APPENDIX K ///
FUNCTIONAL CLASSIFICATION
TECHNICAL MEMORANDUM

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To: Karl MacNair
   City of Medford

From: Susan Wright, P.E. and Sara Parks, Kittelson & Associates, Inc.

Project #: 21255

Project: City of Medford TSP Supplement

Subject: Functional Classification Memorandum

This memorandum provides an overview of the City of Medford’s roadway functional classification system, cross-section elements, supporting standards and policies, and recommended changes to the functional classification system to support the updated 2038 year planning horizon and better meet the City’s multi-modal, economic development, and mobility goals.

FUNCTIONAL CLASSIFICATION

Functional classification of a roadway characterizes the intended purpose, amount, and type of vehicular traffic a roadway is expected to carry, provisions for non-auto travel, and the roadway’s design standards. The classification considers access to adjacent land uses and transportation modes to be accommodated. Functional classification systems:

- Provide a basis for the public and policy-makers to understand, identify, and prioritize improvements.
- Inform right-of-way needs and appropriate street design and streetscape characteristics.
- Guide the City’s development of policies and performance standards needed to operate, manage, maintain, and finance a transportation system that advances the City’s economic and livability goals.

As illustrated in Exhibit 1, higher-order facilities such as arterials are primarily intended to move traffic and provide mobility while lower-order facilities such as local streets are primarily intended to provide access. Roadway design standards and access management policies balance the function of the different classifications of roadways.
Hierarchy of access and mobility needs are established by a roadway’s classification. Ideally, lower-order facilities connect into progressively higher-order facilities, allowing a smooth transition between access and throughput while providing for safe and efficient movement of people and goods. Planning for the needs of active transportation modes is essential to providing a complete transportation system for a community. The Oregon Transportation Planning Rule (OAR 660-12) requires that collector and arterial facilities include pedestrian and bicycle facilities to provide continuous facilities for walking and cycling.

A roadway’s functional classification is determined by several factors, including how the facility connects with the rest of the system, the volume of traffic (local or through) it is expected to carry, and the types of trips it is expected to carry. The functional classification considers the adjacent land uses and the kinds of transportation modes that should be accommodated. The public right-of-way should also provide sufficient space for utilities to serve adjacent land uses. In some cases, natural features, topographical limitations, compatibility issues, and the built urban environment provide constraints that make the ideal functional classification of a given roadway impractical. In cases where an upgrade to larger cross sections are not feasible, parallel facilities were identified to support the network.

RECOMMENDED CHANGES TO EXISTING FUNCTIONAL CLASSIFICATIONS

Review of Existing Functional Classification Network

The City’s functional classification system was reviewed to address the connectivity and continuity of the existing roadway network, constrained corridors based on the link demand to capacity ratio under 2038 conditions, opportunities and constraints of the current system based on the existing vehicular demands, and connectivity of the existing and proposed low stress bicycle network.

System Connectivity and Hierarchy

The need for future roadway connections to serve vehicles, bicyclists, and pedestrians has been expressed by many previous planning documents, including the Regional Transportation Plan (RTP), Jackson County Transportation System Plan (TSP), the existing Medford TSP and expansion area planning, and more.
Connectivity of the existing arterial and collector street system was reviewed by identifying whether a continuous grid network is in place throughout the City, how the facility classification changes or continues at the junction of collector and arterial roadways, and areas that do not follow a traditional hierarchical access scheme.

The arterial network exhibits the highest density along the City core and surrounding the I-5 corridor. The network of arterials is poorly spaced east of Crater Lake Avenue, with both limited east-west and north-south connections. While several roadways are classified as minor arterials west of I-5, the transition in the east of the City generally occurs directly from Major Arterial to some form of Collector. The collector network has limited length and continuity throughout the City. The integration and stepped access from minor collectors to major collectors is generally not present in Medford.

Many of the City’s higher-order facilities (typically the arterial and collector network) are serving both local and regional traffic due to the lack of an integrated local roadway network. To implement the regional system, the City needs additional local and collector roadway extensions and connections that will allow the higher-order facilities to provide their intended function. These are included in the Functional Classification Map as future roadways. In addition, there is also the need for additional connectivity of higher-order facilities as described below.

**South Stage Road Extension**

The South Medford Interchange is one of the most congested areas of the City. Medford anticipates growth in both southwest and southeast Medford. Providing an east-west connection between these two areas will help reduce congestion at the South Medford Interchange, provide access to Major Arterials including North Phoenix Road, Riverside Avenue, and Columbus Avenue, allowing for travel around Medford without reliance on I-5 and the South Medford Interchange. This connection would also remove circuitous trips between areas of Medford and Phoenix. This new connection over I-5 is assumed in the transportation analysis of the 2038 forecast conditions.

