

The purpose of this memorandum is to provide a draft Annotated Outline combining the existing *Creating Livable Streets*, *Green Streets*, and *Trees for Green Streets* guides (Referred to herein as “Existing Metro Guide”. This update is referred to as “New Metro Guide”). The content for the New Metro Guide will be a combination of existing material from the Existing Metro Guides (with reference to the *Green Trails and Wildlife Crossings guides*) and new information from current policies and best practices. This memorandum builds on the completed Table of Contents (TOC) – text shown in black – and provides a Draft Annotated Outline where the narrative in *blue italics* indicates specific information anticipated for each chapter and section based on discussion and themes from the project management team (PMT) and technical working group (TWG). Percentages next to each Chapter heading indicate the amount of space dedicated to that section relative to the whole document.

METRO DESIGNING LIVABLE STREETS & TRAILS GUIDE

DRAFT ANNOTATED OUTLINE

CHAPTER 1: INTRODUCTION [5%]

1.1 Purpose

- Making a Great Place
 - *Describes how diverse people, education, land use, transportation choices, job choices, green infrastructure, access to parks and natural areas, housing choice and affordability, etc. come together to create a great place.*
- Regional 2040 Growth Concept
 - *Overview of the concept and how transportation helps achieve it.*
- Regional Transportation Plan (RTP) Vision and Goals
 - *Overview of the goals and reference the Regional Transportation Plan for additional details.*
 - *The Regional Transportation Plan, Chapter 2, Section 2.4 Regional System Definition will be used as a reference for developing this section.*

1.2 Who Will Use the Guide

- *This subsection will describe the audience the New Metro Guide is intended for and guide them to the areas that might be most useful:*
 - *Planners, landscape architects, and engineers – for best practices.*
 - *Public sector practitioners for best practices and project development guidance.*
 - *It will be public-facing and lay-person friendly.*
 - *Technical appendices (e.g., *Trees for Green Streets*) will provide more detail.*
- *This section will use information from the current guides, but require major updates.*

1.3 How to Use the Guide

- *This subsection will describe that this New Metro Guide is a tool for creating a great place and implementing the 2040 Growth Concept and the Regional Transportation Plan.*
- *Describe on-line resources.*
- *Reference the Regional Transportation Functional Plan (RTFP) and highlight that the RTFP is the regional implementation plan that jurisdictions follow.*
- *This section will use information from the current guides, but require major updates.*

1.4 Chapter Highlights

- *Includes key features and “take-aways” presented in each chapter of the New Metro Guide.*
- *A graphic will illustrate how outcomes, design functions, design classifications and design elements relate to each other. The graphic will be used as a device to throughout the document to remind the reader of the flow/structure.*
- *This section introduces and defines the themes and structure of the following chapters by clearly communicating the following:*
 - **Chapter 2:**
 - *Desired Outcomes – what are the things that make our region a great place?*
 - **Chapter 3:**
 - *Design Functions – how do our transportation corridors contribute to the outcomes?*
 - *Design Classifications – what **functions** are typically served by each regional classification?*
 - **Chapter 4:**
 - *Design Elements – which **elements** serve the core **functions** for each type of travelway?*
 - **Chapter 5:**
 - *How can the elements be combined to create the different regional design classifications in different land use contexts?*
 - **Chapter 6:**
 - *How do practitioners make design decisions using a performance-based design approach?*
 - **Chapter 7:**

- *What implementation strategies can help the region move towards the envisioned system?*

Notes: The project team anticipates Metro leading the development of this upfront content.

CHAPTER 2: DESIGN POLICY AND DESIRED OUTCOMES [8%]

Introduction

Chapter 2 will describe the “story” of the Existing Metro Guides and what has changed over the years. It includes some history, lessons learned, emerging trends, desired outcomes, policies to achieve those outcomes (performance-based design), as well as how the design policy relates to other regional, state, national, and local policies.

2.1 Street and Trail Design in a Land Use Context

This section puts this edition of the guidance (New Metro Guide) in a historical context, acknowledging that the core idea of linking land use context and design is one of the key original ideas of the Existing Metro Guides. It will articulate a design approach that takes a broad perspective of all users and desired outcomes, and connects the land use (existing and future) context and the function(s) of the street.

○ Lessons Learned

Describes what we as a region have learned since the 2040 Growth Strategy was adopted and the Existing Metro Guides were completed, along with many transportation projects.

- *Street design is not “one size fits all”*
- *Nature can be part of the street, and designs need to concurrently maintain wildlife corridor connectivity and remove barriers for wildlife, and use best practices to mitigate hazards for wildlife from lighting, sound barrier walls, etc*
- *Green infrastructure leads to improved environmental and public health outcomes*
- *Regional trails are part of transportation system*
- *Protecting water quality and stormwater management are responsibilities of transportation planners and engineers*
- *Street design can reduce serious and fatal crashes*
- *Economic impacts of livable street design*
- *Past 15 years of significant green street applications have occurred regionally and design standards/guidelines are continually evolving*

○ Emerging Trends

Describes emerging trends that are influencing how we design streets:

- *Population growth and demographic shifts (diversity and aging population)*
- *Climate change and extreme weather events and the need for building community and environmental resiliency*
- *Autonomous and driverless vehicles/connected vehicles, ride-hailing Lyft, Uber, etc.*
- *Rising use of e-shopping and door-to-door delivery of goods*
- *Rising severe crashes, especially for non-motorized users (pedestrians and bicyclists)*
- *Growing demand for Safe Routes to School, transportation options, trails, bicycle commute options*
- *Green street design standards and guidelines are being incorporated holistically in a project and not necessarily treated in isolation, as well as being applied for all design classifications*

2.2 Desired Outcomes: Designing for Today and the Future

Desired Outcomes are the results we want to support (e.g. healthy people, sustainable economy) through street and trail design.

