Technical Memo #10

Transportation Standards
March 3, 2023 – FINAL

Prepared by Fehr & Peers

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Introduction

This technical memorandum documents the transportation system standards in Manzanita, Nehalem, and Wheeler that will be adopted as part of the Nehalem Bay Transportation System Plan (TSP). The standards documented in this memorandum include:

- Roadway functional classification system
- Access spacing standards
- Standard roadway cross-sections
- Bicycle and pedestrian networks
- Traffic impact analysis guidelines
- Mobility standards
- Evacuation routes
- Freight
- Intelligent Transportation System (ITS) guidelines
- Traffic calming guidelines

This memorandum begins with standards that apply to regional roadways, primarily U.S. 101, and standards that apply to all three communities. Those standards include roadway functional classification, access spacing standards and mobility standards on U.S. 101, evacuation routes, freight, and ITS guidelines. Traffic calming guidelines that could be applied to all three cities are also included in the regional section. This is followed by standards specific to each of the three cities including standard roadway cross-sections, bicycle and pedestrian networks, traffic impact analysis guidelines, and local mobility standards.

Regional

This section documents the regional standards that apply to U.S. 101 or are consistent for all three cities and the jurisdiction for each roadway in the study area, which is shown on **Figure 1**.

Roadway Functional Classification System

Functional classification is an important identifying metric for roadways. Roadways are assigned a functional classification to indicate purpose, design, and function. General descriptions of functional classes are as follows.

> **Principal arterials** carry the highest volume of traffic of any roadway type below grade-separated freeways and provide regional connections. Mobility is a priority on principal arterials and access control is important.
>
> **Arterials** are designed for higher volumes but carry fewer regional trips. These streets link major commercial, residential, industrial, and institutional areas.
>
> **Collectors** distribute trips between local streets and arterials. They serve as transition roadways between commercial and residential areas and provide a citywide circulation function. Collectors can be split into **Major** and **Minor** collectors, with major collectors generally having longer lengths, higher speed limits, higher traffic volumes, and more travel lanes than minor collectors. Major collectors offer more mobility and minor collectors offer more access.
>
> **Local streets** are the lowest functional classification. They provide circulation within residential neighborhoods, provide access to homes and properties, and serve a slower-moving mix of modes.

Figure 2 shows the functional class of all streets in the region while **Table 1** shows the jurisdiction and functional classification of roadways that are classified as collectors or higher.

Figure 1. Roadway Jurisdiction

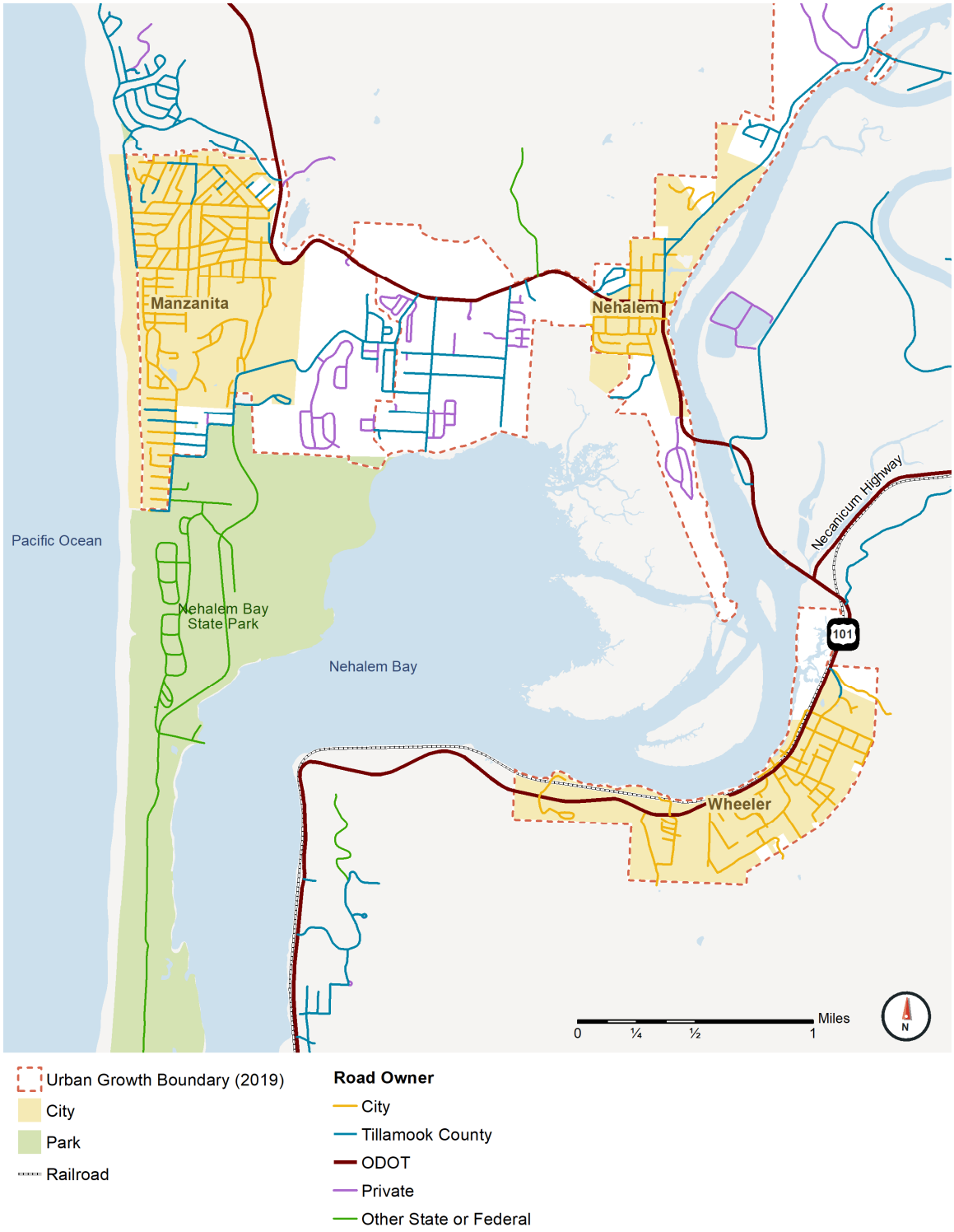


Figure 2. Roadway Functional Classification

Roadway Classification

- Principal Arterial
- Major Collector
- Minor Collector
- Local
- Urban Growth Boundary (2019)
- Park
- City

Table 1: Roadway Jurisdiction and Functional Classification

Roadway	Location	Jurisdiction	Functional Classification
U.S. 101	Study Area	ODOT	Principal Arterial
Laneda Avenue	Manzanita	Tillamook County	Major Collector
7th Street / North Fork Road	Nehalem	Tillamook County	Major Collector
Necarney City Road	Nehalem UGB	Tillamook County	Minor Collector
Ocean Road	Manzanita	Tillamook County	Minor Collector
Nehalem Road	Manzanita	Tillamook County	Minor Collector
Sitka Lane	Manzanita UGB	Tillamook County	Minor Collector
Sandpiper Lane	Manzanita UGB	Tillamook County	Minor Collector
Gary Street	Manzanita UGB	Tillamook County	Minor Collector
Hemlock Street	Wheeler	Wheeler	Minor Collector
Gregory Street	Wheeler	Wheeler	Minor Collector
Hospital Road	Wheeler	Wheeler	Minor Collector
Dubois Street	Wheeler	Wheeler	Minor Collector

Access Spacing Standards

The Oregon Transportation Planning Rule (TPR) defines "Access Management" as "…measures regulating access to streets, roads and highways from public roads and private driveways." The TPR requires that new connections to both arterials and state highways follow designated access management guidelines. Typically, existing access points can remain so long as the land use does not change.

ODOT Standards

The Oregon Highway Plan (OHP) includes access management spacing standards for ODOT highways, most recently amended in 2005. U.S. 101 is under ODOT management and must follow OHP standards, shown in **Table 2**.

Table 2: OHP Access Spacing Standards

Roadway	Speed Limit	Spacing Standard (rural)	Spacing Standard (urban)
U.S. 101	55 or higher	1,320 feet	1,320 feet
	50	1,100 feet	1,100 feet
	40 & 45	990 feet	800 feet
	30 & 35	770 feet	500 feet
	25 & lower	550 feet	350 feet

Mobility Standards

For U.S. 101, mobility standards are documented in the OHP. The OHP establishes v/c mobility targets for highways throughout the state, with a v/c target of 0.8 to 0.85[1] for U.S. 101 within the UGB and 0.70 outside the UGB. These are, however, targets rather than standards and the OHP acknowledges that in some cases it may be impractical to meet these targets. Targets for U.S. 101 are shown in **Table 3**.

Table 3: U.S. 101 Mobility Targets

ID	Segment	v/c target[1]
1	US 101 north of Laneda Avenue	0.80
2	US 101 at west city limits of Nehalem	0.80
3	US 101 west of 7th Street	0.85
4	US 101 north of Tohls Street	0.85
5	US 101 north of Necanicum Highway	0.70
6	US 101 north of Hemlock Street	0.80
7	US 101 north of Rector Street	0.85

[1] v/c targets taken from the Oregon Highway Plan Table 6 based on highway category and posted speed.

ODOT Design Guidance

As a state highway, all improvements on ODOT are subject to ODOT approval and must be designed in compliance with the standards documented in the Highway Design Manual (HDM).

One way to ensure that the appropriate design criteria are applied is completion of an Urban Design Concurrence (UDC) Document. A UDC is a form that is used to determine project context, define design criteria, and document design decisions. As defining the correct project

[1] The v/c targets cited for the segments of U.S. 101 through Nehalem Bay are based on the Oregon Highway Plan Table 6 *Volume To Capacity Ratio Targets Outside Metro*. These segments are classified as Freight Routes on a Statewide Highway Non-MPO, with different targets identified based on posted speed <= 35 mph, >35 and < 45 mph, or >=45 mph.

context is a key component of the design process, this should be completed by the local agency in partnership with ODOT.

Should the cities desire to install traffic control devices on U.S. 101, that must also be completed in accordance with ODOT guidelines and requirements. Under Oregon Administrative Rule (OAR) 734-020-0410, approval of installation of traffic control on state highways is delegated to the state traffic-roadway engineer. This can be achieved through completion and submittal of a State Traffic-Roadway Engineer Approval Request (STRE). Table 100.0-A in the ODOT Traffic Manual lists the devices and features that require STRE approval.

Traffic Calming Guidelines

This section presents a variety of tools that could be used by each of the three cities to slow vehicle speeds and create a more comfortable environment for people walking and riding bicycles. Potential strategies, presented in **Table 4**, were identified as generally low-cost tools that could be deployed on most streets in the Nehalem Bay region. It is important to note, that any traffic calming on U.S. 101 would require approval by ODOT prior to implementation.