**Constrained Corridors**

Year 2038 traffic demand to segment capacity ratios (d/c ratios) were assessed to further identify facilities that operate beyond their current or forecast capacity (based on the travel demand model), as illustrated in Figure 1. The following observations were noted in the review of d/c ratios:

- OR 62, even with the bypass, will continue to operate with significant capacity constraints between Riverside Avenue and the planned bypass.
- Corridors directly serving and along the route to both I-5 interchanges are projected to operate in a constrained manner.
- Vilas Road has a d/c of 0.95 or higher with the assumption of a facility with one travel lane in each direction.
Figure 1
• N Foothill Road – N Phoenix Road has a d/c of 0.95 or higher along a majority of the portion that is in Medford with the assumption of one travel lane in each direction.

**Collector and Arterial Opportunities and Constraints**

The 2038 peak hour link volumes from the travel demand model, peak hour segment volumes calculated from the post processed 2038 intersection volumes, and 2038 traffic d/c ratios were reviewed to assess where opportunities and constraints exist within the current system. This assessment was intended to identify roadways that carry higher or lower volumes than is typical for their classification. Table 1 presents the general volume thresholds for the City’s higher-order facilities from the 2003 Transportation System Plan. These thresholds were used as a guideline to identify if an upgrade to functional classification was needed based on capacity. However, volumes alone are not intended to form the basis of a roadways’ classification. *See Attachment A for the RVMPO Travel Demand Model Outputs.*

<table>
<thead>
<tr>
<th>Functional Classification</th>
<th>Volume Threshold (ADT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Arterial</td>
<td>&gt;15,000</td>
</tr>
<tr>
<td>Minor Arterial</td>
<td>10,000-15,000</td>
</tr>
<tr>
<td>Major Collector</td>
<td>5,000-10,000</td>
</tr>
<tr>
<td>Minor Collector</td>
<td>2,500-5,000</td>
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</tbody>
</table>

**Bicycle Level of Traffic Stress**

To help prioritize the bicycle system needs, the City’s bicycle network (including future roadways assumed to be built to city standards) was evaluated using the Bicycle Level of Traffic Stress (LTS) methodology. This methodology classifies four levels of traffic stress that a cyclist can experience on the roadway, ranging from LTS 1 (little traffic stress) to LTS 4 (high traffic stress). A road segment with a LTS 1 generally has low traffic speeds and low volumes and is suitable for all cyclists, including children. A road segment with a LTS 4 generally has high speeds, high volumes, and is perceived as unsafe by most adults. LTS 2 is considered appealing to a majority of the bike-riding population and is therefore the desired target on most roadways.

The results of the analysis helped guide the improvements, upgrades, or new roadways needed on the functional classification map to improve the bicycle connectivity of the roadway network.

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1 LTS analysis procedures are included in the ODOT Analysis Procedures Manual (APM).
Recommended Changes

Based on the review and analysis of the existing network, changes to the functional classification designations were identified as a part of this TSP to improve system connectivity and provide a roadway network that serves vehicles, bicycles, and pedestrians.

Figure 2 provides an exhibit of the proposed functional classification map and highlights new future roadways and existing roadways with changed designations. As shown in Figure 2, some of the key changes to functional classifications are outline below.

**Airport Road** was identified as a Minor Collector to provide an east-west connection as well as improve the bicycle connectivity between Biddle Road and Table Rock Road.

**W McAndrews Road** was identified to be upgraded to a Minor Arterial to provide connectivity and capacity based on the travel demand forecast.

**Dakota Avenue** was identified to be upgraded to a Minor Collector to provide an east-west connection and bicycle connectivity from Oak Grove Road to S Oakdale Avenue.

**Oak Grove Road** was identified to be upgraded to a Major Collector to provide improved north-south collector connectivity.

**Stewart Avenue** was identified to be upgraded to a Minor Arterial from Orchard Home Drive to Oak Grove to continue the east-west arterial connection Stewart Avenue provides in the vicinity.

**12th Street – Cottage Street** was identified to be upgraded to a Minor Collector from East Main Street to Central Avenue to address the travel demand forecasted in the area and improve the connection across I-5.

**Stevens Street** was identified to be downgraded from the previously proposed Minor Arterial classification to a Major Collector from Crater Lake Avenue to Biddle Road to address the travel demand forecasted in the area.

**Wabash Avenue** was identified as a Minor Collector to provide a north-south collector that connects Major Collectors in the area such as Sunrise Avenue, Stevens Street, and Spring Street.