This section will clearly show how design functions relate to desired outcomes, e.g., the design function of providing space for physical activity is related to the design outcome of increased public health. Desired outcomes are overarching and will not be organized for each street and trail design type. Each bullet (in black text below) will be elaborated with a sentence, short paragraph, and/or references, but will not be an extensive discussion.

- **Safety– Vision Zero**
 - *Summarize that the Vision Zero’s objective is to eliminate serious and fatal crashes.*
 - *Highlight that street design can contribute to the elimination of serious and fatal crashes, including slowing auto traffic speeds and providing more separation of modes, as well as discouraging undesired human behavior.*
- **Transportation Choices**
 - *More people have ability to choose to walk, bike, take transit, use rideshare safely and efficiently.*
- **Efficient and Reliable Travel**
 - *People can get to where they need to go efficiently and reliably by any mode.*
- **Healthy People**
 - *Through more opportunities for physical activity*
 - *Increased bicycle, pedestrian, and transit mode share*

- *Lower asthma rates through reduced GHG , and through increased tree canopy and reduced heat island effect*
- *Through increased access to nature, parks and greenspaces*
- *By eliminating traffic fatalities and severe injuries*
- *Decreased stress through quieter, safer, well lit and greener streets*
- **Security**
 - *Personal security through “eyes on the street,”*
 - *Awareness of other users regardless of their mode choice.*
- **Healthy Environment**

(Draw on Existing Green Streets Guide: section 2.0 Why Green Streets?)

 - *Reducing and mitigating environmental and/or natural resource impacts, including hazards related to light pollution by adhering to best practices in lighting design and incorporating green infrastructure in design stage to ensure and maximize compatibility*
 - *How design may influence mode choice and the environmental impacts it may have by reducing single occupancy vehicles (SOV) trips.*
 - *How management of the stormwater run-off in the street design benefits street users*
 - *Mitigates downstream water quality and flow control problems*
 - *Protects urban natural resources.*
 - *Mitigates urban heat island effect through strategic tree planting.*
 - *Maintains and restores natural processes*
 - *Conserves, protects and restores habitat quantity and quality*
- **Reduced Green House Gas Emissions**
- **Sustainable Economic Prosperity**
 - *Business benefits from walkable and bicycle-friendly areas*
 - *Freight access to industrial jobs and growth in export and import activity*
 - *Employees have transportation choices to access jobs*
 - *Tourism*
- **Social Equity**
 - *Consider racial equity in transportation design process as a way to address equity for all vulnerable groups: lower income, low English proficiency, older adults, youth, people with disabilities*
 - *People empowered process*
 - *Looking carefully for unintended biases*
 - *Preventing displacement through gentrification*
 - *Streets are intuitive and easy to use regardless of age, ability, cultural background, language*

- *Streets and trails are welcoming and safe and comfortable for all and provide transportation options to jobs, schools, health care, food, nature, etc.*
- *Impacts and access to benefits of infrastructure are equitable*
- **Vibrant Communities**
 - *Efficient urban form (supported by transportation)*
 - *Quiet – noise mitigation*
 - *Traffic calming*
 - *Light pollution mitigation*
 - *Place-making*
 - *“Right-sizing” transportation facilities*
- **Resiliency**
 - *Resiliency during natural disasters, during extreme weather events and other major events*
- **Fiscal Stewardship**
 - *Speak to asset management, return on investment*

2.3 **Performance-Based Design**

This section is the KEY overarching design policy from Metro.

- *Describe the need for flexibility in design and context sensitive solutions through performance-based design¹*
- *Federal Highway Administration (FHWA) and State Policies are supportive of design flexibility and establishing similar guidance. Describe the relationship between adopted standards and flexibility, and when diverging from standards is a smart choice.*

2.4 **Policy Context**

(Draw on Existing Green Streets guide: section 3.4 – Regulatory Context)

Regional Policy

Provides a succinct overview of the key regional policies and provide references to specific policy documents for additional details. Discusses how policies support innovative and flexible design, while also limiting what can and cannot be done. Could be presented in a table.

¹ **Performance-Based Design** is an approach for understanding the desired outcomes of a project and selecting performance measures aligning with those outcomes. This approach provides a framework for practitioners to track design decisions, which can support practitioners in implementing flexible designs. This outcome-oriented framework helps identify the design elements that will achieve identified goals, e.g., increase bicycle/pedestrian mode share. Those elements that help achieve goals are used.

- *2040 Regional Land Use Types – 2040 Growth Concept*
- *RTP - Regional Design and Functional Classifications, outcomes based planning, moving people*
- *Regional Transportation Functional Plan (RTFP) – jurisdictions must allow use of guidelines*
- *Urban Growth Management Functional Plan – including Title 2 (Parking), Title 6 (Centers and Corridors), Title 13 (Nature in Neighborhoods)*
- *Goal 5 – Nature in Neighborhoods, fish and wildlife protection*
- *Regional Modal and Topical Plans*
- *Climate Smart Strategy*
- *Regional Transportation Safety Strategy: Vision Zero*
- *Strategic Plan to Advance racial Equity, Diversity and Inclusion*
- *Cap and Trade SB 557 if passed through legislature*

State Policy

- *This subsection will highlight State agency support of design flexibility through performance-based design. References to specific state policies will be included.*
- *Include discussion about Oregon Highway Plan, Policy 1B, which describes that transportation serves the land use.*
- *This will be coordinated with Oregon Department of Transportation (ODOT) as the Urban Design Initiative (UDI) progresses.*
- *Depending on timing, may note certain statewide policies and/or guidance that is under revision or is being updated.*
- *Reference to the “Bicycle Bill” and State Land-Use and Transportation Goals, Transportation Planning Rule*
- *ODOT’s policy code of building all regional trails 16 feet wide (12 with two 2-foot shoulders)*
- *Potential to include pull-out quotes from state legislators, Oregon Transportation Commission (OTC), or ODOT*