Table 4: Traffic Calming Toolbox

Traffic Calming Strategy		Description	Principal Arterial	Major Collector	Minor Collector	Local
Speed Feedback Sign	 Photo Source: Sacramento County Transportation	Speed feedback signs measure each approaching vehicle's speed. Real-time speeds are relayed to drivers and flash when speeds exceed the limit. Speed feedback signs are typically mounted on or near speed limit signs and are most common in school zones.	√	√	√	
Vertical Devices		Vertical deflection devices use variations in pavement height and alternative paving materials to physically reduce travel speeds. These devices are designed for travel speeds over the device of approximately 15 to 20 MPH depending on the device. The vertical deflection devices in the toolbox include: • Speed Lump/Cushion • Speed Hump • Speed Table • Raised Crosswalk			√	√

Table 4: Traffic Calming Toolbox

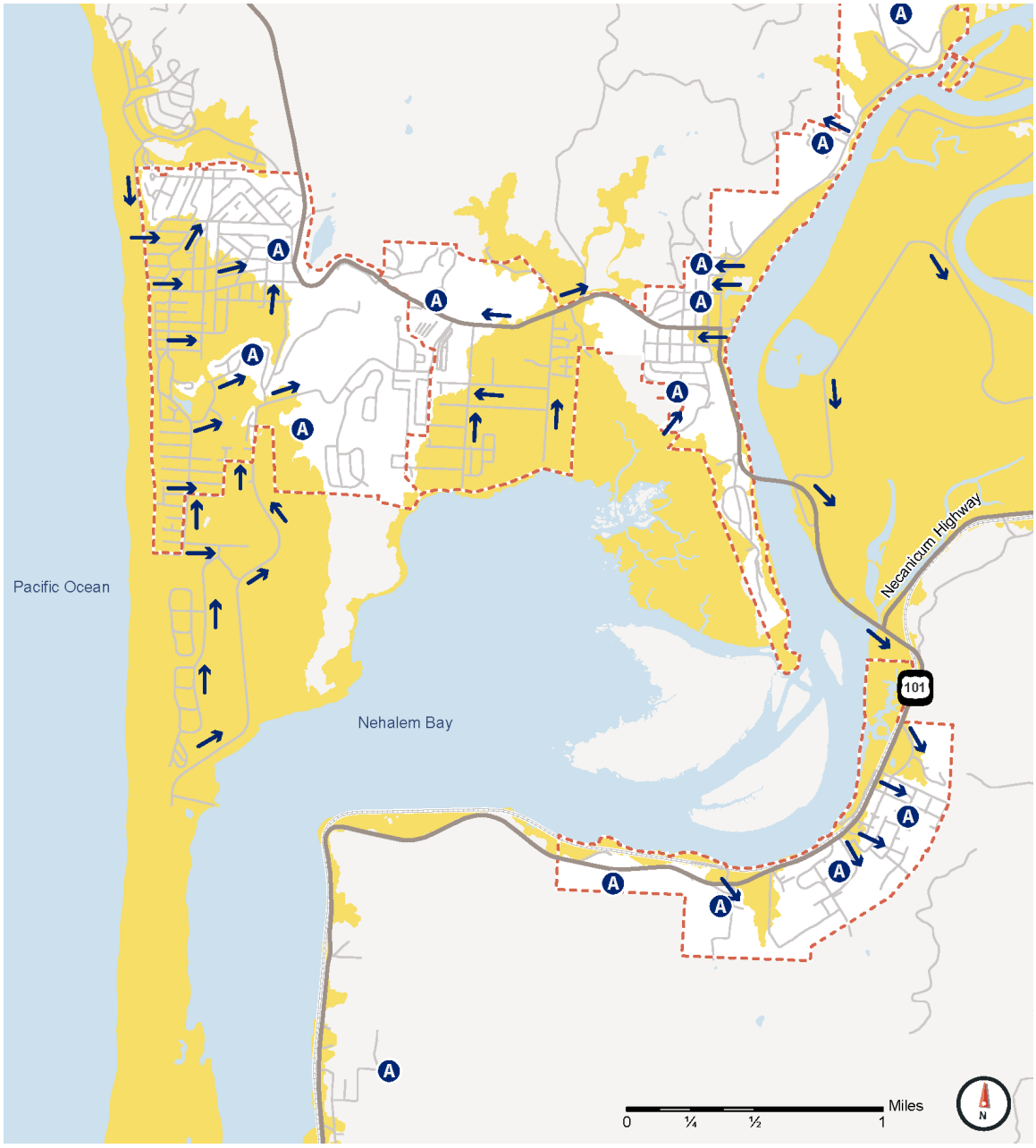
Traffic Calming Strategy		Description	Principal Arterial	Major Collector	Minor Collector	Local
Hardened Centerlines/Rubber Speed Bumps	 Photo Source: Quartz, qz.com	Hardened centerlines are bollards that prevent left-turners from crossing the centerlines to make a turn. Pedestrian islands can also accomplish the same goal if they are placed strategically, with the added benefit of being more durable and providing refuge for walkers.		√	√	√
Narrowing Devices		Narrowing devices use raised islands, curb extensions, and other treatments to narrow the travel way. They are not as effective as vertical or horizontal devices but can still provide traffic calming. The narrowing devices in the toolbox include: • Bulb-Out/Curb Extension • Two-Lane Choker • Median Without Horizontal Deflection/Pedestrian Refuge Island • Street Trees	√	√	√	√

Evacuation & Lifeline Routes

Given the proximity of the three cities to the Pacific Ocean, Nehalem Bay, and the Nehalem River, the Oregon Office of Emergency Management has identified evacuation routes within each of the cities. These routes, which connect people from evacuation zones to designated assembly areas in the event of a tsunami, are shown on **Figure 3** below. **Attachment A** includes detailed maps of the evacuation routes for each City.

ODOT has also identified lifeline routes in the Nehalem Bay area. Lifeline routes were identified as a specific list of highways and bridges recommended to comprise the seismic lifeline system and were categorized using a three tier-system to help prioritize seismic retrofits on State-owned highways and bridges. The only lifeline route in the region is U.S. 101, which is designated as a Tier 2 route from Tillamook to Nehalem and a Tier 3 route from Nehalem to Seaside.

Figure 3. Evacuation Routes



Freight Routes

Freight movement is essential to bring goods to residents and to move products throughout the region. U.S. 101 is designated by the FHWA as part of the National Highway System (NHS), which is defined as roads that are important to the nation's economy, defense, and mobility. The highway is the only designated freight route in Nehalem Bay, and must balance the needs of residents, visitors, and the movement of goods. It is also classified by ODOT as a Reduction Review Route, which are facilities that require review during any planning, project development, development review and maintenance for any potential reduction in vehicle-carrying capacity as stated in Oregon Revised Statue (ORS) 366.215. These routes may not have any permanent reduction in the vehicle-carrying capacity unless required for safety or access considerations or through a local exemption.

ITS Guidelines

Through the application of Intelligent Transportation System (ITS) technologies, agencies are equipped with the tools to optimize the existing transportation system, improving safety and mobility without costly infrastructure improvements such as adding capacity. The use of ITS allows agencies to better manage the system using real-time data to respond to incidents such as crashes or flooding that disrupt the transportation system.

With no traffic signals in the Nehalem Bay Region, the ability to use ITS to manage traffic flow through enhanced traffic signal operations or other common ITS strategies are limited; however, traveler information strategies could be used to alert regional travelers to changes in travel patterns or weather events that may impact travel in the region.

Strategies that should be considered in Nehalem Bay, in coordination with ODOT and Tillamook County include:

- Road Weather Information Systems
- Traffic Cameras
- Roadside Traveler Information
- Trip Planning
- Multi-Agency Operations and Coordination Planning in partnership with ODOT and Tillamook County

Manzanita

This section documents the transportation standards and proposed updates for roadways under the jurisdiction of Manzanita.

Roadway Functional Classification System

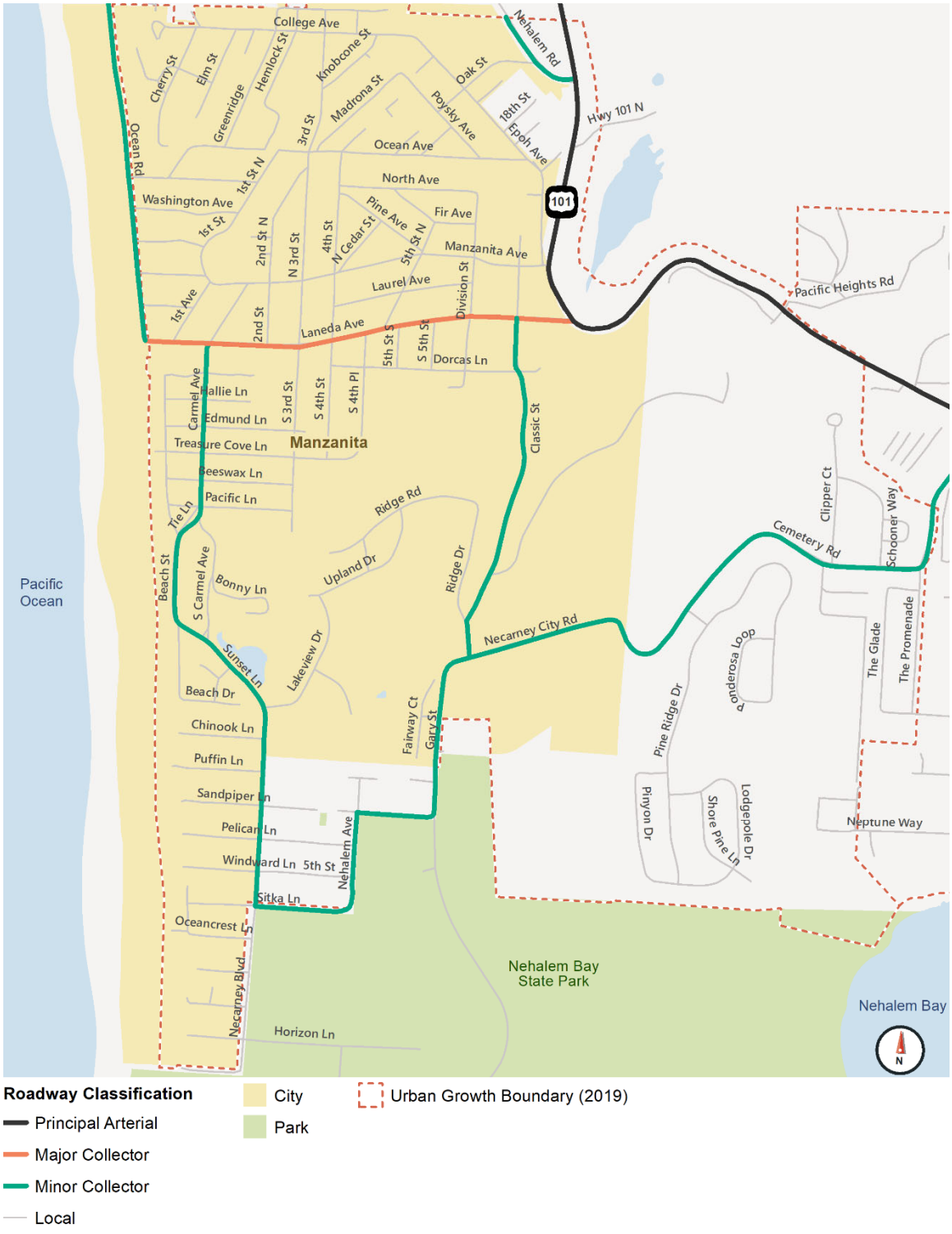
As shown on **Figure 4** and defined in Error! Reference source not found.**,** there are four roadway classifications in the City of Manzanita.

Table 5. Manzanita Roadway Standards by Functional Class

Functional Class	Pedestrian Realm	Transition Realm			Travelway Realm		
	Sidewalk	Bicycle Facilities	Buffer Zone	Minimum On-Street Parking Width	Number of Travel Lanes	Minimum Lane Width	Median/ Center Turn Lane
Principal Arterial[1]	5 to 8 feet	6 feet	3 to 5 feet	None	2	11 to 12 feet	12 to 13 feet
Major Collector	10 feet	None	None	8 feet	2	11 feet	None
Minor Collector	12 feet		2 feet	None	2	11 feet	None
Local[2,3]	None	Advisory Bike Lanes or Sharrows	None	None	1	22 feet	None

1. As the only Principal Arterial in Nehalem is U.S. 101, which is under the jurisdiction of ODOT, values presented above are consistent with recommendations for a Suburban Fringe roadway with a Tier 1 Bikeway based on guidance in the ODOT HDM. Widths shown provide a range of options based on local context consistent with the HDM.
2. While local roadways only require one lane, the width would allow for two-way travel.
3. The Manzanita Bicycle Network Map (Figure 6) identifies the appropriate bicycle facilities for local roadways.