**Experiment Station Road** was identified as a Minor Collector to provide an east-west connection between two Minor Arterials: Garfield Street and S Stage Road.

**Holly Street** was identified to be upgraded to Minor Collector from Garfield Street to Sparrow Way and provide a new roadway extension to S Stage Road to provide a north-south connection between Garfield Street and S Stage Road.
Figure 2
Airway Drive was identified to be upgraded to a Major Collector to provide a collector for the industrial area.

Coker Butte Road was identified to be upgraded to a Minor Arterial from International Way to Lear Way to provide an east-west connection between the future International Way-Airway Drive and Lear Way collectors.

Vilas Road

Vilas Road is identified as a major arterial roadway in the functional classification map to address the demand to capacity (d/c) ratio, to accommodate for the projected volumes at intersections along Vilas Road, and to allow for capacity that supports the construction of the future OR62/Vilas Road interchange.

As illustrated in Figure 1, Vilas Road is projected to have a link demand to capacity ratio of 0.95 or higher under the 2038 conditions with the assumption of a facility with one travel lane in each direction.

The operations analysis at the Crater Lake Highway/Vilas Road intersection is projected to operate at a Level-of-Service “F” and over capacity (see Figure 10H in the Operations Memorandum). This intersection was noted to be monitored after the opening of the OR62 Bypass to verify how travel patterns change and affect the operations of the system (Medford TSP Project I-40).

The Jackson County TSP includes an intersection project at the Table Rock Road/Vilas Road intersection to monitor traffic operations following construction of the OR62 Bypass, with the potential recommendation to install a second separate left-turn lane and a separate right-turn lane at the westbound approach.

Based on turning movement volumes at both Crater Lake Highway/Vilas Road shown in Figure 10H and Table Rock Road/Vilas Road shown in Attachment B, the peak hour segment volumes are over 2,000, which is an approximate average daily traffic volume of 20,000. The projected volumes at these intersections do not include the assumption of a future OR62 Bypass/Vilas Road interchange, which would likely increase the expected volumes.

ROADWAY CROSS SECTIONS

Medford’s roadway cross-section standards apply to new and reconstructed roads. The cross-sections take into consideration roadway function and operational characteristics, including traffic volume, capacity, operating speed, and safety. The cross-sections ensure that as the road system develops, it will be capable of safely and efficiently serving the traveling public, while also accommodating orderly development of adjacent lands. The right-of-way required ensures that adequate space is provided to accommodate all modes of travel as well as utility needs.
Medford’s roadway cross-sections are based on the 20-year forecast conditions to ensure that roadways are built to accommodate forecasted need.

Improvements on Jackson County roads will typically follow City of Medford cross-sections within the city limits but should be coordinated with Jackson County. State highways must meet ODOT’s design and operating standards, as provided in the ODOT Highway Design Manual.

Cross-sections may be adjusted through an adopted plan, such as a downtown or corridor plan, or based on project descriptions contained within this TSP. Streets that are likely to have alternative cross-sections developed through future neighborhood or corridor plans include (but are not limited to):

- Biddle Road
- Riverside Avenue
- Central Avenue
- West 8th Street
- Main Street
- Crater Lake Highway
- East Main Street
- McAndrews Road
- Barnett Road
- Columbus Avenue

For existing roadways, the full right-of-way does not need to be obtained if the proposed cross-section can be accommodated within the available right-of-way.

**Major and Regional Arterials**

The Major Arterial classification is primarily used for roadways with high traffic volumes and inter-regional connections. Arterials are high-order facilities that are generally intended to connect to several collector roadways or provide links to higher order interstate or highway facilities. Regional Arterials are intended to have greater access control than Major Arterials. One-hundred and four feet of right-of-way is required for Major Arterials to allow construction of a five-lane roadway section, bicycle facilities, and detached sidewalks with a landscaped planter strip. Major Arterials within the City of Medford include roadways such as McAndrews Road, N Phoenix Road, and Barnett Road.

Exhibit 2, Exhibit 3, and Exhibit 4 show three variations of the Major and Regional Arterial cross-section. The first includes typical bicycle lanes. The second and third include cross-sections necessary to achieve a Level of Traffic Stress (LTS) 2, which is suitable for bicycling to a broad range of age and abilities. The buffered bicycle lanes are for facilities with posted speed limits of 35 miles per hour or lower. The
separated bicycle lanes are for facilities with posted speed limits of 40 miles per hour and higher. Separated bicycle lanes do not require additional right-of-way but do require a change in the curb alignment. If separated bicycle lanes are not achievable, buffered bicycle lanes are acceptable.

