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REFINED PROJECT LIST SCENARIO EVALUATION MEMORANDUM - DRAFT

DATE: March 25, 2024

TO: Bend MPO Technical Advisory Committee

FROM: Emily D'Antonio, Eileen Chai, Kayla Fleskes-Lane, PE & Aaron Berger, PE | DKS Associates

SUBJECT: Bend 2045 MTP Update: Refined Project List Scenario Evaluation Project #24068-000 Memorandum - DRAFT

INTRODUCTION

This memorandum serves as an update to the analysis documented in the *Draft MTP Project List Evaluation Memorandum*[1]. The Refined Project List Scenario incorporates TAC comments and refined modeling assumptions into three model scenarios (2019 Base Year, 2045 Committed and 2045 Refined Project List), which are discussed in detail later in the memorandum.

These scenarios help form an understanding of needs by the 2045 planning horizon and will help inform the prioritization of projects (documented in a future memorandum). Projects included in the Refined 2045 Project List will be analyzed using the MTP evaluation criteria to help prioritize projects into phasing buckets to outline the timeframe within which each project is recommended for implementation. This phasing will then be paired with funding availability and feasibility to separate projects into financially constrained and aspirational lists.

The ODOT Transportation Planning and Analysis Unit (TPAU) has been applying updates to the Bend-Redmond Model (BRM), including updates to cost of travel assumptions and refinements to the external station data. These model updates were incorporated into the 2019 (Base Year), 2045 No-Build (Committed), and 2045 Refined MTP Project List scenarios, and the updated model performance measures for these three scenarios are included in this memorandum.

This memorandum also includes updated cost estimates for the 2045 MTP Refined Project List. The cost estimates were escalated from their estimate source year to 2023 (present day) values. Cost estimates were also developed for newly identified projects and refined for projects recommended for re-scoping in the Preliminary MTP Project List Evaluation Memorandum.

[1] *Preliminary MTP Project List Evaluation Memorandum,* DKS Associates, February 26, 2024.

This memorandum is divided into the following sections:

- **Summary of Findings** - Provides an overview of outcomes of the evaluation of the 2045 Refined Project List compared to the 2045 Draft Project List.
- **Evaluation Methodology** – Description of refinement to the project list and modeling assumptions, cost estimate updates, and tools and performance measures to evaluate and compare the 2019 (Baseline), 2045 No-Build (Committed), and 2045 Refined MTP Project List scenarios.
- **Active Transportation Evaluation and Findings** – Presents findings related to active transportation focused projects from the 2045 Refined Project List and discusses any new or changing needs for people walking and biking.
- **Transit Evaluation and Findings** – Presents findings related to transit projects from the 2045 Refined Project List and discusses any new or changing needs for people riding transit.
- **Motor Vehicle Evaluation and Findings** - Presents projects with a significant motor vehicle system enhancement component from the 2045 Refined Project List and discusses any new or changing needs for people driving.
- **Attachments Summarizing the Draft Project List** – Maps and tables presenting the 2045 Draft Project List, separated into Active Transportation, Transit, and Motor Vehicle categories.

SUMMARY OF FINDINGS

The following summarizes key results from the 2045 Refined Project List Scenario compared to the 2045 Draft Project List Scenario:

- The Refined Project List Scenario results in more walking, biking, and transit trips due to the implementation of travel demand management programs for large employers (Project P-2; modeled by proxy through parking pricing), enhanced transit coverage in growth areas in Bend (Project CET 6, among others) and Key Walking and Bicycling Route projects.
- The Refined Project List Scenario better addresses congestion on Ward Road south of US 20 with the addition of a new project to upgrade to an urban corridor along Ward Road (Project New-1).
- The Refined Project List Scenario reduces motor vehicle demand (along with other model adjustments to trips and travel cost assumptions) resulting in a 2.5 percent lower daily VMT per capita when compared to the 2019 Baseline Scenario. Additional land use policy changes (e.g., to incorporate Climate-Friendly and Equitable Communities rulemaking) and investments in alternative modes would likely be required to further reduce daily VMT per capita.

The following list includes newly identified or changes to already identified Bend Metropolitan Planning Area (MPA) transportation system needs based on the evaluation of the 2045 Draft Project List scenario that were previously documented and are consistent in the 2045 Refined Project List scenario:

- Only one project from a study completed since the adoption of the Bend TSP clearly impacts a designated Key Routes for Walking and Bicycling. This project is the **proposed new interchange connecting NE 18th Street to US 97** (Project 97.A in Attachment C). This new connection would attract more motor vehicle traffic to the portion of the NE 18th Street corridor designated as a Key Walking and Bicycling Route. The Key Routes project on 18th Street is

recommended to be completed either before or in parallel with the NE 18th Street/US 97 interchange project.

- Community input on ongoing projects such as the Olney Avenue Pedestrian and Bicyclist Improvements project indicates a **desire for higher levels of treatments for active transportation improvements** than was originally scoped for the Key Routes project identified in the Bend TSP. Cost estimates for the projects in this category that do not have a clearly defined scope should be re-considered during upcoming local planning efforts to better reflect community priorities.
- The 2045 Draft Project List **does not provide sufficient transit coverage** to serve the new, dense growth areas on the urban fringe of the MPA. Many of the most critical motor vehicle needs, particularly needs related to east-west river crossings, cannot be fully resolved through new connections or corridor enhancements. Expanded transit service could provide relief to these congested corridors by shifting motor vehicle users to transit.
- **OB Riley Road** – The corridor capacity need that was identified in the prior local planning efforts consolidates to a smaller bottleneck issue at Archie Briggs due to lower land use growth assumptions in this area (e.g., Gopher Gulch). The multi-modal project identified for this corridor (Project C-3) should be considered for re-scoping during this MTP Update and subsequent City planning efforts.
- **Shevlin Park Road** – New traffic congestion issue east of Skyline Ranch Road.
- **Neff Road** – Heightened congestion issue between 8th Street and 27th Street, with the potential of increasing neighborhood cut-through traffic. Considerations for addressing this congestion issue include:
  - Widening the entire corridor is not a viable option, but intersection capacity spot improvements at locations like 8th Street/Neff Road will improve the corridor and reduce the risk of cut-through traffic on local streets.
  - Upgrading the corridor to a Key Route for walking and biking will entice shifts to non-auto modes of travel.
  - Travel Demand Management (TDM) programs partnering with nearby large regional employers such as St Charles and Summit Health will encourage alternative modes of travel and can reduce the auto related congestion on the corridor.
- **Hamby Road** – New traffic congestion issue from Stevens Road to Bear Creek Road, driven by growth in the Stevens Ranch and Department of State Lands (DSL) areas.
- **Powers Road** – New congestion issue between US 97 and Brookswood Boulevard.
- **East-West River Crossings** – This congestion issue was a key need identified in the City's TSP and was flagged for monitoring. Current travel demand model forecasts indicate that these crossings will experience traffic demand well beyond existing capacity, indicating a need to move forward with a study for new/enhanced river crossings.

27th Street – This corridor was flagged for monitoring in the City's TSP, with the year 2040 analysis indicating a need for a continuous five-lane cross section from Empire Boulevard to Ferguson Road. The 2045 Draft Project List evaluation indicates that by the year 2045 Horizon, an additional five-lane cross section is only needed between Bear Creek and Reed Market in the south. The corridor-wide Average Daily Traffic (ADT) growth does indicate a need to improve the rural, two-lane, unimproved portions of 27th Street to three-lane, modernized cross sections with safe crossings to transit to enhance safety for all modes of travel.

EVALUATION METHODOLOGY

This section focuses on the following:

- **Project List Refinement**
- **Cost Estimate Update**
- **Analysis Tools and Performance Measures**

PROJECT LIST REFINEMENT

Gaps or project re-scoping needs were identified through the analysis performed in the Draft Project List memo. Feedback from TAC members who reviewed that methodology was incorporated into the modifications of the Draft Project List Scenario to then create the Refined Project List Scenario outlined within this document. The Attachments section of this memo lists the Refined Project List Scenario projects and programs. Key changes to the project modeling assumptions include:

Modifications to the capacity along Ward Road are consistent with a new project to urbanize the facility.