National Policy

- *This subsection will highlight FHWA support of design flexibility that includes the direction of national guidance and evolution toward performance-based design compared to code-based design.*
- *It will note key legislation that impacts how streets are designed: National Highway System designations, Federal Clean Water Act, Title VI, Executive Order Environmental Justice, Americans with Disability Act (ADA), Architectural Barriers Act (limits what can be done on trails in parks)*

- *Potential to include pull-out quotes from transportation secretary or United States Department of Transportation (USDOT) officials*

Relationship to Local Policies

This subsection will explain how local agencies should use Metro design guidance:

- *Local jurisdictions often take the new lead with innovative design (e.g., Portland bike boxes, Gresham stormwater) – their initiative in design makes it easier for other jurisdictions.*
- *Following this design process and guidance is required for projects competing for Regional Flexible Funds Allocation (RFFA) funding.*
- *Local agencies should use this design guidance in shaping the documents that influence design in local jurisdictions. This section will describe types of local document and discuss how they influence design. These influencing documents include:*
 - *Development Code*
 - *Engineering Design Manuals/Standards*
 - *Comprehensive plans – land use elements/contexts*
 - *Transportation system plans – functional classifications, cross sections, etc.*
 - *“Action Plans” (e.g. safety action plan, climate action plan)*
 - *Specific ordinances (e.g. lighting ordinance, green street ordinance)*
- *Potential to include pull-out quotes from Metro-area agency leaders.*

Notes: The project team anticipates Metro leading the development of specific sections in this chapter.

CHAPTER 3: DESIGN FUNCTIONS AND CLASSIFICATIONS [20%]

Introduction

Chapter 3 will introduce and describe the functions of streets and trails, and how they relate to the desired outcomes in Chapter 2. It will then introduce the Regional Design Classifications (captured in the policy chapter of the Regional Transportation Plan) and which functions each should be designed to serve. The Design Classification Map in Chapter 2 of the RTP is a policy map which identifies the design concepts that need to be considered to address federal, state and regional transportation planning mandates. While regional trails and some local and collector roadways are part of the regional bicycle and pedestrian networks, the design classification map identifies design concepts only for major roadways because it is these roadways where the greatest trade-offs in design must be considered.

3.1 Design Functions

Design Functions describe the universe of uses (e.g. physical activity, moving goods) that streets and trails can serve and thereby contribute to the desired outcomes.

- *This subsection will provide a brief description of design functions (~2-3 sentences each).*
- *Will include a matrix that connects the functions to the desired outcomes from the previous chapter.*
- *Discuss how Regional Mobility Corridors serve functions within the corridor, and that not all functions necessarily need to be served on one street. There are twenty-four overlapping Regional Mobility Corridors in the region. Each is several miles wide and long and encompasses many highways, streets and trails.*
- Pedestrian Access and Mobility: People walking and people using a mobility device
 - *Describe the importance of walking and walkability to the thriving places*
 - *Brief discussion of destinations where it is most critical to prioritize pedestrian access (transit, schools, etc.)*
- Bicycle Access and Mobility: People riding bicycles
 - *Brief discussion of destinations where it is most critical to prioritize bicycle access (transit, schools, etc.)*
- Transit Access and Mobility: People accessing and using transit
 - *Include various transit modes and brief discussion of the functions/destinations served by each. (light rail, bus, bus rapid transit, enhanced transit, frequent bus, paratransit, and standard bus).*
 - *This will include mention of potential for future driverless transit.*
- Truck Freight Access and Mobility: Moving Goods, deliveries, e-commerce
 - *Discussion of situations where it is critical to prioritize truck/freight.*
- Auto Access and Mobility: People driving, ridesharing, automated and driverless vehicles/connected vehicles
 - *Currently the most “complete” network – this function is constrained by congestion/delay, rather than completeness like the other modes.*
 - *Include discussion of need for safe spaces for rideshare drop-off and pick-up that do not impede the flow of other modes of traffic.*
 - *Will include discussion of autonomous vehicles/connected vehicles and how access considerations may differ for them. Later sections will note specific design considerations related to that type of vehicle.*
- Place-Making and Public Space

- *Describe how streets/trails can be a place for recreation, civic life, public space, or a canvas for public art*
- *Public enjoyment of street trees and green street elements (such as rain gardens).*
- **Corridors for Nature and Stormwater Management**
(Draws on Existing Green Streets guide: Section 1.2, What is a Green Street, 3.2, Understanding the hydrologic cycle, and Section 4.2, Factors related to location and design)
 - *Sustainable stormwater solutions in the public right-of-way protects downstream water quality and flow control problems protecting urban natural resources.*
 - *Discussions of wildlife habitat and corridors, wildlife crossings, and crossing stream corridors, including lighting mitigation and other hazard mitigation practices, which will impact the functional utility of those corridors.*
 - *Utilizing tree canopy to reduce urban heat island effect and provide stormwater management benefits.*
 - *Discussion of how site conditions (soil, infiltration, slopes, utilities, contamination and other right of way improvements) impact green street design solutions in various applications.*
 - *Discuss management goals for green street applications (volume reduction, flow control, water quality) and approach (regional vs. distributed)*
 - *Street trees benefits: runoff reduction and detention; conveyance attenuation, water quality mitigation*
 - *Green communities and provide access to nature*
- **Utility Corridors**
 - *Brief description of the need to design for power, water, communication, data, etc. infrastructure, and the benefits of coordination*
- **Stationary Space**
 - *Stationary space is a function that can correspond to each travel mode, and streets/trails may include this function for 1 or more modes:*
 - *auto parking (autos), storage of personal property;*
 - *ride hailing – pick-up and drop-off (autos)*
 - *loading zones (freight/trucks);*
 - *bicycle parking, bikeways behind transit stop (bicycle);*
 - *transit stops/stations (transit);*
 - *benches/seating (pedestrian)*
- **Physical Activity**

- *Discussion of how streets/trails serve as a place for physical activity. Potential to move mention of “recreation” to this section instead of, or in addition to, in “Place-making and public space”.*
- **Emergency Response**
 - *Describe the function of providing emergency access and the different needs of emergency vehicles.*
 - *Describes “Designated Emergency Routes”*
 - *Include discussion of “evacuation routes”*