Additional Notes:

- Planter strip can vary when buffered bike lanes are included or when a multi-use path of at least 10 feet is built.
- Median lane can be reduced to 6 feet if a 2 foot raised median is built and is compatible with the area context and surrounding roadways.
- The range in pavement width accounts for the possibility of reduced median and buffered bike lanes.

Changes to Existing Standards:

- Flexibility with planter strip and median lane widths provides the ability to limit right of way impacts and improve the LTS for bicycles.
- New cross section options that include buffered bicycle lanes or separated bicycle facilities to improve the LTS for bicycles.

Exhibit 2  Major Arterial/Regional Arterial
Exhibit 3  
**Major Arterial/Regional Arterial With Buffered Bicycle Lanes (Low Stress for 35 mph and Lower)**

Exhibit 4  
**Major Arterial/Regional Arterial With Separated Bicycle Lanes (Low Stress for 40 mph and Higher)**
Minor Arterials

The Minor Arterial classification further distinguishes between arterials with a five-lane cross-section (Major Arterials) and those with three traffic lanes (Minor Arterials). Minor Arterials generally serve slightly lower traffic volumes than Major Arterials. Design flexibility for minor arterials may be needed in some areas to allow for lower vehicular speeds, on-street parking, and appropriate landscaped planter strip and sidewalk width to better reflect specific area needs such as Transit-Oriented Districts (TODs), adopted specific plans or neighborhood plans, and pedestrian oriented, mixed-use development areas. Minor Arterials within the City of Medford include roadways such as West Main Street and Kings Highway.

Exhibit 5, Exhibit 6, and Exhibit 7 show three variations of the Minor Arterial cross-section. The first includes typical bicycle lanes. The second and third include cross-sections necessary to achieve a Level of Traffic Stress (LTS) 2 (suitable for bicycling to a broad range of age and abilities). The buffered bicycle lanes are for facilities with posted speed limits of 35 miles per hour or lower. The separated bicycle lanes are for facilities with posted speed limits of 40 miles per hour and higher. Separated bicycle lanes do not require additional right-of-way but do require a change in the curb alignment. If separated bicycle lanes are not achievable, buffered bicycle lanes are acceptable.

Additional Notes:

- Planter strip can vary when buffered bike lanes are included or when a multi-use path of at least 10 feet is built. Minimum width of 5 feet.
- Median lane can be reduced to 6 feet if a 2 foot raised median is built and is compatible with the area context and surrounding roadways.
- The range in pavement width accounts for the possibly of reduced median and buffered bike lanes.

Changes to Existing Standards:

- Flexibility with planter strip and median lane widths provides the ability to limit right of way impacts and improve the LTS for bicycles.
- New cross section options that include buffered bicycle lanes or separated bicycle facilities to improve the LTS for bicycles.
- New travel lane width of 11 feet instead of 12 feet.
- New bicycle lane width of 6 feet instead of 5 feet.
Exhibit 5  Minor Arterial
Exhibit 6  Minor Arterial With Buffered Bicycle Lanes (Low Stress for 35 mph and Lower)

Exhibit 7  Minor Arterial With Separated Bicycle Lanes (Low Stress for 40 mph and Higher)
**Major Collectors**

The Major Collector classification is used for streets that link arterial and lower-order streets and serve moderate traffic volumes. Collectors serve both mobility and access functions with a three-lane roadway section, bicycle lanes, and detached sidewalks with a landscaped planter strip. Within this classification on-street parking is not provided. Where right-of-way is constrained on existing roadways, flexibility shall be provided to allow 5-foot sidewalks plus tree wells or 7-foot curb-tight sidewalks if tree wells are not feasible. Major Collectors within the City of Medford include roadways such as Lozier Lane, Hillcrest Road, Siskiyou Boulevard, Black Oak Drive, and Springbrook Road.

Exhibit 8 and Exhibit 9 show two variations of the Major Collector cross-section. The first includes typical bicycle lanes. The second includes the cross-section necessary to achieve a Level of Traffic Stress (LTS) 2 (suitable for bicycling to a broad range of age and abilities) when the posted speed limit is 35 mph or higher or the existing or projected traffic volumes are over 5,000 ADT.