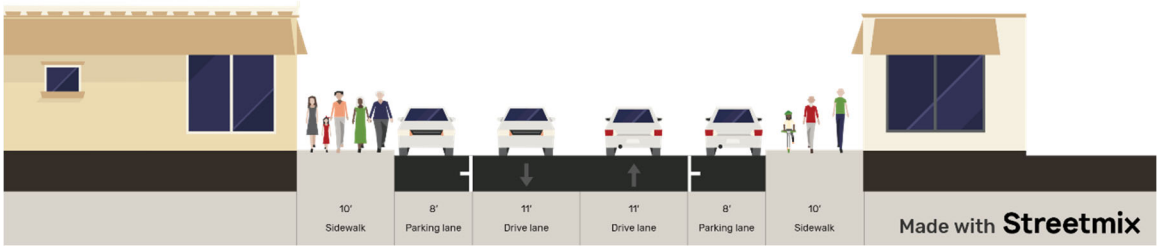
Figure 4. Manzanita Roadway Functional Classification



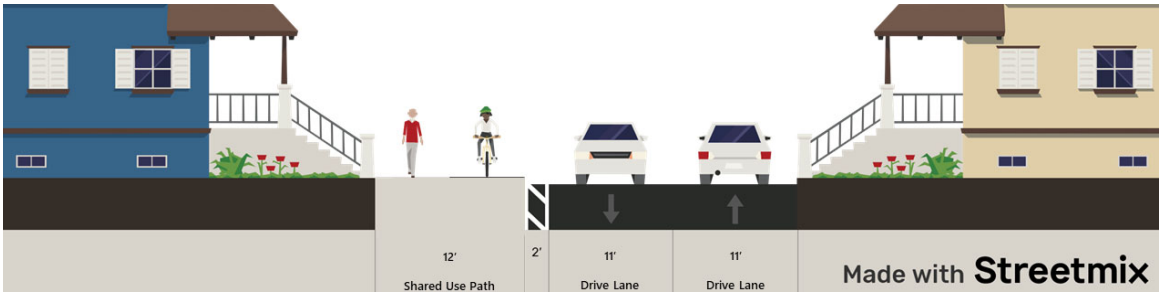
Standard Roadway Cross-Sections

This section presents the standard roadway cross-sections for the three functional classes within the City of Manzanita.

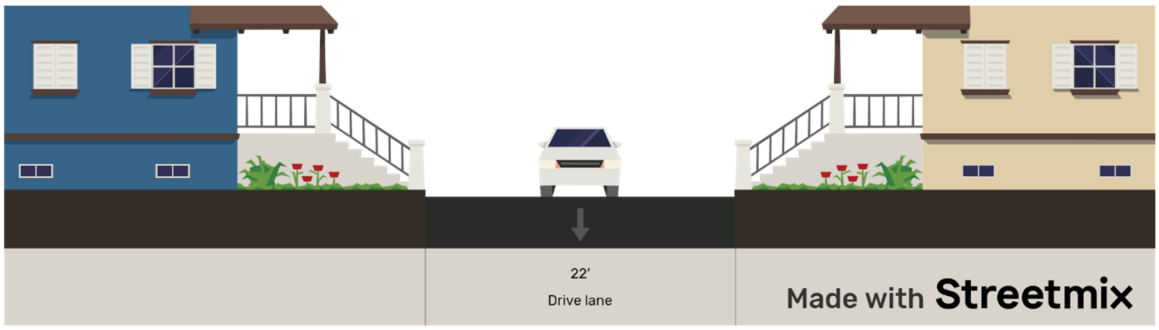
Manzanita Major Collector Cross-Sections



Manzanita Minor Collector Cross-Section



Manzanita Local Road Cross-Section



Access & Spacing Standards

To balance the need for access with safety for all travelers and improve connections for people walking and biking, it is recommended that the City adopt updated access and spacing standards that would apply to new roadways or developing properties to the extent that it is practical, as determined by City staff. As access and spacing standards for U.S. 101 are

documented in the section above, these standards would only apply to streets designated as collectors or local streets.

Table 6: Manzanita Access & Spacing Standards

Functional Class	Maximum Block Length	Minimum Block Length	Minimum Driveway Spacing	Minimum Intersection Set Back
Major Collector	1,000 feet	200 feet	100 feet	150 feet
Minor Collector	1,000 feet	150 feet	75 feet	75 feet
Local	1,000 feet	125 feet	None	25 feet

Bicycle & Pedestrian Networks

This section documents the planned networks for people walking and bicycling within the city of Manzanita, including facility types and standards for the pedestrian and bicycle networks.

Pedestrian Facilities

Within Manzanita, there are two key streets where sidewalks are needed to connect people to key destinations: Laneda Avenue and Ocean Avenue, as shown on **Figure 5**, below.

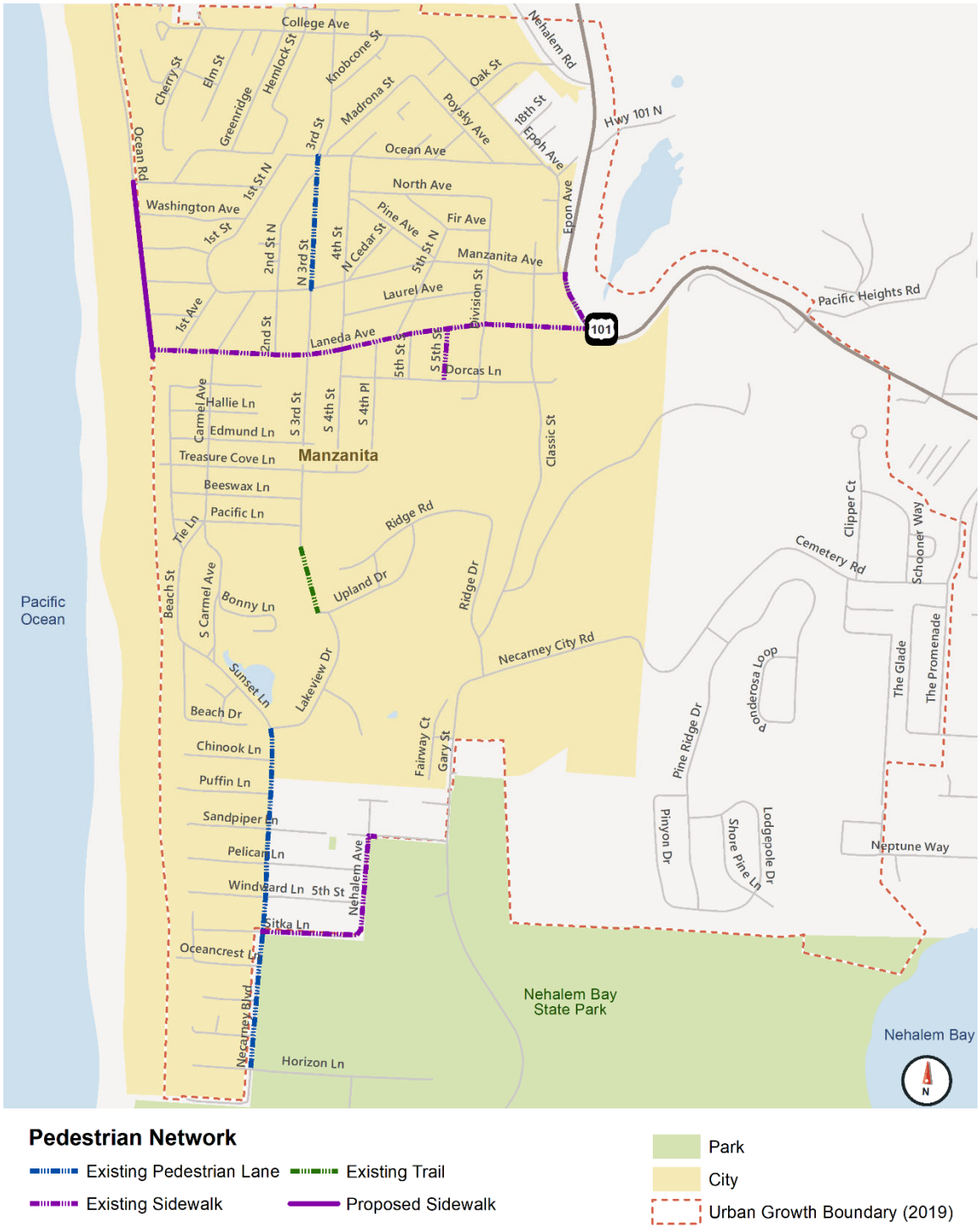
Laneda Avenue is a key pedestrian corridor connecting people from the commercial core to the beach, while Ocean Avenue provides access to the beach. Given the high pedestrian volumes on these key routes, it is recommended that, when feasible, 10 feet of pedestrian throughway be provided. Where space allows, additional space should be provided for frontage (up to four feet) for a total maximum of 14 feet. Where space is constrained, the additional buffer may be eliminated as shown in the Major Collector Cross-Section above, as the on-street parking lane provides separation for the pedestrian realm and the travelway realm.

The American with Disabilities Act (ADA) requires that transportation facilities accommodate the needs of people with varying abilities. By building a pedestrian network that meets the needs of people with varying abilities improves accessibility and results in a high-quality system for all users. To achieve this, the City of Manzanita should incorporate the following features when building new sidewalks or improving existing sidewalks:

- Ensure that sidewalks are free of obstructions. While objects up to 27 inches above the ground can be detected by a white cane, objects between 27 and 80 inches in the pedestrian circulation area may cause injury to blind and low vision users. If objects must protrude into the pedestrian circulation area, detectable delineation to warn users should be provided.

- Provide yellow detectable warning surfaces at curb ramps, railroad crossings, and transit stops.
- Design sidewalks to include firm and level surfaces, adequate clear width, and limited cross-slope.
- Provide an accessible sloped entrance and exit to transition to and from the walkway where the facility begins and ends.