- Minor modification to CET Route 8 to better serve land use growth in the Stevens Road Tract and Stevens Ranch Master Plan areas (east of 27th Street and south of Reed Market Road)
- Incorporation of TDM programs and policies (modeled by proxy though parking pricing assumptions in areas with major employers such as OSU Cascades, Juniper Ridge, and St. Charles Hospital).

This memorandum breaks down the evaluation of the 2045 Project List into three modal focused sections: Active Transportation, Transit, and Motor Vehicle. There is significant modal overlap between many projects, particularly those that fall under the "Motor Vehicle" category as these usually include significant active transportation improvement elements. However, projects are only listed under one category to prevent duplication. Each modal project list is further separated into "Connectivity" and "Corridor Enhancement" subcategories. Connectivity projects focus on new modal connections (e.g., new trails, new transit routes, or new roadways), while Corridor Enhancement projects focus on improvements to existing corridors (e.g., new bike lanes/sidewalks, decreased headways on existing transit lines, or added lanes). In addition, the remaining projects are categorized as "Intersection" (intersection focused projects) and "Technology" (ITS projects), which do not strictly fall into any of the other primary modal subcategories.

The 2045 Project List is mapped and summarized in attachments to this memorandum as follows:

- **Attachment A – Active Transportation**
  - ***Active Transportation Connectivity Projects***
  - ***Active Transportation Corridor Enhancement Projects***
- **Attachment B – Transit Projects**
  - ***Transit Connectivity Projects***
  - ***Transit Corridor Enhancement Projects***
- **Attachment C – Motor Vehicle Projects**

  - ***Motor Vehicle Connectivity Projects***
  - ***Motor Vehicle Enhancement Projects***
- **Attachment D – Intersection Projects**
- **Attachment E – Technology Projects**
- **Attachment F – Proposed Studies**
- **Attachment G – Proposed Plans and Programs**
- **Attachment H- Committed Project List**

COST ESTIMATE UPDATE

Project cost estimates were also reviewed and updated to reflect 2023 cost conditions based on the Engineering News-Record (ENR) 20-City Average Cost Indices. This index tracks material and labor costs and provides an industry standard approach to scaling estimated project costs over time based on changing market conditions. For example, based on this review and the ENR index, project costs developed in 2018 were increased by approximately 21 percent to reflect current conditions. While each project was adjusted based on the year the cost estimate was developed, this example adjustment factor reflects the high increase in project costs that have been realized over the last half decade. The updated MTP will need to consider these higher project cost estimates.

ANALYSIS TOOLS AND PERFORMANCE MEASURES

The Bend Redmond Model (BRM) which was used to evaluate the 2045 Draft Project List was also used to analyze the 2045 Refined Project List Scenario. As discussed in the *MTP Needs Memorandum*[2], the BRM includes 2019 Base Year and 2045 Future Year land use scenarios. The Refined Project List Scenario was developed using the same land use assumptions as the 2045 Committed Scenario. These assumptions are presented in the *MTP Needs Memorandum*. In addition to the project list refinements, several other model elements were updated in the 2019 Base Year, 2045 Committed, and 2045 Refined Project List Scenarios:

- Corrections to the transit coverage factor in the 2045 Refined Project List Scenario to reflect all transit route changes that were made.
- Updated demand to the external stations to reflect a new version of the Statewide Integrated Model (changed in the 2045 Refined Project List Scenario and 2045 Committed Project List Scenario).
- Changes to the intersection density variable within mobility hub areas to reflect a more walkable, bikeable, and transit-friendly area in the 2045 Refined Project List Scenario. This variable can impact mode choice more meaningfully.
- The cost of auto ownership value was updated to reflect new statewide assumptions around electric vehicle adoption (the change was made in the 2045 Refined Project List Scenario and the 2045 Committed Project List Scenario).

[2] *Existing and Future Needs Memorandum,* DKS Associates, December 27, 2023

- The transit cost was deflated to the appropriate base year, reducing the relative cost of transit (change in 2045 Refined Project List Scenario, 2045 Committed Project List Scenario and 2019 Base Year Scenario).

The model results were used to provide quantitative measures throughout the MPA to determine whether projects were effectively addressing identified needs and to highlight new, increased, or decreased needs throughout the region. The primary performance measures used to evaluate the effectiveness of the 2045 Refined Project List are the same measures previously reported for the *2045 Draft Project List Scenario Memo*[3].

ACTIVE TRANSPORTATION EVALUATION AND FINDINGS

This section presents the analysis and findings related to the Active Transportation needs and proposed projects within the Bend MPA, including:

- **Updated Evaluation Results**
- **New/Changing Active Transportation Needs**

UPDATED EVALUATION RESULTS

The Active Transportation focused projects from the 2045 Project List are shown in Attachment A. These projects include the Key Routes projects from the Bend TSP. This section summarizes the key active transportation performance measures for the 2045 Refined Project List, compared against the 2019 Baseline and 2045 Committed conditions using the following performance measures:

- Mode Split
- Change in Motor Vehicle Demand on Key Routes

MODE SPLIT

The percentages of all person trips using walking and bicycle modes within the Bend MPA were calculated from the BRM. These percentages were based on trips that both begin and end within the Bend MPA. Table 1 documents these mode splits between the 2019 Base Year, the 2045 Committed, and the 2045 Refined Project List Scenarios.

[3] *Preliminary MTP Project List Evaluation Memorandum,* DKS Associates, February 26, 2024.

TABLE 1: PERCENT WALKING AND BIKING TRIPS WITHIN THE BEND MPA

MODE	2019 BASE	2045 COMMITTED	2045 REFINED PROJECT LIST	% CHANGE BETWEEN COMMITTED AND REFINED PROJECT LIST
PEDESTRIAN	10%	12%	13%	9%
BICYCLE	3%	3%	4%	30%

The 2045 Refined Project List shows significant shifts towards walking and biking, with a 9 percent increase in walking mode share and nearly 30 percent increase in bike mode share compared to the 2045 Committed Scenario.

This is also a notable increase compared to the original 2045 Draft Project List Scenario, due in large part to the intersection density variable changes to better reflect the walkable and bikeable environment expected near mobility hubs. The BRM still has some limitations to capture sensitivity to walking and biking, with no direct way to capture the quality of bicycle or pedestrian facilities.

CHANGE IN MOTOR VEHICLE DEMAND ON KEY ROUTES

As discussed in the MTP Needs Memorandum, daily motor vehicle traffic volumes are expected to increase along most of the Key Routes for Walking and Bicycling throughout the MPA under the 2045 Committed condition. The 2045 Refined Project List includes multiple projects that change the estimated 2045 daily motor vehicle traffic along these Key Routes when compared against the 2045 Committed condition. Figure 2 highlights this comparison, showing the change in daily motor vehicle traffic volume between the 2045 Committed scenario and the 2045 Refined Project List scenario along the designated Key Routes.