3.2 **Regional Functional and Design Classifications**

- *This section will briefly describe the modal networks and functional classifications in the policy chapter of the Regional Transportation Plan.*
- *Link to maps: <https://gis.oregonmetro.gov/rtp/>*
- **Arterial and Throughways Network and Functional Classifications**
- **Transit Network and Functional Classifications**
- **Freight Network and Functional Classifications**
- **Bicycle Network and Functional Classifications (includes Trails)**
- **Pedestrian Network and Functional Classifications (includes Trails)**
 - *This section will provide a description of the regional design types assigned to Arterials and Throughways and shown on the Regional Design Classification map in the policy chapter of the Regional Transportation Plan. Not all streets, and no trails, identified on the bicycle and pedestrian modal networks will have a regional design type assigned to them. Bicycle and pedestrian elements, including regional trails within the right-of-way, are part of the design type description.*
 - *Link to Design Classification map: <https://gis.oregonmetro.gov/rtp/>*
 - *Metro will work with agency partners and key stakeholder’s to finalize the design classifications and update the Regional Design Classification map.*
 - *Design types are general by nature; in practice the ultimate design and function of Regional Boulevards, for example, will be different based on context and desired outcomes.*
 - *This section will include a matrix that describes which functions should typically be served by which design types. (Potentially specifying primary, secondary, and “optional” functions.) For example: An Industrial Street’s primary function may be freight access, with optional stationary space, while a Regional Boulevard’s main function is multi-modal access and place-making, with optional freight access. It will point to Regional Mobility Corridors and the corridor approach to serve different functions within a corridor (e.g. Industrial Street with nearby regional trail).*
 - *This will review how adjacent land uses impact design classifications.*

- *May acknowledge and/or draw on the functional classification system described in “National Cooperative Highway Research Program (NCHRP) 15-52: Developing a Context-Sensitive Functional Classification System for More Flexibility in Geometric Design” to note the national trends for functional classification.*
- *Throughways: propose to no longer separate into “freeways” and “highways.” This design type is for grade separated limited access facilities. Defines number or lanes. Essential function is throughput and mobility.*
- *Regional Boulevards: propose to no longer distinguish between “regional” and “community” boulevards. This design type would be for major and minor arterials that serve as a “main street” and are typically located in centers and activity centers. Discuss number of lanes, when boulevards are couplets. Balancing access and mobility. Further discussion needed on name. “boulevard” may not be the correct name.*
- *Regional Streets: propose to no longer distinguish between “regional” and “community” streets. This design type would be for major and minor arterials that serve as commercial corridors and connect centers, employment, industrial areas and activity centers. Discuss number of lanes, couplets. Balance between mobility and access.*
- *Industrial Streets: propose to eliminate design classifications on roads outside of the Metropolitan Planning Area boundary. Propose to assign the “industrial streets” design classification to streets identified as Intermodal Connectors on the regional freight map. Essential function of these streets is access to intermodal facilities, while balancing safety and access to transit and other destinations.*

Note: In Phase II, the development of the guide, the Technical Work Group will have further discussion on design classifications and determine an approach for this guide that accounts for trails and bicycle boulevards. Work Group, TPAC and MTAC will have opportunity to weigh in.

CHAPTER 4: DESIGN ELEMENTS [20%]

Introduction

Chapter 4 includes the lowest-level (1000-foot view; most down-to-earth) content, discussing on-the-ground physical design elements and design considerations.

4.1 Performance-Based Design

- *Performance-based design is an approach to designing streets and trails that starts with the desired functions and outcomes of the project and then selects*

the design elements to support achieving those functions and outcomes performance based design is the key principle underlying the selection of elements and design of streets and trails.

- *Communicates the importance of the interaction between design elements based on the context and the need to evaluate how different combinations may contribute to the overall performance of the street.*
- *Embraces the interaction of safety, operations and design together rather than focusing on design elements and their respective dimensions.*
- *Discusses balancing overall width with serving desired functions*

4.2 Design Elements

Design Elements are engineering and design solutions (e.g. wide sidewalks, freight aprons) used to support the various functions (e.g. physical activity, goods movement) and desired outcomes of livable streets and trails (e.g. healthy people, sustainable economy).

Information in this subsection will be based on some of the information in the Existing Creating Livable Streets Guide (Chapter 3), the Existing Green Streets Guide, and the resources identified in the Resource List (e.g., Reference Designing for Truck Movements and other large vehicles in Portland (October 2008)), and will emphasize best practices (e.g. protected bikeways).

- *Intended to include design elements that support the desired outcomes and design functions described in Chapter 2 and 3, respectively.*
- *Each element will be covered in approximately 2-3 pages, and will include the following sections:*
 - *Basic description/definition*
 - *Functions – which does it serve? (The “benefits” of this design element)*
 - *Design Guidance*
 - *Design Considerations/Challenges (will replace much of the envisioned content from “Design Considerations in Context”; design considerations will frequently include discussion of Green Streets infrastructure options)*
 - *Additional Resources*
- *Will not give prescriptive dimensions or detailed design guidance, but will provide ranges and brief guidance for selecting appropriate dimensions depending on context.*

Introduction: The Travelway Realm

- *Describe the on-street/travelway realm, transition realm, pedestrian realm, land use realm. Note that modal facilities may appear in more than one of these*

realms depending on the street and context. (e.g., bicycles and transit may have dedicated space in the travelway or in the transition realm – therefore each of these have their own organizational section)

- *Will include an overarching 3D graphic/illustration that shows the different realms, and also shows how some areas overlap.*
 - *Intersections and Crossings (Nodes) are discussed in their own section.*
 - *Trails are discussed in their own section*
 - *Additional elements for “all realms” included in final section*

Land Use Realm

(Existing guide: Adjacent Land Use, page 44-53, minimal modifications)

- *This section will not include separate “elements” but will treat the land use realm as an “element” – since this guide is not focused on architectural design.*
- *Adjacent land-use (current and planned) guides transportation design.*
- *Brief discussion of building frontage impacts/relationship to key functions of the street; include references with more detail.*
- *Best practices: transparency, edge treatments, etc*

Pedestrian Realm (Sidewalk)

This section will include elements that are primarily found in the pedestrian realm on the sidewalk side of the curb. Numbered entries are the “elements”.