Figure 5. Manzanita Pedestrian Network

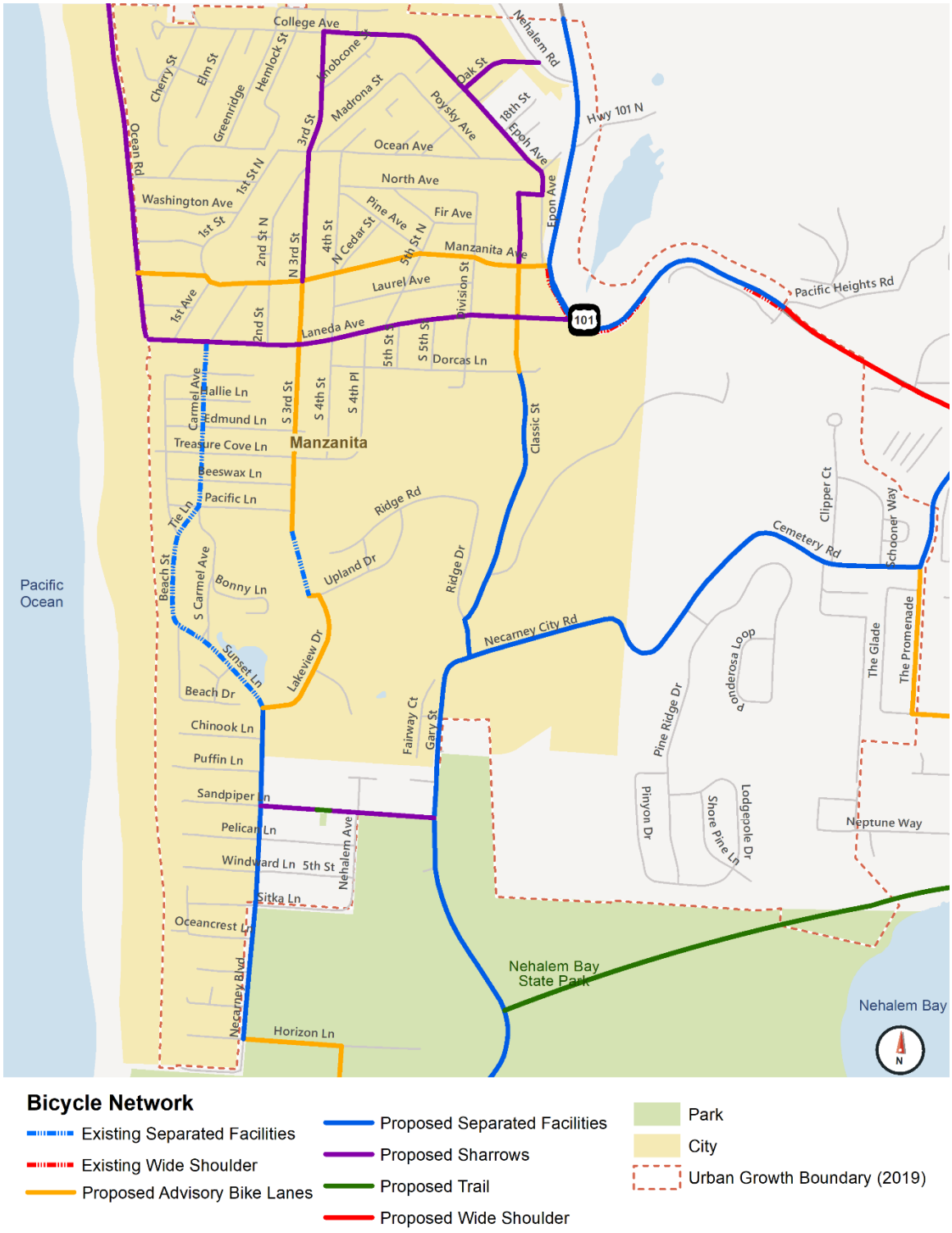


Bicycle Facilities

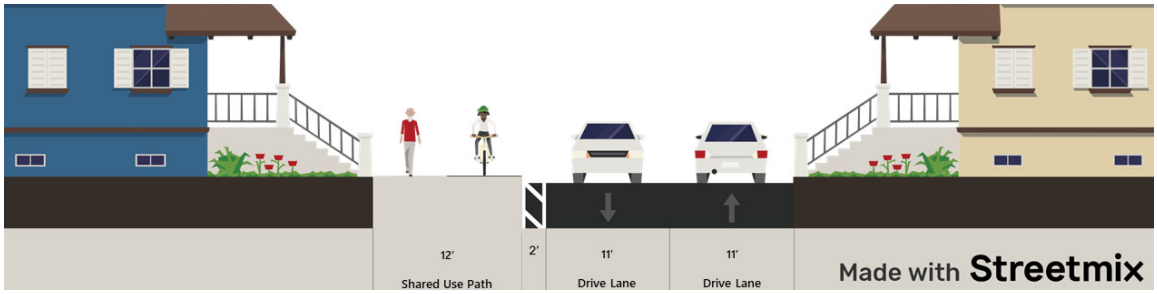
The bicycle network within the City of Manzanita relies on four types of facilities:

- **Separated Bike Lane:** Separated Bike Lanes are part of the street that is designated for bicycle travel, and in some cases pedestrian travel, which are separated from vehicles by a street buffer that contains a vertical element (e.g curb, parking, or bollards).
- **Sharrows:** These are quiet slow streets that prioritize bicycles and automobiles. The shared lane marking (sharrows) indicate that bicycles and automobiles should share the lanes and are typically used when there is a sidewalk or other space allocated for people walking and to complete the bicycle network.
- **Advisory Bike Lanes:** These are quiet slow streets that prioritize bicycles and pedestrians. A shoulder, available for use by bicyclists and pedestrians, is delineated by striping allowing for vehicles to use the shoulder when no pedestrians or bicyclists are present to pass oncoming vehicles.
- **Trails:** Trails, which are typically constructed using a soft-surface and used for recreational travel provide a space for people walking and bicyclists. Trails have dedicated right-of-way and connect people between regional destinations. While trails may parallel a roadway, they may also create a new connection for people walking and bicycling.

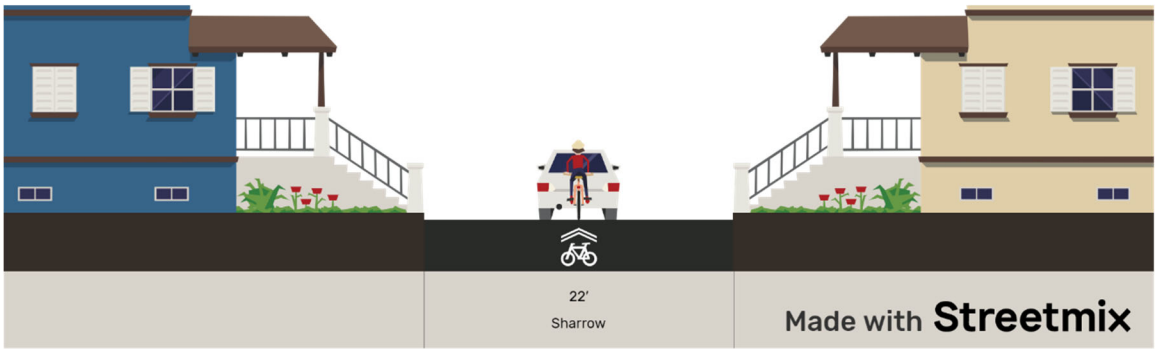
Figure 6. Manzanita Bicycle Network



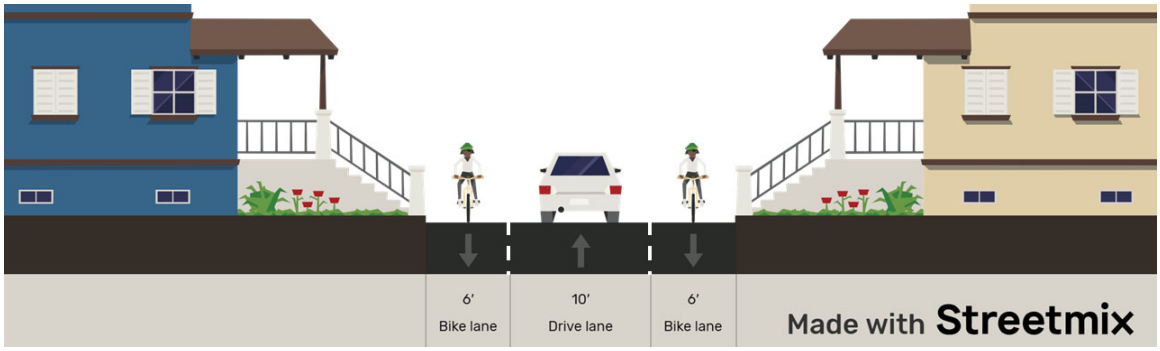
Manzanita Separated Bicycle Facility Cross-Section



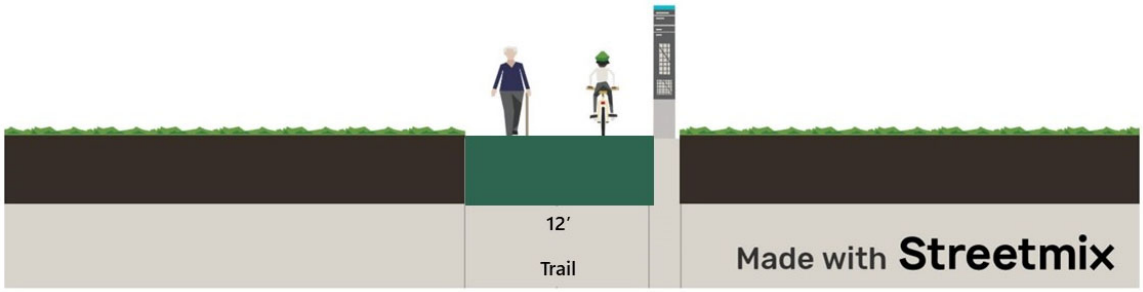
Manzanita Sharrow Cross-Section



Manzanita Advisory Bike Lane Cross-Section



Manzanita Trail Cross-Section



Traffic Impact Analysis Guidelines

The City or other road authority with jurisdiction may require a Traffic Impact Analysis (TIA) as part of an application for development, a change in use, or a change in access. A TIA shall be required where a change of use or a development would involve one or more of the following:

1. A change in zoning or a plan amendment designation;
2. Operational or safety concerns documented in writing by a road authority;
3. An increase in site traffic volume generation by 300 Average Daily Trips (ADT) or more;
4. An increase in peak hour volume of a particular movement to and from a street or highway by 20 percent or more;
5. An increase in the use of adjacent streets by vehicles exceeding the 20,000-pound gross vehicle weights by 10 vehicles or more per day;
6. Existing or proposed approaches or access connections that do not meet minimum spacing or sight distance requirements or are located where vehicles entering or leaving the property are restricted, or such vehicles are likely to queue or hesitate at an approach or access connection, creating a safety hazard;
7. A change in internal traffic patterns that may cause safety concerns; or
8. A TIA required by ODOT pursuant to OAR 734-051.

A professional engineer registered by the State of Oregon, in accordance with the requirements of the road authority, shall prepare the Traffic Impact Analysis.

Mobility Standards

The City of Manzanita does not currently have any adopted mobility standards. It is recommended that the City consider adopting mobility standards for vehicles. As the City does not have any signalized intersections, mobility targets that rely on both volume-to-capacity ratio (v/c) and intersection level of service (LOS) are recommended.

The v/c ratio is a mathematical calculation of the amount of capacity that is used at the intersection at a point in time. A v/c ratio of 1.0 indicates that the intersection is "at capacity." As the v/c ratio approaches 1.0, it is typically an indication of increased congestion. For signalized intersections, the average v/c for all approaches is reported. For unsignalized intersections, the movement with the highest v/c is used.

Level of service (LOS) is a standard method for characterizing delay at an intersection. For all-way stop controlled (AWSC) intersections, the LOS is based on the average delay for all approaches. For two-way stop controlled (TWSC) intersections, the movement with the highest delay is used.

The following mobility standards are recommended for intersections within the City of Manzanita:

- All-Way Stop or Yield Control – LOS D and v/c ≤ 0.90, reported for the worse approach
- Two-Way Stop – LOS E and v/c ≤ 0.95, reported for the worst major/worst minor approach

Nehalem

This section documents the transportation standards and proposed updates for roadways under the jurisdiction of Nehalem.

Roadway Functional Classification System

Figure 7 shows the roadway classification system in the City of Nehalem, while Error! Reference source not found. defines each roadway functional class.

Within Nehalem, U.S. 101 is designated as a Special Transportation Area (STA). STAs, first created as part of Policy 1B in the OHP and later adopted in the ODOT HDM, designate districts of compact development located on a state-owned roadway where local access outweighs the considerations for highway mobility. State-owned roadways with an STA designation should facilitate mobility for people walking, bicycling, and taking transit to connect to local destinations in addition to serving regional through-trips.

