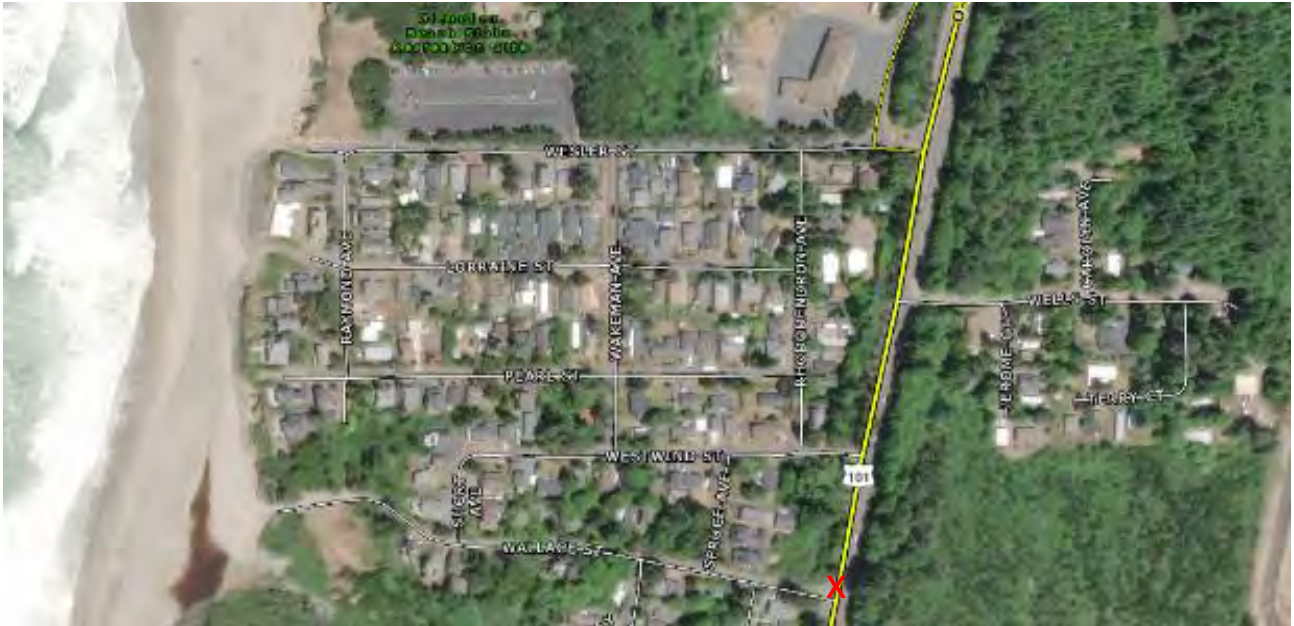
Tigard/Metzger via TransGIS



Tigard/Metzger: Highway141/ SW Knoll Dr via Google Maps

Residential Corridor (continued)

Lincoln Beach: US101 (Hwy009)



Lincoln Beach/Gleneden beach via TransGIS

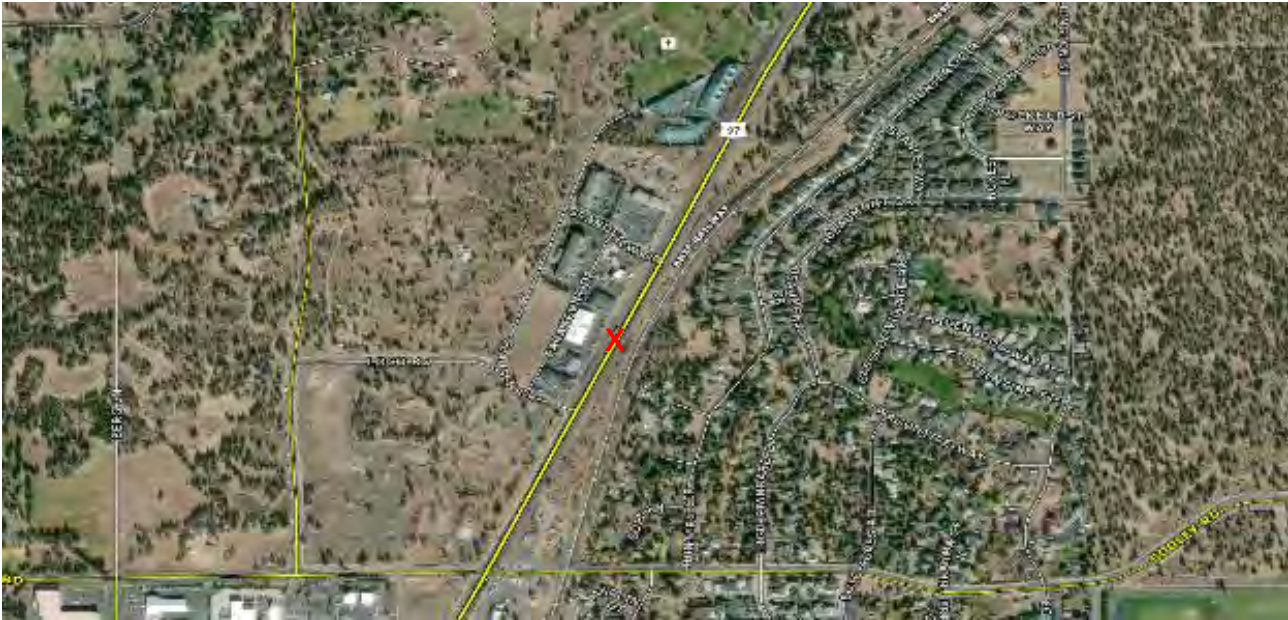


Lincoln Beach/Gleneden Beach: US101 (Highway 009) via Google Maps



Suburban Fringe (continued)

Bend: US97, north of Cooley Rd



North Bend via TransGIS



North Bend: US97 via Google Maps

Suburban Fringe (continued)

Prineville: Paulina Hwy 380



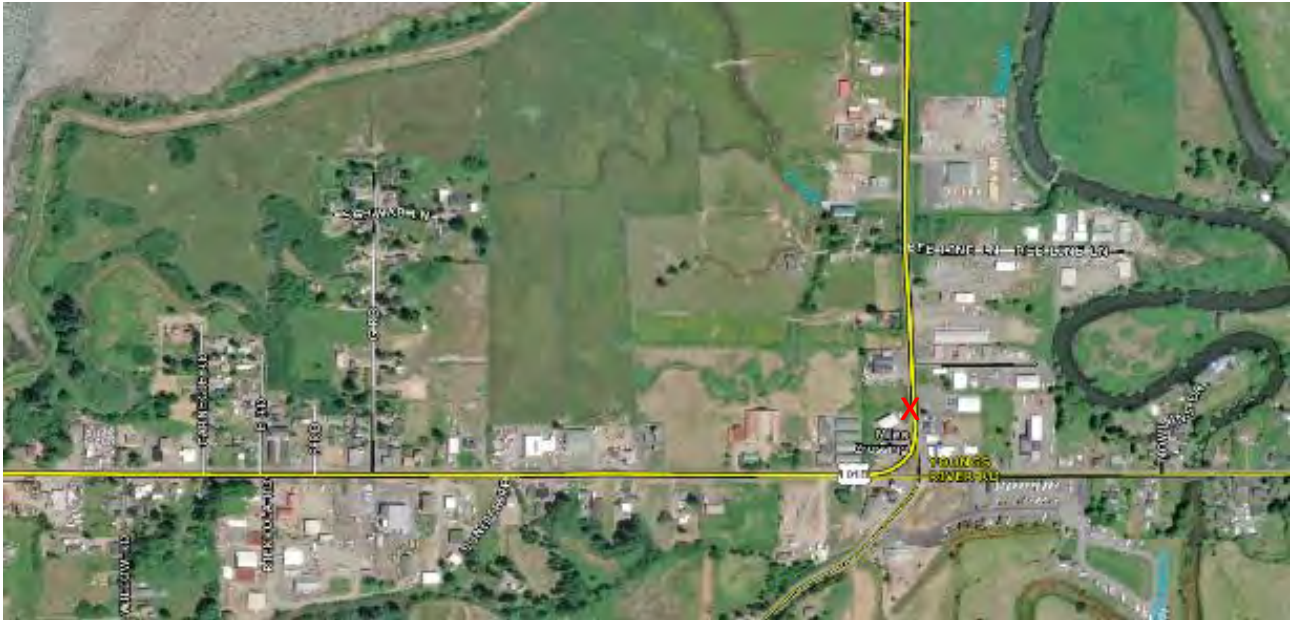
Prineville via TransGIS



Prineville: Highway 380 via US26 via Google Maps

Suburban Fringe (continued)

Astoria: US101-Business Loop (Hwy 102)



Astoria via TransGIS



Astoria: US101-Business Loop (Highway 102) via Google Maps

### Rural Community

Small concentrations of developed areas immediately surrounded by rural, undeveloped areas.

#### Idanha: OR22



Idanha via TransGIS



Idanha: OR22 via Google Maps



Rural Community (continued)

Chiloquin: Hwy 422 Spur



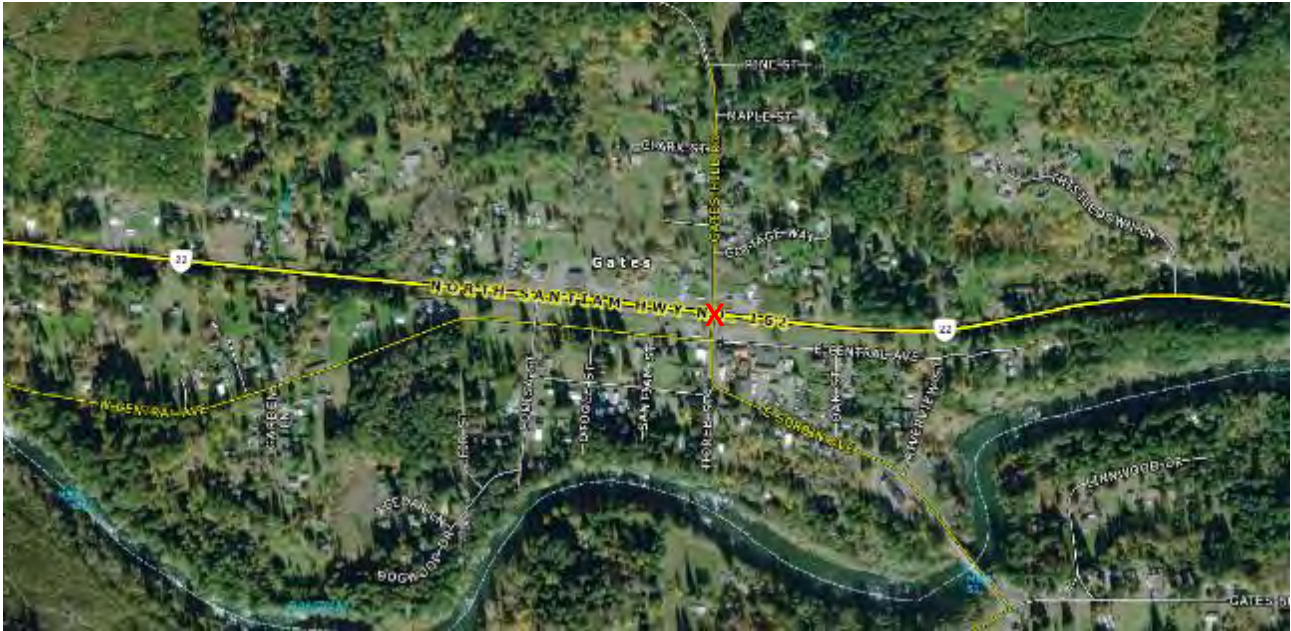
Chiloquin via TransGIS



Chiloquin: Highway 422 via Google Maps

Rural Community (continued)

Gates: OR22



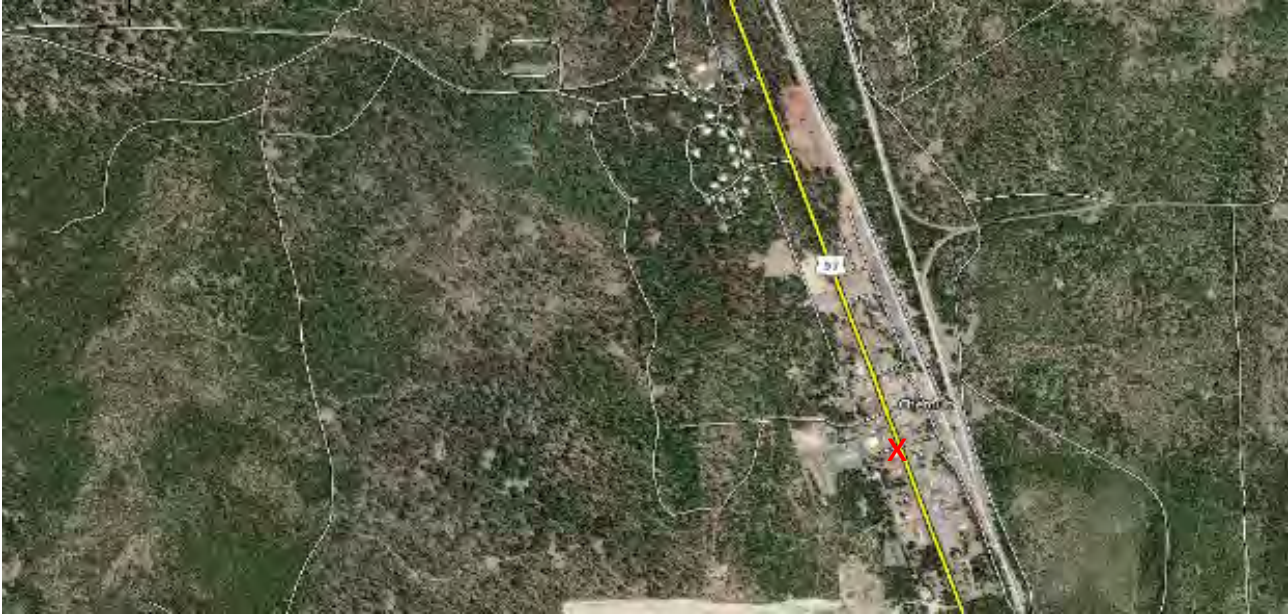
Gates via TransGIS



Gates: OR22/ Gates Hill Rd via Google Maps

Rural Community (continued)

Chemult: US97



Chemult via TransGIS

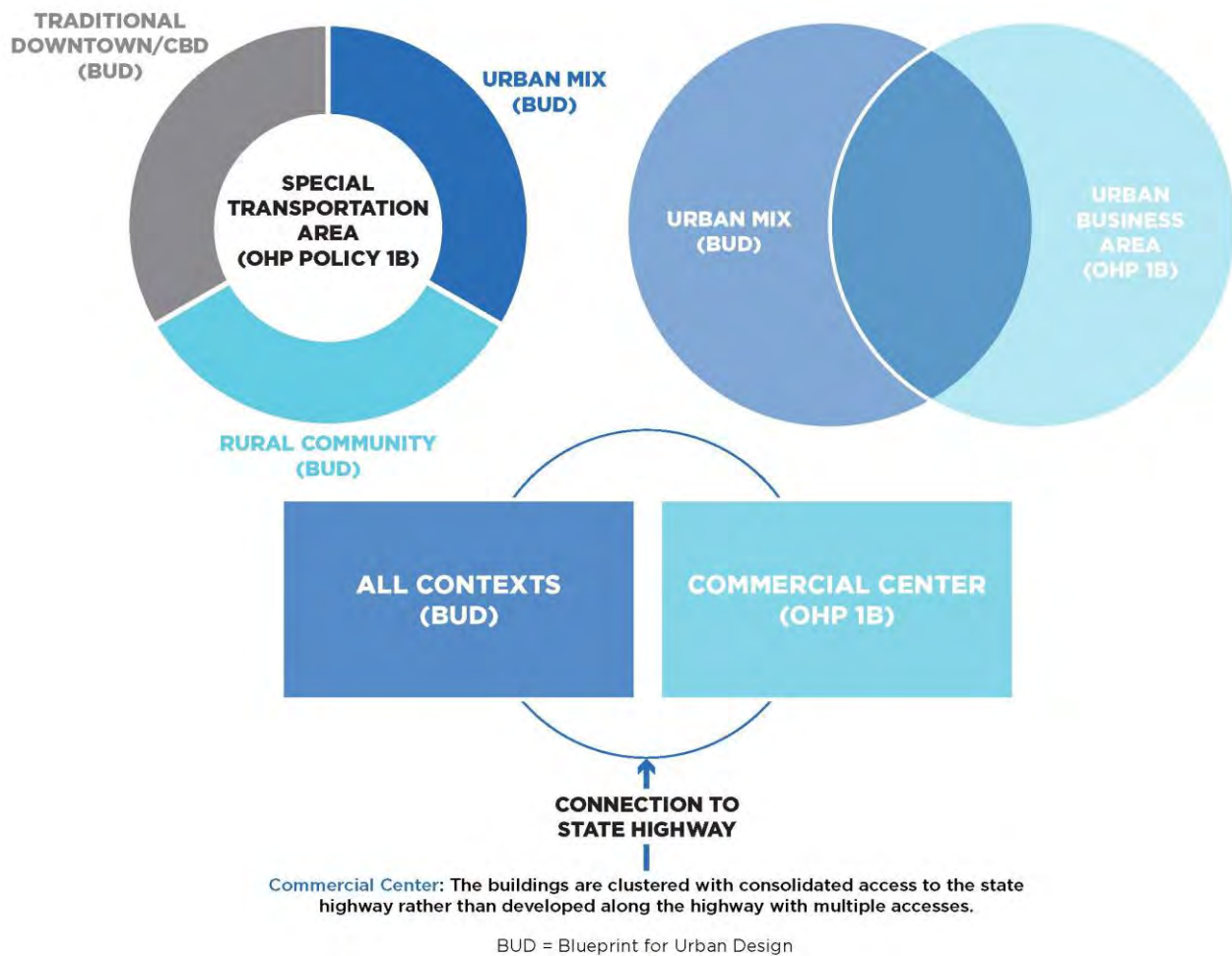


Chemult: US97 via Google Maps

### 2.1.3 Connecting ODOT Designations and Urban Contexts

There is overlap between the highway designations in the HDM and the urban contexts, as described in Section 2.1.1. Below, Figure 2-2 shows how STAs, UBAs, and CCs relate to the ODOT Urban Contexts. A Traditional Downtown/CBD is generally STA like; however, a CBD is not always classified as an STA. Nor is an STA always a Traditional Downtown/CBD. An STA can be located in a Traditional Downtown/CBD, but it can also be located in an Urban Mix context or a Rural Community context. A UBA can be located within an Urban Mix context; however, Urban Mix is not always classified as a UBA. A CC may be located in any of the urban contexts.

Figure 2-2. ODOT Designations and Urban Contexts



## 2.1.4 Determining Urban Context

Table 2-2 presents a framework to determine the urban context along state roadways. The definitions in Section 2.1.2 give a broad description of the land use types and street patterns found within each context. The measures in Table 2-2 provide more detailed assessments of the existing or planned conditions along the roadway. These measures can be evaluated through a combination of a field visit, internet-based aerial and street view imagery, map analysis, consultation with the local jurisdiction, and a review of land use plans. Urban context should be evaluated independently of highway segment designations. For example, an ODOT roadway does not need to be designated as an STA to be Traditional Downtown/CBD.

Projects with a relatively short design horizon, such as resurfacing projects, may only need to consider existing conditions in the determination of the urban context. However, practitioners should look for opportunities to support future land use expectations and address gaps in the bicycle and pedestrian network, where feasible. Proposed developments with approved permits should be considered part of the existing conditions. For projects with a longer design life that consider future transportation demand projections, documented future land use plans should be considered in determining the urban context.

In some cases, the urban context may differ on each side of the roadway (e.g., commercial corridor across from residential corridor). Where characteristics differ on each side of the roadway, the project team determines the appropriate context based on predominant land use, modal priorities, roadway function, or other major considerations.

Table 2-2: ODOT Urban Context Matrix

Land Use Context	Setbacks Distance from the building to the property line	Building Orientation Buildings with front doors that can be accessed from the sidewalks along a pedestrian path	Land Use Existing or future mix of land uses	Building Coverage Percent of area adjacent to right-of-way with buildings, as opposed to parking, landscape, or other uses	Parking Location of parking in relation to the buildings along the right-of-way	Block Size Average size of blocks adjacent to the right-of-way
Traditional Downtown/ CBD	Shallow/ None	Yes	Mixed (Residential, Commercial, Park/Recreation)	High	On-street/ garage/ shared in back	Small, consistent block structure
Urban Mix	Shallow	Some	Commercial fronting, residential behind or above	Medium	Mostly off-street/Single row in front/ In back/ On side	Small to medium blocks
Commercial Corridor	Medium to Large	Sparse	Commercial, Institutional, Industrial	Low	Off-street/In front	Large blocks, not well defined
Residential Corridor	Shallow	Some	Residential	Medium	Varies	Small to medium blocks
Suburban Fringe	Varies	Varies	Varied, interspersed development	Low	Varies	Large blocks, not well defined
Rural Community	Shallow/ None	Some	Mixed (Residential, Commercial, Institutional, Park/Recreation)	Medium	Single row in front/ In back/ On side	Small to medium blocks

### 2.1.5 Designing for Multimodal Users

The ODOT Urban Contexts can also help planners and engineers understand the types of users and the intensity of use that can be expected within each urban context. For example, in a Traditional Downtown/CBD, practitioners should expect a higher number of pedestrians, bicyclists, and transit users than in Suburban Fringe context. Therefore, slower speeds, shorter signal spacing, shorter crossing distances, and other design elements such as bicycle facilities, on-street parking, and wide sidewalks should be considered as strategies to improve safety and comfort of the anticipated users (bicyclists, pedestrians, and transit riders). In Suburban Fringe, designers should expect a predominance of vehicles and freight; however, bicyclists and pedestrians are also likely to be present and enhanced facilities should be considered for safety and comfort. A roadway in Suburban Fringe would typically have higher speeds, and lower levels of traffic delay, but the design elements for the facility will change as it transitions into different urban contexts.

When determining the roadway typical section to be used, designers can use the urban context to better understand the anticipated users and identify appropriate consideration for each of them. Table 2-3 shows a representation of the relative need of each user type to drive planning and design decisions in the different urban contexts. This table is a starting point and not a final determination of modal priorities. Specific modal priorities are determined on a project-by-project basis. Modes with lower consideration must still be accommodated. For example, there will be freight needs to deliver products to businesses in a CBD. Even if freight is a lower consideration compared to bicyclists and pedestrians, project-level needs should still be considered. In this example, it may mean the design vehicle is a single-unit (SU) instead of a tractor-trailer combination WB-67. However, Reduction Review Routes, ORS 366.215 and OAR 731-012 must be considered in these decisions. Chapter 3 will contain more guidance on criteria to be used for each urban context.

Table 2-3: General Modal Consideration in Different Urban Contexts

Land Use Context	Motorist	Freight	Transit	Bicyclist	Pedestrian
Traditional Downtown/CBD	Low	Low	High	High	High
Urban Mix	Medium	Low	High	High	High
Commercial Corridor	High	High	High	Medium	Medium
Residential Corridor	Medium	Medium	Low	Medium	Medium
Suburban Fringe	High	High	Varies	Low	Low
Rural Community	Medium	Medium	Varies	High	High

High: Highest level facility should be considered and prioritized over other modal treatments.

Medium: Design elements should be considered; trade-offs may exist based on desired outcomes and user needs.

Low: Incorporate design elements as space permits.

## 2.2 ROADWAY CLASSIFICATION

### 2.2.1 Oregon Highway Plan Designations

ODOT currently uses a highway classification system that divides state highways into five categories: Interstate, Statewide, Regional, District, and Local Interest Roads. Guidance for the Interstate System is not included in this Blueprint for Urban Design document; however, the remaining four classifications are used for non-limited access roadways in urban areas. Table 2-4 shows ODOT's definitions and objectives for these classifications. ODOT uses the state highway classification system to guide management and investment decisions regarding state roadway facilities. The state highway classifications provide information on the role of roadways related to mobility and access, as well as limited guidance regarding the prioritization of roadway users.

When planning in urban areas, the urban context is the primary basis of planning and design decisions. The state roadway designation would be a secondary basis of planning and design decisions.

Table 2-4: Existing ODOT State Highway Designations

State Highway Classification	Primary Function	Secondary Function	Objective
Statewide Highways	Provide inter-urban and inter-regional mobility and connections to larger urban areas, ports, and major recreation areas	Provide connections for intra-urban and intra-regional trips	Provide safe and efficient, high-speed, continuous-flow operations
Regional Highways	Provide connections and links to regional centers, Statewide or Interstate Highways, or economic or activity centers of regional significance	Serve land uses in the vicinity of these highways	Provide safe and efficient, moderate to high-speed operations
District Highways	Provide connections and links between small urbanized areas, rural centers and urban hubs <sup>1</sup> , and serve local access and traffic	N/A	Provide for safe and efficient, moderate to high-speed continuous-flow operation in rural areas <sup>2</sup> and moderate to low-speed operation in urban and urbanizing areas <sup>1</sup> for traffic flow and for pedestrian and bicycle movements
Local Interest Roads	Local streets or arterials serving little or no purpose for through traffic mobility	N/A	Provide for safe and efficient, low to moderate speed traffic flow and for pedestrian and bicycle movements.

Source: 1999 Oregon Highway Plan

<sup>1</sup> Small urbanized areas, rural centers, and urban hubs described in the OHP are all considered urban within the Blueprint for Urban Design. Their urban context would be classified based on the characteristics described in Section 2.1.

<sup>2</sup> Rural areas, as described in the OHP, are not covered in the Blueprint for Urban Design.