(Existing guide: Pedestrian Realm, page 29, minimal modifications)

1. Frontage Zone of buildings and adjacent parking lots
 - Signage (businesses)
 - Sidewalk cafes, seating
2. Pedestrian Through Zone (Existing guide: Sidewalks, page 30-35, significant reorganization/modification)
 - ADA – Universal design
 - Range of widths for different land use contexts and street types
 - Option for shared space: Reference to trails section – in some cases this is an appropriate design for the pedestrian realm adjacent to streets and in street corners.
3. Street Furniture Zone (Existing Guide: Streetscape features and Landscaping and Planter Strips, page 42-43, significant modification)
 - Street furniture
 - Utility vaults *(limits other pedestrian facilities that can be offered, interfere with other design elements)*

- Transit stops and shelters (reference transit section)
- Reference wayfinding and lighting (in final section)
- Bikeshare stations
- Street trees (Existing Guide: Street Trees, page 36-37; minimal modifications)
 - *Include seven roles of urban street trees (Street Design the Secret to Great Cities and Towns)*
 - *Desirable characteristics (wide spread canopies, tolerate urban pollutants, etc)*
 - *Climate resilient*
 - *Preservation of existing tree resources (especially large form trees) by allowing flexibility in design (retrofitting street with existing trees)*
 - *Sidewalks around existing trees - species that would not damage sidewalk*
 - *Include Appendix with updated Green Trees Guide content.*
- Flow through or infiltration stormwater planters

4. Street Corners

- Curb extensions
- Curb ramp design
- Inclusion of ADA elements
- Bus pullouts
- Flow through or infiltration stormwater planters on curb extensions
- Reference Crossings (discussed in “Nodes” section)

Transition Realm

This section will include elements that are found in the on-street curbside area. This area has the most variation in different contexts and different streets. Additional mode-specific detail is found in the “bikeways” and “transitways” sections.

Numbered entries are the “elements.”

5. Planters, swales, and basins for stormwater management

- Discuss site conditions (*infiltration, slopes, utilities, contamination*)
- Management goals (volume reduction, flow control, water quality)
- Stormwater approach (regional vs. distributed)
- Manufactured technologies (structural soils; tree filter systems)
- Maintenance

6. Curb: On-Street Parking and Other Uses

(Existing guide: On-Street Parking, page 38-39, some modifications, significant additional information)

- Diagonal (front and back-in)
- Parallel
- Publicly shared vehicle parking
- Management strategies for flex-space
- Loading and unloading zones
- Pick-up / drop-offs
- Electric vehicle charging
- Bicycle corrals
- Bike-share stations
- Transit stops (reference transit section for further transit-related design)
- Pervious pavement and structural soils (green street infrastructure considerations)

7. Surface Stormwater Conveyance and Detention

- Inlets, runnels
- Management approaches
- Detention pools
- Considerations: should include stormwater infrastructure type: combined sewer, UIC, or MS4. Design requirements (design storm size; water quality and flow control requirements) can vary substantially for each type.

8. Other buffer elements

- Between pedestrians and travelway (bicycle or auto)
- Between bicycle and auto
- Buffers to visually narrow the lanes
- Street seats
- Noise mitigation – *sound walls (use of materials that minimize collision hazards, i.e., specification of marked glass or other non-transparent, bird safe material); Light pollution mitigation/shielding to prevent light trespass, which has potential to impact human health; use of green walls when possible that provide secondary benefits in addition to noise mitigation.*

Center Travelway Realm

Include discussions on what types and general widths of facilities are needed depending on the context of vehicular activity (e.g. speeds, volumes, number of

lanes, heavy vehicles). A discussion how to treat couplets and number of lanes will be included. Numbered entries are the “elements”.

9. Motor-Vehicle Travel Lanes (existing guide: Travel Lane Width, page 15, with significant modifications)

- Widths and attributes for:
 - Transit
 - Freight
 - Emergency vehicles
 - Autonomous/driverless vehicles/Connected Vehicles
 - *Outlines challenges and considerations, starting with list developed by Urbanism Next*
- Turn-lanes
- Shy distance

10. Medians (existing guide: Medians, page 16-18, minimal modifications)

- Landscaped or hard surface
- Consider flow through or infiltration stormwater planters

11. Traffic Calming

- Vertical Speed Controls
- Horizontal Speed Controls
 - *Include overall discussion that reducing speeds does not always mean the creation of congestion. Some discussion on how lower speeds does not always mean a significant increase in travel times (particularly over shorter distance trips).*

12. Access Management/Driveways

13. Shared Streets

- Auto/bicycle shared lanes
- Bus/bicycle lanes
- All modes (woonerf-style)
- Traffic diversion

Bikeway Design

This section will include elements related to on-street bikeways. Bikeway intersection design is covered under the Intersections section. Multi-use paths in the right-of-way are covered under the trails section. Numbered entries are the “elements”.

14. Dedicated bicycle facilities (Existing guide: Bicycle Lanes, page 21-22, significant modifications)

- Protected bikeways (consideration, driveways)
- Buffered bicycle lanes
- Standard bicycle lanes
- Bicycle-specific Signing and Markings
 - Striping options
 - Bicycle boxes
 - Reference wayfinding element

15. Shared spaces

- Bus and Bikeway Interactions
- Freight, bicycle, and pedestrian interactions
- Mixing zones (*e.g., right turns and bicycles*)
- Shared travel lanes
 - *greenways, bike boulevards, neighborhood bikeways, etc. – routes that are parallel to major streets*

Transitway Design

This section will include elements related to transit access and mobility. Numbered entries are the “elements”.