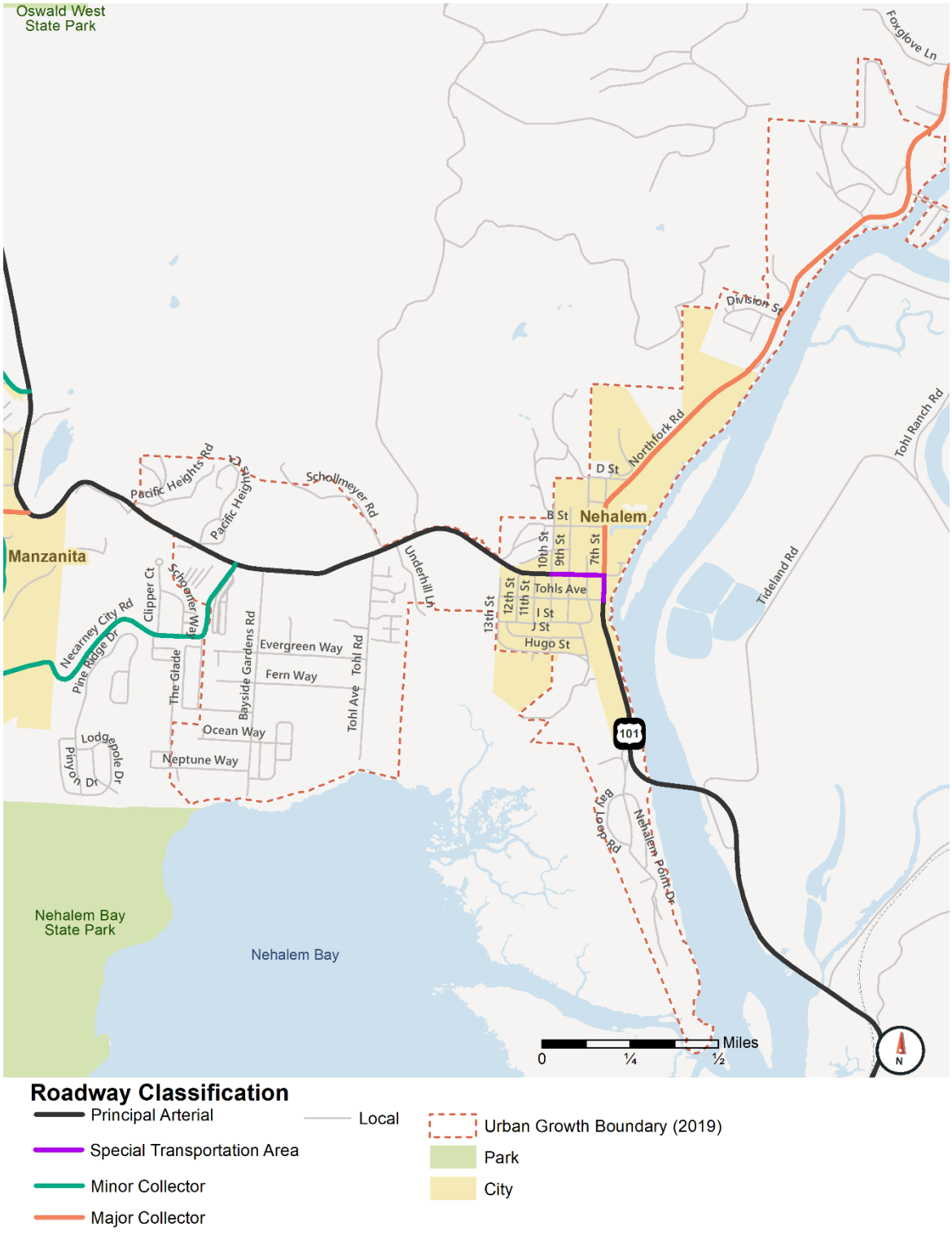
When determining the needs that must be met by a specific road, relying on the surrounding land use context results in a context-sensitive approach to determining the appropriate cross-section and facilities that should be incorporated in a specific roadway. Based on the six urban contexts, with the term urban applying to any area within an UGA, the area surrounding U.S. 101 in Nehalem is identified as Rural Community. This land use context was used to identify the appropriate elements and dimensions for U.S. 101, identified as a Principal Arterial, within Nehalem. The recommended elements and dimensions are shown in Error! Reference source not found..

Table 7. Nehalem Roadway Standards by Functional Class

Functional Class	Pedestrian Realm	Transition Realm			Travelway Realm		
	Sidewalk	Bicycle Facilities	Buffer Zone	Minimum On-Street Parking Width	Number of Travel Lanes	Minimum Lane Width	Median/ Center Turn Lane
Principal Arterial[1]	5 to 9 feet	5 to 6 feet	2 to 4 feet	8 feet	2	11 to 12 feet	11 to 12 feet
Major Collector	6 feet	6 feet	2 feet	None	2	12 feet	None
Local[2,3]	None	Advisory Bike Lanes or Sharrows	None	None	1	22 feet	None

4. As the only Principal Arterial in Nehalem is U.S. 101, which is under the jurisdiction of ODOT, values presented above are consistent with recommendations for a Rural Community roadway with a Tier 1 Bikeway based on guidance in the ODOT HDM. Widths shown provide a range of options based on local context consistent with the HDM.
5. While local roadways only require one lane, the width would allow for two-way travel.
6. The Nehalem Bicycle Network Map (Figure 9) identifies the appropriate bicycle facilities for local roadways.

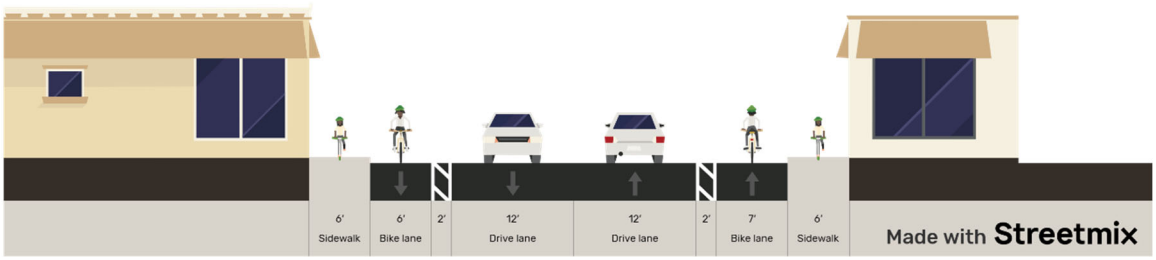
Figure 7. Nehalem Roadway Functional Classification



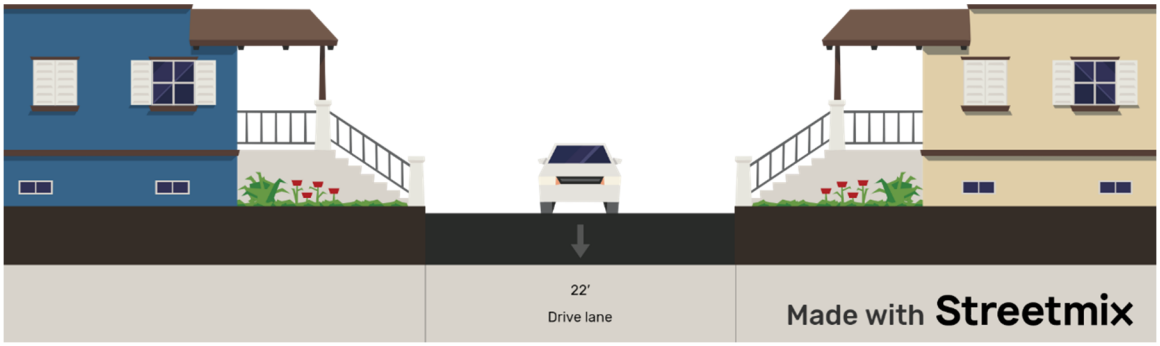
Standard Roadway Cross-Sections

This section presents the standard roadway cross-sections for the two functional classes within the City of Nehalem.

Nehalem Major Collector Cross-Section



Nehalem Local Roadway Cross-Section



Access Spacing Standards

To balance the need for access with safety for all travelers and improve connections for people walking and biking, it is recommended that the City adopt updated access and spacing standards that would apply to new roadways or developing properties to the extent that it is practical, as determined by City staff. As access and spacing standards for U.S. 101 are documented in the section above, these standards would only apply to streets designated as collectors or local streets.

Table 8: Nehalem Access & Spacing Standards

Functional Class	Maximum Block Length	Minimum Block Length	Minimum Driveway Spacing	Minimum Intersection Set Back
Major Collector	1,000 feet	200 feet	100 feet	150 feet
Local	1,000 feet	125 feet	None	25 feet

Bicycle & Pedestrian Networks

This section documents the planned networks for people walking and bicycling within the city of Nehalem, including facility types and standards for the pedestrian and bicycle networks.

Pedestrian Facilities

Within Nehalem, there are two key streets where dedicated space for pedestrians are needed to connect people to key destinations: U.S. 101 and 9th Street, as shown on

The proposed cross-section for U.S. 101, including the appropriate pedestrian realm, is provided in the Standard Roadway Cross-Sections above. For local streets, the proposed cross-section is shown below.

The American with Disabilities Act (ADA) requires that transportation facilities accommodate the needs of people with varying abilities. By building a pedestrian network that meets the needs of people with varying abilities improves accessibility and results in a high-quality system for all users. To achieve this, the City of Nehalem should incorporate the following features when building new sidewalks or improving existing sidewalks:

- Ensure that sidewalks are free of obstructions. While objects up to 27 inches above the ground can be detected by a white cane, objects between 27 and 80 inches in the pedestrian circulation area may cause injury to blind and low vision users. If objects must protrude into the pedestrian circulation area, detectable delineation to warn users should be provided.
- Provide yellow detectable warning surfaces at curb ramps, railroad crossings, and transit stops.
- Design sidewalks to include firm and level surfaces, adequate clear width, and limited cross-slope.
- Provide an accessible sloped entrance and exit to transition to and from the walkway where the facility begins and ends.

, below.

U.S. 101 is a key pedestrian corridor connecting people to downtown Nehalem and the Nehalem River. 9th Street has been identified as a key pedestrian connection due to its direct connection from residential areas south of U.S. 101 to the Nehalem Grade School and safety issues related to the high numbers of pedestrians visiting Wanda's, the post-office, and Nehalem Lumber, all located at U.S. 101 and 9th Street.

The proposed cross-section for U.S. 101, including the appropriate pedestrian realm, is provided in the Standard Roadway Cross-Sections above. For local streets, the proposed cross-section is shown below.