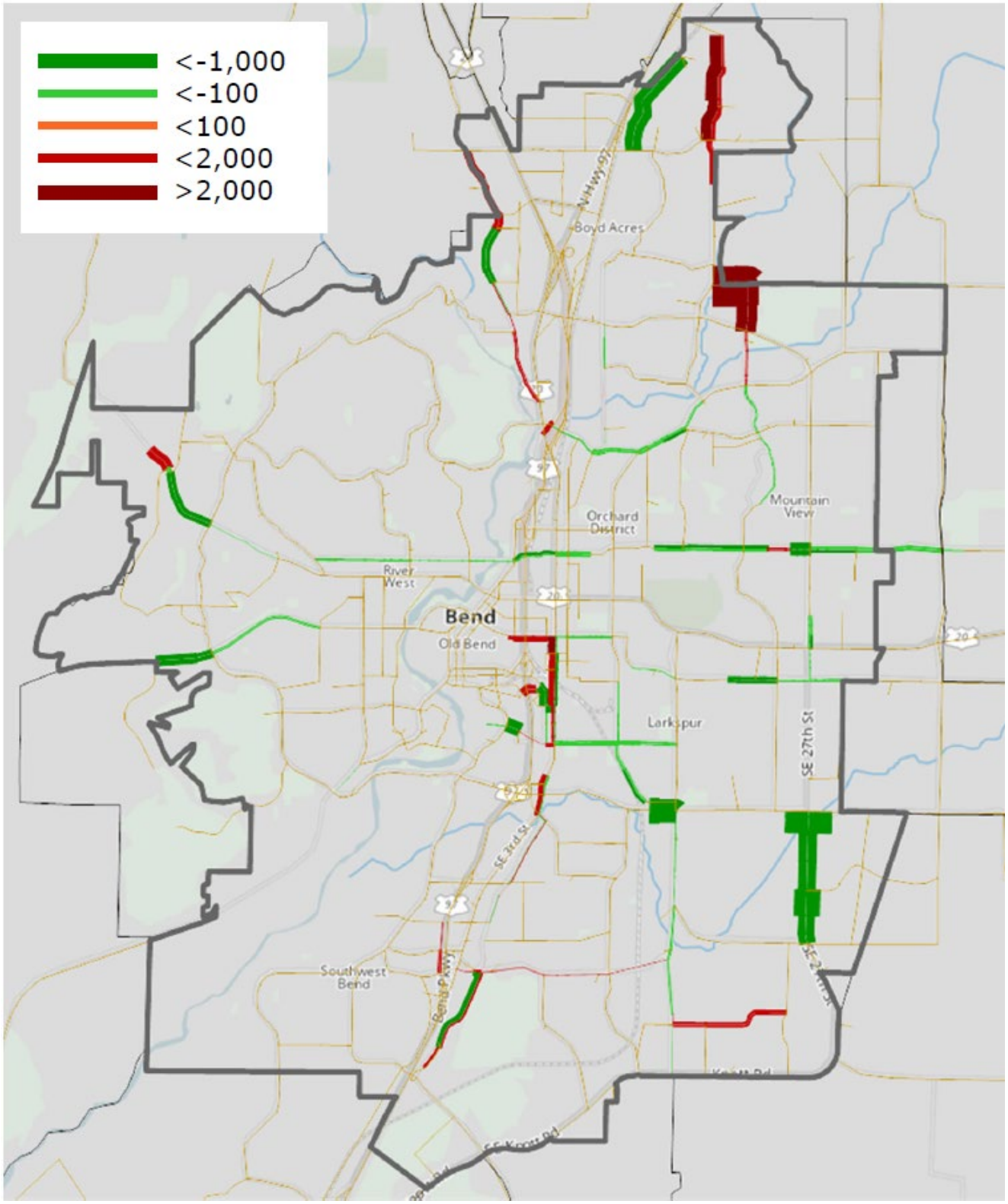

FIGURE 1: CHANGE IN DAILY VOLUME ALONG DESIGNATED KEY ROUTES BETWEEN COMMITTED AND REFINED PROJECT LIST SCENARIO

The most critical changes in daily motor vehicle traffic along Key Routes between the 2045 Committed and Refined Project List Scenarios are summarized as follows:

- **Improved (Reduced Traffic Volume, shown green/orange in Figure 1)**
  - Skyliners Road (NW 17th St to NW Crossing Dr) – 19% reduction primarily due to the NW Crossing Extension (Project 202).
  - Shevlin Park Road (Mt Washington Dr to Skyline Ranch Rd) – 21% reduction due to new expansion area connections to the north (Projects 219 and 230).
  - Bear Creek Road (NE 15th St to Ward Rd) – 18% reduction due to new Stevens Road Re-alignment (Project C-65) and mode shifts driven by nearby transit route enhancements (Projects CET 6 and CET 7).
  - Hawthorne Ave (NW Harriman St to US 97) - 78% decrease due to the closure of the eastbound right turn onto US 97 at Hawthorne Ave (Project C2B). If the southbound right turn from the Parkway onto Hawthorne Avenue is ultimately closed due to the design of the new Hawthorne Pedestrian Overcrossing (Project 23494), traffic volumes along Hawthorne Avenue west of US 97 would dramatically decrease.
  - SE 9th Street (SE Glenwood Dr to Reed Market Rd) – 9% decrease due to the closure of 9th Street direct vehicle access onto Reed Market Rd as part of the Rail Crossing Improvement (Project C-44). Along this segment near Bend High, the removal of the limited use left turn lane between Franklin Avenue and Glenwood Avenue could create space for bike lane separation, and this treatment is recommended for further consideration in the upcoming City of Bend TSP Update.
- **Degraded (Increased Traffic Volume, shown red in Figure 1)**
  - NE Franklin Ave (NW Harriman St to NE 3rd St) – 19% increase in demand due to the closure of the eastbound right turn onto US 97 at Hawthorne Ave (Project C2B). If the southbound right turn from the Parkway onto Hawthorne Avenue is ultimately closed due to the design of the new Hawthorne Pedestrian Overcrossing (Project 23494), additional traffic impacts may be experienced on this roadway segment. Potential treatments for this increase in traffic include crosswalk enhancements at the Franklin Ave/Harriman St intersection to limit left turns, which will be considered through the ongoing Midtown Crossings Project.
  - Parrell Rd (China Hat Rd to Murphy Rd) – 62% increase in NB demand due to the closure of the China Hat Rd RI/RO access to US 97 as part of the China Hat/Ponderosa Overcrossing (Project C-58). The southern portions of the modernization project for Parrell Road (Project M-2) are recommended for prior or parallel implementation with Project C-58 to mitigate the effects of this traffic increase on active transportation and improve safety for all modes of travel on Parrell Road.
  - NE 18th St (NE Talus Pl to Egypt Dr) – 26% increase due to NE 18th Street connection to the new interchange at US 97 (Project 97. A).
  - Yeoman Road – increase due to Yeoman Road extension to NE 18th Street, which adds a new motor vehicle connection to the existing pedestrian and bicyclist only path along the key route.

NEW/CHANGING ACTIVE TRANSPORTATION NEEDS

The 2045 Refined Project List Scenario showed a significant increase in walking and biking trips compared to the 2045 Committed Scenario and the previously documented 2045 Draft Project List Scenario. No other significant new needs were identified from the 2045 Refined Project List Scenario compared to the 2045 Draft Project List Scenario.

As previously documented for the 2045 Draft Project List Scenario, key active transportation needs in 2045 include:

- Only one project from a study completed since the adoption of the Bend TSP clearly impacts a designated Key Route for Walking and Bicycling. This project is the proposed new interchange connecting NE 18th Street to US 97 (Project 97.A & 97.B in Attachment C). This new connection would attract more motor vehicle traffic to the portion of the NE 18th Street corridor designated as a Key Walking and Bicycling Route. The Key Routes project on 18th Street is recommended to be completed either before or in parallel with the NE 18th Street/US 97 interchange project.
- Community input on on-going Key Walking and Bicycling Route projects (such as the Olney Avenue Pedestrian and Bicyclist Improvements project) indicates a desire for higher levels of treatments for active transportation improvements than was originally scoped for the Key Routes project identified in the Bend TSP. Cost estimates for the projects in this category that do not have a clearly defined scope should be re-considered during upcoming local planning efforts to better reflect community priorities. For the purposes of this MTP update, cost estimates have been escalated from the Bend TSP.
- E-bikes have been rapidly increasing in popularity, and this has reduced the effects of commute distance on mode choice. These changes to local bicycling behavior highlight the active transportation needs throughout the Bend MPA and represent an opportunity for jurisdictions within the region to further encourage usage of non-auto modes of travel.

TRANSIT EVALUATION AND FINDINGS

This section presents the following analysis and findings related to the transit needs and proposed projects within the Bend MPA:

- **Updated Evaluation Results**
- **New/Changing Transit Needs**

UPDATED EVALUATION RESULTS

The transit focused projects from the 2045 Refined Project List are shown in Attachment B. This section summarizes key transit performance measures for 2045 Refined Project list, compared against the 2019 Baseline and 2045 Committed conditions, including:

- Mode Split
- Transit Coverage

MODE SPLIT

The percentages of all person-trips using transit within the Bend MPA were calculated from the BRM. These percentages were based on trips that both begin and end within the Bend MPA. Table 2 below documents these mode splits between the 2019 Base Year, the 2045 Committed, and the 2045 Refined Project List scenarios.

TABLE 2: PERCENT TRANSIT TRIPS WITHIN THE BEND MPA

MODE	2019 BASE	2045 COMMITTED	2045 REFINED PROJECT LIST	% CHANGE BETWEEN BASE AND REFINED PROJECT LIST	% CHANGE BETWEEN COMMITTED AND REFINED PROJECT LIST
TRANSIT DEMAND	0.18%	0.15%	0.83%	352%	447%

As shown in Table 2, the overall percentage of transit trips compared against all person trips throughout the MPA remains extremely low, even with enhanced transit assumptions in the 2045 Refined Project List scenario. This highlights some of the limitations of the BRM for modeling transit usage but also additional opportunities to achieve greater benefit to the system by attracting more riders.