Additional flexibility should be added to the Statewide and Regional Highway classifications to allow for low to moderate speeds in urban contexts and to further support safe movement of bicyclists and pedestrians. Currently, District Highways have different objectives in urban and rural areas; the same could be identified for Statewide and Regional Highways.



## 2.2.2 Other Roadway Designations or Characteristics

While urban context and OHP roadway classification can provide general guidelines for the type and activity level of different users, there are other roadway designations or characteristics that impact planning and design of roadways in urban areas. Table 2-5 summarizes some of these additional factors and the design criteria they can potentially affect. Chapter 3 provides more details related to how specific design elements are impacted by these designations or characteristics.

Table 2-5: Designations/Characteristics Impacting Design Decisions

Factors	Data Sources	Affected Design Criteria
Reduction Review Route	<ul style="list-style-type: none"> <li>• ODOT designation – defined and stipulated by statute; OAR 731-012 and ORS 366.215</li> </ul>	<ul style="list-style-type: none"> <li>• Anything that constitutes a permanent change to overall roadway horizontal and vertical clearance</li> </ul>
Level of Access Management <sup>2</sup>	<ul style="list-style-type: none"> <li>• Driveway density</li> <li>• Intersection density<sup>3</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Median type</li> <li>• Median opening spacing</li> <li>• Signal spacing</li> <li>• Intersection spacing</li> <li>• Frequency of pedestrian crossings</li> <li>• Bicycle facility design</li> <li>• Target speed</li> </ul>
Freight Activity	<ul style="list-style-type: none"> <li>• Percent and volume of heavy vehicles</li> <li>• Need for loading/unloading zones</li> </ul>	<ul style="list-style-type: none"> <li>• Design vehicle</li> <li>• Lane width</li> <li>• Intersection curb-return radii</li> <li>• Bicycle facility design</li> </ul>
Transit Activity	<ul style="list-style-type: none"> <li>• Presence of transit routes/stops</li> <li>• Transit ridership</li> <li>• Local transit plan</li> </ul>	<ul style="list-style-type: none"> <li>• Lane width and use restrictions</li> <li>• Sidewalk and bicycle connections</li> <li>• Frequency of pedestrian crossings</li> <li>• Bicycle facility design</li> <li>• Transit stop location and layout</li> </ul>
Seismic Lifeline Route / Tsunami Evacuation Route	<ul style="list-style-type: none"> <li>• Oregon designation</li> </ul>	<ul style="list-style-type: none"> <li>• Lane width</li> <li>• Shoulder width</li> </ul>

## 2.3 DOCUMENTING CONTEXT AND CLASSIFICATION FINDINGS

Urban context and other roadway characteristics/designations must be documented early in the project development process, ideally prior to project scoping, in order to use the appropriate context-based design criteria. Documentation could also become part of ODOT urban design concurrence to provide background for design decisions based on the urban context.

The urban context may be initially documented in a local agency's long-range plan and/or an ODOT facility plan. In some cases, the urban context may be different for the existing condition and

<sup>2</sup> ODOT standards are defined and stipulated by statute OAR 734-051 and [PD-03 Access Management](#)  
<sup>3</sup> Driveway density and intersection density are directly related to ODOT State Highway Designations

the future planned land use. If this is true, the future urban context must be supported by other planning and regulatory documents, as described in Section 2.1.3.

If the urban context is documented in an existing long-range or facility plan, planners should review and coordinate with local planners to confirm the context at the start of a project. For projects that are not included in a long-range or facility plan, in collaboration with local planners, ODOT should determine the context at the start of the project, prior to scoping or design. ODOT will have the final determination of the urban context.

ODOT staff should also determine the applicable designations and characteristics from Section 2.2.2 for the roadway in question. These designations/characteristics should be documented through Design Documentation, including a brief description of their impact on the design. Documentation could also become part of ODOT design documentation to provide background for design decisions based on the urban context, designations, and characteristics.

The urban context and roadway characteristics/designations documented at the start of the project should be reviewed and updated as needed at the start of every project phase to consider current data and recent local planning efforts. Documentation may become part of ODOT design documentation. *Additional information on the multimodal performance-based decision framework is provided on Chapter 4.*

## 2.4 DESIGNING BASED ON CONTEXT AND CLASSIFICATION

The purpose of this section is to outline how the urban contexts, modal expectations, and roadway characteristics described in Section 2.1 and 2.2 can be applied together, with the design approach described for each urban context. Table 2-6 provides general guidance on design direction for various elements of the roadway design. More specific guidance for design elements within each land use context is included in Chapter 3, particularly for the elements covered within the topical memorandums for Bicycle Facility Selection, Pedestrian Crossings, and Target Speed provided in Appendix C, Volume 2 of the Blueprint for Urban Design. The design guidance tables and cross section figures in Chapter 3 also provide more detail on considering different roadway characteristics.

**Traditional Downtown/Central Business District:** To best serve all users, vehicle speeds should be 25 mph or below, and higher levels of congestion are expected. Transit stops should be placed at frequent intervals, and transit priority treatments can help with transit mobility, even in congested conditions. Bicycle and pedestrian facilities should be relatively wide and comfortable to serve anticipated users. Curbside uses are important and may include loading/unloading, parking (vehicles, bicycles, etc.), and other uses. Landscaping and street trees, following ODOT placement and spacing guidelines, are appropriate in this context.

**Urban Mix:** To best serve all users, vehicle speeds are typically 25 to 30 mph, and higher levels of congestion are acceptable. Transit stops should be placed in proximity to origins and destinations. Bicycle and pedestrian facilities should be relatively wide and comfortable to serve anticipated users. Where low speeds cannot be achieved, practitioners must consider a buffer between travel lanes and bicycle and pedestrian facilities. Curbside uses are important and may include loading/unloading, parking (vehicles, bicycles, etc.), and other uses. Landscaping and street trees, following ODOT placement and spacing guidelines, are appropriate in this context.

**Commercial Corridor:** Multimodal access to destinations must be balanced with vehicle and freight throughput. Vehicle speeds are typically 30 to 35 mph, depending on the roadway function. Medians should be used to facilitate access to commercial destinations. Demand for transit service is moderate to high due to the prevalence of commercial land use. Bicycle and pedestrian connections to transit should be prioritized and boarding and alighting occur at the curbside. Bicycle and pedestrian facilities should be separated from travel lanes by a buffer.

**Residential Corridor:** On state-owned roadways, these streets are likely to see use from a variety of modes, with most uses related to vehicular traffic moving through the area. Vehicle speeds are typically 30 to 35 mph, depending on the roadway function. The single-use nature of this context limits the multimodal activity; however, bicycle and pedestrian facilities should be provided for residents. These facilities should be separated from travel lanes by a buffer. Consideration should also be given to local pedestrian/bicycle plans, providing enhanced crossings where desired by the local communities.

**Suburban Fringe:** Special attention should be paid to the expected future context of the roadway when determining the level of consideration paid to each mode. Speeds will generally be higher on these roadways with a range of 35 to 40 mph. Therefore, bicycle and pedestrian facilities should be separated from travel lanes by a buffer. This context often separates rural areas from more urban contexts, and vehicle speeds should be lowered through appropriate transition zones.

**Rural Community:** In this context, streets are likely to see use from a variety of modes, with most uses related to either vehicular traffic moving through the town or local community members moving throughout the community via walking, bicycling, or driving. To best serve this mix of users, vehicle speeds should be lowered to a range of 25 to 35 mph entering the town, potentially through use of speed transition zones. Other design features can help inform drivers that they are entering a town, such as “gateway” intersections, street trees lining the street, or other local icons/art/signs visible from the street. Pedestrian crossings of the roadway in rural towns should be relatively frequent to reduce the roadway’s impact as a barrier. Designs related to sidewalks, bicycle facilities, and curbside uses should reflect the need of the local community.

Table 2-6: Designing based on urban context, considering roadway designations and activity of different modes

Urban Context	Target Speed (MPH) <sup>4</sup>	Travel Lanes <sup>2</sup>	Turn Lanes <sup>1,2</sup>	Shy Distance <sup>1,3</sup>	Median <sup>1,2</sup>	Bicycle Facility <sup>1,2,5</sup>	Sidewalk	Target Pedestrian Crossing Spacing Range (feet) <sup>6</sup>	On-street parking <sup>1</sup>
Traditional Downtown/ CBD	20-25	Start with minimum widths, wider by roadway characteristics	Minimize additional crossing width at intersections	Minimal	Optional, use as pedestrian crossing refuge	Start with separated bicycle facility	Ample space for sidewalk activity (e.g., sidewalk cafes, transit shelters)	250-550 (1-2 blocks)	Include on-street parking if possible
Urban Mix	25-30	Start with minimum widths, wider by roadway characteristics	Minimize additional crossing width at intersections	Minimal	Optional, use as pedestrian crossing refuge	Start with separated bicycle facility, consider roadway characteristics	Ample space for sidewalk activity (e.g., sidewalk cafes, transit shelters)	250-550 (1-2 blocks)	Consider on-street parking if space allows
Commercial Corridor	30-35	Start with minimum widths, wider by roadway characteristics	Balance crossing width and operations depending on desired use	Consider roadway characteristics, desired speeds	Typically used for safety/ operational management	Start with separated bicycle facility, consider roadway characteristics	Continuous and buffered sidewalks, with space for transit stations	500-1,000	Not Applicable
Residential Corridor	30-35	Start with minimum widths, wider by roadway characteristics	Balance crossing width and operations depending on desired use	Consider roadway characteristics, desired speeds	Optional, use as pedestrian crossing refuge	Start with separated bicycle facility, consider roadway characteristics	Continuous and buffered sidewalks	500-1,000	Generally Not Applicable, Consider roadway characteristics
Suburban Fringe	35-40	Start with minimum widths, wider by roadway characteristics	Balance crossing width and operations depending on desired use	Consider roadway characteristics, desired speeds	Optional, use as pedestrian crossing refuge	Start with separated bicycle facility, consider roadway characteristics	Continuous and buffered sidewalks	750-1,500	Not typical
Rural Community	25 - 35	Start with minimum widths, wider by roadway characteristics	Balance crossing width and operations depending on desired use	Consider roadway characteristics, desired speeds	Optional, use as pedestrian crossing refuge	Start with separated bicycle facility, consider roadway characteristics	Continuous and buffered sidewalks, sized for desired use	250-750	Consider on-street parking if space allows

<sup>1</sup> Design decisions should consider the presence and volumes of freight and transit activity. The typical review process should be followed along reduction review routes.

<sup>2</sup> Design decisions must consider the existing level of access management and/or the driveway density.

<sup>3</sup> Shy distance: the lateral distance from the edge of the travel way beyond which a roadside object will not be perceived as an immediate hazard by the typical driver

<sup>4</sup> Section 3.2.4 provides the approach and strategies associated with target speed (see Volume 2, Appendix C, Topical Memorandum, Target Speed for more detail)

<sup>5</sup> Section 3.2.2 provides a flow chart to determine appropriate bicycle treatments (see Volume 2 Appendix C, Topical Memorandum, Bicycle Facility Selection Process)

<sup>6</sup> Section 3.2.3 provides guidance for pedestrian crossing locations (see Volume 2, Appendix C, Topical Memorandum, Enhanced Pedestrian Crossings for more detail)

## 2.5 REFERENCES

1. Oregon Department of Transportation (ODOT). Oregon Highway Plan. 1999.
2. ODOT. Highway Design Manual. 2012.
3. Metro. 2040 Metro Growth Concept. 2014.
4. Pennsylvania and New Jersey Departments of Transportation. Smart Transportation Guidebook. 2008.
5. Florida Department of Transportation. Context Classification. 2017.
6. Transportation Research Board (TRB). NCHRP Report 855: *An Expanded Functional Classification System for Highways and Streets*. 2018.



OREGON DEPARTMENT OF TRANSPORTATION

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**BLUEPRINT FOR URBAN DESIGN**  
ODOT's Approach for Design in Oregon Communities

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Chapter 3

Design Flexibility at ODOT in  
Urban Contexts

January 2020





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## 3.0 DESIGN FLEXIBILITY AT ODOT IN URBAN CONTEXTS

Chapter 3 provides guidance for practitioners to use existing design flexibility to implement designs that are appropriate within each urban context described in Chapter 2. Chapter 3 includes information to help practitioners identify and evaluate trade-offs while considering the operations, safety, maintenance, and design for urban projects. Section 3.1 highlights the need to reference existing ODOT resources and tools for evaluating design, operations, and safety. Utilizing these resources to evaluate the trade-offs can help integrate the needs of each modal group and develop solutions that meet the desired outcomes of the project. Section 3.2 introduces the cross section realms and provides specific considerations to the design elements within each realm as it relates to urban design projects. In addition, the summary tables within Section 3.2 provide design guidance recommendations for ODOT urban projects. Refer to the decision-making process outlined in Chapter 4 for guidance to document and provide reasoning for the proposed project design.

### 3.1 INTEGRATING DESIGN, OPERATIONS, MAINTENANCE, AND SAFETY

Designing multimodal transportation facilities in urban areas is inherently complex. While past design trends have emphasized adherence to strict design standards, the Blueprint for Urban Design highlights flexibility in design and emphasizes the need to identify project goals and performance measures that align with the intended project outcomes. Project teams involved with urban design projects are tasked with balancing the needs and priorities of a variety of roadway users while integrating design principles, operations, maintenance tasks, and safety. Understanding and executing a performance-based approach within each stage of the project development process enables project teams to make informed decisions about the performance trade-offs. This is especially helpful when developing solutions in fiscally and physically constrained environments. National activities and associated publications, such as the FHWA Performance-Based Practical Design initiatives and the NCHRP Report 785: *Performance-Based Analysis of Geometric Design of Highways and Streets*, have resulted in a framework for how to integrate design, operations, and safety by evaluating the overall performance of the project (1,2). Chapter 4 provides more details on how a performance-based approach can encourage effective problem solving, collaborative decision making, and an overall greater return on infrastructure investments.

#### 3.1.1 Existing ODOT Resources for Design, Operations, and Safety

Balancing the trade-offs by integrating design, operations, maintenance tasks, and safety for all modal groups involves using relevant, objective data to support the design decisions. This will require an awareness of the resources available to quantify specific performance measures or qualitatively describe the anticipated effect of a given roadway or intersection. Fundamental ODOT

Specific safety calibration factors developed for the State of Oregon can help practitioners better apply the predictive safety methods in the Highway Safety Manual to address project safety outcomes.

resources and tools for design, safety, and operations associated with the urban environment are shown in Appendix B of Volume 2 of the Blueprint for Urban Design. In addition to the items in Appendix B, long term maintenance tasks must also be considered in the final design. The Maintenance Section plays a significant role in making sure ODOT's facilities function as they were designed. The Maintenance role in a facility's life cycle is an important one. Designing and constructing a facility that is difficult to maintain will not provide adequate long-term service. Other recently published research, such as NCHRP Report 880: *Design Guide for Low-Speed Multimodal Roadways*, also provides a useful resource for considering design trade-offs in an urban environment (3).

Whether or not safety is the catalyst for a project, conducting safety analysis can help identify areas for improving the roadway for various modal users. ODOT seeks to provide safe transportation to each roadway user and continues to work towards reducing fatal and severe injury crashes on state facilities. Therefore, using safety performance measures or qualitative assessment of safety is often a focus when evaluating project alternatives and assessing project trade-offs. There are limitations in the bicycle and pedestrian crash data available at ODOT. Practitioners can reference the Oregon Pedestrian and Bicycle Safety Implementation Plan for additional guidance and resources (4).

Evaluating the trade-offs within a constrained roadway environment and balancing the needs of various modal users can be particularly challenging in an urban area. The ODOT HDM is the primary resource for detailed design guidance and discusses the flexibility in urban highway design in relation to land use and community-based decision processes (5). While in the past the primary project focus was motor vehicle operations, there are now resources and tools to guide practitioners in multimodal analysis and evaluating the needs for each user from an operational perspective.

### 3.1.2 Understanding Trade-offs for Design, Operations, Maintenance and Safety

Roadway facilities should be designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists, and transit riders of all ages and abilities. The design team should understand the difference between "accommodating" versus "designing for" a given mode and apply consistent principles within the project context. Multimodal design considerations depend on the intended function of the corridor, as well as balancing trade-offs and objectives from local plans. For example, consider a roadway designed primarily for mobility for motorized vehicles. The design is required to "accommodate" other users, such as pedestrians and bicycles, but it will not attract a wide range of vulnerable users. A roadway

Appendix B, found in Volume 2 of the Blueprint for Urban Design, includes extensive resources for assessing and evaluating safety, design and operations. It is important for practitioners to understand the principles of these aspects and how their overall performance of a project can be evaluated to meet the intended outcomes of a project. How a specific design will affect maintenance tasks must also be considered.

intended to serve and attract non-auto users, however, should be “designed for” multimodal users. This means mobility for motorized vehicles as a lower priority and allows some congestion.

Table 3-1 outlines an example of how to consider such trade-offs.

Table 3-1: Example of Trade-offs to Consider

How to Consider Trade-offs – Right-turn Lane at an Intersection
<p>Project Summary:</p> <p>Paving a 3-mile section of a highway in a residential corridor context, mitigating (right) turn movements at three intersections while accommodating bicycles and pedestrians along the arterial. Each intersection within the 3-mile segment should be evaluated separately and then considered collectively as a continuous segment. Different solutions may be identified at each intersection depending on the unique context, users, and design characteristics.</p>
<p>Performance-Based Approach:</p> <ul style="list-style-type: none"><li>• For a performance-based approach, every project should establish clear project goals and identify desired outcomes based on the urban context.<ul style="list-style-type: none"><li>○ Who are we trying to serve in this project?</li><li>○ What are we trying to achieve?</li><li>○ What is the context of the corridor?</li></ul></li><li>• Chapter 2, Table 2-2 provides specific information on the six ODOT Urban Contexts, Table 2-3 provides modal considerations for the contexts, and Table 2-5 includes design considerations for each context.</li><li>• Chapter 4, Figure 4-4 provides guidance for applying a performance-based approach and using a multimodal decision-making framework, including specific information on identifying project goals and performance measures.</li></ul>
<p>Analysis:</p> <ul style="list-style-type: none"><li>• Conducting a field visit can provide additional roadway and context characteristics that may contribute to appropriate evaluation of trade-offs and decision making.</li><li>• An operational analysis conducted for an intersection in an urban area may show a capacity need that introduces a separate right-turn lane.<ul style="list-style-type: none"><li>○ From the operational perspective, the right-turn lane may benefit the motor vehicle mobility at this intersection.</li><li>○ From a safety perspective, adding a right-turn lane may create a conflict between bicycles and motor vehicles and increase the crossing distance for pedestrians at the intersection.</li></ul></li><li>• Chapter 3, Section 3.1.1 provides additional information on the existing ODOT resources that can be used in the analysis.</li></ul>
<p>Evaluating Trade-offs:</p> <ul style="list-style-type: none"><li>• Based on the agreed upon project objectives established early in a project, multidiscipline project teams can evaluate and understand the trade-offs by integrating design, operations, and safety for various users, while also identifying specific maintenance needs and how to mitigate them.</li><li>• Chapter 3, Tables 3-11 through 3-16 provide specific design guidance for design elements within each of the six urban contexts. Understanding the variety of cross section alternatives and trade-offs can help practitioners allocate space within the existing project constraints while serving the intended roadway users and meeting desired project outcomes.</li><li>• The multimodal decision-making framework in Chapter 4, Figure 4-4 provides an outline for considering trade-offs and documenting design decisions for ODOT urban design concurrence.</li></ul>

Table 3-1: Example of Trade-offs to Consider (continued)

How to Consider Trade-offs – Right-turn Lane at an Intersection
<p>Evaluating Trade-offs:</p> <ul style="list-style-type: none"><li>• Considerations are:<ul style="list-style-type: none"><li>○ The project team should confirm the need to accommodate bicycles at the intersection and then consider the range of bicycle facility types. Chapter 3, Section 3.2.2 provides additional information on bicycle facility selection.<ul style="list-style-type: none"><li>▪ Providing the bicycle lane between the through lane and right-turn lane to limit the conflict between right-turning traffic and bicycle users. However, the bicyclist will be exposed riding between faster moving vehicles.</li></ul></li><li>○ The team should consider the appropriate pedestrian accommodation at the intersection and the range of options for pedestrian facilities.<ul style="list-style-type: none"><li>▪ Identifying additional pedestrian crossing treatments that improve the pedestrian's ability to navigate the intersection, such as refuge islands as part of channelized right-turns</li></ul></li><li>○ Accepting some congestion for motorized vehicles by not providing the additional right-turn lane but allowing the bicyclists to stay on the outside of motorized vehicles and minimizing the crossing distance for pedestrians at the intersection.</li><li>○ The project team should review the original project intended outcomes and modal user priorities to determine if the outcomes aligns with the project goals.</li></ul></li></ul>

With an understanding of the overall project performance, including maintenance needs, a project team can begin to evaluate the design element application based on the integration of design, operations, and safety. As described in Chapter 2, the emphasis of this will be the urban context, with the highway designation/classification also considered. Chapter 4 provides a design-making framework with additional information on evaluating trade-offs and documenting design decisions as part of ODOT urban design concurrence.

## 3.2 EVALUATING AND PRIORITIZING DESIGN ELEMENTS

Section 3.1 provides an overview of the importance of integrating design, safety and operations in conjunction with maintenance needs and provided a summary of potential tools for measuring and evaluating the considerations and trade-offs. Section 3.2 provides the next level of detail by discussing the range of considerations for design elements within the roadway cross section, which are **organized into “cross section realms” as described in Table 3-2**. In addition, Section 3.2 provides design guidance recommendations for roadway cross sections within each ODOT Urban Context. Projects that are not able to attain the recommended design guidance can use the decision-making process described in Chapter 4 to justify and document the design decisions and reasoning for the preferred solutions.

### 3.2.1 Cross Section Realms and Considerations

Table 3-2 provides an overview of the various cross section realms and the functions they may serve in urban areas. Figure 3-1 provides a graphical overview of the various cross section realms. The elements and dimensions of these realms will vary depending on the urban context, the anticipated users, and desired project outcomes.

Table 3-2: Summary of Cross Section Realms

Street Realm	Location	Function
Land Use Realm	Immediately adjacent to the roadway right-of-way	<ul style="list-style-type: none"> <li>Typically, privately owned, the land use realm contributes to the urban context of the place.</li> <li>This space can also serve a variety of other functions in some cases, including pedestrian space, amenities such as bicycle parking, utilities, landscaping, parking, and other uses.</li> <li>Awnings or building appurtenances, signs and other activities that require use of the public right-of-way or overhang into the Pedestrian Realm must be permitted by ODOT or the local agency (if sidewalk is locally owned).</li> </ul>
Pedestrian Realm	Includes the sidewalk and the buffer or furniture zone	<ul style="list-style-type: none"> <li>Serves pedestrians and access to land uses</li> <li>Buffer/furniture zone often used as a place for utilities, lighting, signs, street trees, and other furnishings</li> <li>May also serve as public space for art, sidewalk seating, or other types of public uses if sidewalk is locally owned.</li> </ul>
Transition Realm	The area immediately adjacent to the curb or sidewalk edge (e.g., parking, loading, transit stops). May also include non-pedestrian areas behind the curb (e.g., curb-separated bicycle lanes).	<ul style="list-style-type: none"> <li>Bicycle movement or parking, pedestrians, planters, transit stops, parking, loading/unloading, pick-up/drop-off</li> <li>May serve multiple functions in same block or location, may vary by time of day.</li> <li>May also include street trees and/or other green streets treatments</li> </ul>
Travelway Realm	The center of the right-of-way used for movement, typically including travel lanes, median, and/or turn lanes	<ul style="list-style-type: none"> <li>Primarily functions to serve various types of vehicle movement (including motor vehicles, buses, light rail vehicles, streetcars, bicycles, motorcycles, freight, etc.)</li> <li>Can provide or manage vehicular access through turn lanes, medians, and other treatments</li> <li>Median can function as a place for vegetation, green streets stormwater treatments, and as a pedestrian refuge.</li> </ul>

Figure 3-1: Example of Cross Section Realms



Note: Some design elements are not absolute to a specific realm. Tables 3-11 to 3-16 provide additional design guidance.

Table 3-3 through 3-6 provide key questions and considerations for primary design elements typically found within each of the cross section realms. These questions and considerations guide practitioners in making decisions about how to apply, evaluate, and design the cross-sectional elements. In subsequent sections (Section 3.2.5), there is specific design guidance for elements within the realms for each urban context. If a project team finds that a roadway is not able to attain the design recommendations, the information in Table 3-3 through 3-6 can support the project team's approach to evaluating trade-offs and documenting design decisions as part of ODOT urban design concurrence. Project teams should consider the existing urban context and the potential future context desired by the community. Understanding the context considerations in Chapter 2 and outlining clear desired project outcomes (for the near-term and long-term needs of the community) can help guide project teams with decision making.

#### *Land Use Realm*

The land use realm shown, in Figure 3-2 and described in Table 3-3, is a key defining feature of the urban context. ODOT does not typically own or control the adjacent land use directly. Instead, it is typically private property, regulated by the local jurisdiction code. ODOT project teams should work in parallel with the local jurisdiction to verify that the street design supports the desired context and desired project outcomes.

The function of the land use realm in a Traditional Downtown/CBD area is different from that in the other contexts. Where there is zero setback in a downtown area, business entrances are at the back of the sidewalk, so the roadway speed, volume, and operations influence the attractiveness of the businesses. By contrast, in a Commercial Corridor, entrances farther from the roadway are typically preferred. The road noise caused by higher speeds may impact real estate and the attractiveness of businesses. There can also be zero setback in a Commercial Corridor (typically the back wall of a business).