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Nehalem Local Road with Pedestrian Facility Cross-Section

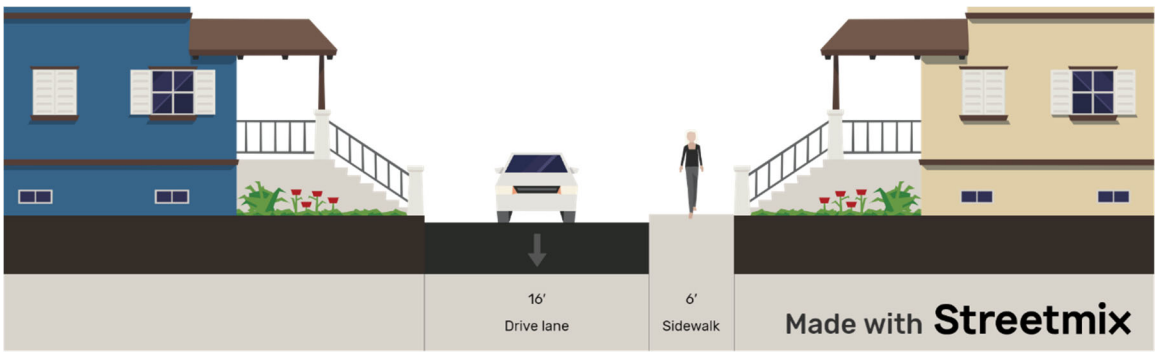


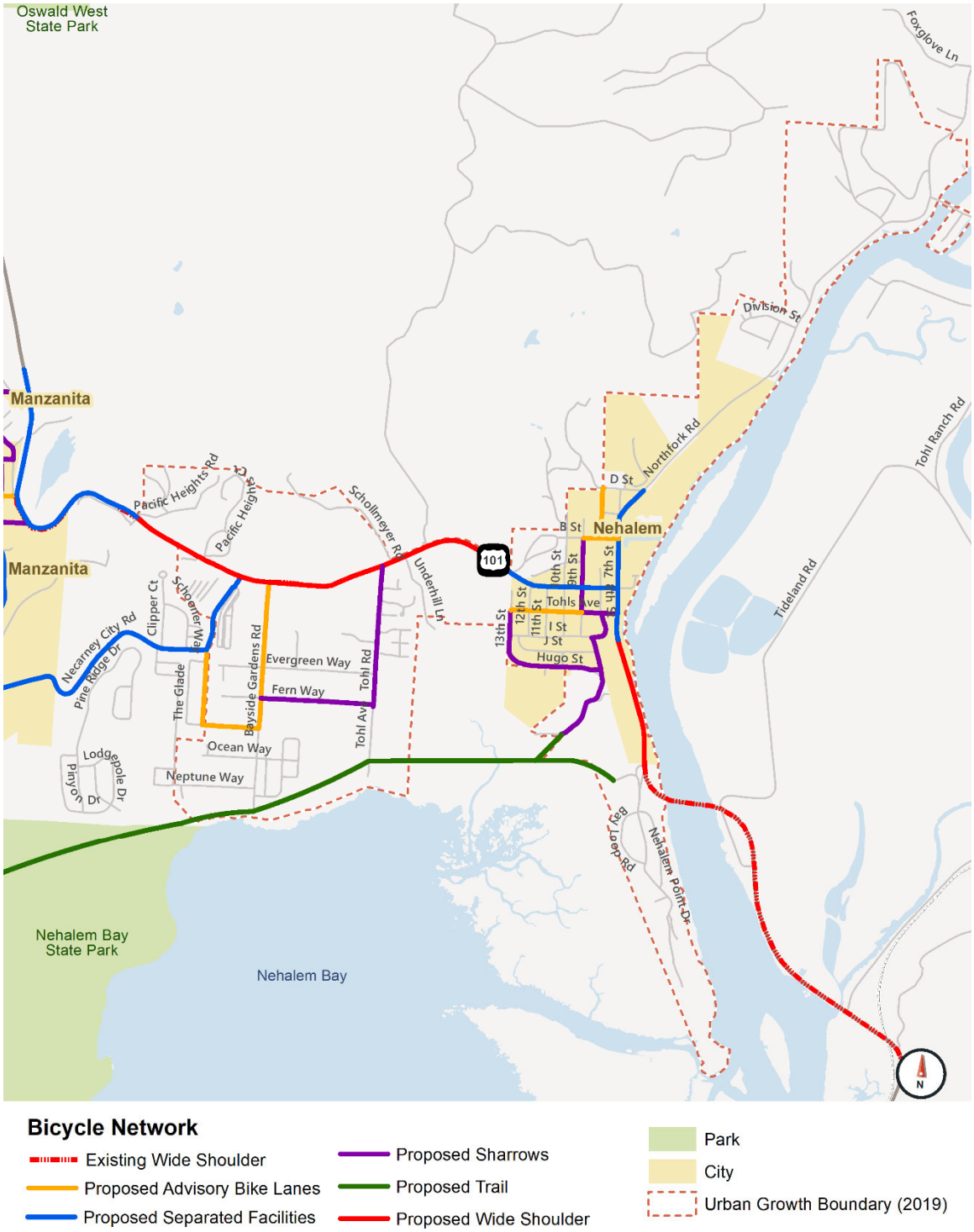
Figure 8. Nehalem Pedestrian Network

Bicycle Facilities

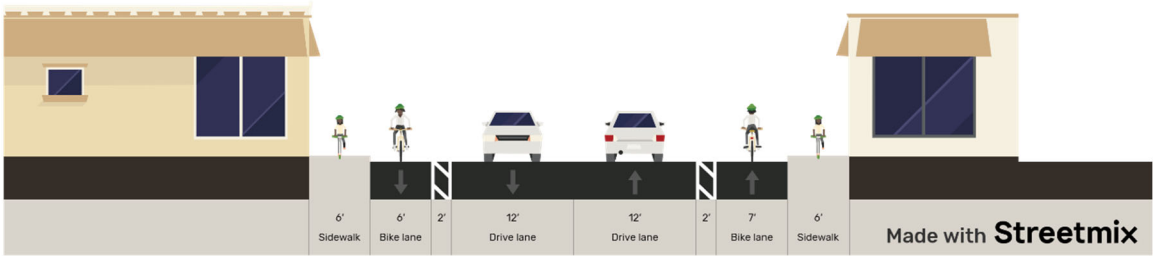
The bicycle network within the City of Nehalem relies on four types of facilities:

- **Separated Bike Lane:** Separated Bike Lanes are part of the street that is designated for bicycle travel, and in some cases pedestrian travel, which are separated from vehicles by a street buffer that contains a vertical element (e.g curb, parking, or bollards).
- **Sharrows:** These are quiet slow streets that prioritize bicycles and automobiles. The shared lane marking (sharrows) indicate that bicycles and automobiles should share the lanes and are typically used when there is a sidewalk or other space allocated for people walking and to complete the bicycle network.
- **Advisory Bike Lanes:** These are quiet slow streets that prioritize bicycles and pedestrians. A shoulder, available for use by bicyclists and pedestrians, is delineated by striping allowing for vehicles to use the shoulder when no pedestrians or bicyclists are present to pass oncoming vehicles.
- **Trails:** Trails, which are typically constructed using a soft-surface and used for recreational travel provide a space for people walking and bicyclists. Trails have dedicated right-of-way and connect people between regional destinations. While trails may parallel a roadway, they may also create a new connection for people walking and bicycling.

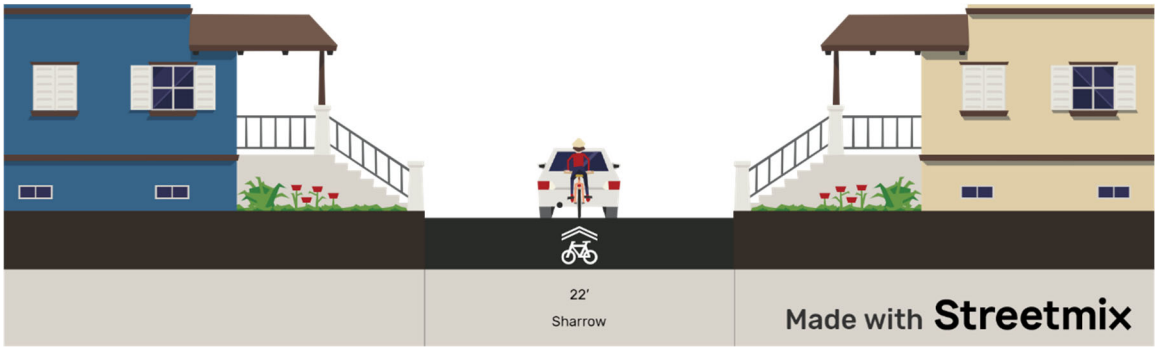
Figure 9. Nehalem Bicycle Network



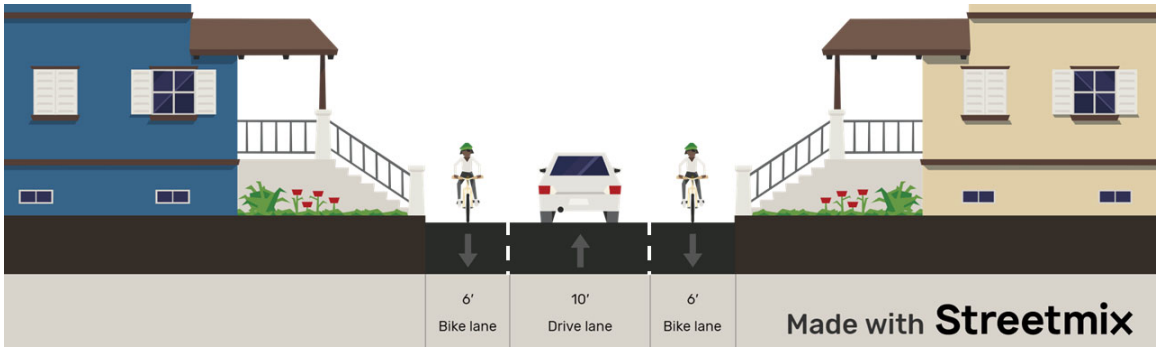
Nehalem Separated Bicycle Facility Cross-Section



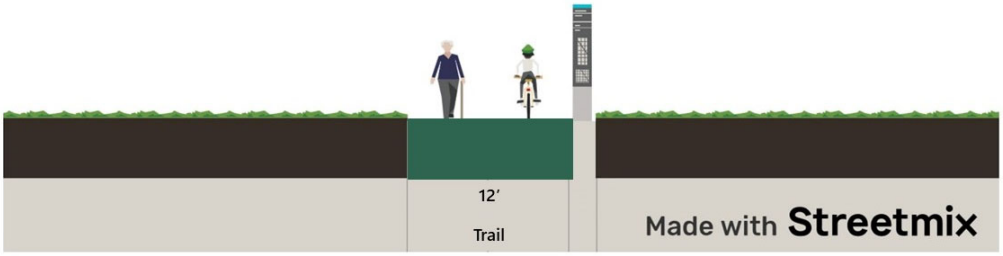
Nehalem Sharrow Cross-Section



Nehalem Advisory Bike Lane Cross-Section



Nehalem Trail Cross-Section



Traffic Impact Analysis Guidelines

The City or other road authority with jurisdiction may require a Traffic Impact Analysis (TIA) as part of an application for development, a change in use, or a change in access. A TIA shall be required where a change of use or a development would involve one or more of the following:

1. A change in zoning or a plan amendment designation;
2. Operational or safety concerns documented in writing by a road authority;
3. An increase in site traffic volume generation by 300 Average Daily Trips (ADT) or more;
4. An increase in peak hour volume of a particular movement to and from a street or highway by 20 percent or more;
5. An increase in the use of adjacent streets by vehicles exceeding the 20,000-pound gross vehicle weights by 10 vehicles or more per day;
6. Existing or proposed approaches or access connections that do not meet minimum spacing or sight distance requirements or are located where vehicles entering or leaving the property are restricted, or such vehicles are likely to queue or hesitate at an approach or access connection, creating a safety hazard;
7. A change in internal traffic patterns that may cause safety concerns; or
8. A TIA required by ODOT pursuant to OAR 734-051.

A professional engineer registered by the State of Oregon, in accordance with the requirements of the road authority, shall prepare the Traffic Impact Analysis.

Mobility Standards

The City of Nehalem does not currently have any adopted mobility standards. It is recommended that the City consider adopting mobility standards for vehicles. As the City does not have any signalized intersections, mobility targets that rely on both volume-to-capacity ratio (v/c) and intersection level of service (LOS) are recommended.

The v/c ratio is a mathematical calculation of the amount of capacity that is used at the intersection at a point in time. A v/c ratio of 1.0 indicates that the intersection is "at capacity." As the v/c ratio approaches 1.0, it is typically an indication of increased congestion. For signalized intersections, the average v/c for all approaches is reported. For unsignalized intersections, the movement with the highest v/c is used.