Existing guide: Public Transit, page 40-41, significant reorganization, modification)

16. Transit stops (show design in conjunction with bicycle facilities, shared and separate spaces)

17. Transit priority treatments

- Lanes (Business Access & Transit (BAT), Pro-time transit, shoulder, etc.)
- Queue jumps
- Signal priority
- Enhanced transit treatments (*Portland developing toolkit*)

18. Transit in travelways

- High Capacity Transit (HCT) bus
- High Capacity Transit (HCT) rail
- Streetcar
- Center-running / side-running

Intersections and crossings (nodes)

This section will include elements related to intersections and crossings for all facility types and modes. Numbered entries are the “elements”. Will include considerations for inclusion of green streets infrastructure described in other elements.

(Existing guide: Intersections, page 23-26, significant reorg of info)

19. Midblock crossings (Existing guide: page 19-20, significant modifications)

- Pedestrian

- Bicycle
 - *Discuss the interaction of pedestrians/bicycles using crossings and how crossings span the pedestrian realm and the center travelway; also discuss serving potential transit at crossings*
 - Trail
 - Wildlife Crossings
 - *This section will primarily reference the existing Wildlife Crossings Guide (which will not be updated through the New Metro Guide process), noting considerations of lighting impacts on wildlife and hazard mitigation (e.g. marked glass)*
 - *Consideration: hazard mitigation, including addressing of lighting.*
 - Consider flow through or infiltration stormwater planters (discussed under street corners)
20. Un-signalized intersections
- Crosswalks
 - Bicycle crossings
 - Stop controls
 - Reference traffic diversion from shared streets element
 - Curb radii
 - Driveway crossings
21. Signalized intersections
- Crosswalks
 - Bicycle crossings
 - Signalization considerations
 - Turn lanes
 - Conflict points - Multimodal Considerations at Complex Intersections
 - Curb radii / freight aprons
22. Roundabouts/mini-roundabouts
- including mountable curbs for freight trucks
 - Planter strips/central island – design opportunities
23. Unique / Gateway / Transition Contexts
- Raised intersections/treatments

Regional Trails and On-Street Multi-Use Paths

This section will describe the different regional trail typologies in different contexts. A graphic will depict a trail moving through different land use contexts from rural/sparsely populated to dense urban core to illustrate how different trail

typologies respond to context.² The focus of the regional trails discussion is on trails for transportation. Numbered entries are the “elements”.

24. Multi-use paths on independent alignment

- *On levees, along railroads, utility corridors*
- *Widths for different contexts and users*
- *Separating modal users – lane striping, pavements, etc*
- *Consideration of maintenance and emergency vehicles*
- *Multi-use paths in riparian corridors – (reference to Green Trails guidance, lighting impacts, Clean Water Services guidance)*
- *Crime Prevention Through Environmental Design approaches*
- *Special considerations for trails: ADA, slope (running and cross slope) Architectural Barriers Act, maintenance*

25. Multi-use paths in roadway right-of-way

- *Adjacent to roadway >35 mph*
- *Adjacent to roadway < 35 mph*
- *Attached to roadway*
- *Widths and separation for different contexts and users*
- *Consideration of maintenance and emergency vehicles*

26. Connections to other facilities

- *Transitions between on- and off-street facilities*
- *Detour due to road closure*
- *Access points*

27. Bridges, boardwalks and structures

- *consider load factor resistance design*
- *rails, walls and fences - use of materials that minimize collision hazards (i.e., specification of marked glass or other non-transparent, bird safe material) and/or green walls*

28. Trail Crossings

- *mid-block*
- *end block*
- *intersections*

² *For example the graphic could show a trail moving from a soft surface trail in a dense forest, to a shared multi-use path alongside a rural road, to a slightly wider multi-use path through a small suburban along an active rail line, to a shared path through a utility corridor, to a wide shared use path alongside a riparian corridor in a dense inner city neighborhood, to a shared use path with separation between walking and bicycling in the ROW alongside a busy arterial, to a 20ft wide shared use path in a dense city center along a major river with a separate protected bikeway.*

- driveways
- Undercrossing/ culverts
- Rail road
- Overcrossing
- Mixing zones (to address conflict points)
- Bollards

Design Elements for All Realms

This section will provide an overview of design elements that apply in various realms.

29. Street and Trail Surfaces

- Pervious surfaces – where can they be applied
- Permeable pavers
- Varying surfaces to separate users
- Materials options specific to Metro region

30. Lighting

- Types of lighting and best practices
- When and where to use lighting
- Lighting for safety
- Pedestrian scale lighting
- Wildlife sensitivity
- Dark skies

31. Wayfinding

- Signing and striping for wayfinding
- Trails
- Bicyclists and pedestrians

32. Place-making Amenities

- Art
- Water-fountains
- Seating

4.3 Design Considerations Checklist

Section 4.3 is a checklist of design considerations that may influence design. These considerations are described in above sections, so this is a “summary” that will help practitioners easily identify the elements they need to consider. Some of these considerations have an influence on design even if they are not contributing to the core function of the street.

- How is emergency vehicle access provided? Is this an emergency vehicle route?
Evacuation route?

- Is this street within ¼ mile of a school? (Safe Routes to School Access)
- Is this a transit route?
- Is this a Metro freight route? Is it an ODOT “Hole in the Air” route (i.e., ORS 366.215)?
- Is this an National Highway System (NHS) route?
 - *Reference the Guide for Integrating Goods and Services Movement by Commercial Vehicles in Smart Growth Environments.*
- Are there environmental constraints? (parks, wetlands, streams, sensitive wildlife habitat) Are there opportunities to protect natural resources, improve natural resources, and increase access to natural resources?
- Cultural or historical constraints or influences?
- What is the topography / Slope and structures? (Retaining Walls, Bridges)
- Do we need to design for automated and driverless vehicles/connected vehicles, emerging technologies?
- How would this street be impacted by extreme weather events? (heat, more rain, street trees, shade, shelter, pavement)
- What are the maintenance needs – above and underground?
 - *this can be a particular challenge in areas with low home-ownership (e.g., street trees, bioswales)*
- Traffic diversion (from street calming, bicycle boulevards, etc)
- What are the Public Input and Community Desires?
 - *may include perception of design strategies, such as “road diets” or trails.*
- Are there conflicting policies from different jurisdictions?
- Are there parallel routes to serve certain functions (e.g. parallel bicycle routes)?