Figure 3-2: Land Use Realm

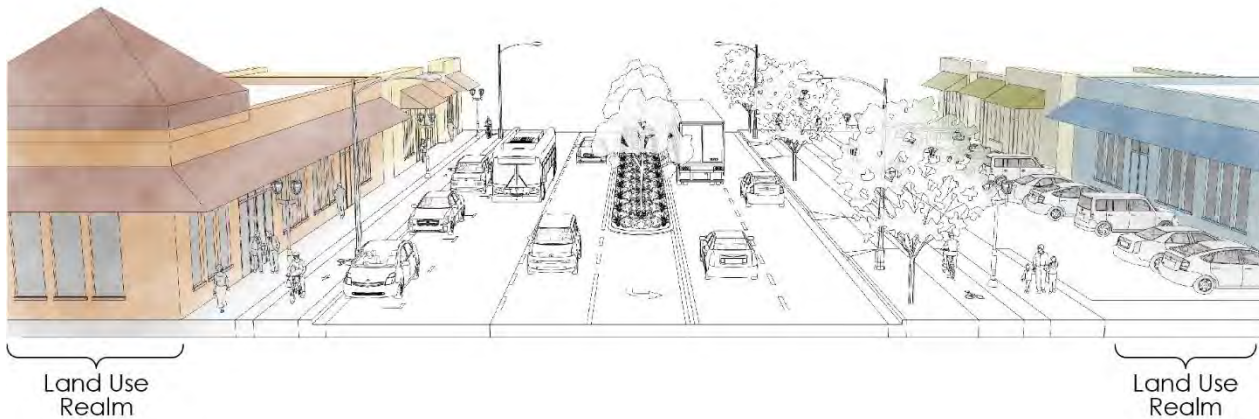


Table 3-3: Design Element Considerations within the Land Use Realm

Design Element	Considerations
Access to commercial development / storefront	<ul style="list-style-type: none"> <li>• In traditional downtown type land use, buildings often have zero setback, creating a welcoming environment for pedestrians. To ensure adequate space for building frontage in addition to pedestrian movement, wider sidewalks may be necessary.</li> <li>• In other contexts, buildings may have zero setback or a significant setback. In these situations, evaluate and consider the likely pedestrian path between land uses and to/from transit stops to determine where there is likely a demand for street crossings.</li> </ul>
Elements supportive of pedestrian realm	<ul style="list-style-type: none"> <li>• In some urban contexts, the land use realm can offer space that is supportive of the pedestrian realm, potentially reducing demands on the street right-of-way. Consider whether there is the potential to work with the local jurisdiction and property owners to include any of the following:                             <ul style="list-style-type: none"> <li>○ Additional sidewalk width</li> <li>○ Pedestrian plazas / parks</li> <li>○ Landscaping adjacent to the sidewalk</li> <li>○ Stormwater facilities (green streets)</li> </ul> </li> <li>• Awnings or building appurtenances, signs, and other activities that require use of the public right-of-way must be permitted by ODOT or the local agency (if sidewalk is locally owned).</li> </ul>
Elements supportive of other street functions	<ul style="list-style-type: none"> <li>• The land use realm can also provide space to support other functions.                             <ul style="list-style-type: none"> <li>○ Consider whether it would be appropriate to rely on the adjacent land use for parking.</li> <li>○ In many cases, local jurisdiction development code requires property owners to provide bicycle parking.</li> <li>○ In some cases, an easement can allow for utilities to be located on adjacent land use.</li> </ul> </li> </ul>

### Pedestrian Realm

The pedestrian realm, shown in Figure 3-3 and described in Table 3-4, includes the sidewalk and buffer. In some urban contexts, this may also include a frontage zone. Understanding the pedestrian activity, access to land use, and buffers in this realm can help prioritize the design decisions for this section of the roadway and support the need to balance the trade-offs amongst the various cross section constraints.

Figure 3-3: Pedestrian Realm

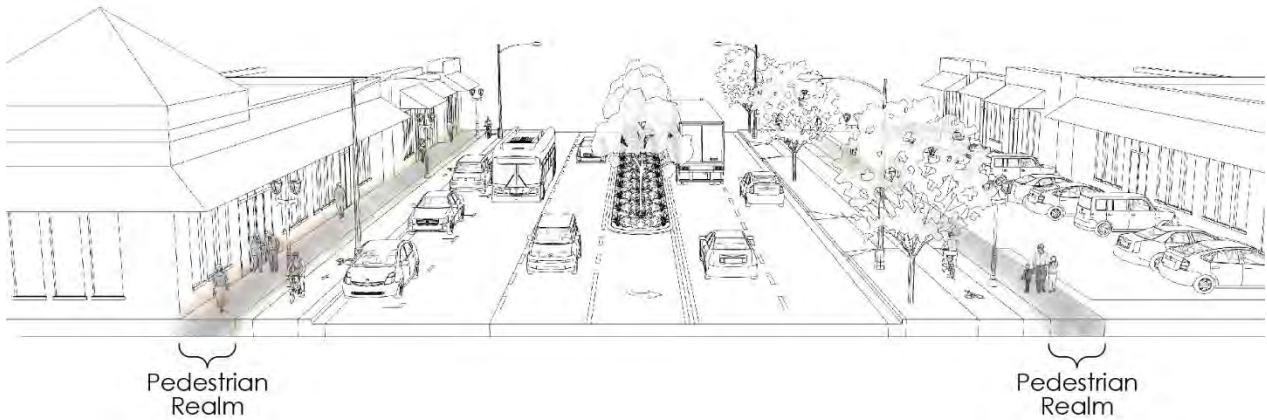


Table 3-4: Design Elements Considerations within the Pedestrian Realm

Design Element	Considerations
Frontage Zone	<ul style="list-style-type: none"> <li>• The frontage zone is located between the pedestrian zone and the right-of-way.</li> <li>• Depending on the available space, this zone may include items such as sandwich boards (if sidewalk locally owned), bicycle racks, and benches.</li> <li>• This area is used by window shoppers and is where people enter and exit buildings.                             <ul style="list-style-type: none"> <li>◦ The width of the frontage zone is needed to prevent adjacent property owners from installing a fence at the back of walk, or for maintenance personnel to make sidewalk repairs.</li> <li>◦ In a Traditional Downtown/CBD context, additional width is needed to provide space for merchandise and sidewalk cafés (if sidewalk is locally owned and permitted), and opening doors (typically needs 4 feet).</li> </ul> </li> </ul>
Pedestrian Zone	<ul style="list-style-type: none"> <li>• What is the travel speed next to the sidewalk?</li> <li>• Is the street a high priority for pedestrian activity, based on community input and local jurisdiction planning efforts?                             <ul style="list-style-type: none"> <li>◦ If so, prioritize serving pedestrians with a high-quality facility (width and buffer).</li> </ul> </li> <li>• What level of pedestrian activity is occurring today? Is there a desire or potential for higher pedestrian activity?                             <ul style="list-style-type: none"> <li>◦ Select sidewalk widths with sufficient space to accommodate anticipated/desired level of activity.</li> </ul> </li> <li>• What is the target pedestrian level-of-traffic-stress for this location?</li> <li>• A pedestrian accessible route is provided in the pedestrian zone.</li> </ul>

Table 3-4: Design Elements Considerations within the Pedestrian Realm (continued)

Design Element	Considerations
Buffer Zone	<ul style="list-style-type: none"> <li>• People walking need to be buffered from motor vehicle movement. Ensure that a buffer is provided within the pedestrian realm or the transition realm, or that generous sidewalk width provides sufficient space for buffering if sidewalk is curb-tight.</li> <li>• Permitted items such as sandwich boards, bicycle racks, and other street furniture are typically placed in this zone.</li> <li>• Additional design elements to consider in sidewalk design include:                         <ul style="list-style-type: none"> <li>○ Pedestrian scale lighting</li> <li>○ Utility pole placement</li> </ul> </li> <li>• Do transit stops need extra buffer?                         <ul style="list-style-type: none"> <li>○ Where vehicle speeds or volumes are high, sufficient buffer is important.</li> <li>○ Downtown area may have parked cars that can serve as a buffer.</li> </ul> </li> <li>• Suburban areas have no parking but may include a planter strip.</li> </ul>
Curb Zone	<ul style="list-style-type: none"> <li>• The curb zone is the transition between a sidewalk to the roadway at a crosswalk or intersection.                         <ul style="list-style-type: none"> <li>○ The design of the gutter pan (apron) is important for ADA access standards.</li> <li>○ A curb and gutter is typically 2 feet, and the gutter portion can be part of the adjacent transition realm.</li> </ul> </li> <li>• Where separated bicycle lanes exist, the curb is on the other side of the bicycle lane, so in lieu of the curb zone being defined as the curb between the bicycle lane and sidewalk, this zone is characterized by the buffer space between the bicycle lane and the sidewalk.</li> <li>• Most urban streets with sidewalks are typically curbed.</li> <li>• A vertical curb channelizes drainage and prevents vehicle from parking on the sidewalk.</li> </ul>

*Transition Realm*

The transition realm, shown in Figure 3-4 and described in Table 3-5, includes the area immediately adjacent to the curb or sidewalk edge (e.g., parking, loading, transit stops) and may also include non-pedestrian areas behind the curb (e.g., curb-separated bicycle lanes). The primary design elements within this realm are the right-side shoulder, bicycle facilities, and on-street parking. Stormwater and landscape considerations are also relevant in this realm and can impact the overall roadway cross section.

Figure 3-4: Transition Realm

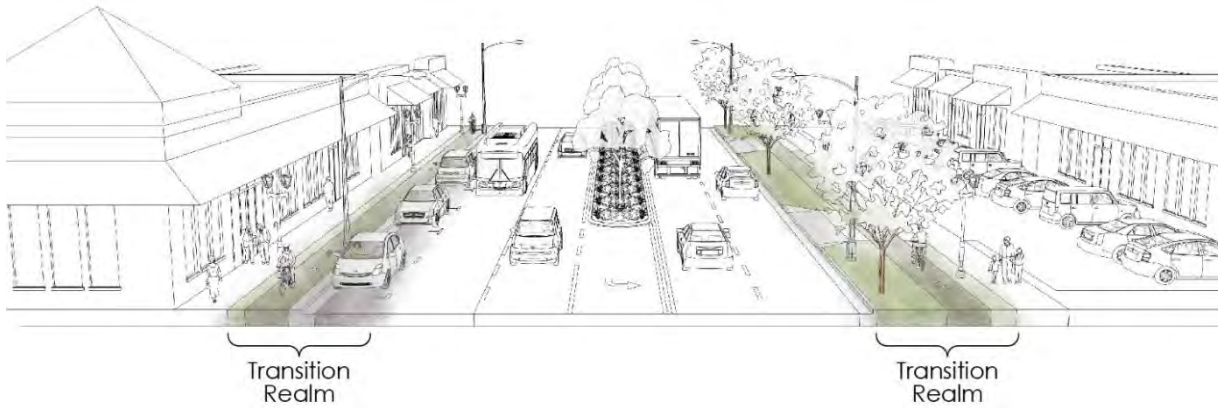


Table 3-5: Design Elements Considerations within the Transition Realm

Design Element	Considerations
Right Side Shoulder	<ul style="list-style-type: none"> <li>• What is the purpose of this space?</li> <li>• Is there a need for roadside recoverable area or shy distance based on the urban context, target speed, and/or run-off the road crashes?</li> <li>• Is stormwater allowed to encroach into travel lanes (spread) given the context and target speed?</li> </ul>
Bicycle Facility	<ul style="list-style-type: none"> <li>• What cross-sectional elements are next to the bicycle lane (e.g. narrow travel lane with higher percentage of trucks)?</li> <li>• What are speeds?                             <ul style="list-style-type: none"> <li>○ When speeds are higher, the project team needs to consider additional separation, such as extra buffer or moving bicycles behind the planter strip.</li> <li>○ Street buffers function to increase the sense of comfort and safety for bicyclists. This space can serve many functions from green treatments to transit boarding platforms. Features that are necessary to be accessed from the travel lane, typically located in the sidewalk buffer, such as mailboxes, should be in the street buffer.</li> </ul> </li> <li>• Is the street part of the regional bicycle network?                             <ul style="list-style-type: none"> <li>○ If so, prioritize serving bicycle access and mobility.</li> </ul> </li> <li>• What type of bicyclist is currently served?</li> <li>• What level of facility is needed to serve riders of all ages and abilities?                             <ul style="list-style-type: none"> <li>○ On a shoulder bicycle lane, bicyclists can pass other bicycles by using part of the adjacent vehicle lane. However, when bicycle lanes are constrained between curbs or other objects, passing may be restricted. Where separated bicycle lanes are used, the bicycle lane should consider the ability for a bicycle to be passed or for two bicycles to travel side-by-side.</li> </ul> </li> <li>• What are the forecast volumes of bicyclists, and is the width sufficient to serve them?</li> <li>• Can buffer widths be minimized by providing greater physical protection?</li> <li>• Is there a parallel route that is equally direct/accessible and/or that has been identified in a local jurisdiction plan?</li> <li>• Can anticipated volumes of bicyclists and pedestrians be served with a multi-use path on one or both sides of the street?</li> </ul>

Table 3-5: Design Elements Considerations within the Transition Realm (continued)

Design Element	Considerations
Bicycle / Street Buffer Zone	<p><u>Stormwater/Landscape Strip</u></p> <ul style="list-style-type: none"> <li>• What are the green street treatment locations that present the fewest trade-offs on this street?                             <ul style="list-style-type: none"> <li>○ Curb extensions work well with on-street parking, but are more challenging to implement in conjunction with separated bicycle facilities.</li> <li>○ <b>Linear facilities in transition zone provide "greening" benefits along the length of street but require width for the entire cross section. Street trees are often required by local jurisdictions in the landscape zone and must meet site distance standards and be permitted by ODOT.</b></li> <li>○ Basins can be implemented in right-of-way remnants.</li> </ul> </li> <li>• Are there opportunities to reduce impermeable surface to reduce run-off volumes?</li> </ul> <p><u>Transit Stops</u></p> <ul style="list-style-type: none"> <li>• Are buses stopping in the travel lane or in a bus pull-out? What is the transit agency's guidance along the specific corridor?</li> <li>• Are bus stops upstream or downstream of intersection?</li> <li>• What would be the interaction between the bus stop and the bicycle facility, as well as access to pedestrian facilities?</li> <li>• Transit stops may be incorporated in the buffer and curb zones that are part of the pedestrian zone.</li> </ul>
On-Street Parking	<ul style="list-style-type: none"> <li>• What is the off-street parking situation? What about parking availability on side streets?                             <ul style="list-style-type: none"> <li>○ Consult a parking study if available or determine available capacity on side streets or off-street, and compare that to the utilized capacity on the study street.</li> <li>○ Ensure availability of ADA spaces.</li> <li>○ Identify the need to allocate space for the following:                                     <ul style="list-style-type: none"> <li>▪ Bicycle parking</li> <li>▪ On-street loading/unloading</li> <li>▪ Freight</li> <li>▪ Pick-up/drop-off of people</li> </ul> </li> </ul> </li> </ul>
Maintenance	<ul style="list-style-type: none"> <li>• When determining appropriate elements for the transition zone, the ability for maintaining the facility shall be considered. Consult ODOT maintenance staff for input when determining the following:                             <ul style="list-style-type: none"> <li>○ Sweeping and maintaining constrained cycle track facilities.</li> <li>○ Restriping and maintaining markings for buffered bicycle lanes.</li> <li>○ Maintaining vertical elements like tubular markers used for delineation and separation of the bicycle facility and the travel lane.</li> </ul> </li> <li>• Consider intergovernmental agreements with the local jurisdiction for maintenance of the transition zone and elements within it. This may include the pedestrian realm as well.</li> </ul>

### Travelway Realm

The travelway realm, shown in Figure 3-5 and described in Table 3-6, focuses on the movement of motor vehicles and includes travel lanes, median, and/or turn lanes. Understanding the user priorities and desired outcomes for a project can help prioritize the trade-offs for the design elements within the travelway realm.

Figure 3-5: Travelway Realm



Table 3-6: Design Elements within the Travelway Realm

Design Element	Considerations
Travel Lane Width	<ul style="list-style-type: none"> <li>• What is the land use context and target speed for the street?                             <ul style="list-style-type: none"> <li>○ In slower, denser urban contexts, consider narrow, minimum lane widths.</li> <li>○ In suburban contexts, consider narrower lane width.</li> <li>○ In higher speeds, maintain wider lane.</li> <li>○ Maintain typical lane width for the context.</li> </ul> </li> <li>• What design elements are adjacent to the lane?                             <ul style="list-style-type: none"> <li>○ Evaluating the appropriate lane width may depend on the design elements adjacent to the lane.</li> <li>○ The width of a travel lane adjacent to shy distance or a buffered bicycle lane, may have flexibility to be narrowed while still meeting the roadway needs.</li> <li>○ A travel lane directly adjacent to a curb may benefit from a full width to allow for adequate width for users on the roadway.</li> </ul> </li> <li>• What are the appropriate number of through travel lanes?                             <ul style="list-style-type: none"> <li>○ If a street has several through lanes per direction, consider a detailed operational evaluation of a road reorganization (i.e., road diet) to reallocate space to other functions and get public input.</li> <li>○ Consider if it is appropriate to accept higher levels of congestion.</li> </ul> </li> <li>• What role does this street play in the regional transit network?                             <ul style="list-style-type: none"> <li>○ If the street is part of the frequent bus network (or any rail or High Capacity Transit), prioritize designs that prioritize transit.</li> </ul> </li> <li>• What role does this street play in the freight network?                             <ul style="list-style-type: none"> <li>○ If the street is part of the regional or statewide freight network, prioritize designs that preserve adequate vehicular capacity for the demand.</li> </ul> </li> <li>• What role does this street play in Reduction Review Route?                             <ul style="list-style-type: none"> <li>○ Follow the appropriate process outlined in OAR 731-012.</li> </ul> </li> </ul>

Table 3-6: Design Elements within the Travelway Realm (continued)

Design Element	Considerations
Turn Lane Width	<ul style="list-style-type: none"> <li>• What design elements are adjacent to the left-turn lane?                             <ul style="list-style-type: none"> <li>○ Is there a median with a shy distance that may provide an opportunity to narrow the lane width?</li> <li>○ What is the median striping width in the opposing direction?</li> </ul> </li> <li>• What design elements are adjacent to the right-turn lane?                             <ul style="list-style-type: none"> <li>○ How are bicycles addressed at right-turns?</li> </ul> </li> </ul>
Left Side Shy Distance	<ul style="list-style-type: none"> <li>• In low-speed urban contexts, consider minimizing additional width needed for “shy” distance (e.g. median or curb).                             <ul style="list-style-type: none"> <li>○ Lower target speeds</li> <li>○ Use fewer vertical elements (which require shy)</li> <li>○ Zero foot shy may be acceptable when considering trade-offs and design considerations in relation to the context</li> </ul> </li> </ul>
Striped Median Width	<ul style="list-style-type: none"> <li>• What is the speed along the street and the potential of vehicles to cross into oncoming traffic?</li> </ul>
Raised Curb Median	<ul style="list-style-type: none"> <li>• What is the purpose of the median?                             <ul style="list-style-type: none"> <li>○ Access management.</li> <li>○ Landscaping to create “boulevard” effect.</li> </ul> </li> </ul>

As noted previously, Tables 3-3 through 3-6 provide guidance to help project teams consider various design elements typically found within each of the cross section realms. Having an understanding of each element and how they interact with each other will guide practitioners in making decisions about how to apply, evaluate, and design the cross-sectional elements.

### 3.2.2 Focus on Bicycle Facility Selection

Encouraging and accommodating bicycles as a transportation mode is a priority within urban projects. In order to expand the portion of the bicyclist demand served, appropriate bicycle facilities need to be evaluated and included early in project planning and development. Understanding current guidance about bicycle facility selection, identifying the degree of separation, and evaluating trade-offs are key to effective implementation. Reviewing various options using a decision-making framework can help prioritize trade-offs, refine decisions, and lead to a solution that supports the project needs.

Appendix C in Volume 2 of the Blueprint for Urban Design includes the Bicycle Facility Selection Topical Memorandum that provides recommended updates to guidance for identifying, planning, designing, and implementing appropriate bicycle facilities on state-owned facilities in urban areas. The memorandum provides a framework to support appropriate bicycle facility selection and implementation. The following information provides an overview of the recommendations. When considering decisions about bicycle facility selection, keep in mind the maintenance needs with each facility type. The answer to the question, “What will be the maintenance issues and how will we mitigate them with this design?” is an important aspect to the final facility choice. If a bicycle facility is being added to an existing cross-section by simply restriping the existing design elements,

care must be taken to ensure removal of the exiting striping does not leave “ghost” lines that may confuse both drivers and bicyclists. The final striping layout must be clear and understandable to roadway users. Discussion will be needed to determine the best method to remove or obliterate the striping to not leave behind ghosting of the original striping.

#### *Recommendations for Bicycle Facility Selection*

The recommended approach is similar to what is outlined in FHWA's Bikeway Selection Guide (6). There are three parts in the approach: policy, planning, and bikeway selection. Bikeway Selection Policy is already established in the OBPP. Bikeway Selection Planning includes efforts to identify and designate connected bicycle networks of “low-stress” bicycle facilities at the transportation system plan level. These networks represent the community's vision for how to provide comfortable and safe access to key destinations for people riding bicycles. Planning efforts should identify ODOT highway contexts as well as the role of the ODOT highway in the bikeway network. The Bikeway Selection framework uses traffic characteristics to identify the bikeway tier and uses key planning level information to refine the bicycle facility. The process shown in Figure 3-6 (and supported by Figure 3-7, Table 3-7, and Table 3-8) summarizes the process for selecting appropriate bicycle facilities on state-owned urban streets in different contexts.

In many cases, implementation of bicycle facilities on ODOT streets in urban areas is completed through a retrofit project, in which additional space for bicycle facilities require weighing trade-offs compared to other uses for the space.



Figure 3-6: Bicycle Facility Selection Process

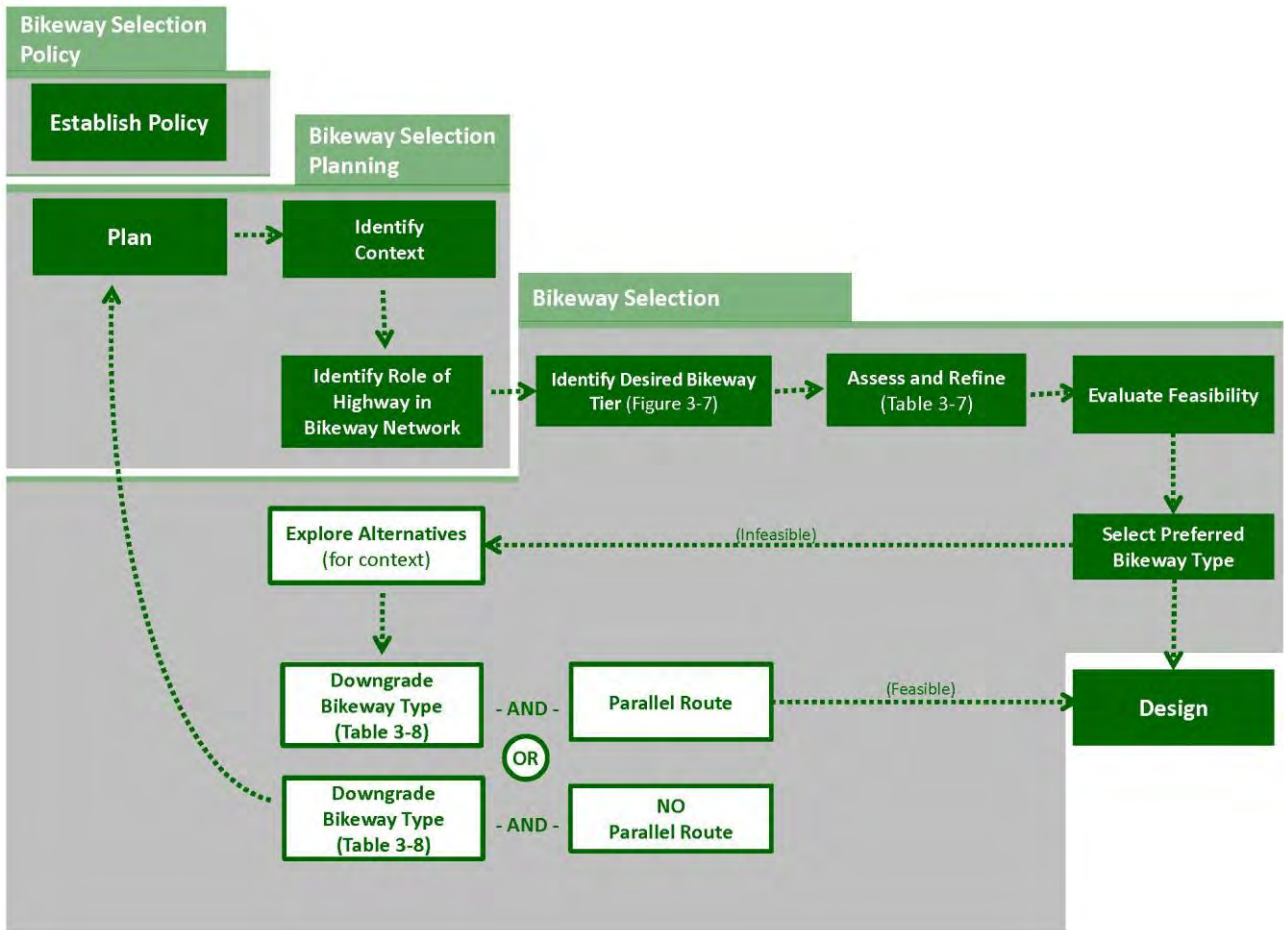
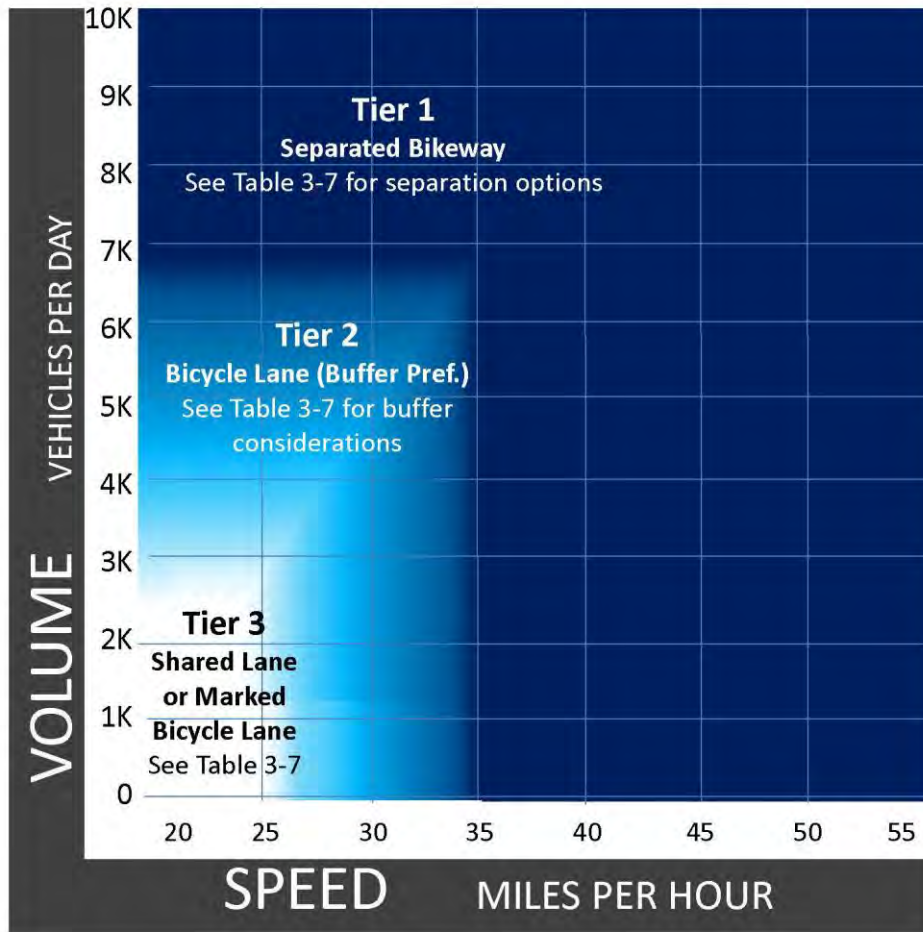


Figure 3-7: Bicycle Facility Tier Identification Matrix<sup>1</sup>



<sup>1</sup> On urban interstates, freeways, and expressways, bicycle traffic should be accommodated on parallel streets or shared use paths.