TRANSIT COVERAGE

Table 3 lists the percentage of households and jobs within 0.25 miles of transit service. The geographic transit coverage buffers compared against MPA housing and employment growth areas are shown in Figure 3 and Figure 4.

TABLE 3: PERCENT OF MPA HOUSEHOLDS AND JOBS WITHIN 0.25 MILES OF TRANSIT SERVICE

MODE	2019 BASE	2045 COMMITTED	2045 REFINED PROJECT LIST	% CHANGE BETWEEN BASE AND REFINED PROJECT LIST	% CHANGE BETWEEN COMMITTED AND REFINED PROJECT LIST
HOUSEHOLDS	55%	44%	52%	6%	33%
JOBS	69%	55%	66%	4%	30%

With significantly more transit coverage due to mobility hubs and new transit routes, the 2045 Refined Project List Scenario results in 30-33 percent more households and jobs within walking distance (0.25 miles) of transit. This is higher than previously reported for the 2045 Draft Project List Scenario due to the expansion of transit near the Stevens Road Area. Even with these transit changes, 48 percent of households and 34 percent of jobs are not within a walkable distance (0.25 miles or less) to transit. Note this analysis does not consider the quality of pedestrian facilities to access transit, which may also pose a barrier to transit access.

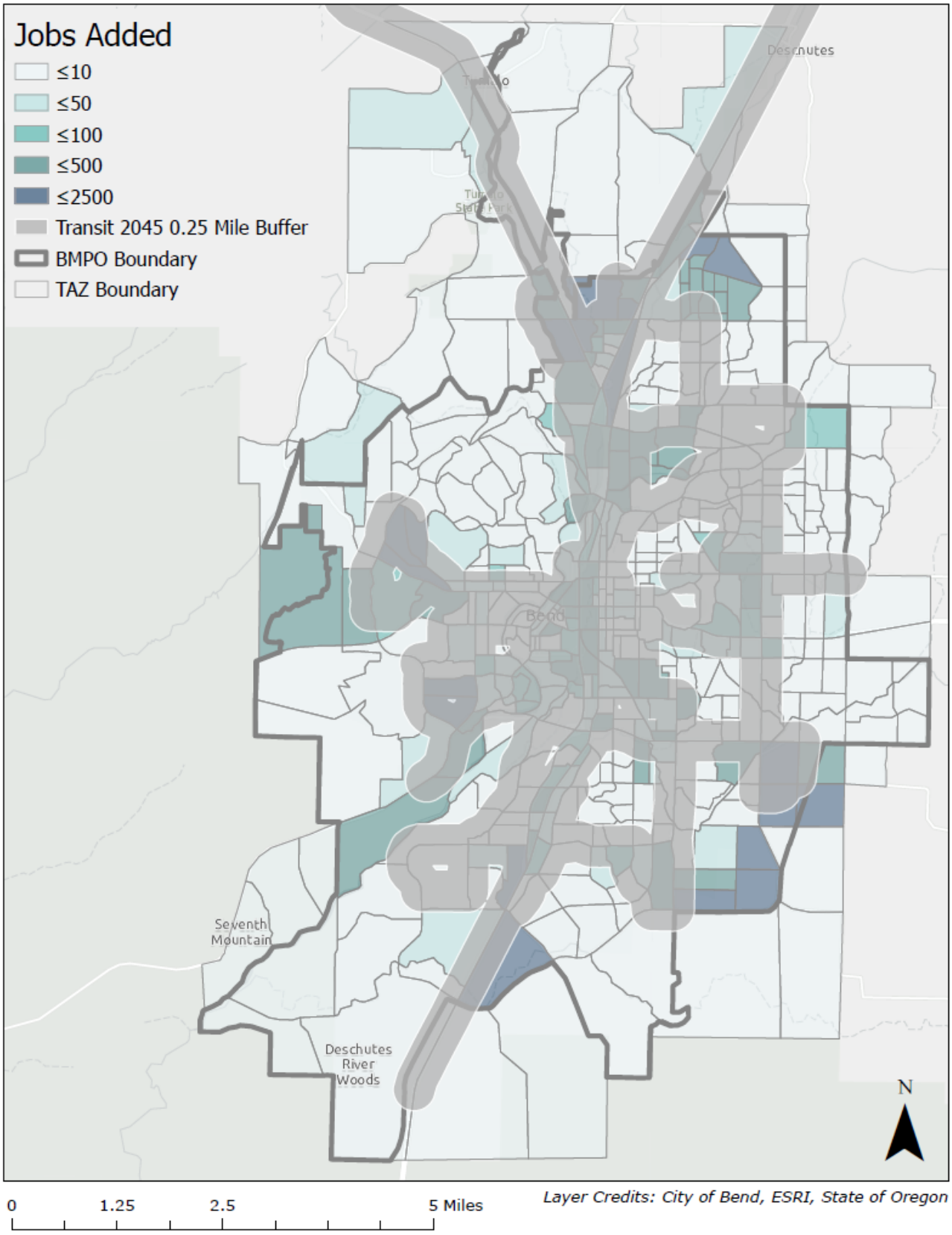

FIGURE 2. 2045 REFINED PROJECT LIST TRANSIT COVERAGE AND JOB GROWTH

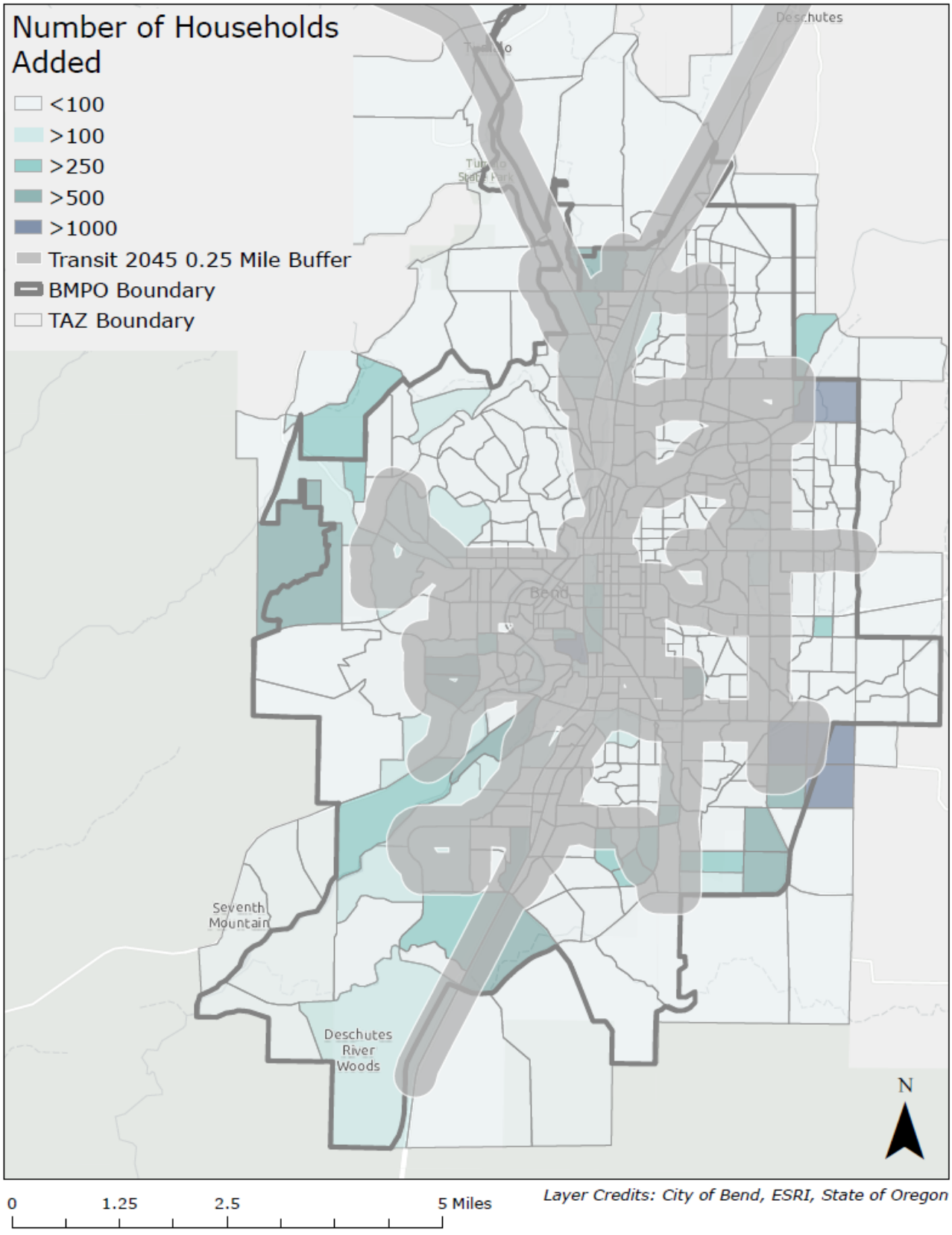

FIGURE 3. 2045 REFINED PROJECT LIST TRANSIT COVERAGE AND HOUSING GROWTH

NEW/CHANGING TRANSIT NEEDS

Compared to the 2045 Draft Project List Scenario, adjusting CET Route 6 (serving east Bend) in the model to better serve growth in Stevens Ranch and Stevens Road Tract, and travel demand management programs for major employers (modeled using parking pricing as a proxy), led to an over 400% increase in the percentage of transit trips in the 2045 Refined Project List Scenario. The refinement of the transit projects included in the 2045 Refined Project List also increases the number of households and jobs within walking distance (0.25 miles) of a transit route.

As previously documented for the 2045 Draft Project List Scenario, key transit needs in 2045 include:

- The 2045 Draft MTP Project List does not provide sufficient transit coverage to fully serve the new growth areas on the urban fringe of the Bend Metropolitan Planning Area (MPA). Many of the most critical motor vehicle needs, particularly needs related to east-west river crossings, cannot be fully resolved through new connections or corridor enhancements. Expanded transit service could provide relief to these congested corridors by shifting motor vehicle users to transit.
- Some programmatic opportunities to increase travel in transit type modes beyond currently identified projects could include vanpool/carpool incentives for large area employers, targeting businesses along corridors identified to have increasing motor vehicle congestion. Some of these types of programs already exist, such as the Enterprise program, but targeted funding to increase the reach of these programs is lacking. More refined funding sources for these programs are recommended as a consideration in the upcoming Bend TSP Update.
- In addition, buses in the transit system are affected by motor vehicle congestion on many of the existing or planned routes, affecting travel times and reliability. Future local plan updates (Deschutes County ITS Plan, CET Master Plan, Bend TSP Update) are recommended to consider ITS projects supporting transit signal priority.