Level of service (LOS) is a standard method for characterizing delay at an intersection. For all-way stop controlled (AWSC) intersections, the LOS is based on the average delay for all approaches. For two-way stop controlled (TWSC) intersections, the movement with the highest delay is used.

The following mobility standards are recommended for intersections within the City of Nehalem:

- All-Way Stop or Yield Control – LOS D and v/c ≤ 0.90, reported for the worse approach
- Two-Way Stop – LOS E and v/c ≤ 0.95, reported for the worst major/worst minor approach

Wheeler

This section documents the transportation standards and proposed updates for roadways under the jurisdiction of Wheeler.

Roadway Functional Classification System

Figure 10 shows the roadway classification system in the City of Nehalem, while Error! Reference source not found. defines each roadway functional class.

Within Wheeler, U.S. 101 is designated as a Special Transportation Area (STA). STAs, first created as part of Policy 1B in the OHP and later adopted in the ODOT HDM, designate districts of compact development located on a state-owned roadway where local access outweighs the considerations for highway mobility. State-owned roadways with an STA designation should facilitate mobility for people walking, bicycling, and taking transit to connect to local destinations in addition to serving regional through-trips.

When determining the needs that must be met by a specific road, relying on the surrounding land use context results in a context-sensitive approach to determining the appropriate cross-section and facilities that should be incorporated in a specific roadway. Based on the six urban contexts, with the term urban applying to any area within an UGA, the area surrounding U.S. 101 in Wheeler is identified as Rural Community. This land use context was used to identify the appropriate elements and dimensions for U.S. 101, identified as a Principal Arterial, within Nehalem. The recommended elements and dimensions are shown in Error! Reference source not found.. As the Salmonberry Trail, which is included in the TSP as a high-priority regional project, will ultimately provide a low-stress alternative for people bicycling through Wheeler, a Tier 2 facility is proposed on U.S. 101. Until the Salmonberry Trail is constructed, 1st Street, which parallels U.S. 101 from Hall Street to just south of the city limits, could be designated as a low-stress parallel route as it is a low-speed local street.

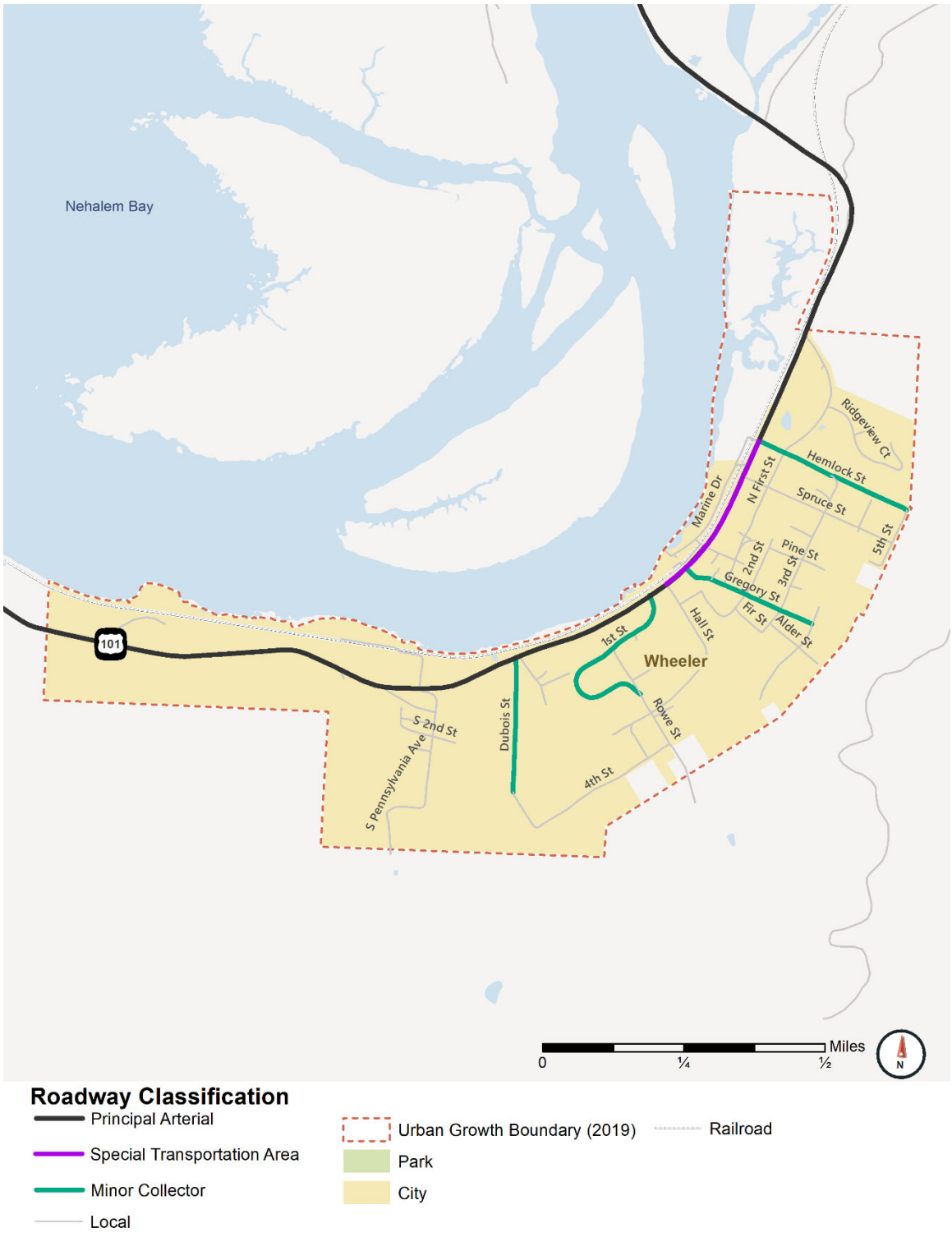
The TSP also proposes to add Private Streets to Wheeler's functional classifications. These streets would be a sub-class of Local Streets that provide connections to either specific properties or a small number of residences and could be built to provide minimal infrastructure, as long as emergency access standards are met. As these streets would not be maintained by the City, they are not addressed in the TSP.

Table 9: Wheeler Roadway Standards by Functional Class

Functional Class	Pedestrian Realm	Transition Realm			Travelway Realm		
	Sidewalk	Bicycle Facilities	Buffer Zone	Minimum On-Street Parking Width	Number of Travel Lanes	Minimum Lane Width	Median/ Center Turn Lane
Principal Arterial[1]	6 feet	6 feet	-	8 feet	2	11 to 12 feet	11 to 12 feet
Minor Collector[3]	6 feet	Sharrows or Advisory Bike Lanes	None	None	2	11 feet	None
Local[2,3]	None	None or Advisory Bike Lanes	None	None	1	22 feet	None

1. As the only Principal Arterial in Wheeler is U.S. 101, which is under the jurisdiction of ODOT, values presented above are consistent with recommendations for a Rural Community roadway based on guidance in the ODOT HDM. Widths shown provide a range of options based on local context consistent with the HDM. As 1st Street provides a low-stress alternative to U.S. 101 today and the planned Salmonberry Trail will provide an off-street alternative route, the cross-section recommendations above are consistent with a Tier 2 Bikeway.
2. While local roadways only require one lane, the width would allow for two-way travel.
3. The Wheeler Bicycle Network Map (Figure 12) identifies the appropriate bicycle facilities for Minor Collectors and Local roadways in the City.

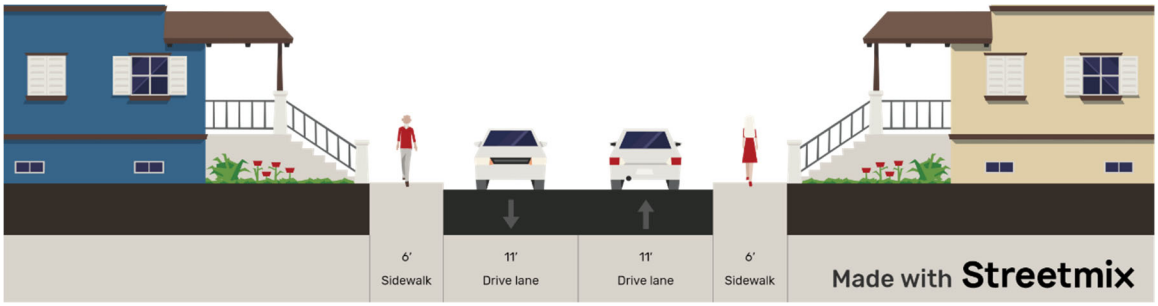
Figure 10. Wheeler Roadway Functional Classification



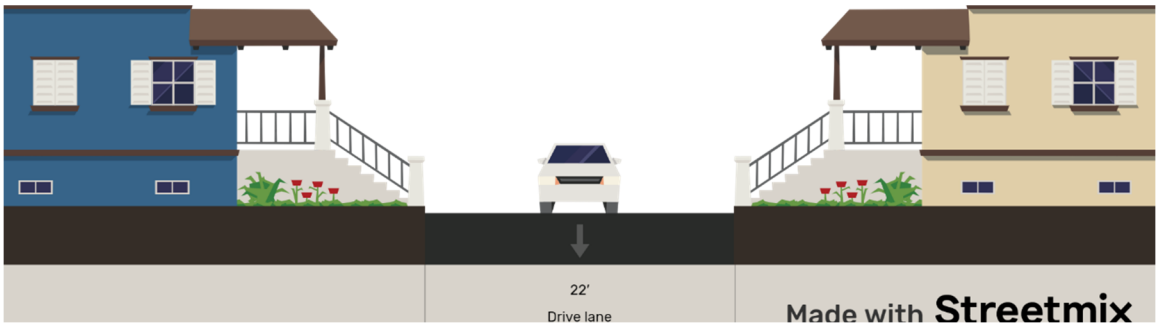
Standard Roadway Cross-Sections

This section presents the standard roadway cross-sections for the three functional classes within the City of Wheeler.

Wheeler Minor Collector Cross-Section



Wheeler Local Roadway Cross-Section



Access Spacing Standards

To balance the need for access with safety for all travelers and improve connections for people walking and biking, it is recommended that the City adopt updated access and spacing standards that would apply to new roadways or developing properties to the extent that it is practical, as determined by City staff. As access and spacing standards for U.S. 101 are documented in the section above, these standards would only apply to streets designated as minor collector or local streets within the City of Wheeler.

Table 10: Wheeler Access & Spacing Standards

Functional Class	Maximum Block Length	Minimum Block Length	Minimum Driveway Spacing	Minimum Intersection Set Back
Minor Collector	1,000 feet	200 feet	100 feet	150 feet
Local	1,000 feet	150 feet	None	75 feet

Bicycle & Pedestrian Networks

This section documents the planned networks for people walking and bicycling within the city of Wheeler, including facility types and standards for the pedestrian and bicycle networks.

Pedestrian Facilities

Within the City of Wheeler, U.S. 101 is identified as the primary connection for people walking. The proposed cross-section for U.S. 101, including the appropriate pedestrian realm, is provided in the Standard Roadway Cross-Sections above.