Table 3-7: Preferred Bicycle Facility Design for ODOT Highways in Urban Areas

Urban Context	Tier 1 – Separated Bikeway <sup>1</sup> Delineation options in the bicycle/street buffer zone	Tier 2 Bicycle Facility <sup>2</sup>	Tier 3 Bicycle Facility <sup>3</sup>
Traditional Downtown/ CBD	Parking, raised island, flexible delineator posts, rigid bollards, parking stops, planters, bioswale	Evaluate Bicycle Lane Buffer	Evaluate Bicycle Lane vs Shared Lane
Urban Mix	Parking, raised island, flexible delineator posts, parking stops, planters, bioswale	Evaluate Bicycle Lane Buffer	Evaluate Bicycle Lane vs Shared Lane
Commercial Corridor	Raised island, flexible delineator posts, concrete barrier, guardrail, bioswale, ditch	Evaluate Bicycle Lane Buffer	Evaluate Bicycle Lane vs Shared Lane
Residential Corridor	Raised island, flexible delineator posts, concrete barrier, guardrail, bioswale, ditch	Evaluate Bicycle Lane Buffer	Evaluate Bicycle Lane vs Shared Lane
Suburban Fringe	Raised island, flexible delineator posts, concrete barrier, guardrail, bioswale, ditch	Bicycle lane or wide shoulder. Evaluate Buffer	Evaluate Bicycle Lane vs Shared Lane
Rural Community	Parking, raised island, flexible delineator posts, planters, concrete barrier, guardrail, bioswale, ditch	Bicycle lane or wide shoulder. Evaluate Buffer	Evaluate Bicycle Lane vs Shared Lane

<sup>1</sup> Separated Bikeways may include shared use paths, sidewalk level separated bicycle lanes, or buffered bicycle lanes with vertical delineation in the buffer zone. See ODOT Bicycle and Pedestrian Design Guide for more information on various separated bikeway designs.

<sup>2</sup> Considerations whether to provide additional buffer width for a bicycle lane are given on page 24 of the FHWA Bikeway Selection Guide. See ODOT Blueprint for Urban Design, Chapter 3, 3-11 through 3-16 for bicycle/street buffer widths.

<sup>3</sup> Evaluate by considering factors that influence the appropriateness of a shared travel lane condition, which are discussed in the ODOT Bicycle and Pedestrian Design Guide (on pages 1-4 to 1-5). Note that shared lanes should only be used where operating speeds are 25 mph or lower.

<sup>4</sup> When painted buffers or vertical elements like curbing or flexible delineators are proposed to provide separation in a facility design, evaluate long-term maintenance needs and provide a solution to identified problems.

Table 3-8:\* Alternative Bicycle Facility Design for ODOT Highways in Urban Areas – with Identified Lower Stress Parallel Routes

Urban Context	Alternative Bicycle Facility	Width	Other potential facility types	Urban Design Concurrence Documentation Needed?
Traditional Downtown/ CBD	Shared Lane (20 - 25 mph)	--	6' Bicycle Lane	If the proposed facility does not align with the "bicycle facility" and "width" AND does not match the other potential facility types, urban design concurrence documentation is necessary.
			5' Bicycle Lane (with no on-street parking)	
Urban Mix	Bicycle Lane	6'	Shared Lane (25 mph)	
			5' Bicycle Lane (curb adjacent)	
Commercial Corridor	Bicycle Lane	6'	Shared Lane (25 mph)	
			5' Bicycle Lane (curb adjacent)	
Residential Corridor	Bicycle Lane	6'	Shared Lane (25 mph)	
			5' Bicycle Lane (curb adjacent)	
Suburban Fringe**	Shoulder	6'	4'-5' Shoulder	
			5'-6' Bicycle Lane	
Rural Community	Bicycle Lane	6'	Shared Lane (25 mph)	
			5' Bicycle Lane (curb adjacent)	

\*Note: Table 3-7 is to be used as the "standard" bicycle facility design. Table 3-8 is to be used to identify alternative bicycle facility design options where the preferred bicycle facility design is infeasible. If Table 3-8 is used, projects should still consider a design that does not preclude the preferred bicycle facility or future vision for a planned bicycle route. If the preferred bicycle facility design cannot be provided on the ODOT highway, improvements should be considered to provide a low-stress parallel route. See the section below on "Parallel Routes" for more information.

\*\* The "suburban fringe" context is typically 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.

*Parallel Routes*

In Oregon all public urban roadways should have appropriate walkways and bikeways provided, regardless of whether or not they are a "designated" route. Per ORS 366.514, walkways and bikeways must be provided whenever a roadway is "constructed, reconstructed, or relocated." Extra effort should be given to provide the preferred facility type (Table 3-7) on ODOT facilities that are part of state, regional, local bicycle routes, scenic bikeways, US Bicycle Routes, or other designated bikeways. On highways that are not part of a planned bicycle route, accommodations for bicycle traffic should still be provided with the "Interested but Concerned"<sup>1</sup> rider in mind, unless a low-stress parallel route has been identified by the local jurisdiction or an adopted network plan.

<sup>1</sup> The upcoming 2019 edition of AASHTO's *Guide for the Development of Bicycle Facilities* provides context-based guidance to design facilities that appeal to four types of bicyclists, including "Interested but Concerned": People willing to bicycle in low-speed, low-volume settings and paths separated from vehicles. This guidance is further described in Volume 2, Appendix C.

When parallel routes are selected, they should be as direct as possible and well-signed for bicycle wayfinding. To be viable, parallel routes should provide equivalent access to destinations along the highway, provide facilities and crossings for “Interested but Concerned” users, and should increase average trip lengths by less than 0.27 miles or 1.5 minutes for short trips.

#### *Urban Interstates, Freeways, Expressways*

Wide shoulders on urban limited access highways serve many purposes; as recovery zone for vehicle roadway departures, breakdown zones for vehicles during mechanical incidents or after collisions, emergency and maintenance vehicle access, and potential bus on shoulder operations. Shoulders should be available for pedestrians to access the nearest exit during mechanical incidents or after collisions, but it is not preferred to accommodate bicycle or pedestrian travel on shoulders on urban limited access facilities. Instead, pedestrian and bicycle travel should be accommodated on a parallel multi-use path, separated bikeway, or parallel streets. Limited access highway shoulders should only be used as a primary pedestrian and bicycle accommodation in low volume rural areas and/or where physical constraints and sparse surrounding network make a parallel route infeasible.

### 3.2.3 Focus on Pedestrian Crossing Locations

Identifying and prioritizing pedestrian crossing locations on ODOT facilities is a priority within urban projects. Considerations for pedestrian crossing locations and the trade-offs of various options are decision topics that begin during the planning process through project delivery and maintenance. Planning level information and specific scoping guidance for determining target frequency (spacing) and appropriate locations for crossings in urban contexts can lead to effective project implementation and influence a project's ability to adequately serve the needs of each roadway user.

Appendix C in Volume 2 of the Blueprint for Urban Design includes the Pedestrian Crossing Topical Memorandum that addresses how to determine target frequency (spacing) of pedestrian crossings on ODOT highways. ODOT has some policy guidance related to the topic of pedestrian crossing spacing; however, ODOT can consider providing additional guidance to more specifically outline the target frequency of crossings in urban contexts. The following information provides an overview of the recommendations.

#### *Pedestrian Crossings Guidance*

The target spacing of crossings for each urban context is provided in Table 3-9. A range, rather than a single target, is provided 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 the land uses are more intense.

Table 3-9: Target Crossing Spacing

Urban Context	Target Spacing Range (feet)
Traditional Downtown/ CBD	250-550
Urban Mix	250-550
Commercial Corridor	500-1,000
Residential Corridor	500-1,000
Suburban Fringe*	750-1,500
Rural Community	250-750

\* 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.

The targets in Table 3-9 are a starting point. Practitioners should evaluate the density of land uses and pedestrian generators and their locations to determine if a lesser or greater spacing is needed. When considered as part of a larger project, such as a corridor project, ODOT should strive to meet the spacing targets. If the target crossing spacing cannot be met on a project, the project team should provide documentation as part of ODOT design documentation. Similarly, if a crossing is proposed for removal and would lead to a spacing distance beyond the target range for the context, justification should be provided.

Once crossing locations have been identified, an engineering study is done at each crossing according to the ODOT Traffic Manual to determine what, if any, enhancements are needed at each crossing. If enhancements are proposed to be added along a section of highway listed as a Reduction Review Route that would change or restrict the cross-section for large vehicles, the project must follow the process outlined in OAR 731 012.

### 3.2.4 Focus on Target Speed

Reducing vehicle operating speeds on highways within urban areas can encourage walking and bicycling and reduce fatal and serious injury crashes. Considering the target speed (desired operating speed) and identifying strategies to achieve the desired speed are key priorities for urban projects. Understanding the relationship between the target speed, design speed, and posted speed can help practitioners consider the trade-offs from a speed perspective and how speed may influence the characteristic of the roadway and its users.

Appendix C in Volume 2 of the Blueprint for Urban Design includes the Target Speed Topical Memorandum that considers speed for highways within urban areas from various perspectives, including consideration of a target speed and speed management strategies. This information describes the relationship between target speed, design speed, posted speed, and the actual

operating speed of a roadway. The following information provides an overview of the recommendations.

### *Recommendations for Target Speed*

ODOT has clear policy guidance related to posted speed selection. However, ODOT may consider changes to its guidance to more effectively achieve desired operating or target speed. Table 3-10 provides a recommendation for target speed in each urban context.

In practice, the target speed and design speed should be the same, and a roadway should encourage an actual operating speed at the target speed. When the target speed is below the current design or operating speed, speed management treatments should be used to help achieve the selected target speed.

Table 3-10 includes a list of treatments that would be appropriate in each urban context.

The target speed is intended to be used as the posted speed limit; however, per the MUTCD, posted speeds should be established based on statutory limits unless an engineering study has been performed in accordance with established traffic engineering practices (7). ODOT typically uses the 85<sup>th</sup> percentile operating speed to set the posted speed. When the target speed is lower than the current operating speed, ODOT may consider:

- Selecting a design speed as close as possible to the target speed. Select design elements to achieve the target speed and set the posted speed as close to target speed as possible within current OAR. As operating speeds decrease in response to design, adjust posted speed to reflect the current OAR guidance.
- Adjusting OARs to reflect the FHWA guidance on using 50th percentile speeds in urban areas rather than 85<sup>th</sup> percentile speeds.

ODOT will continue to monitor national research and guidance on setting speeds and work with Oregon cities and counties to consider context, road classification and other factors as appropriate, for establishing posted speeds to improve safety for all users of the system. ODOT is developing a new speed setting methodology based on context that will closely match the practices in this document.

Table 3-10: Recommended ODOT Target Speed and Design Treatments for Urban Contexts

Urban Context	Target Speed (MPH)	Design Treatments
Traditional Downtown/CBD	20-25	Roundabouts, lane narrowing, speed feedback signs, on-street parking <sup>1</sup> , street trees <sup>2</sup> , median islands, curb extensions, chicanes <sup>3</sup> , textured surface, coordinated signal timing, speed tables <sup>3</sup> , road diets
Urban Mix	25-30	Roundabouts, lane narrowing, speed feedback signs, on-street parking <sup>1</sup> , street trees <sup>2</sup> , median islands, curb extensions, chicanes <sup>3</sup> , textured surface, coordinated signal timing, road diets
Commercial Corridor	30-35	Roundabout, lane narrowing, speed feedback signs, landscaped median Islands, coordinated signal timing, road diets
Residential Corridor	30-35	Roundabout, lane narrowing, speed feedback signs, landscaped median Islands, coordinated signal timing, road diets
Suburban Fringe*	35-40	Roundabouts, transverse pavement markings, lane narrowing, speed feedback signs, road diets, entry treatments
Rural Community	25-35	Roundabouts, lane narrowing, speed feedback signs, on-street parking <sup>1</sup> , street trees <sup>2</sup> , median islands, curb extensions, chicanes <sup>3</sup> , speed tables <sup>3</sup> , road diets, entry treatment

\* 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.

<sup>1</sup>If on-street parking is not well utilized, the additional pavement width may increase operating speeds.

<sup>2</sup> When used along roadways, street trees may not reduce speeds in a specific urban context to a point where it is appropriate to have a vertical element adjacent to the roadway.

<sup>3</sup> Speed tables and chicanes may not be appropriate on most state roadways but may be considered in special cases.

### 3.2.5 Cross Section Realm Design Guidance

A holistic evaluation of the cross section that considers the individual design elements together, rather than separately, can help verify that the overall roadway cross section aligns with desired project outcomes and balances the needs of each user. Table 3-11 through 3-16 provide recommendations for design elements within the six urban contexts described in Chapter 2:

- Traditional Downtown/CBD
- Urban Mix
- Commercial Corridor
- Residential Corridor
- Suburban Fringe
- Rural Community

Chapter 6 of the HDM has a series of tables that list design criteria in a matrix format based on highway segment designations. These tables and accompanying footnotes already provide flexibility for practitioners. However, based on internal and external stakeholder feedback, it appears that practitioners continue to follow more traditional standard-based design approaches and are not embracing the flexibility that already exists within ODOT.



Table 3-11 through 3-16 build on the current HDM tables with the new urban context categories as defined in Chapter 2 and provide design guidance recommendations for roadway cross sections within each ODOT urban context. Projects that are not able to attain the recommended design guidance in Table 3-11 through 3-16 can use ODOT urban design concurrence and the decision-making process described in Chapter 4 to justify and document the project team decisions and reasoning for the preferred solutions. When reviewing the tables from a pedestrian and bicycle user perspective, the higher end of the dimension range should be the starting point, as shown first in the tables. For travel lanes, the intent is to begin with the smaller dimension and increase if needed depending on the context, users, and roadway characteristics.

The values provided in these tables provide a guidance for developing roadway cross sections for the respective ODOT urban context categories. Project teams will use ODOT urban design concurrence to provide justifications and document their decisions on their agreed upon project cross section.

Each chapter of the Blueprint for Urban Design contributes to the decision-making and development of project solutions, such as:

- How urban context influences roadway design while designing for multimodal users considering designations/characteristics, as described in Chapter 2;
- How design elements fit together within the respective cross section realms as discussed earlier in Chapter 3; and
- How to document design decisions as part of ODOT urban design concurrence as outlined in Chapter 4.

As planners and engineers become familiar with the entire Blueprint for Urban Design, they should understand that these tables cannot be used in isolation.

Design decisions related to each design element within the respective urban context should consider integrating the trade-offs for design, operations, maintenance and safety. Practitioners should have an understanding of the considerations within these respective cross section realms within the urban context.

### Traditional Downtown/CBD

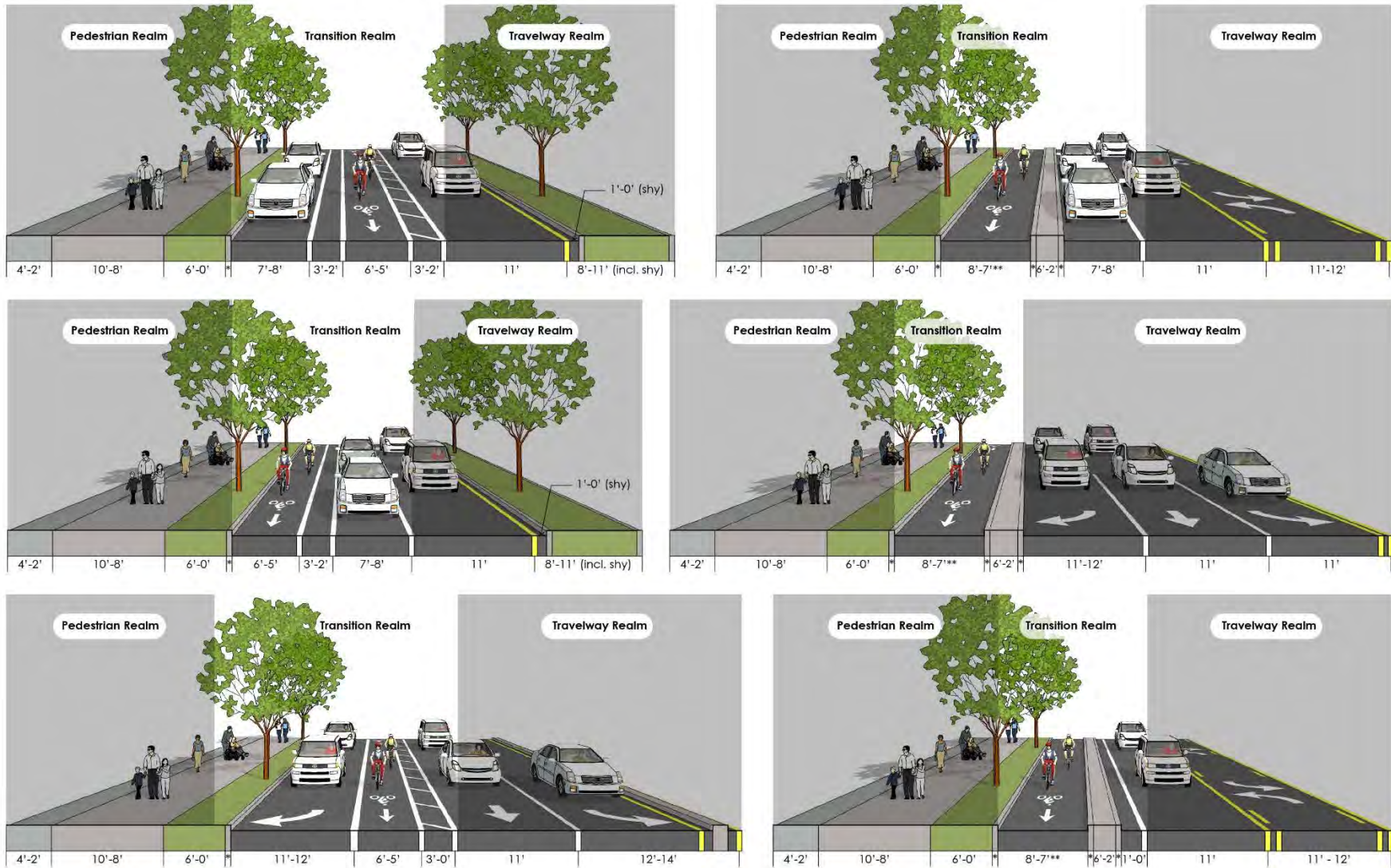
Table 3-11 provides design guidance for the respective design elements for ODOT roadways through the Traditional Downtown/CBD context. With this design approach, the goal is to design roadways in the Traditional Downtown/CBD context for a target speed of 20-25 mph. Figure 3-8 illustrates various cross section scenarios for how the design elements within this type of context may be arranged.

Table 3-11: Design Element Recommendations for Traditional Downtown/CBD

Design Element		Guidance
Pedestrian Realm	Frontage Zone	4' to 2'
	Pedestrian Zone	10' to 8'
	Buffer Zone	6' to 0'
	Curb/Gutter <sup>1</sup>	2' to 0.5'
Transition Realm <sup>6</sup>	Separated Bicycle Lane (Curb Constrained Facility) <sup>2</sup>	8' to 7'
	On-Street Bicycle Lane (not including Buffer) <sup>2</sup>	6' to 5'
	Bicycle/Street Buffer <sup>2</sup>	3' to 2'
	Right Side Shoulder (if travel lane directly adjacent to curb) <sup>3,5</sup>	2' to 0'
	On-Street Parking	7' to 8'
Travelway Realm <sup>5</sup>	Travel Lane <sup>4,5</sup>	11'
	Right Turn Lane (including Shy Distances)	11' to 12'
	Left Turn Lane <sup>4</sup>	11'
	Left Side / Right Side Shy Distance	1' to 0'
	Two-Way-Left-Turn Lane	11' to 12'
	Raised Median – No Turn Lane (including Shy Distances)	8' to 11'
	Left-Turn Lane with Raised Curb Median/separator (includes 16" separator & Shy Distances)	12' to 14'

- <sup>1</sup> Where curb and gutter is used and on-street parking is provided or travel lane is directly adjacent to curb, gutter pan should be included in shoulder/shy or on-street parking measurement. Gutter pan should be included in travel lane, bicycle lane or turn lane measurements only where a smooth transition from gutter pan to roadway surface is provided.
- <sup>2</sup> Refer to Bicycle Facility Selection process (Section 3.2.2) to determine appropriate bicycle facility type. Consider raised bicycle lanes where appropriate. 5-foot on-street bicycle lane is allowed only with a street buffer. When a raised buffer is used to protect the bicycle lane, the width should be 6' if parking is adjacent or if signs or other features are anticipated.
- <sup>3</sup> Overall shoulder width depends on other section elements. Elimination of shoulder width/lateral offset should only be considered in constrained locations and needs to be balanced with all cross-section and drainage needs. If the travel lane is next to a curb with a gutter (e.g., a 2-foot curb zone), the gutter typically serves as the right-side shoulder. A wider shoulder may be needed to accommodate drainage based on hydrological analysis or other specific needs.
- <sup>4</sup> 11-foot lane width preferred to 12-foot lane; 10-foot lane width requires design approval from the State Roadway Engineer. On freight- or transit-oriented streets, a 10-foot travel lane is generally not appropriate without a buffer zone or shoulder.
- <sup>5</sup> On Reduction Review Routes, comply with ODOT Freight Mobility Policies, ORS 366.215 and OAR 731-012. Element dimensions may need to be modified.
- <sup>6</sup> When painted buffers or vertical elements like curbing or flexible delineators are proposed to provide separation in a bicycle facility design, evaluate long-term maintenance needs and provide a solution to identified problems.

Figure 3-8: Example Cross Section Options for Traditional Downtown/CBD, See Table 3-11 for additional information



\* 0.5' (curb) or 2' (curb & gutter)

\*\* Consider raised bicycle lane

Note: When painted buffers or vertical elements like curbing or flexible delineators are proposed to provide separation in a bicycle facility design, evaluate long-term maintenance needs and provide a solution to identified problems.

### Urban Mix

Table 3-12 provides design guidance for the respective design elements for ODOT roadways through the Urban Mix context. With this design approach, the goal is to design roadways for a target speed of 25-30 mph. Figure 3-9 illustrates various cross section scenarios for how the design elements within this type of context may be arranged.

Table 3-12: Design Element Recommendations for Urban Mix

Design Element		Guidance
Pedestrian Realm	Frontage Zone	1'
	Pedestrian Zone <sup>7</sup>	8' to 5'
	Buffer Zone	6' to 0'
	Curb/Gutter <sup>1</sup>	2' to 0.5'
Transition Realm <sup>6</sup>	Separated Bicycle Lane (Curb Constrained Facility) <sup>2</sup>	8' to 7'
	On-Street Bicycle Lane (not including Buffer) <sup>2</sup>	6' to 5'
	Bicycle/Street Buffer (preferred for On-Street Lane) <sup>2</sup>	4' to 2'
	Right Side Shoulder (if travel lane directly adjacent to curb) <sup>3,5</sup>	2' to 0'
	On-Street Parking	8'
Travelway Realm <sup>5</sup>	Travel Lane <sup>4,5</sup>	11' to 12'
	Right Turn Lane (including Shy Distances)	11' to 12'
	Left Turn Lane <sup>4</sup>	11' to 12'
	Left Side / Right Side Shy Distance	1' to 0'
	Two-Way-Left-Turn Lane	11' to 12'
	Raised Median – No Turn Lane (including Shy Distances)	8' to 11'
	Left-Turn Lane with Raised Curb Median/Separator (including 16" separator & Shy Distances)	12' to 14'

<sup>1</sup> Where curb and gutter is used and on-street parking is provided or travel lane is directly adjacent to curb, gutter pan should be included in shoulder/shy or on-street parking measurement. Gutter pan should be included in travel lane, bicycle lane or turn lane measurements only where a smooth transition from gutter pan to roadway surface is provided.