**Additional Notes:**
- Planter strip can vary when buffered bicycle lanes are included. Minimum width of 5 feet.

**Changes to Existing Standards:**
- Flexibility with planter strip widths when right-of-way is constrained which provides the ability improve the LTS for bicycles.
- New cross section option that includes buffered bicycle lanes to improve the LTS for bicycles.
- Removal of the cross section alternative that includes on street parking.
Exhibit 8  Major Collector

Exhibit 9  Major Collector With Buffered Bicycle Lanes (Low Stress for 35 mph and Higher)
**Minor Collectors**

Minor Collectors place a greater emphasis on access than throughput as compared to major collectors and serve relatively low traffic volumes. Most Minor Collectors run through neighborhoods and link residential streets to higher-order collectors and arterials. This classification includes a similar paved width to major collectors but includes on-street parking and no center turn lane. Where right-of-way is constrained on existing roadways, flexibility shall be provided to allow 5-foot sidewalks plus tree wells or 7-foot curb-tight sidewalks if tree wells are not feasible.

**Additional Notes:**
- Parking is not SDC creditable, done at developer’s expense.
- The range in pavement width accounts for the possibility of no on-street parking.

**Changes to Existing Standards:**
- Flexibility with planter strip widths provides the ability to limit right of way impacts and improve the LTS for bicycles.
- New alternative minor collector cross section that provides options for wider parking and bicycle lanes to improve LTS for bicycles.

**Exhibit 10 Minor Collector**

![Minor Collector Diagram]
Exhibit 11  Minor Collector Alternative
**Industrial Street**

The Industrial Street classification is used for lower-order streets within or abutting industrially zoned lands. Industrial streets provide frontage and direct access to industrial uses and link them to collectors and arterials to facilitate mobility for vehicles and goods. This designation provides wider travel lanes and a center turn lane/median to accommodate heavy trucks. Industrial Streets also provide on-street parking, sidewalk, and planter strips on both sides of the street. This cross section is an option for industrially zoned lands when the commercial street standard is not adequate for the expected volume of truck traffic. No roadways are currently designated as industrial streets in Medford.

**Additional Notes:**

- Left-turn lane may be omitted at the developer’s request with approval from the City Engineer.

**Exhibit 12 Industrial Street**
Commercial Street

The Commercial Street classification is intended to provide frontage and direct access to land uses within a commercially zoned district. Commercial streets link downtown and commercial centers with other parts of the City and provide vehicular and pedestrian mobility and access by providing one travel lane and on-street parking in each direction with a sidewalk and planter strip on both sides. The Municipal Code allows for adjustments in sidewalk width and planter strip use to create a “main street” atmosphere. The Commercial Street classification can also be used for industrially zoned lands where lower volume truck traffic is expected. This section is identical to Standard Residential. Six inches of right-of-way is to be provided behind the sidewalks.

Exhibit 13  Commercial Street
Standard Residential Street

Standard residential streets classification prioritizes access over throughput and generally serves less than 2,500 vehicles per day. Standard residential is the highest of the residential roadway classifications, connecting neighborhoods to collector roadways. This designation provides one travel lane and on-street parking in each direction with a sidewalk and planter strip on both sides. Typical volumes and speeds on Standard Residential streets are low enough to accommodate shared use of travel lanes between bicyclists and motorists. Six inches of right-of-way is to be provided behind the sidewalks.

Exhibit 14 Standard Residential Street
Minor Residential Street

Minor Residential Streets are low-volume streets that provide immediate access to a maximum of 100 dwelling units on adjacent land. Minor Residential Streets have a two-lane cross-section and on-street parking on both sides. Given the narrow width and low-speed environment cyclists share the road with motorists. A key consideration within this cross-section is the ability to maintain a 20-foot clear width for fire access, where use of on-street parking could leave only 14-feet. This requires clustered, off-set (staggered) driveways so parking spots are not located directly opposite each other. An option is available for a wider street section (33-feet) with narrowed planter strips to maintain the same right-of-way. Six inches of right-of-way is to be provided behind the sidewalks. Minor Residential Streets that are also Neighborhood Bikeways include pavement markings and may also include wayfinding signage and traffic calming devices.

Exhibit 15 Minor Residential Street
Residential Lane

Residential Lanes are the lowest-order residential facility. These roads can serve a maximum of 8 residences and extend no more than 450 feet. The terminus of residential lanes is an approved cul-de-sac adequate for turn-around maneuvers (minimum 37-foot paved radius). Six inches of right-of-way is to be provided behind the sidewalks or curb if no sidewalk is present. The right-of-way width provides for future sidewalks and landscape strips on both sides of the roadway.
Additional Notes:

- Additional 2 feet of right-of-way required for drainage behind the curb with no sidewalk when the road is on the outside border of a development. Not required when street is internal to the development and there is a Public Utility Easement (PUE) behind the curb.
Attachment B