The American with Disabilities Act (ADA) requires that transportation facilities accommodate the needs of people with varying abilities. By building a pedestrian network that meets the needs of people with varying abilities improves accessibility and results in a high-quality system for all users. To achieve this, the City of Wheeler should incorporate the following features when building new sidewalks or improving existing sidewalks:

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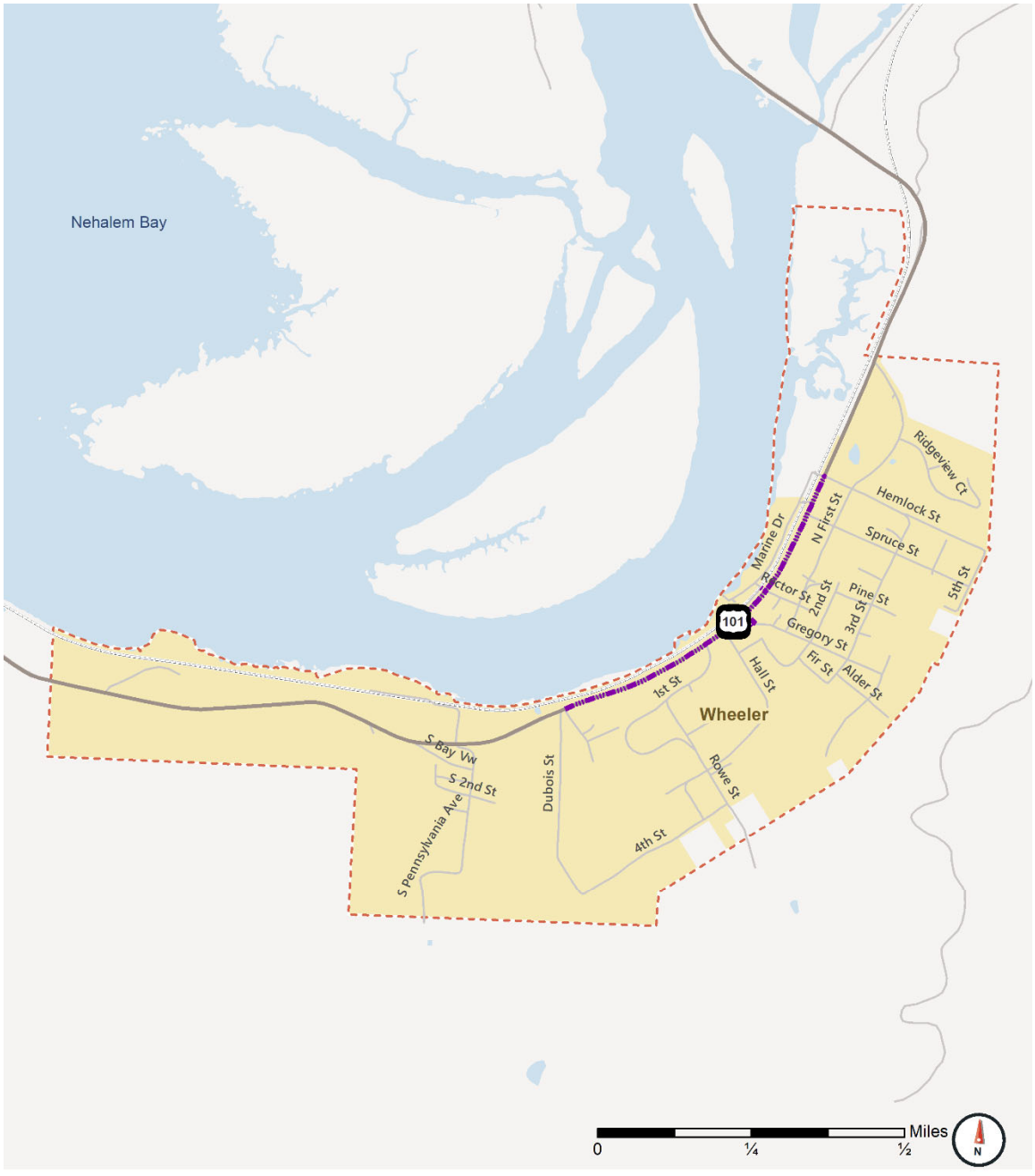
Figure 11. Wheeler Pedestrian Network



Bicycle Facilities

The bicycle network within the City of Wheeler relies on four types of facilities:

- **Sharrows:** These are quiet slow streets that prioritize bicycles and automobiles. The shared lane marking (sharrows) indicate that bicycles and automobiles should share the lanes and are typically used when there is a sidewalk or other space allocated for people walking and to complete the bicycle network.
- **On-Street Bike Lane:** On-Street Bike Lanes are part of the street that is designated for bicycle travel but are not separated from vehicles by a vertical street buffer.
- **Advisory Bike Lanes:** These are quiet slow streets that prioritize bicycles and pedestrians. A shoulder, available for use by bicyclists and pedestrians, is delineated by striping allowing for vehicles to use the shoulder when no pedestrians or bicyclists are present to pass oncoming vehicles.
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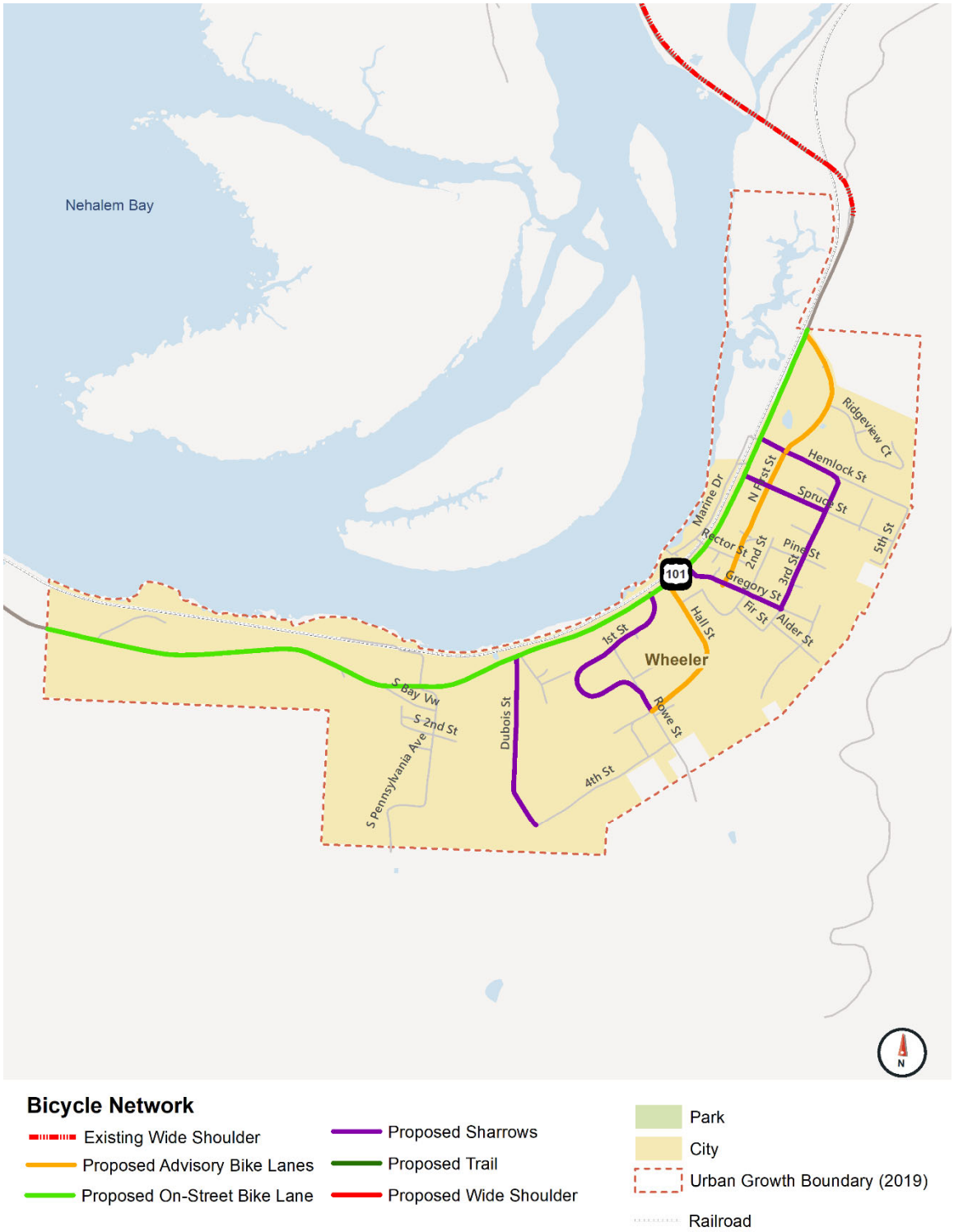
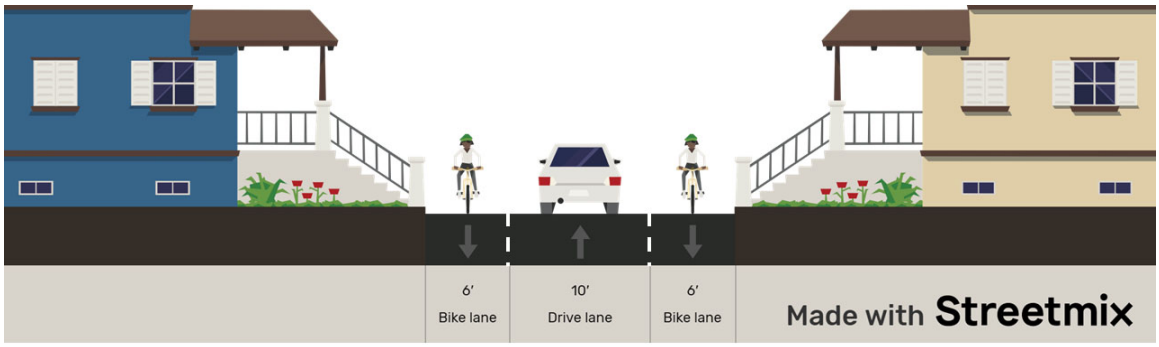
Figure 12. Wheeler Bicycle Network

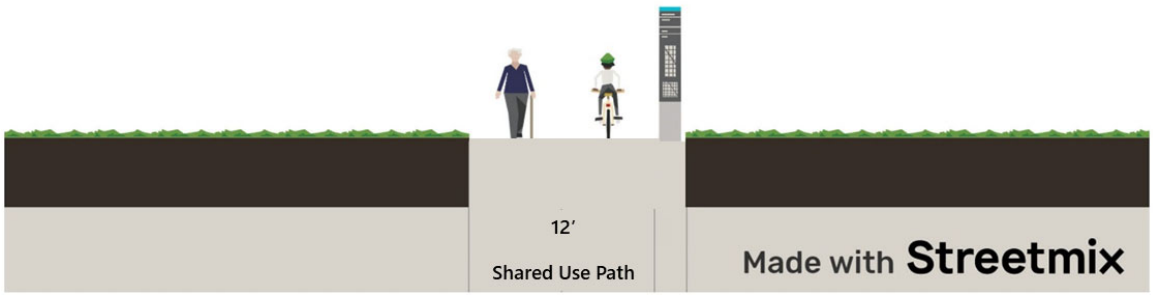


Wheeler Sharrow Cross-Section

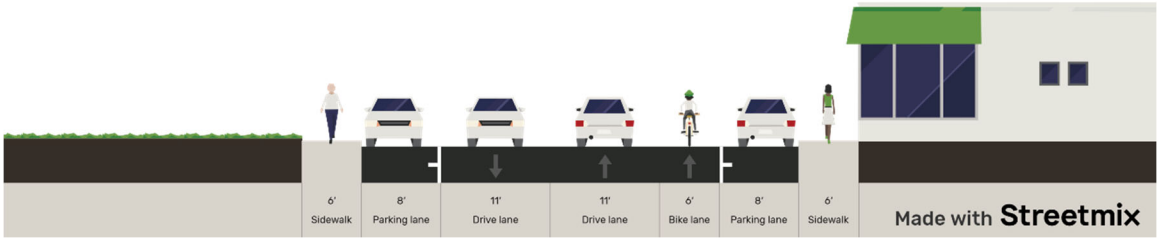
Wheeler Advisory Bike Lanes Cross-Section



Wheeler Shared Use Path Cross-Section



Wheeler On-Street Bike Lane Cross-Section



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