<sup>2</sup> Refer to Bicycle Facility Selection process (Section 3.2.2) to determine appropriate bicycle facility type. Consider raised bicycle lanes where appropriate. 5-foot on-street bicycle lane is allowed only with a street buffer. When a raised buffer is used to protect the bicycle lane, the width should be 6' if parking is adjacent or if signs or other features are anticipated.

<sup>3</sup> Overall shoulder width depends on other section elements. Elimination of shoulder width/lateral offset should only be considered in constrained locations and needs to be balanced with all cross-section and drainage needs. If the travel lane is next to a curb with a gutter (e.g., a 2-foot curb zone), the gutter typically serves as the right-side shoulder. A wider shoulder may be needed to accommodate drainage based on hydrological analysis or other specific needs.

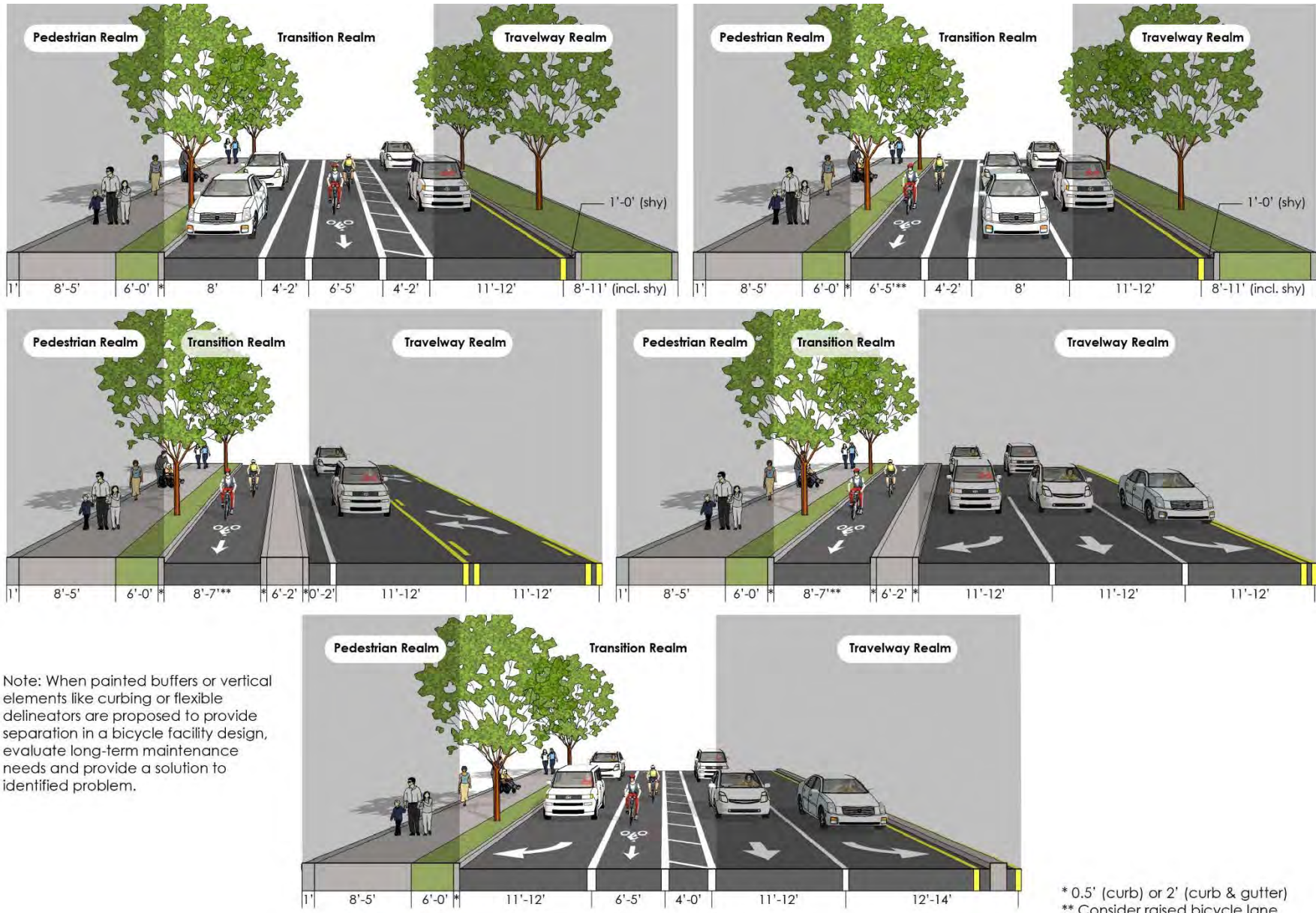
<sup>4</sup> 11-foot lane width preferred; 10-foot lane width requires design approval from the State Roadway Engineer. On freight- or transit-oriented streets, a 10-foot travel lane is generally not appropriate without a buffer zone or shoulder.

<sup>5</sup> On Reduction Review Routes, comply with ODOT Freight Mobility Policies, ORS 366.215 and OAR 731-012. Element dimensions may need to be modified.

<sup>6</sup> When painted buffers or vertical elements like curbing or flexible delineators are proposed to provide separation in a bicycle facility design, evaluate long-term maintenance needs and provide a solution to identified problems.

<sup>7</sup> 5-foot pedestrian zone requires a paved frontage zone and/or a paved buffer zone. Minimum "sidewalk" width is 6-feet.

Figure 3-9: Example Cross Section Options for Urban Mix, See Table 3-12 for additional information



### Commercial Corridor

Table 3-13 provides design guidance for the respective design elements for ODOT roadways through the Commercial Corridor context. With this design approach, the goal is to design roadways for a target speed of 30-35 mph. Figure 3-10 illustrates various cross section scenarios for how the design elements within this type of context may be arranged.

Table 3-13: Design Element Recommendations for Commercial Corridor

Design Element		Guidance
Pedestrian Realm	Frontage Zone	1'
	Pedestrian Zone <sup>9</sup>	8' to 5'
	Buffer Zone	5' to 0'
	Curb/Gutter <sup>1</sup>	2' to 0.5'
Transition Realm <sup>8</sup>	Separated Bicycle Lane (Curb Constrained Facility) <sup>2</sup>	8' to 7'
	On-Street Bicycle Lane (not including Buffer) <sup>2</sup>	6' to 5'
	Bicycle/Street Buffer (preferred for On-Street Lane) <sup>2</sup>	5' to 2'
	Right Side Shoulder (if travel lane directly adjacent to curb) <sup>3,5</sup>	4' to 0'
	On-Street Parking	N/A
Travelway Realm <sup>5</sup>	Travel Lane <sup>4,5</sup>	11' to 12'
	Right Turn Lane (including Shy Distances)	12' to 13'
	Left Turn Lane <sup>6</sup>	12' to 14'
	Left Side / Right Side Shy Distance <sup>3</sup>	1' to 0'
	Two-Way Left-Turn Lane <sup>6</sup>	12' to 14'
	Raised Median – No Turn Lane (including Shy Distances)	8' to 11'
	Left-Turn Lane with Raised Curb Median/Separator (including 16" separator & Shy Distance) <sup>7</sup>	14' to 16'

<sup>1</sup> Where curb and gutter is used and on-street parking is provided or travel lane is directly adjacent to curb, gutter pan should be included in shoulder/shy or on-street parking measurement. Gutter pan should be included in travel lane, bicycle lane or turn lane measurements only where a smooth transition from gutter pan to roadway surface is provided.

<sup>2</sup> Refer to Bicycle Facility Selection process (Section 3.2.2) to determine appropriate bicycle facility type. Consider raised bicycle lanes where appropriate. 5-foot on-street bicycle lane allowed only with a street buffer. When a raised buffer is used to protect the bicycle lane, the width should be 6' if parking is adjacent or if signs or other features are anticipated.

<sup>3</sup> Overall shoulder width depends on other section elements. Elimination of shoulder width/lateral offset should only be considered in constrained locations and needs to be balanced with all cross-section and drainage needs. If the travel lane is next to a curb with a gutter (e.g., a 2-foot curb zone), the gutter typically serves as minimum right-side shoulder width. A wider shoulder may be needed to accommodate drainage based on hydrological analysis or other specific needs. At 35 mph and above, at a minimum, include a 1-foot shoulder/shy distance.

<sup>4</sup> 10-foot lane width requires design approval from the State Roadway Engineer. On freight- or transit-oriented streets, a 10-foot travel lane is generally not appropriate without a buffer zone or shoulder.

<sup>5</sup> On Reduction Review Routes, comply with ODOT Freight Mobility Policies, ORS 366.215 and OAR 731-012. Element dimensions may need to be modified.

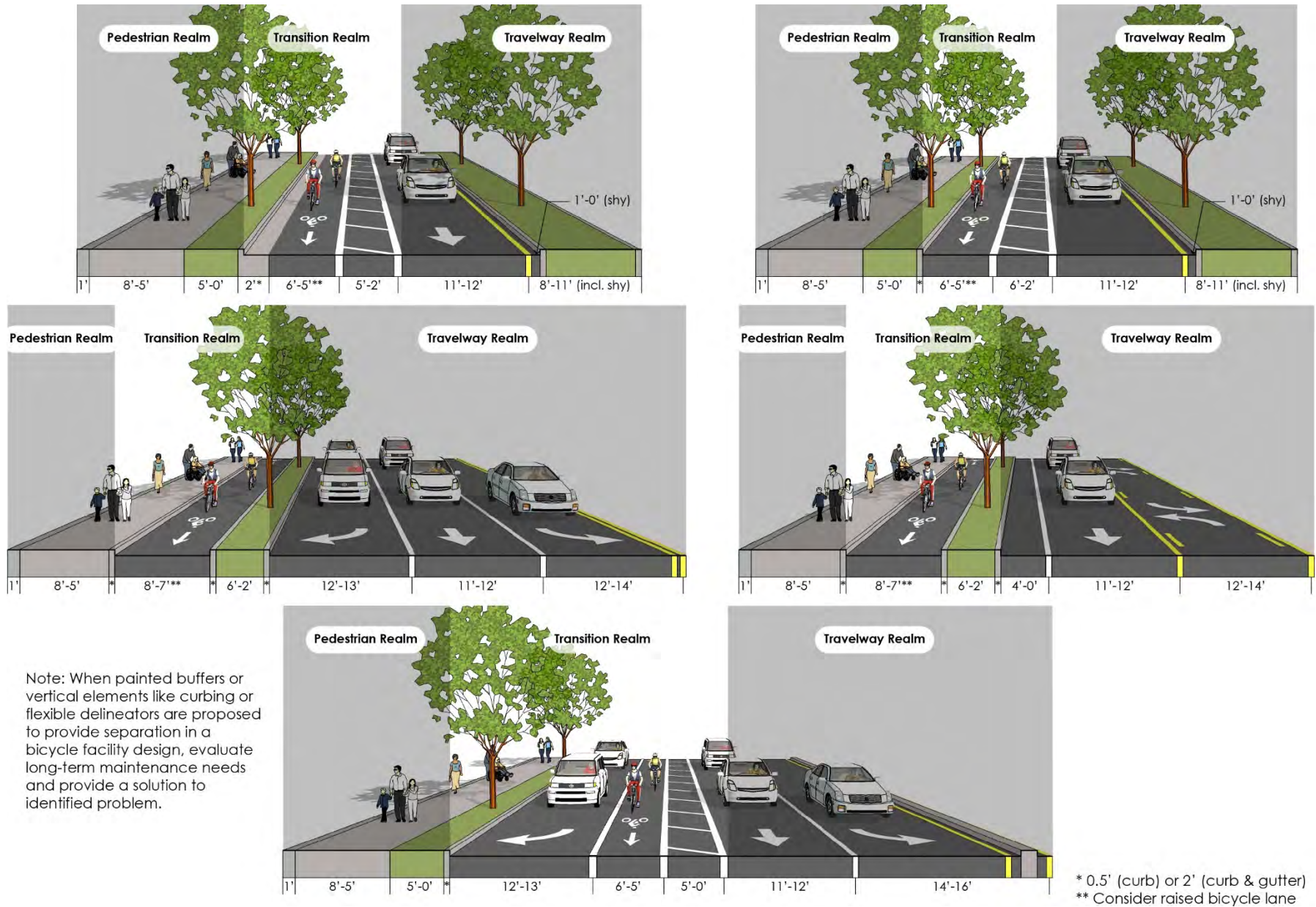
<sup>6</sup> At 40 mph and above, a 14-foot lane is preferred.

<sup>7</sup> At 40 mph and above, a 16-foot lane is preferred.

<sup>8</sup> When painted buffers or vertical elements like curbing or flexible delineators are proposed to provide separation in a bicycle facility design, evaluate long-term maintenance needs and provide a solution to identified problems.

<sup>9</sup> 5-foot pedestrian zone requires a paved frontage zone and/or a paved buffer zone. Minimum "sidewalk" width is 6-feet.

Figure 3-10: Example Cross Section Options for Commercial Corridor, See Table 3-13 for additional information



### Residential Corridor

Table 3-14 provides the design guidance for the respective design elements for ODOT roadways through the Residential Corridor context. With this design approach, the goal is to design roadways for a target speed of 30-35 mph. Figure 3-11 illustrates various cross section scenarios for how the design elements within this type of context may be arranged.

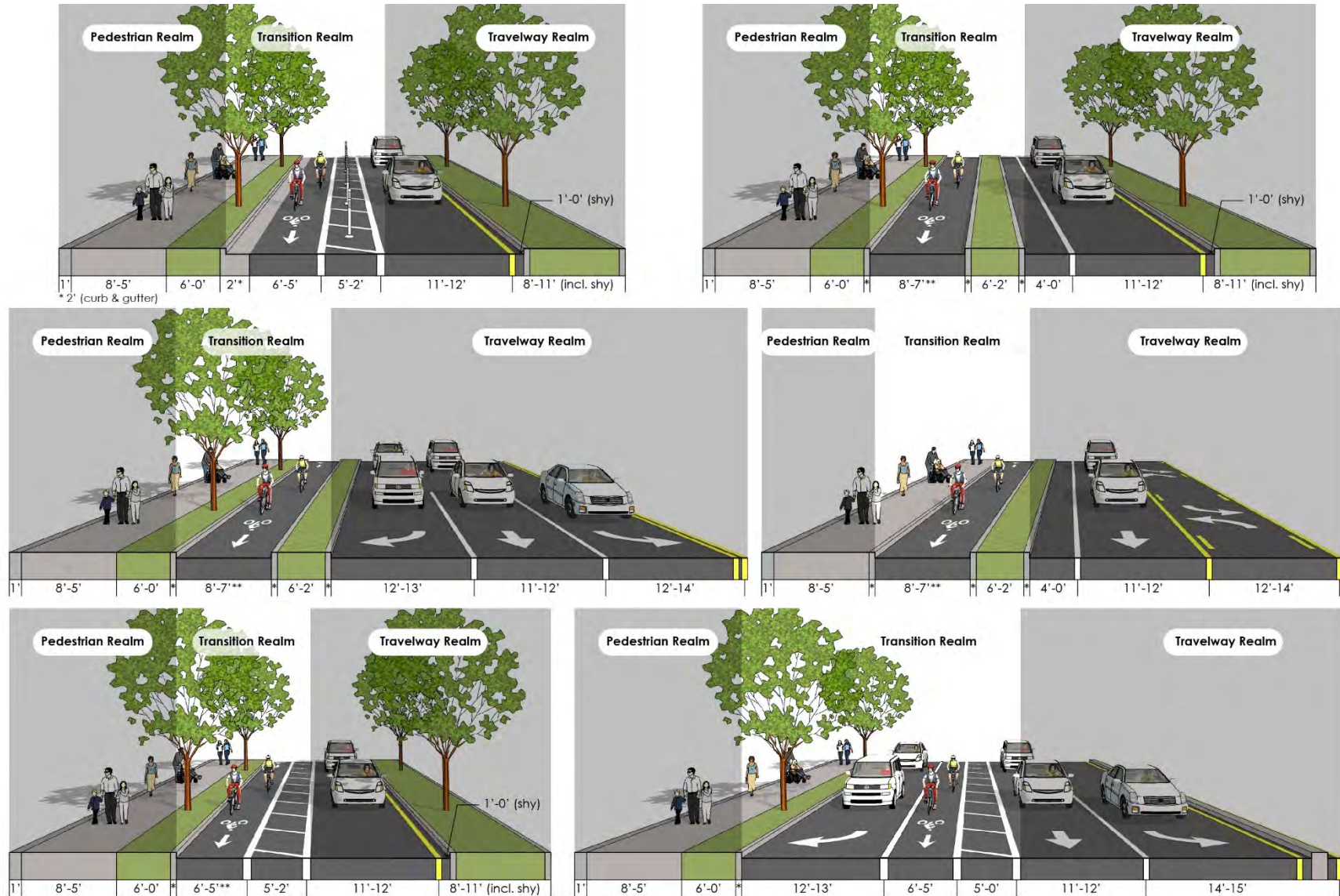
Table 3-14: Design Element Recommendations for Residential Corridor

Design Element		Guidance
Pedestrian Realm	Frontage Zone	1'
	Pedestrian Zone <sup>9</sup>	8' to 5'
	Buffer Zone	6' to 0'
	Curb/Gutter <sup>1</sup>	2' to 0.5'
Transition Realm <sup>8</sup>	Separated Bicycle Lane (Curb Constrained Facility) <sup>2</sup>	8' to 7'
	On-Street Bicycle Lane (not including Buffer) <sup>2</sup>	6' to 5'
	Bicycle/Street Buffer (preferred for On-Street Lane) <sup>2</sup>	5' to 2'
	Right Side Shoulder (if travel lane directly adjacent to curb) <sup>3,5</sup>	4' to 0'
	On-Street Parking	N/A
Travelway Realm <sup>5</sup>	Travel Lane <sup>4,5</sup>	11' to 12'
	Right Turn Lane (including Shy Distances)	12' to 13'
	Left Turn Lane <sup>6</sup>	12' to 14'
	Left Side / Right Side Shy Distance <sup>3</sup>	1' to 0
	Two-Way Left-Turn Lane <sup>6</sup>	12' to 14'
	Raised Median – No Turn Lane (including Shy Distances)	8' to 11'
	Left-Turn Lane with Raised Curb Median/Separator (including 16" separator & Shy Distances) <sup>7</sup>	14' to 15'

- <sup>1</sup> Where curb and gutter is used and on-street parking is provided or travel lane is directly adjacent to curb, gutter pan should be included in shoulder/shy or on-street parking measurement. Gutter pan should be included in travel lane, bicycle lane or turn lane measurements only where a smooth transition from gutter pan to roadway surface is provided.
- <sup>2</sup> Refer to Bicycle Facility Selection process (Section 3.2.2) to determine appropriate bicycle facility type. Consider raised bicycle lanes where appropriate. 5-foot on-street bicycle lane allowed only with a street buffer. When a raised buffer is used to protect the bicycle lane, the width should be 6' if parking is adjacent or if signs or other features are anticipated.
- <sup>3</sup> Overall shoulder width depends on other section elements. Elimination of shoulder width/lateral offset should only be considered in constrained locations and needs to be balanced with all cross-section and drainage needs. If the travel lane is next to a curb with a gutter (e.g., a 2-foot curb zone), the gutter typically serves as minimum right-side shoulder width. A wider shoulder may be needed to accommodate drainage based on hydrological analysis or other specific needs. At 35 mph and above, at a minimum, include 1-foot shoulder/shy distance.
- <sup>4</sup> 10-foot lane width requires design approval from the State Roadway Engineer. On freight- or transit-oriented streets, a 10-foot travel lane is generally not appropriate without a buffer zone or shoulder.
- <sup>5</sup> On Reduction Review Routes, comply with ODOT Freight Mobility Policies, ORS 366.215 and OAR 731-012. Element dimensions may need to be modified.
- <sup>6</sup> At 40 mph and above a 14-foot lane is preferred.
- <sup>7</sup> At 40 mph and above, a 15-foot lane is preferred.
- <sup>8</sup> When painted buffers or vertical elements like curbing or flexible delineators are proposed to provide separation in a bicycle facility design, evaluate long-term maintenance needs and provide a solution to identified problems.
- <sup>9</sup> 5-foot pedestrian zone requires a paved frontage zone and/or a paved buffer zone. Minimum "sidewalk" width is 6-feet.



Figure 3-11: Example Cross Section Options for Residential Corridor, See Table 3-14 for additional information



\* 0.5' (curb) or 2' (curb & gutter)

\*\* Consider raised bicycle lane

Note: When painted buffers or vertical elements like curbing or flexible delineators are proposed to provide separation in a bicycle facility design, evaluate long-term maintenance needs and provide a solution to identified problems.

### Suburban Fringe

Table 3-15 provides design guidance for the respective design elements for ODOT roadways through the Suburban Fringe context. With this design approach, the goal is to design roadways for a target speed of 35-40 mph. Figure 3-12 illustrates various cross section scenarios for how the design elements within this type of context may be arranged.

Table 3-15: Design Element Recommendations for Suburban Fringe

Design Element		Guidance
Pedestrian Realm	Frontage Zone	1'
	Pedestrian Zone <sup>9</sup>	8' to 5'
	Buffer Zone	6' to 0'
	Curb/Gutter <sup>1</sup>	2' to 0.5'
Transition Realm <sup>8</sup>	Separated Bicycle Lane (Curb Constrained Facility) <sup>2</sup>	8' to 7'
	On-Street Bicycle Lane (not including Buffer) <sup>2</sup>	6'
	Bicycle/Street Buffer (physical separation preferred for On-Street Lane) <sup>2</sup>	5' to 2'
	Right Side Shoulder (if travel lane directly adjacent to curb) <sup>3</sup>	6' to 0'
	On-Street Parking	N/A
Travelway Realm <sup>5</sup>	Travel Lane <sup>4,5</sup>	11' to 12'
	Right Turn Lane (including Shy Distances)	12' to 13'
	Left Turn Lane <sup>6</sup>	12' to 14'
	Left Side / Right Side Shy Distance <sup>3</sup>	1' to 0'
	Two-Way Left-Turn Lane <sup>6</sup>	12' to 14'
	Raised Median – No Turn Lane (including Shy Distances)	8' to 13'
	Left-Turn Lane with Raised Curb Median/Separator (including 16" separator & Shy Distances) <sup>7</sup>	14' to 16'

<sup>1</sup> Where curb and gutter is used and on-street parking is provided or travel lane is directly adjacent to curb, gutter pan should be included in shoulder/shy or on-street parking measurement. Gutter pan should be included in travel lane, bicycle lane or turn lane measurements only where a smooth transition from gutter pan to roadway surface is provided.

<sup>2</sup> Refer to Bicycle Facility Selection process (Section 3.2.2) to determine appropriate bicycle facility type. The preferred bicycle and pedestrian facility in Suburban Fringe is a 10-foot to 16-foot shared use path with a 6-foot buffer from the roadway. On-street bicycle lanes shall include the widest street buffer that can be accommodated and should include physical separation (e.g., flexible delineator posts) where feasible. Consider raised bicycle lanes where appropriate. When a raised buffer is used to protect the bicycle lane, the width should be 6 feet if parking is adjacent or if signs or other features are anticipated.

<sup>3</sup> Overall shoulder width depends on other section elements. Elimination of shoulder width/lateral offset should only be considered in constrained locations and needs to be balanced with all cross-section and drainage needs. If the travel lane is next to a curb with a gutter (e.g. a 2-foot curb zone), the gutter typically serves as minimum right side shoulder width. A wider shoulder may be needed to accommodate drainage based on hydrological analysis or other specific needs. At 35 mph and above, at a minimum, include a 1-foot shoulder/shy distance. In transition areas from higher speed to lower speed, shoulder width should taper from wider, higher speed shoulder width to appropriate lower speed urban shoulder width.

<sup>4</sup> 10-foot lane width requires design approval from the State Roadway Engineer. On freight- or transit-oriented streets, a 10-foot travel lane is generally not appropriate without a buffer zone or shoulder.

<sup>5</sup> On Reduction Review Routes, comply with ODOT Freight Mobility Policies, ORS 366.215 and OAR 731-012. Element dimensions may need to be modified.