- As a community, the Bend MPA does not have a transit culture. Developing a transit culture will require additional support, with Commute Options, incentives, direct marketing, and other strategies and tactics targeting transit ridership. The upcoming Bend TSP Update is recommended to consider identifying funding sources to support these types of strategies and tactics to increase transit ridership throughout the region.

MOTOR VEHICLE EVALUATION AND FINDINGS

This section presents the following analysis and findings related to the motor vehicle needs and proposed projects within the Bend MPA:

- **Updated Evaluation Results**
- **New/Changing Motor Vehicle Needs**

UPDATED EVALUATION RESULTS

The motor vehicle/multi-modal focused projects from the 2045 Refined Project List are shown in Attachment C (connectivity and corridor enhancement), Attachment D (intersections), and Attachment E (technology). This section summarizes the key motor vehicle performance measures

for the 2045 Refined Project List, compared against the 2019 Base, 2045 Committed and 2045 Draft Project List Scenarios, including:

- Corridor Congestion
- System Delay
- Vehicle Miles Traveled (VMT)
- Trip Diversion

CORRIDOR CONGESTION

The levels of corridor congestion throughout the Bend MPA were estimated using BRM model outputs, which were summarized as Demand to Capacity (D/C) ratios indicating capacity constraints throughout the system. Figure 5 compares the PM Peak Hour D/C ratio results by corridor for the 2045 Refined Project List and the 2045 Committed scenario.

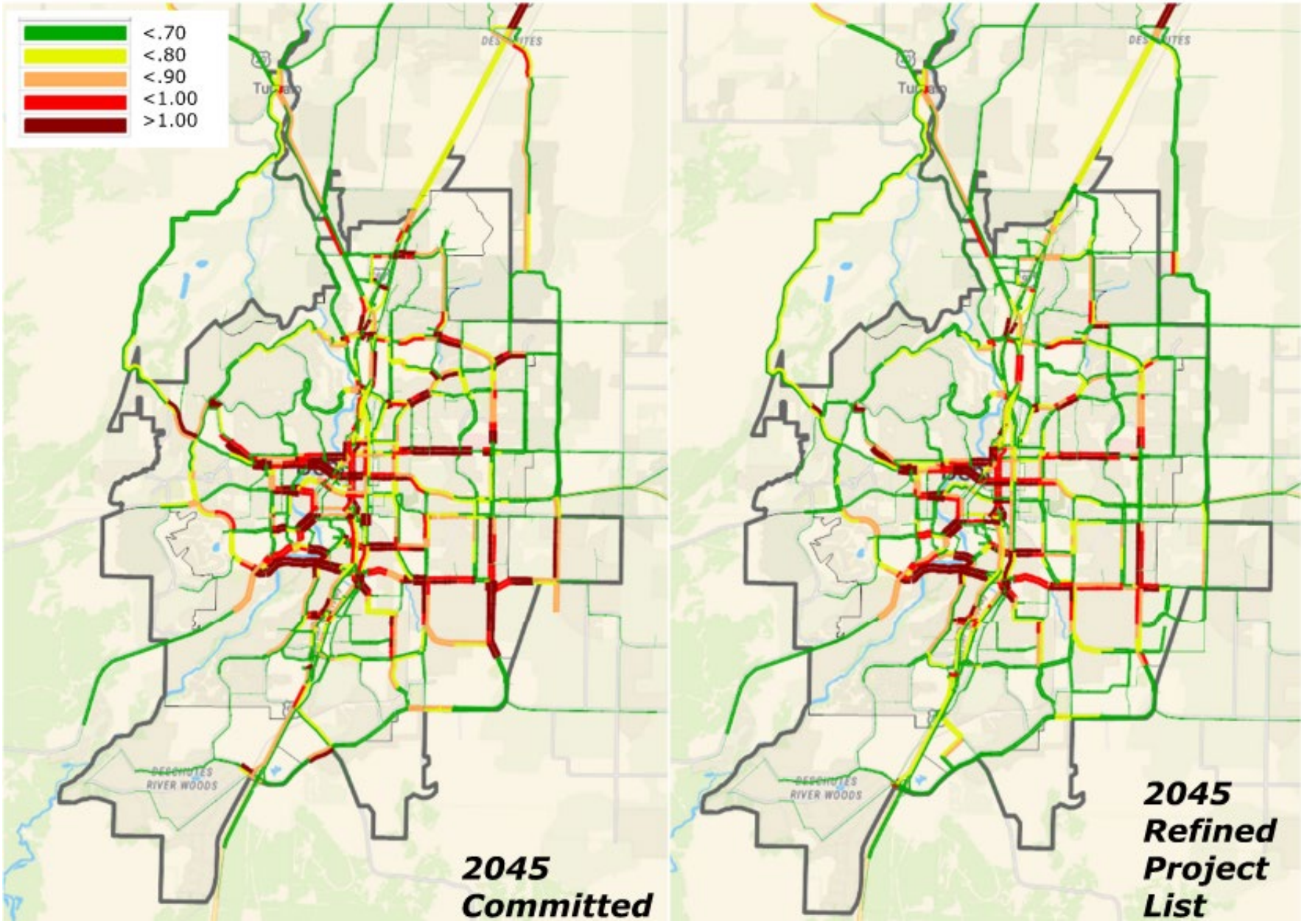

FIGURE 4: 2045 COMMITTED AND REFINED PROJECT LIST PM PEAK HOUR DEMAND/CAPACITY RATIOS

As shown in Figure 5 (with the darkest red symbolizing demand exceeding capacity), the 2045 Refined Project List Scenario improves some of the congestion issues flagged in the MTP Needs Memorandum[4] (similar to the 2045 Draft Project List Scenario), including:

- US 97 Parkway - traffic operations improve, due mainly to restricted access (Projects C2A-C2H) and parallel routes that provide new direct connections to US 97, like the 18th Street extension (Project 97.b)
- North-south corridors – 27th Street improves south of Reed Market Road due to additional connectivity projects to the east and enhanced transit access.
- Empire Boulevard/Butler Market Road – Improves due to Yeoman Road extension (Projects C-1 and C-76)

While the 2045 Refined Project List addressed congestion better than the 2045 Committed Project List (through a handful of new connectivity projects and increased mode shift to active transportation and transit), congestion issues that remain include:

- All East-West river crossings
- East-West corridors, including:
  - NW Galveston Ave
  - NW Portland Ave
  - NE Neff Road
  - NE Newport Ave
  - SE Reed Market Road
  - SE Wilson Avenue
  - Smaller portions of Butler Market Road
  - Powers Road
- North-South corridors including:
  - SE 15th Street
  - 27th Street

In a change from the 2045 Draft Project List, the 2045 Refined Project List Scenario better addresses congestion on Ward Road south of US 20 with the addition of a new project to upgrade Ward Road to an urban corridor.