CHAPTER 5: VISUALIZING DESIGN CLASSIFICATIONS IN CONTEXT [12%]

Introduction

Chapter 5 will provide illustrative examples of what the design elements look like for the design classifications and in a variety of contexts (e.g., existing, constrained Regional Boulevard in a dense older neighborhood, new Regional Street in a new development, retrofit/incremental change). The examples will include several schematic drawings for each design type to illustrate that one size does not fit all and flexibility in design. Photos of existing streets and trails in the region (that people recognize!) and show different design elements on the various street types can also be used to illustrate how the design elements come together to create livable streets and trails.

- *This chapter will focus on “visualization” of the classifications through schematics and cross-sections. Photos may also be used to show existing examples.*

- *Visualizations and cross sections represent design classifications from Section 3.2 and include elements from Chapter 4: how treatments fit within the different contexts; including stormwater and trees treatments; Potential to show some sample metrics about performance.*
 - **Throughways**
 - *Below grade in urban area, four motor-vehicle travel lanes, bus rapid transit lanes, concrete divider, adjacent multi-use path with lighting, trees and stormwater treatments and green elements on embankments.*
 - *Below grade, six vehicle motor-travel lanes, concrete separator, adjacent light rail, trees stormwater treatments and green elements on embankment.*
 - *At grade in suburban area, greenway separation, pedestrian/bicycle over and undercrossings.*
 - **Regional Boulevards**
 - *One to four story mixed use development, frequent transit corridor, bicycle and pedestrian parkway, four motor-vehicle travel lanes, transit priority lane, median with trees, turn lane, roundabout at intersection, adjacent multi-use path with two way bikeway and pedestrian zone, ADA.*
 - *Intersection with bicycle treatments, paving treatments, raised crosswalk, roundabout, ADA.*
 - *Two to four story mixed use development, frequent transit corridor, bicycle and pedestrian parkway, freight route, four motor-vehicle travel lanes, separated two-way bikeway, planted buffer with bikeshare station and bio-swales, wide sidewalk, ADA.*
 - *One to two story mixed use development and single family housing, frequent transit corridor, pedestrian parkway, two motor-vehicle travel lanes, median and turn lane, planted buffer with electric vehicle charging and bio-swales, wide sidewalk, bicycle boulevard one street over, ADA.*
 - *One to four story mixed use development, frequent transit corridor, bicycle and pedestrian parkway, freight route, four motor-vehicle travel lanes, median with trees, turn lane, separated bikeways, wide sidewalk with transit stations, regional trail one street over, ADA.*
 - *Similar to examples above but with couplet.*
 - **Regional Streets**
 - *Commercial development, big box, mixed use at intersections, frequent transit, freight route, bicycle and pedestrian parkway. Four motor-vehicle travel lanes, transit priority lanes, median, turn lane, wide sidewalk with transit stations, bicycle boulevard one street over, ADA.*

- *Commercial development, big box, frequent transit, freight route, bicycle and pedestrian parkway. Two motor-vehicle travel lanes, transit priority lanes, buffered bikeway, planted buffer with bikeshare station and bio-swales, wide sidewalk, freight aprons at curb, , ADA.*
- *Commercial development, big box, mixed use at intersections, frequent transit, and pedestrian parkway. Two motor-vehicle travel lanes, median and turn lane, planted buffer with electric vehicle charging and bio-swales, wide sidewalk, ADA.*
- *Similar to examples above but with couplet.*
- **Industrial Streets**
 - *Industrial development, large lots, access to intermodal facility. Four motor-vehicle travel lanes, wider streets, wider turning radii at intersections and driveways, adjacent multi-use path separated from street by planted buffer, ADA.*
 - *Two lane roadway through town center connecting to intermodal facility. wider turning radii at intersections and driveways, adjacent multi-use path separated from street by planted buffer, ADA.*
 - *Intersection with freight apron, mountable curbs.*

CHAPTER 6: DECISION-MAKING IN CONTEXT [18%]

Introduction

Chapter 6 is intended to provide practitioners with a framework to guide decision-making. Ultimately, the decision-making guidance in this chapter will need to be flexible enough that a variety of jurisdictions can use it to make decisions, and also use it to explain their decision-making process to other agency stakeholders, members of the public, elected officials, etc.

- *Will emphasize consistency with previous chapters – policies focus on **desired outcomes** (6.1), and the performance-based design process (6.2) is based on serving design **functions** by combining design **elements**.*

6.1 Policy Guides Decision-Making

- **Policy Guidance**
 - *Policies and desired outcomes should guide transportation design*
 - *Restate Metro’s overarching policy from Chapter 2, Section 2.4 – performance-based design.*
- **Focus on Desired Outcome**
 - *Emphasize that desired outcomes and functions must be clearly determined prior to embarking on design.*

- *Also acknowledge that streets and trails are not developed in a “perfect world”. Funding constraints, competing policy objectives, existing infrastructure and traditional approaches to designing streets are part of the reality in which street designs are developed.*

6.2 Performance-Based Design: Decision-Making

This subsection will outline a decision-making process or flow-chart for travelway design, drawing on NCHRP 785: Performance-Based Analysis of Geometric Design of Highways and Streets.³ The process/flow will draw on content from earlier chapters in this New Metro Guide, with practitioners guided through a series of questions (the following questions are examples/possibilities).