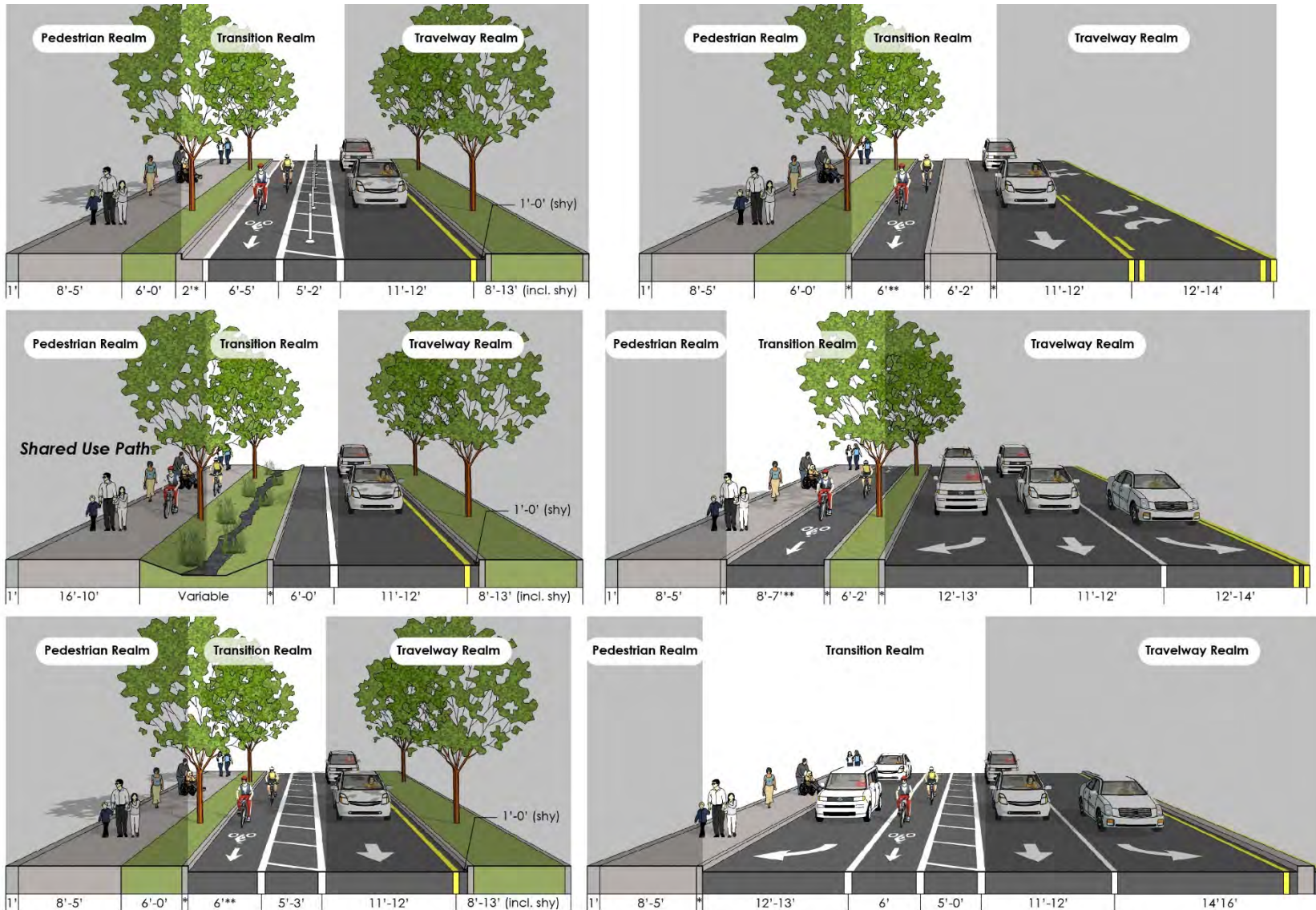
<sup>6</sup> At 40 mph and above a 14-foot lane is preferred.

<sup>7</sup> At 40 mph and above a 16-foot lane is preferred.

<sup>8</sup> When painted buffers or vertical elements like curbing or flexible delineators are proposed to provide separation in a bicycle facility design, evaluate long-term maintenance needs and provide a solution to identified problems.

<sup>9</sup> 5-foot pedestrian zone requires a paved frontage zone and/or a paved buffer zone. Minimum "sidewalk" width is 6-feet.

Figure 3-12: Example Cross Section Options for Suburban Fringe, See Table 3-15 for additional information



\* 0.5' (curb) or 2' (curb & gutter)    \*\* Consider raised bicycle lane

Note: When painted buffers or vertical elements like curbing or flexible delineators are proposed to provide separation in a bicycle facility design, evaluate long-term maintenance needs and provide a solution to identified problems.

## Rural Community

Table 3-16 provides design guidance for the respective design elements for ODOT roadways through the Rural Community context. With this design approach, the goal is to design roadways for a target speed of 25-35 mph. Figure 3-13 illustrates various cross section scenarios for how the design elements within this type of context may be arranged.

Table 3-16: Design Element Recommendations for Rural Community

Design Element		Guidance
Pedestrian Realm	Frontage Zone	1'
	Pedestrian Zone <sup>8</sup>	9' to 5'
	Buffer Zone	5' to 0'
	Curb/Gutter <sup>1</sup>	2' to 0.5'
Transition Realm <sup>7</sup>	Separated Bicycle Lane (Curb Constrained Facility) <sup>2</sup>	8' to 7'
	On-Street Bicycle Lane (not including Buffer) <sup>2</sup>	6' to 5'
	Bicycle/Street Buffer <sup>2</sup>	4' to 2'
	Right Side Shoulder (if travel lane directly adjacent to curb) <sup>3</sup>	6' to 0'
	On-Street Parking	8'
Travelway Realm <sup>5</sup>	Travel Lane <sup>4,5</sup>	11' to 12'
	Right Turn Lane (including shy)	11' to 12'
	Left Turn Lane	11' to 12'
	Left Side / Right Side Shy Distance <sup>3</sup>	1' to 0'
	Two-Way Left-Turn Lane	11' to 12'
	Raised Median – No Turn Lane (including Shy Distances)	8' to 11'
	Left-Turn Lane with Raised Curb Median/Separator (including 16" separator & Shy Distances) <sup>6</sup>	12' to 14'

<sup>1</sup> Where curb and gutter is used and on-street parking is provided or travel lane is directly adjacent to curb, gutter pan should be included in shoulder/shy or on-street parking measurement. Gutter pan should be included in travel lane, bicycle lane or turn lane measurements only where a smooth transition from gutter pan to roadway surface is provided.

<sup>2</sup> Refer to Bicycle Facility Selection process (Section 3.2.2) to determine appropriate bicycle facility type. Consider raised bicycle lanes where appropriate. 5-foot on-street bicycle lane allowed only with a street buffer. When a raised buffer is used to protect a bicycle lane, the width should be 6 feet if parking is adjacent or if signs or other features are anticipated.

<sup>3</sup> Overall shoulder width depends on other section elements. Elimination of shoulder width/lateral offset should only be considered in constrained locations and needs to be balanced with all cross-section and drainage needs. If the travel lane is next to a curb with a gutter (e.g., a 2-foot curb zone), the gutter typically serves as minimum right-side shoulder width. A wider shoulder may be needed to accommodate drainage based on hydrological analysis or other specific needs. At 35 mph and above, at a minimum, include a 1-foot shoulder/shy distance. In transition areas from higher speed to lower speed, shoulder width should taper from wider, higher speed shoulder width to appropriate lower speed urban shoulder width.

<sup>4</sup> 11-foot lane width preferred, at 40 mph and above, a 12-foot lane is preferred. 10-foot lane width requires design approval from the State Roadway Engineer. On freight- or transit-oriented streets, a 10-foot travel lane is generally not appropriate without a buffer zone or shoulder.

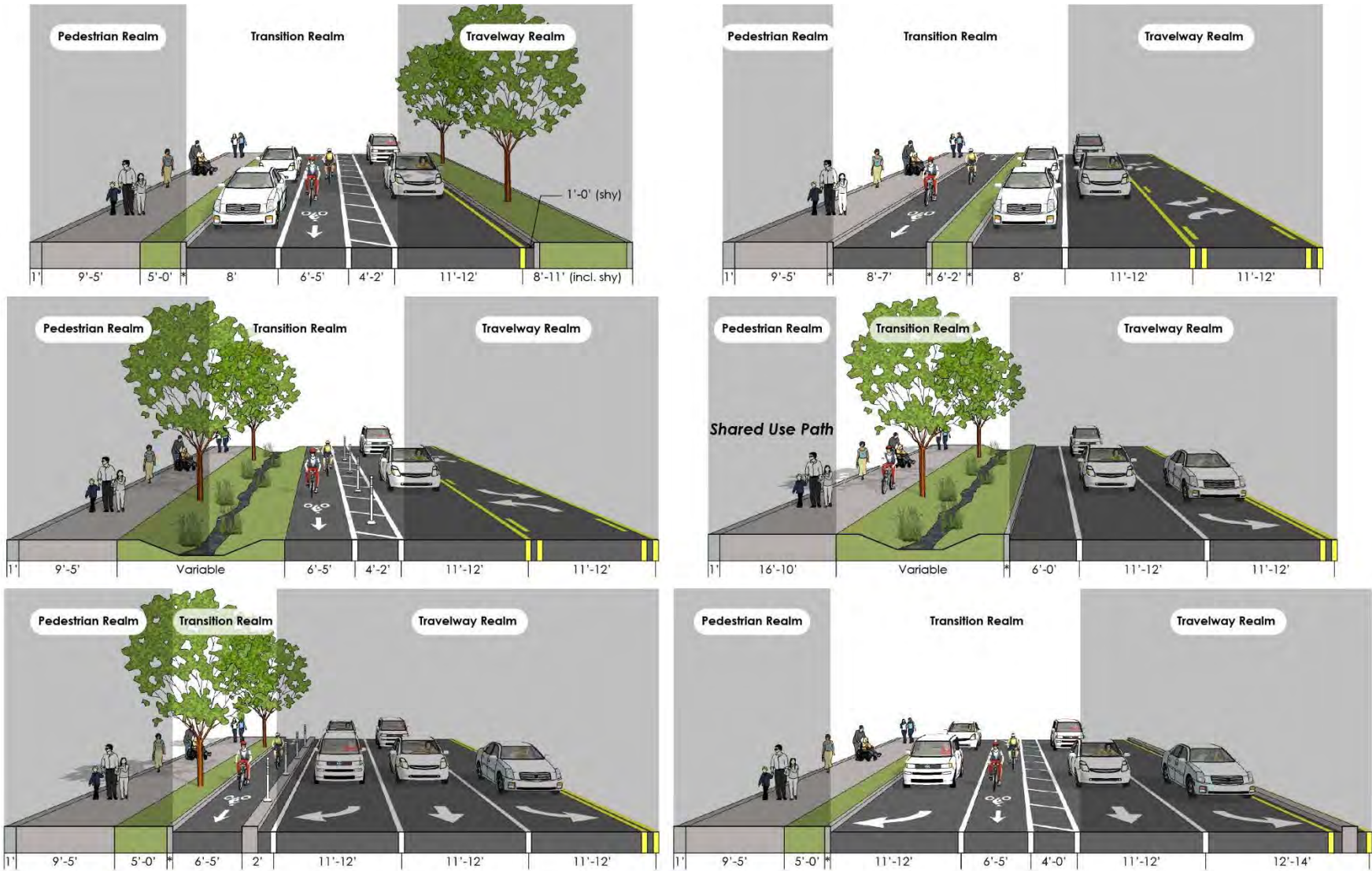
<sup>5</sup> On Reduction Review Routes, comply with ODOT Freight Mobility Policies, ORS 366.215 and OAR 731-012. Element dimensions may need to be modified.

<sup>6</sup> At 40 mph and above, a 14-foot lane is preferred.

<sup>7</sup> When painted buffers or vertical elements like curbing or flexible delineators are proposed to provide separation in a bicycle facility design, evaluate long-term maintenance needs and provide a solution to identified problems.

<sup>8</sup> 5-foot pedestrian zone requires a paved frontage zone and/or a paved buffer zone. Minimum "sidewalk" width is 6-feet.

Figure 3-13: Example Cross Section Options for Rural Community, See Table 3-16 for additional information



\* 0.5' (curb) or 2' (curb & gutter)      \*\* Consider raised bicycle lane

Note: When painted buffers or vertical elements like curbing or flexible delineators are proposed to provide separation in a bicycle facility design, evaluate long-term maintenance needs and provide a solution to identified problems.

### 3.2.6 Intersections

ODOT's long-term goal is to guide decisions on the type of traffic control at intersections (stop, yield, roundabout, signalized, etc.) using an Intersection Control Evaluation approach. The goal of an Intersection Control Evaluation is to select an appropriate intersection form by comparing alternatives for modal operations, safety, and cost (initial and lifecycle costs).

ODOT's guidelines on Intersection Control Evaluation will be developed in a separate effort. Until that is completed, the ODOT Traffic Manual contains guidelines for evaluating alternatives at an intersection.

## 3.3 REFERENCES

1. Federal Highway Administration (FHWA). Performance-Based Practical Design. Website: <https://www.fhwa.dot.gov/design/pbpd/>
2. Transportation Research Board (TRB). NCHRP Report 785: *Performance-Based Analysis of Geometric Design of Highways and Streets*. TRB, Washington, D.C., 2014.
3. TRB. NCHRP Report 880: *Design Guide for Low-Speed Multimodal Roadways*. TRB, Washington, D.C., 2018.
4. Oregon Department of Transportation (ODOT). Oregon Pedestrian and Bicycle Safety Implementation Plan. Website: [https://www.oregon.gov/ODOT/Engineering/Docs\\_TrafficEng/Bike-Ped-Safety-Implementation-Plan.pdf](https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Bike-Ped-Safety-Implementation-Plan.pdf)
5. ODOT. Highway Design Manual. ODOT, Salem, Oregon, 2012.
6. FHWA. Bikeway Selection Guide. FHWA, Washington, D.C., 2019.
7. FHWA. *Manual on Uniform Traffic Control Devices (MUTCD)*. FHWA, Washington, D.C., 2009.

OREGON DEPARTMENT OF TRANSPORTATION

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**BLUEPRINT FOR URBAN DESIGN**  
ODOT's Approach for Design in Oregon Communities

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Chapter 4  
A Multimodal Decision-Making  
Framework

January 2020





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## 4.0 A MULTIMODAL DECISION-MAKING FRAMEWORK

Chapter 4 focuses on a performance-based approach to project development and delivery that supports decision making from planning through design. Identifying the desired project outcomes and understanding the urban context and primary roadway users can guide practitioners in determining appropriate performance measures to evaluate the trade-offs of various design decisions. Completing these steps early in the project flow<sup>1</sup> can guide the planning phase and refine the range of alternatives considered. Reviewing and confirming project goals throughout planning, design, and construction validates that the alternative chosen reflects the original project goals and serves the intended users. Chapter 4 draws upon ODOT's **Practical Design Strategy** and integrates national perspectives to outline a multimodal decision-making framework for projects in urban areas. Chapter 4 identifies how ODOT will integrate design documentation into the decision-making framework to document project decisions and outcomes for projects in urban contexts.

### 4.1 PERFORMANCE-BASED DESIGN

Performance-based design is an approach that emphasizes the outcomes of design decisions as the primary measure for design effectiveness.

*NCHRP Report 785*

Understanding and executing a performance-based approach enables project teams to make informed decisions about the performance trade-offs of alternative solutions. This is especially helpful when developing solutions in fiscally and physically constrained environments. National activities and associated publications, such as FHWA Performance-Based Practical Design initiatives and NCHRP Report 785:

*Performance-Based Analysis of Geometric Design of*

*Highways and Streets* have resulted in a framework for how this approach can be executed within a project (1). As demonstrated in the AASHTO's *A Policy on Geometric Design of Highways and Streets, 7<sup>th</sup> Edition*, this approach will continue to shape how practitioners deliver projects in a variety of contexts and stages of project flow (2).

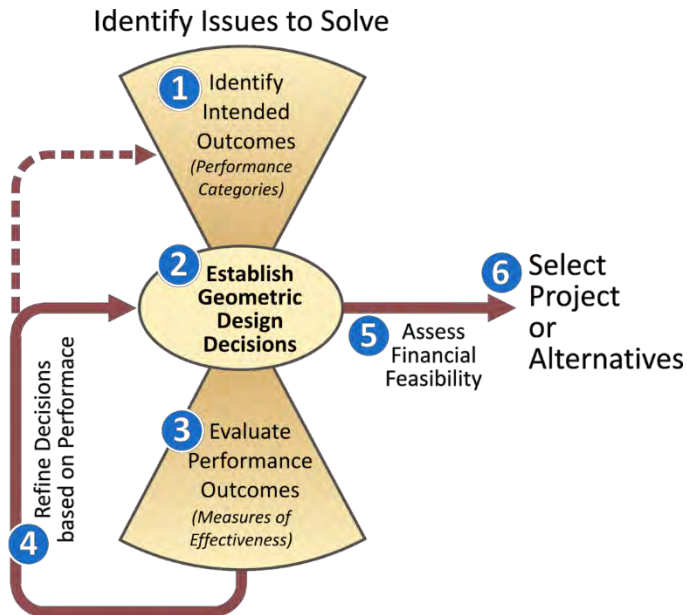
#### 4.1.1 Applying a Performance-Based Approach within the Project Flow

Clear documentation of a performance-based approach can encourage effective problem-solving, collaborative decision making, and an overall greater return on infrastructure investments. NCHRP Report 785 presents a performance-based model that is based on desired project outcomes and applies at various project levels as shown in Figure 4-1.

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<sup>1</sup> The term "project development process" is often used in national publications to describe the overall project timeline and project stages from planning through construction and maintenance. The term "Project Development" is a specific stage of the ODOT Transportation System Lifecycle. Therefore, for the purposes of this document, the term "project flow" will be used to describe the overall project timeline, including ODOT's current project development process.

Figure 4-1: Performance-Based Approach



Source: NCHRP Report 785 (1)

This performance-based approach is based on:

- 1 Identifying desired project outcomes and performance metrics
- 2 Establishing design decisions based on the desired outcomes
- 3 Evaluating the performance of the design
- 4 Iterating and refining the design to align solutions with the desired outcomes
- 5 Assessing the financial feasibility of the alternatives
- 6 Selecting a preferred alternative that aligns with the desired outcomes or re-assessing desired outcomes if no acceptable solution is identified

The performance-based approach aligns with ODOT's Practical Design Strategy which calls for delivering projects that benefit the transportation system within existing resources by establishing appropriate scopes to deliver specific results. The ODOT Practical Design Strategy emphasizes the need to utilize different perspectives and discuss pertinent project information early in the project flow to establish clear project objectives and problem statements. This strategy describes the need to evaluate a specific project with the overall transportation system in mind and highlights that "the system context will shape the design" (3).

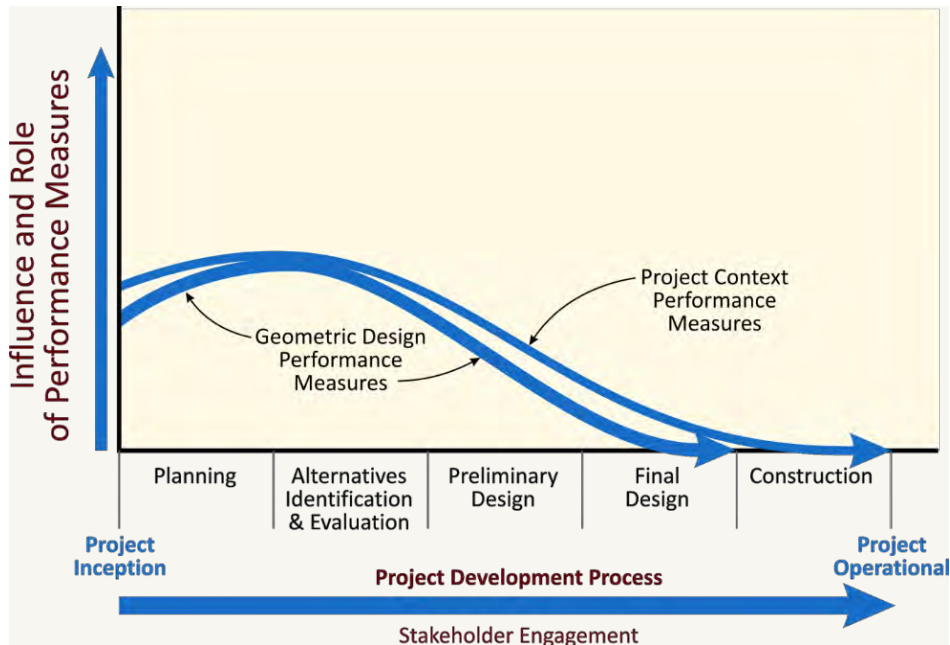
The ODOT Practical Design Strategy identifies the benefits of a multidisciplinary project team and outlines the values associated with this strategy. The values, described by the acronym "SCOPE," are compatible with ODOT's mission and assist decision-makers in their role in managing the state's transportation system. The "SCOPE" values are shown below (3):

- Safety
- Corridor Context
- Optimize the System
- Public Support
- Efficient Cost

Understanding how to integrate practical design strategies and a performance-based approach into the project flow can help guide practitioners in setting up project teams, documenting decisions, and identifying solutions that serve the intent of the urban context and users within that context.

Integrating practical design strategies and a performance-based approach is most effective when applied at the earlier stages of the project flow. Design influences are identified, outlined, discussed, and evaluated before the actual design of a project begins. NCHRP Report 785 illustrates the influence and role that design performance measures have, from project planning to final design, as shown in Figure 4-2. Early project scoping and alternatives, identification and evaluation efforts have a major influence. As a project moves from preliminary to final design, it becomes much more difficult to affect overall project outcomes (1).

Figure 4-2: Role of Performance Measures within the Project Delivery Process<sup>2</sup>



Source: NCHRP Report 785 (1)

### 4.1.2 Integrating a Performance-Based Approach into ODOT's System Lifecycle

The ODOT Transportation System Lifecycle begins with the analysis and planning of the existing system to identify potential projects, and ends when a project transitions into maintenance and operations. The System Lifecycle consists of the following four stages, and each stage involves distinct activities and products.

- Program Development: ODOT and its partners identify which transportation projects will be funded or not, establish the basic project scope and budget for each, and develop the

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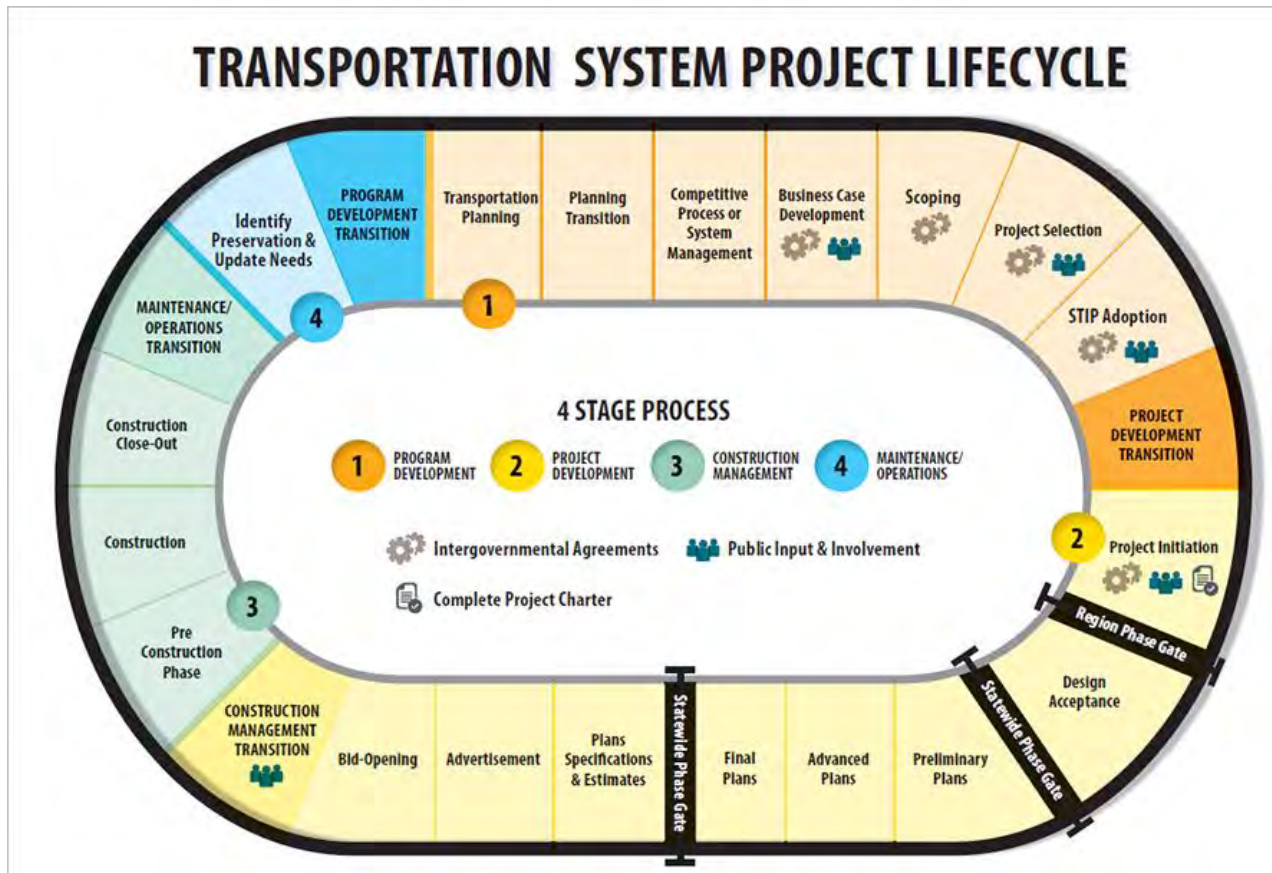
<sup>2</sup> ODOT's Project Development Stage is mostly captured within the "Final Design" stage in this graph that represents: project initiation & kick-off; design acceptance; permits & clearance; right of way; plans & development; plans, specifications & estimates; and advertisement bid & awards.

Statewide Transportation Improvement Program (STIP) of projects to be designed and constructed.

- **Project Development:** Following funding approval or STIP adoption, ODOT staff form project teams to guide development and refinement of project designs, establish environmental commitments, and purchase applicable property right of way. Project Development ends with submitting a final Plans, Specifications, and Estimates (PS&E) package for construction.
- **Construction Management:** An ODOT Project Manager oversees the construction of the designed project.
- **Maintenance and Operations:** An ODOT District Manager and staff manage the applicable facility, including routine maintenance, controlling access through permitting, and emergency operations. When developing a project, it is important to keep in mind the long-term maintenance of the final facility. Constructing a facility that cannot be maintained does little for permanent improvements as the facility degrades from lack of maintenance and is not an effective use of resources

The ODOT Project Delivery Guidebook provides guidance on the first two stages of the System Lifecycle: Program Development and Project Development. Figure 4-3 illustrates the System Lifecycle and depicts how projects are initiated and how they progress through the various stages of the project flow.