SYSTEM DELAY

The MPA area roadway system PM Peak Hour vehicle delay with the 2045 Refined Project List is summarized in Table 4, and compared against 2019 and 2045 Committed conditions. The system delay is separated by facility jurisdiction (City of Bend, ODOT, Deschutes County).

[4] (DKS Associates 2023)

TABLE 4: PM PEAK HOUR VEHICLE HOURS OF DELAY

ROADWAY JURISDICTION	2019 BASE	2045 COMMITTED	2045 REFINED PROJECT LIST	% CHANGE BETWEEN BASE AND REFINED PROJECT LIST	% CHANGE BETWEEN COMMITTED AND REFINED PROJECT LIST
CITY OF BEND FACILITIES	283	1,248	867	206%	-31%
ODOT FACILITIES	114	445	336	196%	-25%
DESCHUTES COUNTY FACILITIES	7	38	16	125%	-57%
TOTAL	404	1,731	1,219	202%	-30%

As listed in Table 4, the 2045 Refined Project List Scenario is expected to significantly decrease overall delay on roadways within the MPA compared to the 2045 Committed Scenario. The connectivity and corridor enhancement projects that add alternate routes to the system and motor vehicle capacity drive this delay reduction. As noted in the *Active Transportation* and *Transit* sections above, changes in mode split are relatively minimal but do help contribute to the reductions in delay across the MPA.

VEHICLE MILES TRAVELED (VMT)

Vehicle Miles Traveled (VMT) is a measure of total motor vehicle travel within the system. Normalized to the population within the MPA, this measure indicates trends in both the number of vehicle trips and average trip length, measures which reflect both land use planning implications on travel and approximated future year motor vehicle emissions. Table 5 summarizes the daily VMT results for trips originating from households within the Bend MPA under 2019, 2045 Committed, and 2045 Refined Project List conditions.

TABLE 5: DAILY VMT PER CAPITA RESULTS

MEASURE	2019 BASE	2045 COMMITTED	2045 REFINED PROJECT LIST	% CHANGE BETWEEN BASE AND REFINED PROJECT LIST	% CHANGE BETWEEN COMMITTED AND REFINED PROJECT LIST
DAILY VMT PER CAPITA	6.89	7.26	6.72	-2.5%	-7.4%

The 2045 Refined Project List significantly improves VMT per capita over the 2045 Committed Scenario (7.4 percent reduction). Additionally, this is a minor decrease relative to 2019 Base Year conditions (2.5 percent reduction). This shift occurs due to careful balancing of land use (housing

and employment) in Bend MPA growth areas, enhancements to the transit system, and improvements to connectivity.

TRIP DIVERSION

With congestion expected to continue to grow throughout the Bend MPA in the future, traffic may divert onto local streets in attempts to bypass system or corridor bottlenecks. To estimate the system-level risk of trip diversion, the percentage of collector roadways with Average Daily Traffic (ADT) of more than 4,000 was calculated from the BRM. Table 6 summarizes this measure for 2019, 2045 Committed, and 2045 Refined Project List conditions.

TABLE 6: TRIP DIVERSION POTENTIAL

MEASURE	2019 BASE	2045 COMMITTED	2045 REFINED PROJECT LIST	% CHANGE BETWEEN BASE AND REFINED PROJECT LIST	% CHANGE BETWEEN COMMITTED AND PROJECT LIST
DIVERSION POTENTIAL [A]	7%	22%	18%	136%	-22%

[A] Measured as a percentage of collector roads with an average daily traffic volume above 4,000 vehicles per day.

As listed in Table 6, the 2045 Refined Project List reduces the risk of trip diversion over the 2045 Committed condition, but still more than doubles the amount of high-volume collector facilities compared to the present day. Cut-through traffic already occurs adjacent to various congested corridors and hot spots throughout the Bend MPA.

NEW/CHANGING MOTOR VEHICLE NEEDS

Compared to the 2045 Draft Project List Scenario, the 2045 Refined Project List Scenario included a modernization of Ward Road south of US 20 (Project New-1), which addressed congestion issues in the area. In addition, a reduction in motor vehicle demand along with other model changes resulted in a lower daily VMT per capita when compared to the 2019 Baseline Scenario (2.5 percent reduction), although additional land use changes and investments in alternative modes would likely be required to further reduce daily VMT per capita and meet the state's climate goals.

As previously documented for the 2045 Draft Project List Scenario, the new horizon year of 2045 and changes to land use based on recent growth trends and local planning activities have both created new needs and changed the scope of previously identified motor vehicle system needs. The combined impact of these changes is reflected in the following summary of changes in motor vehicle system needs between the prior and current MTP updates:

- **East West River Crossings** – This congestion issue was a key need identified in the City's TSP and was flagged for monitoring. Current travel demand model forecasts indicate that these crossings will experience traffic demand well beyond existing capacity, indicating a need to move forward with a study for new/enhanced river crossings. This study should include best practices/strategies to manage the existing river crossings as well, particularly given the topographic and right-of-way constraints affecting many of the bridges and connecting facilities.

- **27th Street** – This corridor was flagged for monitoring in the City's TSP, with the year 2040 analysis indicating a need for a five-lane cross section from Empire Boulevard to Ferguson Road. The 2045 Draft Project List evaluation indicates that by the year 2045 Horizon, a five-lane cross section extension is likely only needed from Bear Creek Road to Reed Market Road.
- **Shevlin Park Road** – A new traffic congestion issue east of Skyline Ranch Road.
- **Neff Road** – Heightened congestion issue between 8th Street and 27th Street, with the potential of increasing neighborhood cut-through.
- **Hamby Road** – New traffic congestion issue from Stevens Road to Bear Creek Road, caused in part by growth in the Stevens Ranch and DSL areas.
- **Powers Road** – New congestion issue between US 97 and Brookswood Boulevard.

In addition, key system motor vehicle needs in 2045 previously documented for the 2045 Draft Project List Scenario include:

- Shifts away from motor vehicle modes could provide further improvements in system delay, but to realize these improvements, targeted funding to strategic programs would be needed. Therefore, all local plans supporting jurisdictions within the MPA are recommended to consider establishing strategic mode shift programs with dedicated funding sources or designating funding sources and implementation plans for already identified but unfunded programs.
- The Bend TSP considered funding and staffing a program to manage cut-through traffic, and this program has been at least partially implemented to support the construction efforts related to the G.O. Bond projects. The continued traffic growth throughout the Bend MPA indicates a need to expand the implementation of this program to consider non-construction related cut-through traffic under current conditions.