- **Developing Complete Networks to Serve the Design Functions**
 - *What is the land use context and regional (or local) classification of the travelway?*
 - *For which networks is this travelway critical? For which networks are there alternate/parallel routes that can serve?*
 - *Walking?*
 - *Biking?*
 - *Driving?*
 - *Driverless vehicles?*
 - *Transit?*
 - *Freight?*
 - *Nature/habitat corridors?*
 - *This subsection will highlight how function and modal priorities can be evaluated in the context of the greater transportation network. This is intended to help practitioners decide when trade-offs can be made given the nature and presence of parallel routes.*
 - *Safety considerations will be included in this section. If the project team states that a street is going to serve a particular mode, then it should include safety-related design treatments for that particular mode.*
- **Defining Priorities and Needed Functions for Each Travelway**

³ *Reference NCHRP Report 785, Performance-Based Analysis of Geometric Design of Highways and Streets, as well as direction from Federal Highway Administration (FHWA) encouraging states to implement performance-based practical design to address system performance, mobility, and safety needs in the current era of financial limitations.*

- *What design functions must be included or improved to further the desired outcome?*
 - *And/or: What design functions must be maintained...?*
 - *And/or: What design functions are not carrying us towards the desired outcome?*
 - *Potentially specify primary, secondary, and “optional” functions.*
- *What metrics will be used to evaluate the function of existing (if applicable) and future design options?*
- **Flexibility in Design – Combining Elements**
 - *Based on answers to above and guidance outlined within the design elements, what design elements or design solutions should be considered (develop alternatives)?*
 - *How well do the design elements serve the desired functions?*
 - *How do these alternatives compare to the available right-of-way (ROW)? (Are you designing for a travelway that has the opportunity to obtain more ROW, or is it constrained to the existing ROW?)*
 - *This subsection would provide guidance (e.g., range of dimensions) for different travelway design types.*
 - *What are the key design controls and influences? (speeds, sight distance)*
- **Data to support decision making**
 - *Include discussion of typical data that would be available or that can be collected to support decision-making and evaluate the impacts of the selected design (before/after implementation).*
- **Evaluating Trade-offs**
 - *If right-of-way is constrained, insert series of questions/process that will help identify trade-offs to guide the practitioner, e.g.:*
 - *Can an alternate/parallel route within this corridor serve one or more of the desired functions (typically bicycle mobility)? – If alternate/parallel routes are identified those parallel routes must be included in the overall project, including:*
 - *Access to the parallel travelway; distinctive bicycle parking and wayfinding for intuitive access*
 - *For walking and biking, special consideration must be given when walking and biking routes intersect with travelways and when people walking and biking access destinations on that travelway. This is especially important if the travelway has a high traffic volume with high speeds, as people walking and biking may be less visible to people driving*

- *Can widths of particular design elements be minimized without sacrificing the function? (and/or is more research needed to determine appropriate widths?)*
- *Is there an existing function that can be removed from this travelway, keeping in mind the desired outcomes?*
- *Can the travelway space be allocated in different ways depending on time of day?*
- *Can a particular mode be de-emphasized?*

CHAPTER 7: IMPLEMENTATION STRATEGIES AND EXAMPLES [17%]

Introduction *This chapter will consider implementation strategies illustrated with actual implemented projects to describe the project development and how the design comes together following the decision-making process in Chapter 6. This chapter will rely heavily on case studies, which will cover a range of topics and projects, aiming to show a variety of themes that different agencies can relate to. Each case study will be 1-2 pages and will include images and potential diagrams as well as explanatory text. Case studies will be either completed, or based on potential redesigns of existing streets.*

7.1 New Streets and Trails

- *Discussion of balancing overall width with achieving desired outcomes and serving desired functions. Note that the maximum width for new streets/trails is not necessarily the optimal even if it serves the most functions, due to impacts on the surrounding land uses and nature and the potential for it to be a barrier.*
- *Include case study of new street that is successful at this.*
- *Trail case study: South waterfront example of separating bicycles and pedestrians into two facilities. Good design for the context, but not appropriate for all regional trails. The point is that one size does NOT fit all.*

7.2 Retrofit / Redesigns

- Temporary/Pilot Implementation
 - Moving the curb with paint
 - Parklets
 - Temporary street closures
 - Pilot bus lanes (suburban example: Everett, Massachusetts and urban example: Pittsburgh, Liberty Avenue)
 - Interim public plazas
 - *Include a case study illustrating these methods.*
 - *Discuss who needs to be involved, what type of code allows these, what potential barriers to consider.*

- **Low-cost**
 - *Will discuss low-cost strategies for improving outcomes in the near-term. Include discussion of:*
 - *Metro policy on constructing active transportation facilities – fill gaps first*
 - *Low-cost does not need to mean low-quality*
 - *Outline different examples of low-cost changes and discuss how they change the function of the travelway.*
 - *How might a low-cost/near-term implementation impact the potential for a larger project in the future?*
 - *Discuss strategies that leverage routine repaving and maintenance to make improvements.*
 - *Include a case-study of a project that has been implemented with re-striping / paint only.*
- **Incremental change (e.g. lot-by-lot through development)**
 - *Discussion of factors that influence whether incremental change is feasible (e.g., street frontage improvements)*
 - *What types of design elements provide benefit when they are constructed incrementally (e.g. sidewalks)*
 - *Discussion of best practices for timing of construction (including consideration of nature, e.g. Avoiding Impacts on Nesting Birds—Vegetation and Construction projects)*
 - *Include a case-study of a street that has gone through incremental change over time, with each parcel redeveloping, or dedicating ROW. (?)*
 - *Multi-use path construction*

7.3 Intersection Project

- *Urban and suburban example*

7.4 Evaluation: Before and After Implementation

- *Discuss the importance of documenting before and after metrics. Evaluation should be included in all implementation.*
- *Include summary of relevant performance measures and include references with more detail.*
 - *Include a matrix of project-level performance measures that align with the RTP system performance measures (though they will not be the same measures in most cases.)*