Figure 4-3: ODOT Transportation System Lifecycle



Source: ODOT Project Delivery Guide (4)

There are opportunities within each stage of the ODOT Transportation System Lifecycle to apply a performance-based design approach and identify opportunities for tailoring this overall framework to align with the goals and objectives of urban design projects. Within each stage of the Transportation System Lifecycle, evaluating the trade-offs between design, operations, and safety can help confirm that the project solutions align with the intent of the urban context and identified users. Section 4.3 provides guidance on how to apply a performance-based approach for different project types.

A multidisciplinary project team established at the early stages of the project can provide continuity through project completion. In ODOT's Transportation System Lifecycle, this team (which may vary by project phase) will help verify that planning decisions are considered at the next stage of alternatives evaluation and preliminary design. During Program Development, this team is the Project Scoping Team, and during Project Development, this team is the Project Delivery Team. This multidisciplinary project team will create documentation, maintain project continuity, and verify that design decisions are aligning with the original project goals. The performance-based approach establishes a framework that can guide this team throughout the project flow.

Other State DOT Example: The Washington State Department of Transportation (WSDOT) has created an effective approach to engaging a multidisciplinary project advisory team. The overall project team charters an advisory team that includes multiple disciplines and stakeholders. The advisory team participates in the design decision process, and decision making is achieved through collaboration, consensus building, and cooperative work sessions. Involvement continues through all stages: need identification, context identification, design control selection, alternative formulation/evaluation, and performance trade-off decisions (5).

Integrating a performance-based approach and a multidisciplinary project team into the four stages of ODOT's System Lifecycle can help establish appropriate desired project outcomes and effectively evaluate trade-offs during decision making. This approach can also be a guide for creating an iterative process that allows for flexibility in the design, continuous verification of desired project outcomes, and documenting of design decisions throughout each stage of the process. Figure 4-4 illustrates how a performance-based approach may be integrated into the System Lifecycle stages and highlights key locations for input and documentation.



Figure 4-4: A Performance-Based Approach to ODOT Project Flow

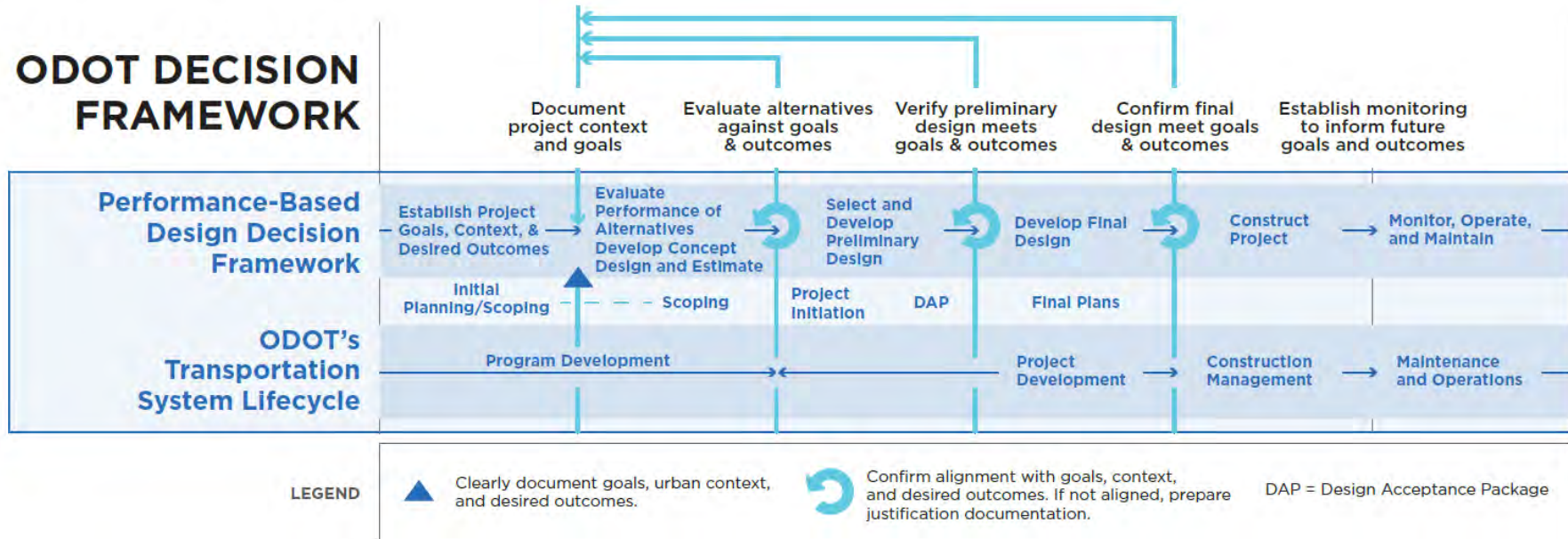


Figure 4-4 provides a multimodal decision-making framework and shows how this approach may become iterative at specific stages of the project. The decision-making framework includes the following six stages:

- Establish Project Goals, Context, and Desired Outcomes
- Evaluate Performance of Alternatives
- Select and Develop Preliminary Design
- Develop Final Design
- Construct Project
- Monitor, Operate, and Maintain

The blue circular arrow symbols highlight milestones within the decision framework where the project goals and desired project outcomes should be revisited to verify that the planning and design decisions, alternatives development, and designs align with the original intent of the project and serve the needs of the users. These are also milestones in which design documentation of planning and design decisions is important. If design decisions, project team discussions, and alternative evaluations have led to any changes in the performance measures or project goals, this information and the project team decisions should be clearly documented. This process will need to follow guidance established in the ODOT Directive PD-02 and meet requirements and policies established through the ODOT Statewide Project Delivery Branch.

As noted previously, engaging the multidisciplinary project team early in the project can help identify constraints, project context considerations, and evaluate trade-offs for various design decisions. The blue circular arrow symbols represent logical milestones for engaging this team to ensure that input is received early, often, and continuously throughout the project. Changes will need to be justified through ODOT design documentation, reviewed, and then approved/rejected by the team.

Changes should be justified through ODOT urban design concurrence documentation, reviewed, and then approved or rejected by a multidisciplinary team.

## 4.2 REFINED DECISION-MAKING FRAMEWORK

This section provides information on establishing project goals and desired outcomes to inform the performance-based decision making throughout the project flow. Information is provided to help practitioners identify and select performance measures that relate to the project goals and how to evaluate alternatives throughout the project flow described in Section 4.1.

### 4.2.1 Establishing Project Goals and Desired Outcomes

Early in the project flow, the project team (Project Scoping Team) should identify the project goals and desired outcomes. The project goals should be a brief list of succinct points that speak to what a community thinks are important as it relates to a multimodal transportation vision and the associated land use goals of the study area. Goals can be visionary and focused on the future, but

should be stated in plain, non-technical language and understood by community members. At a minimum, the goals should address:

- Vision of the place: The vision will incorporate the existing urban context and may relate to a desired future land use pattern and nature of future growth (e.g., remain a Rural Community context, increase mix of uses to become an Urban Mix context). The role of the place in the region (e.g., employment center, residential enclave, neighborhood retail, regional shopping area, etc.) and other community values, such as safety, economic development, community character, as well as environmental and cost impacts should be considered. As described in Chapter 2, the future vision of the place should be documented in a local implementation-oriented plan (e.g., small area plans) and vetted with area stakeholders.
- Desired role of the facility: The desired role of the facility will draw heavily from the transportation characteristics described in Chapter 2, as well as regional and local vision and goals for the study area, vetted with stakeholders. A facility could function as a regional commuting facility with longer-distance trips or a local-serving roadway with mostly short distance trips.
- Major users of the facility: The urban context and the role of the facility will inform who the users are. Based on observations of existing and future transportation and land use conditions, the project team can define who the major users of the facility are now and in the future. These users may include pedestrians, bicyclists, transit users, freight traffic, motorists, etc., and should also include demographic groups (e.g., elderly, school children, tourists, retailers, employees, disadvantaged communities, etc.) from major land uses around the facility.

As illustrated in Figure 4-4, the project goals should be determined at the start of the project and confirmed at key milestones in the multimodal decision-making framework. This will help verify that the alternatives and design decisions align with the original intent of the project and serve the needs of the identified users. Appendix D in Volume 2 of the Blueprint for Urban Design provides examples of project goals.

## 4.2.2 Evaluating Performance Alternatives

Project-level performance measures allow practitioners to develop and evaluate alternatives based on the project goals and desired outcomes. For each project, performance measures should be tailored to evaluate an **alternative's ability to respond to the specific needs of the users and should relate directly to the project's documented goals**. Therefore, performance measures should be identified after defining the project's goals and desired outcomes, and before alternatives are developed. Refer to Tables 3-11 through 3-16 for design guidance for the urban contexts. The measures chosen for a project could be discussed, understood, vetted, and agreed upon with a multidisciplinary project team and key stakeholders.

In general, project-level performance measures should:

- **Reflect Project Goals and Desired Outcomes:** Balanced measures of success account for project goals and how these goals fit into the larger transportation network (i.e., local versus commuter oriented). An effective set of measures describes the experience of each anticipated user and provides a way to assess the likelihood of achieving desired outcomes. Projects typically have a wide range of goals and, therefore, no individual measure should be used to determine the solution to a problem. For instance, a community may want to implement bicycle lanes on an ODOT arterial while minimally impacting traffic mobility. Measures such as bicycle level of traffic stress (LTS) or multimodal level-of-service (MMLOS) could be used to measure impacts to bicyclists, while the traditional vehicle volume-to-capacity (v/c) ratio could still be considered for traffic mobility.
- **Be Understandable and Easy to Communicate:** With competing interests over potential transportation projects, measures of success should communicate to all of those involved. They should be readily measurable using available data and explained in a way that can be understood by non-technical stakeholders and members of the public. While some measures require relatively complex calculations (such as v/c ratio), other simpler measures can still produce a good deal of understanding with minimum analysis. For instance, measures that describe the pedestrian environment can be as simple as determining the number of crosswalks per mile, the type of pedestrian signals provided, and the presence of Americans with Disabilities Act (ADA) compliant ramps. While it may seem that having more data and conducting more analysis would lead to the “correct” result, a simple and easy to understand set of evaluation criteria that truly reflect the context and project goals may lead to better stakeholder buy-in and the ultimate success of the project.
- **Be Consistent, Objectively Measurable:** To effectively support decision making, each measure needs to be objectively measurable for all alternatives. For example, a measure specific to traffic signal performance would not be consistently measurable when comparing a signalized corridor to a roundabout corridor. In another example, “forecast bicycle volumes” could be consistently and objectively measurable if the agency has a travel demand model for bicycle travel and takes infrastructure into account when predicting behavior. When selecting measures, it is important to agree on a consistent, objective methodology for evaluating the measure. Even more qualitative measures, such as “level of community support,” can be measured using a consistent, objective method.
- **Help Differentiate Between Alternatives:** In aggregate, the selected set of measures needs to help differentiate performance among the alternatives to inform decision making. Each individual measure does not need to differentiate – in some cases, all alternatives under consideration will fulfill a goal (and related measure) to the same degree. However, within the set of measures, one or more must be measurably different between the various alternatives.
- **Be Specific to the Plan:** Effective measures of success should be developed for specific plans and studies and not simply “copied and pasted” from previous studies with similar attributes. For example, while v/c ratio is generally used for many traffic-related roadway

considerations, a study exploring ways to improve pedestrian safety on a corridor may focus on the number and spacing of pedestrian crossings instead.

Appendix E in Volume 2 of the Blueprint for Urban Design provides a menu of potential project-level performance measures that could be considered for each mode and an example of linking performance measures to a project's goals and desired outcomes. This list is not intended to be an exhaustive list or to be prescriptive. The list draws from industry best practices, including latest guidance and research from FHWA, such as the FHWA Guidebook for Developing Pedestrian and Bicycle Performance (6), the Environmental Protection Agency (EPA) Guide to Sustainable Transportation Performance Measures (7), the Oregon Analysis Procedures Manual (8), and the Oregon Safety Action Plan (9). ODOT also has a set of system wide monitoring Key Performance Measures (KPMs); while these cannot all be applied at the project level to evaluate alternatives, they can help to inform the types of measures to be used. For example, one KPM is, "Number of serious traffic injuries per 100 million vehicle miles traveled (VMT) in Oregon." A corresponding project-level measure could be "predicted safety performance" for each alternative.

As described in Section 4.1.1, establishing and applying performance measures has the greatest influence on project outcomes when they are incorporated early in project scoping and alternatives identification. The iterative nature of the project flow helps practitioners align solutions with the original desired outcomes.

### 4.2.3 Selecting and Developing the Preliminary Design

As discussed in Chapter 2, the urban context informs the types of users and the intensity of uses within each context. For almost every project, the needs of users can be addressed in multiple ways. The alternatives developed to respond to these needs should explore a variety of methods and means for meeting them.

Sometimes, due to limited right-of-way, difficult choices must be made for how to serve different users along a roadway. Where it is not possible to provide a high-quality facility for each mode along all ODOT roadways, it may be necessary to rely upon parallel networks to provide additional travel options that serve all users.

The network approach requires close coordination between ODOT and local communities. In the example (to the right) of an alternative that prioritizes on-street parking over a dedicated bicycle facility, the analysis should be informed by local vision, availability

Example: In a higher intensity area, such as a Traditional Downtown/Central Business District, local business owners may want to prioritize on-street parking over a dedicated bicycle facility, if they believe the on-street parking is critical to their customers. There are a variety of ways to address such a case. One solution would be to create a shared lane (vehicles and bicycles) with speeds that are 25 mph or lower to allow for a basic level of bicycle access. In this case, since not all bicyclists are comfortable sharing a lane with vehicle traffic, the project team can also look beyond the roadway in question and consider the larger network in developing alternatives.

of parallel routes, and the local partner’s willingness to invest in and maintain parallel facilities. This may be documented in local plans. Further, the evaluation of this alternative (and others) could also be informed by collecting data about the on-street parking use – who is using it, utilization rates, turnover rates, and side-street parking availability. Finally, the decision must also be informed by technical analysis of bicycling trip origins and destinations, and the need for bicycling connectivity, safety data and user input.

In many cases, there may not be one clear-cut alternative that equally serves users at the same level. Selecting a well-vetted set of performance measures will frame a discussion and provide information for ODOT, the public, and local officials to understand the trade-offs among the alternatives. Some potential ways to help evaluate the trade-offs for this example between on-street parking and a bicycle facility may include:

- Number of people served by each facility (e.g., parking spaces on a block used by 50 customers per day; bicycle lane used by 200 people per day);
- Availability of alternative facilities to serve each use (e.g., whether there is a nearby low-stress route for bicyclists or whether there is available parking on side streets or parking lots);
- Understanding the trade-offs between impacts on safety, comfort, and convenience of users (e.g., asking motorists to park and walk an extra block to access destinations, versus asking bicyclists to ride in mixed traffic or out of direction on an alternate route);
- Economic impact (e.g., understanding potential economic impacts of convenient on-street parking space versus bicycle facility to adjacent businesses); and
- How each alternative supports community goals.

Table 4-1 illustrates an example of how trade-offs between alternatives can be communicated to decision makers and stakeholders.

Table 4-1: Example Summary of Alternative Trade-offs

Desired Outcome	Alternative A	Alternative B
Objective #1	High	Medium
Objective #2	High	High
Objective #3	High	Medium
Objective #4	Low	High
Objective #5	Low	High

If design decisions, project team discussions, and alternative evaluations lead to any changes in the performance measures or project goals, this information and the project team decisions should be clearly documented (potentially as part of ODOT design documentation) and justified for review by

the project team who would either confirm the decisions or would provide alternate direction on how to proceed. The alternate direction could include:

- Additional or further modification to the project team revisions;
- Rejection of the revisions and return to original project goals; or
- Decision to change the scope of the project and reinitiate the process of goals development.

This is a similar approach to what the scoping team uses on ODOT STIP projects. After consensus has been reached, the preliminary design decisions and trade-offs should be well documented, with stakeholder support. In some cases, this documentation will take the form of a “corridor plan” with a concept. In other cases, the documentation may be more informal and internal to ODOT to document the process and outcome to pass on to the final design project team.

#### 4.2.4 Moving to Final Design and Construction

As a project moves into Project Charter (typical to ODOT projects), careful consideration should be given to preserve the goals and desired outcomes of the preliminary design. In some cases, the project team may discover during the final design of a project that it is infeasible or significantly more costly than anticipated to provide a key element of the agreed-on preliminary design. In these cases, if changes must be made to a design, they should be clearly documented (potentially as part of ODOT design documentation), and justification provided to the project team for their review and direction. These decisions should also be vetted with key local stakeholders engaged in the beginning of the project flow. If the local stakeholders and project team cannot agree on a path forward, it may be necessary, and ultimately less costly, to stop the development of the final design and return to an earlier step in the process. This may be the establishment of project goals or the development and evaluation of project alternatives.

If changes must be made to a design, they should be clearly documented, and justification should be provided to the project team for their review and direction.

#### 4.2.5 Monitoring, Operating, and Maintaining

After a project is constructed, ODOT can use the project performance measures (or variations of them) for monitoring and to inform future project goals and outcomes. For example, if predicted safety performance was used as a metric to select the design, ODOT should monitor the safety performance of the roadway and compare it to the predicted safety performance. If travel time reliability for any mode was used as a performance metric, travel times should be monitored and compared to the goal. This monitoring can help ODOT evaluate whether or to what extent selected designs are helping to fulfill the desired outcomes.

As ODOT operates and maintains the roadway, it may find other opportunities for smaller changes or investments that could further enhance alignment with project goals. In the example of the

traditional main street, in which the selected design implemented on-street parking and did not have separate bicycle facilities, ODOT might find that bicyclists are riding on the sidewalk to access businesses. In this situation, ODOT could work with the local jurisdiction to install improved wayfinding signage on the parallel route as an initial step. If high levels of bicyclists on sidewalks remain, ODOT could work with the local jurisdiction to develop a pilot that would reallocate on-street parking to a separated bicycle facility. Finally, depending on the operations, results of the pilot, and community desires, ODOT could alter the striping of the roadway to replace parking with a separated bicycle facility, in conjunction with a maintenance project.

As maintenance and repaving projects occur on a roadway, the project team should review any previously documented project goals before making any alterations to the streetscape. There may be additional opportunities in maintenance to advance desired outcomes from previous planning efforts. For example, ODOT may consider narrowing lane widths to add buffer to bicycle lanes.

Finally, busy urban roadways are often more difficult to maintain and operate than rural highways. Urban roadway design features are more likely to include elements like street trees, vegetated stormwater management solutions, separated bicycle facilities, complex multimodal signal operations, busy transit stops, and pedestrian crossing treatments. ODOT needs to equip staff responsible for maintenance with the resources (training and funding) to properly maintain these urban roadway investments.

### 4.3 OPPORTUNITIES WITHIN ODOT'S PROJECT FLOW

Building upon the decision-making framework described in Figure 4-4, this section describes the key points at which ODOT project teams make decisions for urban projects. While each type of project requires a tailored approach, the following elements provide a general outline for incorporating performance-based design into ODOT's project flow:

- Initiate or maintain collaboration with a multidisciplinary project team
- Establish or review project goals, desired outcomes, performance measures, and documentation approach
- Review past studies and plans to understand the urban context and modal expectations
  - If there are no prior studies, then the project should identify the Urban Context and Modal Expectations (Chapter 2).
- Verify that the preliminary design meets original project goals and desired outcomes
- Confirm that detailed design decisions still meet project goals and outcomes
- Document the decisions at each stage of the project and confirm that the final design meets project goals and outcomes

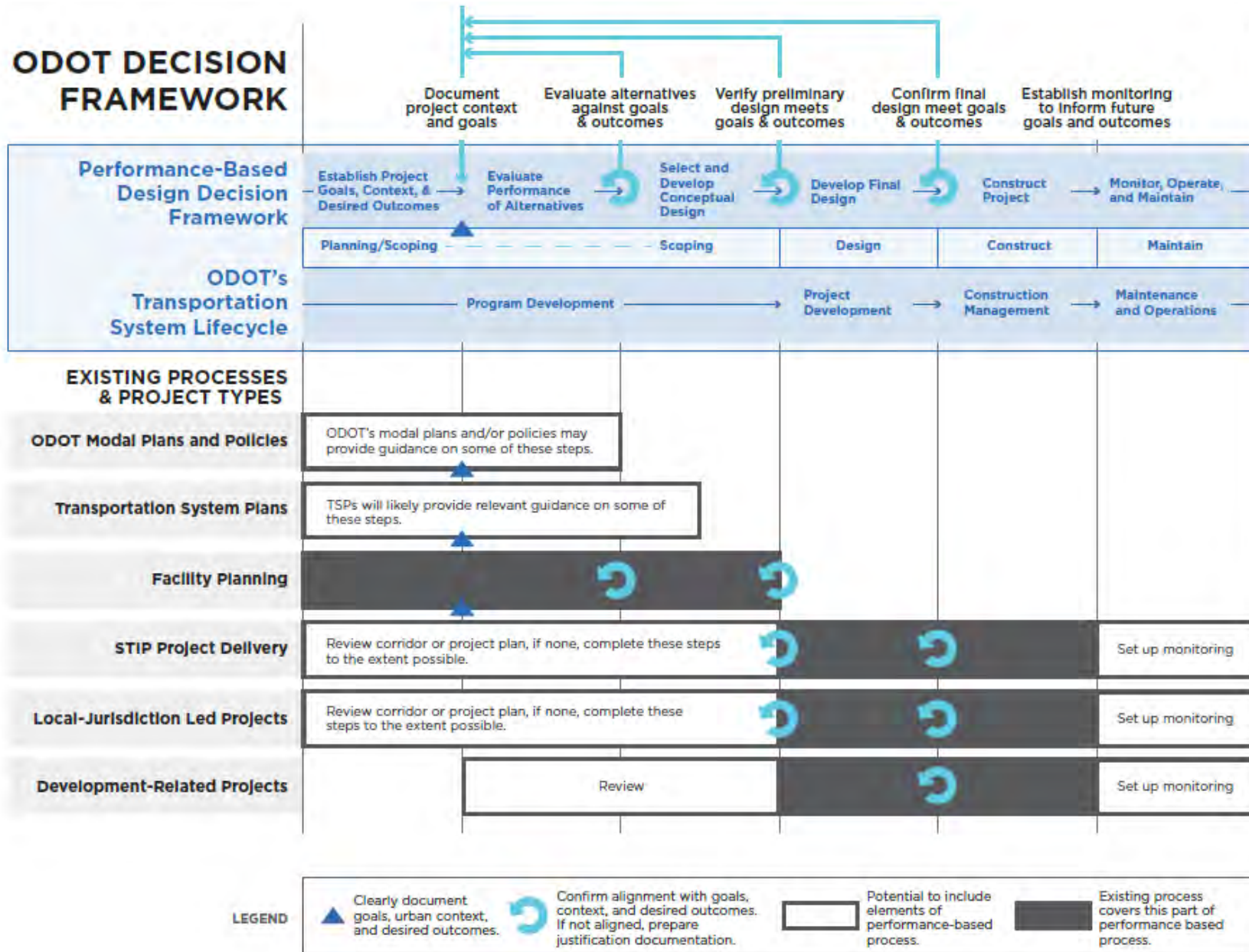


- o Any changes from prior decisions will be evaluated against the original intent of the project, and justification would be provided for evaluation by a multidisciplinary project team. Consider ODOT design documentation if needed.

Figure 4-5 expands on the project flow presented in Figure 4-4 to illustrate how the decision-making framework correlates to the variety of activities within ODOT's project flow. It highlights key decision points and/or opportunities for multidisciplinary project team engagement. Specific considerations for applying a performance-based design approach and the decision-making framework are provided for each project type. As shown in Figure 4-5, ODOT Modal Plans and Policies can help support decision making in early stages of the project flow. If a project does not have a TSP or facility plan that establishes project goals, context, and desired outcomes, these statewide plans and policies may be used as guidance.

The blue circular arrow symbols in Figure 4-5 highlight milestones within the decision framework where the project goals and desired project outcomes should be revisited to verify that the planning and design decisions, alternatives development and designs are aligning with the original intent of the project and serving the needs of the users. These are also milestones during which design documentation of planning and design decisions is important.

Figure 4-5: Best Practice Decision-Making Framework for ODOT Projects



### 4.3.1 Transportation System Planning (TSP)

ODOT is not typically responsible for leading TSPs at the local jurisdiction level, but ODOT funds most TSP development. Through this role, ODOT staff are frequently key individuals on the project management teams for TSPs or serve on the technical advisory committee. In this capacity, ODOT staff can weigh in on early decisions that will feed into design, including:

- Local community or agency articulation of vision and goals for the local transportation system, and in some cases, for specific corridors.
- Documentation of the urban context, future urban context, and modal expectations for different parts of the jurisdiction.
- Development of a bicycle and pedestrian network where people of all ages, incomes, and abilities can access destinations in urban and rural areas on comfortable, safe, well connected biking and walking routes.
- Preliminary decisions that impact design on major corridors (including ODOT facilities), such as the number of vehicle lanes, presence of transit, designation as a freight route, and the general type of bicycle facility. TSP guidelines require cross-sections.
  - In some cases, the TSP will instead recommend a more detailed corridor or area study to make these types of decisions, which can then be incorporated into the TSP.

ODOT staff can help guide the TSP process to clearly document direction on each of these topics, **as feasible within the jurisdictions' planning effort**. Table 4-2 provides an example of a TSP that provides this level of direction.