ATTACHMENTS

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ATTACHMENT A: ACTIVE TRANSPORTATION PROJECTS

TABLE 7: ACTIVE TRANSPORTATION CONNECTIVITY PROJECTS

MAP ID	PROJECT DESCRIPTION	COST ESTIMATE[1]
20714	US 97: Multi-Use Trail	$5,977,000
23494	Hawthorne Ave Pedestrian Bike and Overcrossing	$24,450,000
BP-1	Sidewalks on 7th Street (Tumalo)	$325,000
BP-10	Sidewalks on 8th Street (Tumalo)	$433,000
BP-2	Sidewalks on 4th Street (Tumalo)	$325,000
BP-3	Sidewalks at 2nd and Cook (Tumalo)	$1,841,000
BP-6	Sidewalks on 5th Street (Tumalo)	$541,000
M-12	Olney Avenue Bike Lanes and Undercrossing	$2,116,000
M-15A	Greenwood Undercrossing Sidewalk Widening	$8,087,000
M-15C	Franklin Avenue Underpass	$48,089,000
M-20	Knott Canal Crossing	$846,000
M-9A	Franklin Avenue Underpass Shared Use Path	$6,974,000
M-9C	Greenwood Undercrossing Sidewalk Widening and Shared Use Path	$3,055,000
P10	DRT North Trailhead	$320,000
P11	DRT Kirkaldy to Putnam	$72,000
P13	DRT Galveston to Miller's Landing	$3,077,000
P14	DRT South UGB and Bike/ Pedestrian Bridge	$3,625,000
P35	Riley Ranch Nature Reserve Bike/ Pedestrian Bridge	$1,200,000
P41	Arnold Canal Trail	$645,000
P44	Discovery West Trail	$1,600,000
P45	Hansen Park Trailhead	$755,000
P47	High Desert Park Trail	$258,000
P49	North Unit Canal Trail	$512,000
P50	Pilot Butte Canal Trail	$198,000
P55	Hansen to Big Sky Park Trail	$3,625,000
P56	Manzanita Trail	$48,000
P57	Neff and Hamby Road Crossings	$3,625,000
P6	COHCT from Blakely Road to Hansen Park	$798,000
P61	Riley Ranch Nature Reserve Neighborhood Access	$151,000
P64	Shevlin Park North to Tumalo Creek Bike/ Pedestrian Bridge	$755,000
P67	TransCanada Trail	$755,000
P69	DRT Connector to Shelvin Park	$82,000
P7	COCHT from Hansen Park to Eastgate Park	$178,000
P75	Powerline Trail	$755,000
P77	South DRT Buck Canyon Trailhead	$3,625,000
P78	Tumalo Creek Trail	$755,000
P8	COCHT from Eastgate Park to the Badlands	$755,000
P9	DRT Putnam to Riley Ranch Nature Reserve Bike/ Pedestrian Bridge	$155,000
R2-A	NW Franklin Ave: Harriman Ave to Railroad Undercrossing	$205,000

1. All costs are in 2023 dollars. Costs from prior plan years were adjusted to 2023 dollars.

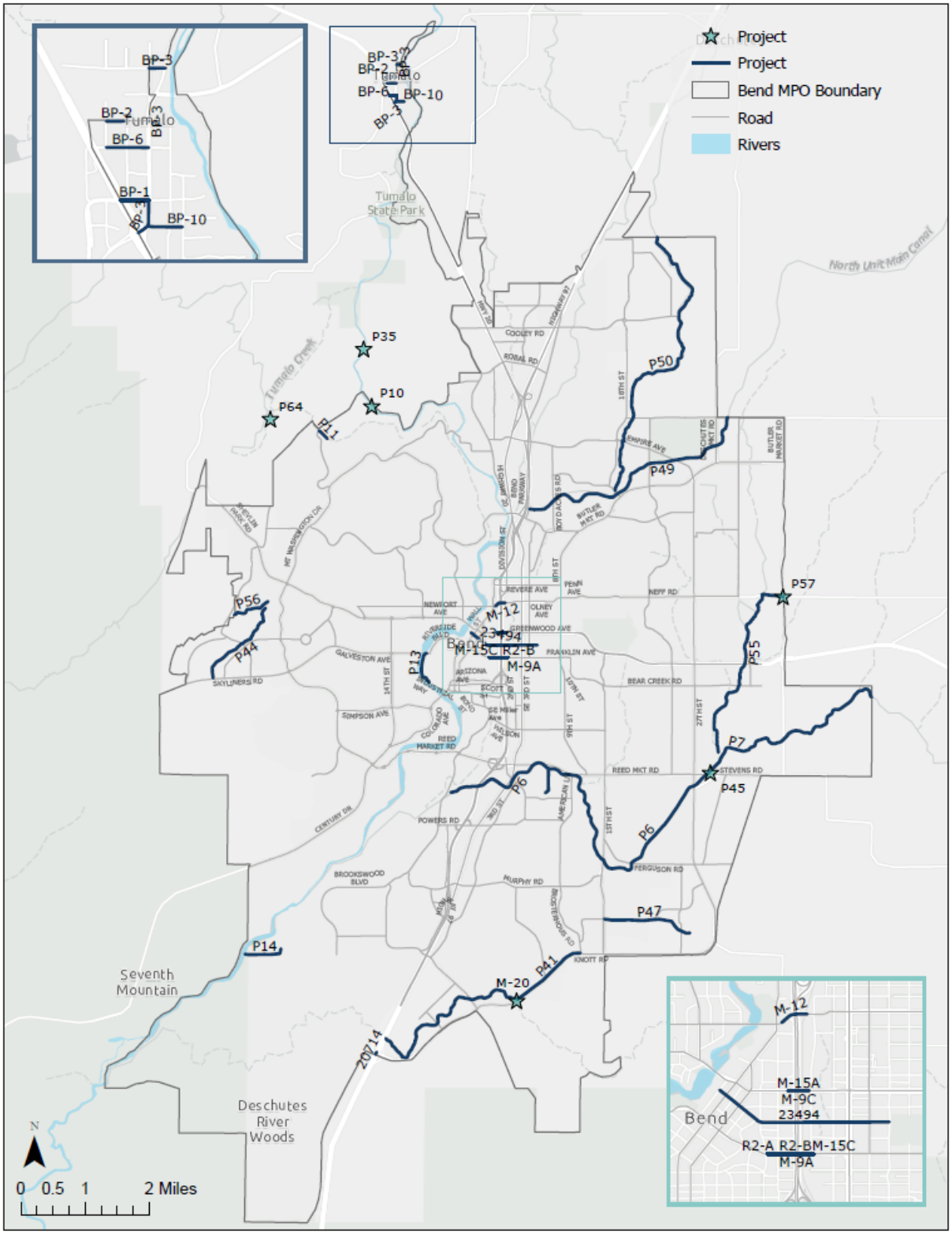

FIGURE 5. 2045 REFINED PROJECT LIST ACTIVE TRANSPORTATION CONNECTIVITY PROJECTS

TABLE 8: ACTIVE TRANSPORTATION CORRIDOR ENHANCEMENT PROJECTS

MAP ID	PROJECT DESCRIPTION	COST ESTIMATE[1]
20391	US 20: Empire-Greenwood Improvements	$2,034,000
21489	US 20 3rd St-15th St Improvements	$6,427,000
22442	Sisters and Bend ADA Improvements	$17,633,000
C4A	Cooley Road Improvements	$3,487,000
C4B	Butler Market Road Improvements	$232,000
C4G	Canal/ Garfield Undercrossing	$1,453,000
C4H	Badger/ Pinebrook Overcrossing	$8,718,000
C4I	Murphy Road Improvements	$8,718,000
C4L	Robal Road Improvements	$1,162,000
C4P	Wilson Avenue Improvements	$1,000,000
M-1	Galveston Avenue Corridor Improvements	$4,712,000
M-10	Drake Park Pedestrian Bridge Improvements	$1,482,000
M-11	Archie Briggs Road Trail Improvements	$581,000
M-14	Butler Market Road Sidewalk Improvements	$3,745,000
M-16	Revere Avenue/ 2nd Street Intersection Improvement	$244,000
M-17	Olney Avenue Railroad Crossing Improvements	$604,000
M-18	Eagle Road Functional Urban Upgrade	$16,856,000
M-19	Knott Road Urban Upgrade from China Hat Road to 15th Street	$18,134,000
M-2	Parrell Road Urban Upgrade from China Hat Road to Brosterhous Road	$33,828,000
M-21	SE 27th Street rural road upgrade from Stevens Road to Ferguson Road	$1,668,000
M-22	SE 27th Street rural road upgrade from Ferguson Rd to Diamondback Ln	$770,000
M-23	SE 27th Street rural road upgrade from Diamondback Lane to access road	$128,000
M-24	SE 27th Street rural road upgrade from access road to Knott Road	$1,668,000
M-25	Knott Road rural road upgrade from 15th Street to Raintree Court	$642,000
M-26	Knott Road rural road upgrade from Raintree Court to SE 27th Street	$7,059,000
M-27	Knott Road rural road upgrade south of China Hat Road	$385,000
M-29	Cooley Road rural road upgrade from O.B. Riley Road to US 20	$1,668,000
M-3	Olney Avenue/2nd Street intersection improvement	$244,000
M-30	Cooley Road rural road upgrade to urban standards from US 20 to Hunnell Road	$1,279,000
M-31	Hunnell Road rural road upgrade to urban standards from Cooley Road to Loco Road	$232,000
M-32	Yeoman Rd rural road upgrade from the western terminus to Deschutes Market Rd	$3,209,000
M-33	Deschutes Market Road rural road upgrade from Yeoman Road to Canal	$642,000