Table 4-2: Transportation System Plan (TSP) Example

**Jackson County TSP – Jackson County, Oregon**

- ➔ **Project Catalyst:** From a bicycle perspective, understanding which roadways should provide more focus on “designing for” bicycles vs “accommodating” bicycles on a typical bicycle lane, shoulder, or shared roadway.
- ➔ **Urban Context:** All urban contexts. Chapter 2, Section 2.1.2 provides descriptions for the various urban contexts.
- ➔ **Modal Expectations:** Vary by roadway. Help define where bicycles should have a greater emphasis (higher priority) in the design decisions. Chapter 2, Section 2.1.4 provides guidance for designing for multimodal users. Section 2.2.2 highlights other roadway characteristics to consider. Chapter 3, Section 3.2.2 provides additional information on bicycle facility selection.
- ➔ **Project Goals:** The project goals included improving and expanding access via all travel modes to recreational areas and facilities throughout the county, with a focus on improved connections to regional bicycle routes and trails systems and using bicycle route designations established in the TSP to provide a basis for prioritizing improvements to bicycle facilities. Section 4.2.1 provides guidance for establishing project goals.
- ➔ **Performance Measures:** Level of traffic stress for bicycles; bicycle network connectivity to recreational areas, facilities, and regional bicycle routes and trails; and order of magnitude costs. Section 4.2.2 outlines strategies for identifying performance measures to meet the project goals and desired outcomes.
- ➔ **Alternatives Considered:** Alternatives for shared lane, typical bicycle lane to enhanced bikeway treatments including buffered bicycle lanes, protected bikeways, and shared use paths. Section 4.2.2 provides additional information on evaluating performance alternatives.
- ➔ **Design Decisions:** Bicycle Route Designation Map identifying which facilities should be designed as enhanced bicycle facilities (including some level of separation between bicycles and vehicles), standard bicycle facilities (bicycle lane or shoulder), or shared roadways (bicycles and vehicles sharing the same space). Chapter 3, Section 3.2.2 provides guidance for selecting bicycle facilities. The decisions captured in the transportation system plan will be the starting point for follow-up project stages.

**Bicycle Route Designations**

- County Bikeway
- County Shared Roadway
- ODOT Bikeway
- ODOT Shared Roadway
- Enhanced Bikeway

### 4.3.2 Facility Planning

Facility Planning occurs within the Program Development stage of the System Lifecycle. Facility Planning includes: interchange area management plans, corridor plans, access management plans, scenic byway plans, and safety corridor plans. It typically includes critical steps from the performance-based design decision-making framework. The outcome of this planning process provides the foundation for future project stages, as shown in Figure 4-5. A facility plan should:

- Identify and document the urban context and modal expectations as well as project-level goals and desired outcomes to inform design decisions
- Develop and evaluate project alternatives using performance measures that align with the project goals
- Select a preferred alternative, and typically, also include a preliminary design

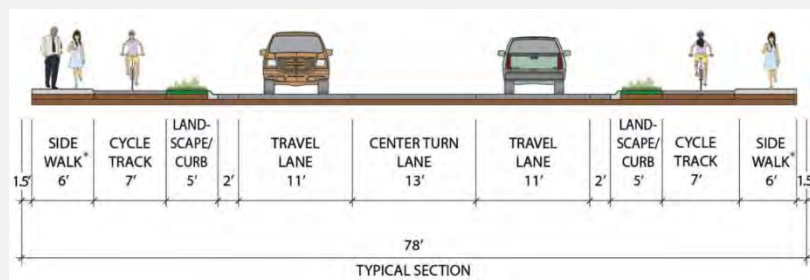
Table 4-3 provides an example of a facility planning process that is reflective of this decision-making framework.

Table 4-3: Facility Planning Example

Highway 43 Corridor – West Linn, Oregon

- ➔ **Project Catalyst:** Lack of clarity and consistent application of existing 2008 corridor plan created a need for an update to gain design documentation and move to implementation.
- ➔ **Urban Context:** Residential Corridor, Urban Mix. Chapter 2, Section 2.1.2 provides descriptions and Section 2.1.3 provides guidance in determining the various urban contexts.
- ➔ **Modal Expectations:** High pedestrians, bicyclists, and transit; low-to-medium freight/trucks; medium automobile, with an emphasis on providing access and safety. Chapter 2, Section 2.1.4 provides guidance for designing for multimodal users. Section 2.2.2 highlights other roadway characteristics or characteristics to consider.
- ➔ **Project Goals:** The project goals included: provide access for bicyclists of all ages and abilities; improve pedestrian and transit access; provide consistent access for maintenance and emergency vehicles; reduce reliance on the automobile; improve access and support adjacent land uses in the corridor; develop realistic cost estimates; minimize major right-of-way impacts; and secure agreement between ODOT and City of West Linn on a concept design. Section 4.2.1 provides guidance for establishing project goals.
- ➔ **Performance Measures:** Level of traffic stress; presence of continuous bicycle and pedestrian facilities; presence of consistent three-lane cross section for maintenance and property access; number of buildings and properties impacted; order of magnitude costs; and volume-to-capacity ratio at key intersections. Section 4.2.2 outlines strategies for identifying performance measures to meet the project goals and desired outcomes.
- ➔ **Alternatives Considered:** Alternatives included a wider cross section with all elements at standard widths and a variety of alternative options for including some elements at narrower widths. The alternatives included both a two-lane and three-lane cross section, and all alternatives had bicycle and pedestrian facilities. Section 4.2.2 provides additional information on evaluating performance alternatives.
- ➔ **Design Decisions:** Include narrower travel lanes (11') and median (13'), reduced shoulder width (2'), separated bicycle facilities (raised cycle track with buffer), and continuous sidewalks, as well as enhanced transit stops and crossings. Remove buffer between raised cycle track and vehicle travel lanes in very constrained areas. Chapter 3, Tables 3-11 through 3-16 provide design guidance for roadway cross section elements for each urban context. Project teams will use ODOT design documentation to document design decisions.

Plan includes scaled 5% design layouts, based on geographic information system (GIS) information. Design includes cross section with two through travel lanes and a center turn lane (narrower than standard width);



raised cycle track and sidewalk with buffer (buffer omitted in constrained areas); enhanced crossings, transit stops, and intersections with specific locations and design details to be determined in design phase.

### 4.3.3 Designing Statewide Transportation Improvement Program (STIP) Projects

The Statewide Transportation Improvement Program (STIP) is a staged, multi-year intermodal program of transportation projects. It is consistent with the statewide transportation plan and planning processes as well as metropolitan plans and transportation improvement programs (TIPs). Typical project types include Safety, Operations, Bridge, Pavement Preservation and Modernization. As shown in Figure 4-5, STIP projects occur within the Project Development and Construction Management stages of the System Lifecycle. Figure 4-5 also identifies areas where there may be potential to integrate earlier and later steps from the decision-making framework. STIP projects should:

- Review previous corridor studies or project plans to understand the urban context and modal expectations.
  - If there are no prior applicable plans and studies, then, to the extent possible, the project team should establish project goals and document the urban context and modal expectations. Collaborating with a multidisciplinary project team can help support these activities.
- Verify during the scoping process that the conceptual design meets project goals and desired outcomes and fits the urban context.
- Confirm during the final design stage that the design decisions align with the project goals, urban context and expected users.
- Prior to construction, confirm that the final design meets the original project goals and desired outcomes. Include clear documentation of design decisions, particularly if they do not align with the guidance for the identified urban context.
- Establish an approach for monitoring the project.

Any changes to prior decisions should be evaluated against the original intent of the project, and justification would be provided for evaluation by a multidisciplinary project team. Table 4-4 provides an example of a STIP project, corridor improvement along Highway 97 through La Pine, Oregon that is reflective of this decision-making framework. Table 4-5 provides an example of a STIP project, intersection improvement in Sisters, Oregon that is reflective of this decision-making framework.

Table 4-4: STIP Project Example – La Pine, Oregon



US 97 through La Pine, OR	
	<ul style="list-style-type: none"><li>➔ Project Catalyst: High speeds through rural town with a lack of bicycle and pedestrian facilities.</li><li>➔ Urban Context: Suburban Fringe, Rural Community, Urban Mix. Chapter 2, Section 2.1.2 provides descriptions and Section 2.1.3 guidance in determining the various urban contexts.</li><li>➔ Modal Expectations: Medium pedestrians and bicyclists along and across the highway, medium freight/trucks, medium automobile, with an emphasis on providing access and safety to this rural community. Chapter 2, Section 2.1.4 provides guidance for designing for multimodal users. Section 2.2.2 highlights other roadway characteristics or characteristics to consider. Chapter 3, Section 3.2.3 provides additional information on pedestrian crossing locations and Section 3.2.2 provides additional information on bicycle facility selection.</li><li>➔ Project Goals: Provide a multimodal road including: provide access for bicyclists; improve pedestrian access along and across roadway; improve access and support adjacent land uses in the corridor; reduce speeds through community; stay within existing right-of-way impacts; and secure agreement between ODOT and City of La Pine of proposed improvements. Section 4.2.1 provides guidance for establishing project goals.</li><li>➔ Performance Measures: Level of traffic stress; presence of continuous bicycle and pedestrian facilities; presence of consistent three-lane cross section for maintenance and property access; volume-to-capacity ratio at key intersections; reducing travel speeds. Section 4.2.2 outlines strategies for identifying performance measures to meet the project goals and desired outcomes.</li><li>➔ Alternatives Considered: Alternatives included a wider cross section with all elements at standard widths as well as options including some elements at narrower widths and converting a five-lane cross section to a three-lane cross section. The alternatives included bicycle and pedestrian facilities. Section 4.2.2 provides additional information on evaluating performance alternatives.</li><li>➔ Design Decisions: Through La Pine, the cross section includes a three-lane cross section (removing a through lane in each direction), separated bicycle facilities (6-foot striped with buffer), and detached continuous sidewalks, as well as enhanced crossings. Entering La Pine from the north, the project included lane narrowing with recessed pavement markers and speed feedback signs entering the city. Chapter 3, Tables 3-11 through 3-16 provide design guidance for roadway cross section elements for each urban context. Project teams will use ODOT design documentation to document design decisions.</li><li>➔ Project Outcomes: Average speed dropped by approximately 8 mph.</li></ul>
	



Table 4-5: STIP Project Example – Sisters, Oregon

US 20/Barclay Drive Intersection in Sisters, OR

- ➔ **Project Catalyst:** The US20/Barclay Drive intersection was previously analyzed as part of the Sisters TSP.
- ➔ **Urban Context:** Suburban Fringe, Rural Community, Urban Mix. Chapter 2, Section 2.1.2 provides descriptions and Section 2.1.3 guidance in determining the various urban contexts.
- ➔ **Modal Expectations:** Low-to-medium pedestrians and bicyclists along and across the highway, medium freight/trucks, medium automobile, with an emphasis on providing access and safety at this intersection entering the town. Chapter 2, Section 2.1.4 provides guidance for designing for multimodal users, and Section 2.2.2 highlights other roadway characteristics or characteristics to consider.
- ➔ **Project Goals:** Provide an intersection that serves various modes while addressing the operational and safety issues, including: provide access for bicyclists and pedestrians through this intersection; improve access and support existing business in the vicinity of the intersection; obtain acceptance from the freight industry to install a roundabout; minimize right-of-way impacts; and secure agreement between ODOT and City of Sisters of proposed intersection improvement. Section 4.2.1 provides guidance for establishing project goals.
- ➔ **Performance Measures:** Level of traffic stress; presence of continuous bicycle and pedestrian facilities; maintenance and property access; volume-to-capacity ratio at intersection; reducing fatal and injury A crashes; accommodating oversize overweight trucks. Section 4.2.2 outlines strategies for identifying performance measures to meet the project goals and desired outcomes.
- ➔ **Alternatives Considered:** Alternatives included single-lane and multilane roundabouts as well as a signalized intersection. The project team conducted an objective intersection control evaluation to compare the various alternatives. The project team worked extensively with the freight industry to test the roundabout designs with various sized trucks. The alternatives included bicycle and pedestrian facilities. Section 4.2.2 provides additional information on evaluating performance alternatives.
- ➔ **Design Decisions:** The preferred alternative was the single-lane roundabout. The project team continued working with the industry to test the roundabout design with a full-size layout by conducting a roundabout rodeo. In addition to minimizing various impacts, the team prepared design exceptions for a smaller inscribed diameter and a shorter than traditional design year horizon. Chapter 3, Tables 3-11 through 3-16 provide design guidance for roadway cross section elements for each urban context. Project teams will use ODOT design documentation to document design decisions.
- ➔ **Project Outcomes:** The project team developed a new approach for approving a roundabout on a state highway.



### 4.3.4 Development-Related Projects

Integrating new development into and along the existing infrastructure and transportation system creates the need for continuous collaboration. This type of project requires the development review team to review existing plans, prior studies, and/or other information about the project location to verify that the improvements associated with the development meet the code requirements and long-term needs for the area. As shown in Figure 4-5, development-related projects occur within the Program Development, Project Development and Construction Management stages of the ODOT Transportation System Lifecycle. Figure 4-5 also notes the potential for development projects to review prior work and documented direction for the corridor or project area. ODOT staff reviewing development related projects should:

- Review the TSP and corridor plan, if available, to understand the urban context, goals and desired outcomes for the project area, and future right-of-way needs.
- If there is no specific guidance in past studies, the design should use guidance and standards as outlined in Chapters 2 and 3 for the urban context of the development. In most cases, it will not be feasible to conduct a planning process as part of the development review, but project teams will be able to follow the decision-making framework in this chapter to document assumptions and decisions. If the selected design does not align with adopted plans or current standards for the urban context, ODOT staff should document design decisions and seek agreement from the multidisciplinary project team.

Table 4-6 provides an example of Development-Related Project.

Table 4-6: Development-Related Project Example

Lombard New Seasons – Portland, Oregon

- ➔ **Project Catalyst:** Developers proposed to construct a new 25,000 square foot grocery store and accessory surface parking lot with 60 parking spaces at this site. The ODOT Development Review team coordinated with the City of Portland on access management, frontage improvements, and implementing the City Transportation System Plan (TSP) and the St. Johns/Lombard Plan.
- ➔ **Urban Context:** Urban Mix. Chapter 2, Section 2.1.2 provides descriptions and Section 2.1.3 guidance in determining the various urban contexts.
- ➔ **Modal Expectations:** High volumes of pedestrians, bicyclists, and transit; high freight/trucks; medium-high automobile, with an emphasis on providing access and safety. Chapter 2, Section 2.1.4 provides guidance for designing for multimodal users. Section 2.2.2 highlights other roadway characteristics or characteristics to consider.
- ➔ **Project Goals:** As development occurs, the City of Portland requires applicants to provide adequate access to bikes, pedestrians, vehicles and transit by implementing their TSP. In this case, the existing roadway lacked a bike lane, City standard sidewalks, and an appropriate pedestrian crossing. Therefore, the goal was to provide these elements consistent with ODOT and City standards. Section 4.2.1 provides guidance for establishing project goals.
- ➔ **Performance Measures:** Presence of continuous bicycle and pedestrian facilities; appropriate pedestrian crossing location; and meeting access management standards. Section 4.2.2 outlines strategies for identifying performance measures to meet the project goals and desired outcomes.
- ➔ **Alternatives Considered:** The existing highway was two lanes, allowed on-street parking, and there were no bike lanes despite being designated as a bike route. ODOT and the City considered wider sidewalks, driveway locations, pedestrian crossing locations, and adding turn lane. Section 4.2.2 provides additional information on evaluating performance alternatives.
- ➔ **Design Decisions:** The City and ODOT decided to remove on-street parking and require the developer to construct frontage improvements. The developer also contributed a proportionate share of funding to ODOT in order to implement the 3-lane cross section linking this location to the Starbucks redevelopment to the east and the rail overcrossing to the west. This accommodates both turning movements into the site where a turn lane was warranted. The public infrastructure includes bike lanes and sidewalks as well an enhanced midblock crossing to provide a network of multimodal connectivity throughout the community. Chapter 3, Tables 3-11 through 3-16 provide design guidance for roadway cross section elements for each urban context. Project teams will use ODOT urban design concurrence to document design decisions.



### 4.3.5 Local-Jurisdiction Led Projects

This section describes projects where local agencies deliver projects on ODOT facilities. This information is not intended to apply to local facilities. Local projects funded through ODOT-managed selection processes may be led by local agencies and are expected to be designed and constructed to reflect the original project proposal. ODOT maintains design decision making for projects on state-owned roadways, including those led by local agencies. For local-led projects, ODOT's funding agreements typically require local agencies to submit final cost, as-built drawings, and other documents to confirm the project selected was what was ultimately constructed. Local agency projects on ODOT's system should only be led by certified agencies that ODOT has agreed to lead delivery. For projects not on ODOT's system or delivered by ODOT, the local agency is responsible for these design decisions. ODOT can inform local agency decision making as an interested stakeholder.

Table 4-7 and the photographs below provide an example of a local agency-led project on a state-owned roadway.

NE Martin Luther King Jr. Blvd (OR99E)/NE Columbia Blvd Intersection in Portland, Oregon



Table 4-7: Local Agency-Led Project Example

NE Martin Luther King Jr. Blvd(OR 99E)/NE Columbia Blvd Intersection in Portland, OR

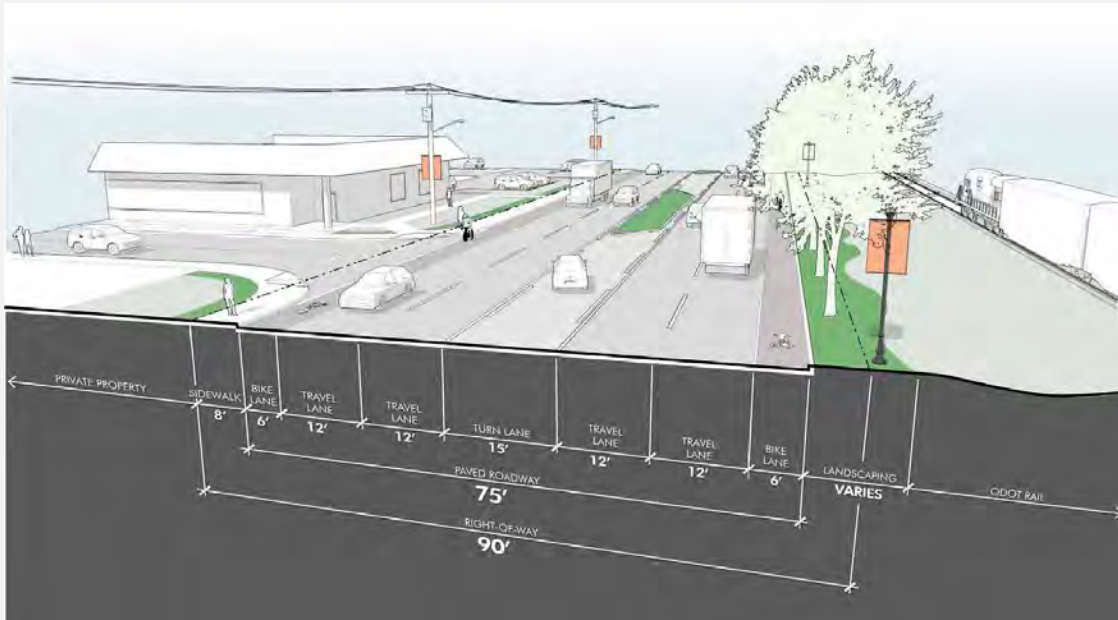
- ➔ **Project Catalyst:** The westbound right turn movement at the intersection of NE Columbia Boulevard and NE Martin Luther King Jr. Boulevard moves a significant amount of freight traffic. At this intersection, congestion makes it difficult for freight traffic to travel efficiently.
- ➔ **Urban Context:** Commercial Corridor. Chapter 2, Section 2.1.2 provides descriptions and Section 2.1.3 guidance in determining the various urban contexts.
- ➔ **Modal Expectations:** Low-to-medium pedestrians and bicyclists along and across the highway, high freight/trucks, high automobile, with an emphasis on providing freight access and safety at this intersection. Chapter 2, Section 2.1.4 provides guidance for designing for multimodal users, and Section 2.2.2 highlights other roadway characteristics or characteristics to consider.
- ➔ **Project Goals:** Provide an intersection that serves various modes while addressing the operational and safety issues for freight turning movements. Provide access for pedestrian access through this intersection; improve access and support existing business in the vicinity of the intersection; obtain acceptance from the freight industry; and secure agreement between ODOT and City of Portland of proposed intersection improvement. Section 4.2.1 provides guidance for establishing project goals.
- ➔ **Performance Measures:** Presence of continuous bicycle and pedestrian facilities; maintenance and property access; volume-to-capacity ratio at intersection; reducing fatal and injury A crashes; accommodating oversize overweight trucks. Section 4.2.2 outlines strategies for identifying performance measures to meet the project goals and desired outcomes.
- ➔ **Alternatives Considered:** The intersection does not have a westbound right turn lane, and has substandard sidewalks and ADA ramps. ODOT and the City considered wider sidewalks, driveway locations, and adding a right turn lane. Section 4.2.2 provides additional information on evaluating performance alternatives.
- ➔ **Design Decisions:** The project will construct a dedicated westbound right turn lane on NE Columbia Boulevard at the intersection of NE Martin Luther King Jr. Boulevard and NE Columbia Boulevard. In addition, a 12-foot sidewalk adjacent to the new right turn lane and a new traffic signal will be constructed, bringing all ADA ramps up to standard. Chapter 3, Tables 3-11 through 3-16 provide design guidance for roadway cross section elements for each urban context. Project teams will use ODOT urban design concurrence to document design decisions.
- ➔ **Project Outcomes:** The City is currently constructing the identified improvements in ODOT right of way.

Table 4-8: Facility Plan Example

US 30 Corridor – St Helens, Oregon

- ➔ Project Catalyst: Provide safe, convenient access to local businesses along the highway, while balancing that with state goals for traffic mobility.
- ➔ Urban Context: Commercial Corridor. Chapter 2, Section 2.1.2 provides descriptions and Section 2.1.3 guidance in determining the various urban contexts.
- ➔ Modal Expectations: Low pedestrians, bicyclists, and transit; medium freight/trucks; high automobile, with an emphasis on providing access and safety. Chapter 2, Section 2.1.4 provides guidance for designing for multimodal users. Section 2.2.2 highlights other roadway characteristics or characteristics to consider.
- ➔ Project Goals: The overall project goals included: **create "streetscape" plans for the US 30 corridor that reflect the community's vision for appearance and function** and improve the aesthetics and function of the corridor to attract business and investment; provide better access, direction and signage to the St. Helens Houlton and Riverfront District areas; and improve desirability. Section 4.2.1 provides guidance for establishing project goals.
- ➔ Performance Measures: Improves street connectivity, design, and ability to access and locate business areas; improves pedestrian and bicycle safety and accessibility, thereby encouraging walking and bicycling; balances the need for local access and traffic calming with the need to provide for through-traffic movement and mobility as well as emergency vehicle access; develop and implement solutions consistent with local and regional needs. Section 4.2.2 outlines strategies for identifying performance measures to meet the project goals and desired outcomes.
- ➔ Alternatives Considered: **Alternatives included: "Green Edge"** – a landscaped edge along the east side of the highway that discourages informal pedestrian crossings of US 30 and of the railroad tracks – crosswalks would be provided at signalized intersections to offer connectivity with local destinations; **"Green Corridor"** – a new sidewalk with planting strip and continuous fence along the east side of the highway, with enhanced pedestrian crossings at key intersections. Raised planted medians with trees and shrubs were also proposed along the middle of the highway at strategic locations, as well as new planting areas behind the sidewalk along the west side of the highway; **"Complete Street"** – wider sidewalks with landscape strips and planted medians consistent with the local transportation system plan (TSP). Section 4.2.2 provides additional information on evaluating performance alternatives.
- ➔ Design Decisions: Short-term improvements include landscape strips on both sides of the roadway and raised median islands in select locations. Long-term improvements include 6-foot (curb-tight) sidewalks on the west side of the highway with a planting strip of varying width and fence along the back of walk; 8-foot (curb-tight) sidewalks on the east side of the highway with landscape strips located on private property; 9-foot raised media islands in strategic locations. Chapter 3, Tables 3-11 through 3-16 provide design guidance for roadway cross section elements for each urban context. Project teams will use ODOT design documentation to document design decisions.  
  
Plan includes scaled 5% design layouts, based on geographic information system (GIS) information. Design includes a 5-lane cross section with two through lanes in each direction and a center turn lane with raised median islands, bicycle lanes, sidewalks with landscape buffers; enhanced crossings, transit stops, and design details and key opportunity areas.

### US 30 Short-term Design Recommendations



### US 30 Long-term Design Recommendations



## 4.4 REFERENCES

1. Transportation Research Board (TRB). NCHRP Report 785: *Performance-Based Analysis of Geometric Design of Highways and Streets*. TRB, Washington, D.C., 2014.
2. American Association of State Highway Transportation Officials (AASHTO). *A Policy on Geometric Design of Highways and Streets*. AASHTO, Washington D.C., 2018.
3. Oregon Department of Transportation (ODOT). *Practical Design Strategy*. ODOT, 2010.
4. ODOT. *Project Delivery Guide*. ODOT, 2017.
5. Washington State Department of Transportation. *Design Manual*. WSDOT, 2018.
6. Federal Highway Administration (FHWA). *Guidebook for Developing Pedestrian and Bicycle Performance Measures*. FHWA, 2016.
7. Environmental Protection Agency (EPA). *Guide to Sustainable Transportation Performance Measures*. EPA, 2011.
8. ODOT. *Analysis Procedures Manual*. ODOT, 2006 (Update 2018).
9. ODOT. *Oregon Safety Action Plan*. ODOT, 2016.