MAP ID	PROJECT DESCRIPTION	COST ESTIMATE[1]
M-34	Deschutes Market Rd urban road upgrade from Canal to Butler Market Rd	$513,000
M-36	Butler Market Road rural road upgrade from Eagle Road to Clyde Lane	$513,000
M-37	Butler Market Road rural road upgrade from Clyde Lane to Hamby Road	$1,412,000
M-38	Butler Market Rd rural road upgrade from Hamby Rd to Hamehook Rd	$1,412,000
M-39	Stevens Road urban road upgrade from Stevens realignment to Bend UGB	$2,439,000
M-4	Greenwood Avenue/2nd Street intersection improvement	$244,000
M-40	Clausen Drive rural road upgrade from Loco Road to Northern terminus	$257,000
M-41	China Hat Road urban road upgrade north of Knott Road	$257,000
M-42	China Hat Road Canal Bridge widening	$483,000
M-43	Deschutes Market Road canal bridge widening	$513,000
M-5	Franklin Avenue/2nd Street intersection improvement	$244,000
M-6	Franklin Avenue/4th Street intersection improvement	$244,000
M-7	Clay Avenue/3rd Street intersection improvement	$244,000
R11-A	Murphy Road: Parrell Road to 15th Street Shared Use Path	$2,533,000
R12-A	Wilson Ave: 2nd Street to SE 9th Street	$2,533,000
R1-A	SE 9th St: Wilson Ave to Reed Market Rd	$1,343,000
R1-B	SE 9th St: Wilson Ave to Glenwood Ave	$3,000
R1-C	NE Boyd Acres Rd: Butler Market Rd to Empire Ave	$2,190,000
R1-D	SE 15th Street: Reed Mkt Rd to 300’ south of King Hezekiah	$1,378,000
R2-C	Franklin Ave: 1st St to 5th St	$19,000
R2-D	Bear Creek SRTS: Larkspur Trail to Coyner Trail	$448,000
R3-A	Norton Ave: NE 6th St to NE 12th St	$228,000
R3-B	Hillside Trail: Connects NE 12th to Neff Rd	$280,000
R3-C	Neff Rd: NE 12th to Big Sky Park	$4,224,000
R3-E	Olney Avenue: Wall Street to railroad	$489,000
R4-A	NW 15th St: Lexington Ave to Milwaukie Ave	$128,000
R4-B	NW 14th St: Ogden Ave to Portland Ave	$128,000
R5-A	Butler Market Rd: Brinson Blvd to NE 6th St	$2,281,000
R7-A	3rd St: Crosswalk btw RR and Wilson Ave	$250,000
R7-B	3rd St: Crosswalk btw RR and Franklin Ave	$250,000
R7-C	3rd St: Underpass	$244,000
R8-A	27th St: Hwy 20 to Reed Mkt Rd - Shared use path	$5,597,000
RMRP2	Reed Market Road/ Chamberlain Street Improvements	$250,000
RMRP6A	3rd Street/ Brosterhous Road Safety Improvements	$130,000
US20.2	US 20/ NE 8th Street Improvements	$2,100,000

1. All costs are in 2023 dollars. Costs from prior plan years were adjusted to 2023 dollars.

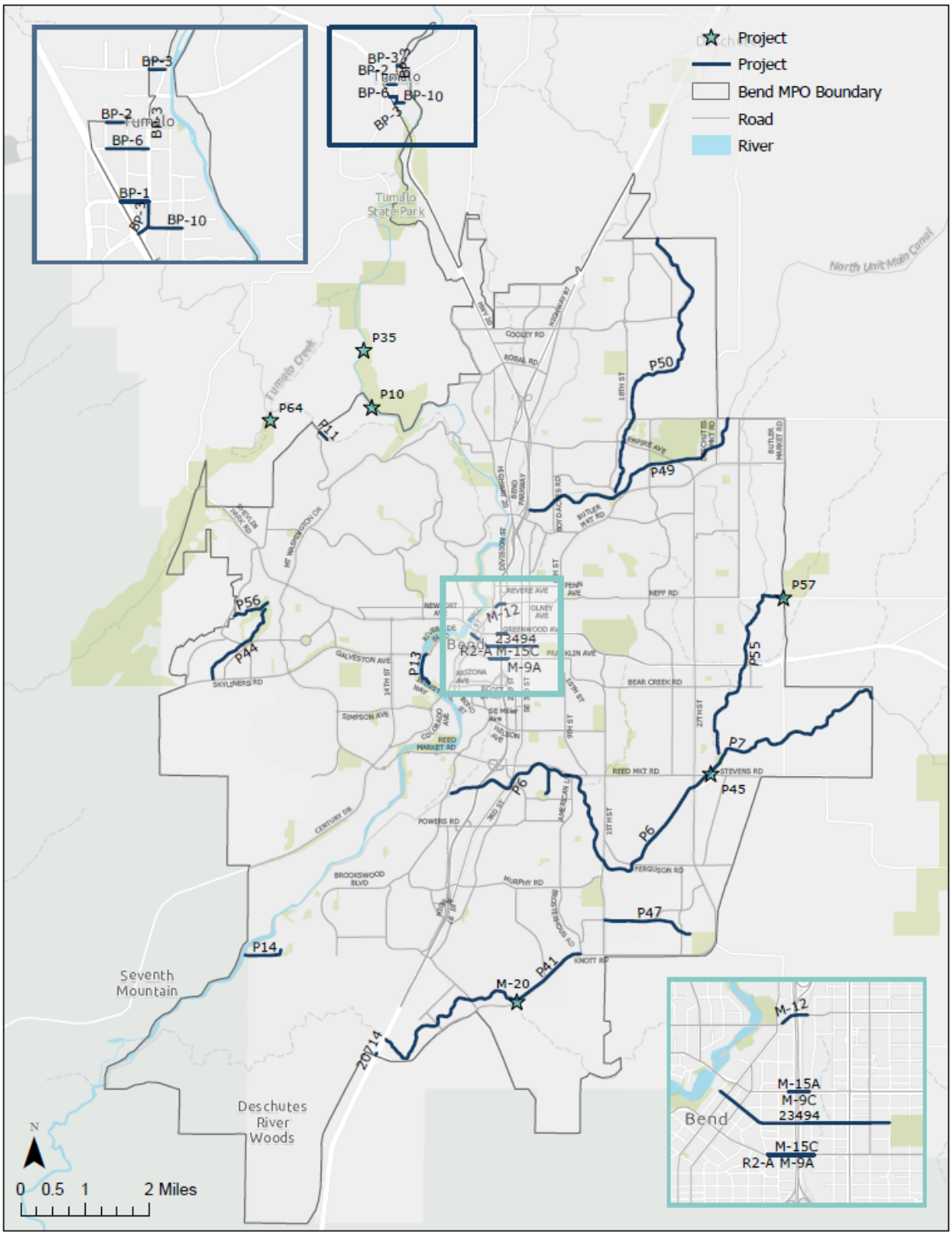

FIGURE 6. 2045 REFINED PROJECT LIST ACTIVE TRANSPORTATION CORRIDOR ENHANCEMENT PROJECTS

ATTACHMENT B: TRANSIT PROJECTS

TABLE 9. TRANSIT CONNECTIVITY PROJECTS

Cost Estimate: $8.7 Million

MAP ID	PROJECT DESCRIPTION
MHND	North Downtown Mobility Hub
MHOMD	Old Mill District Mobility Hub
MHHS	Hawthorne Station Mobility Hub
MHEB	East Bend Mobility Hub
MHST	South 3rd Mobility Hub
MHNB	North Bend Mobility Hub
MHOSU	OSU Cascades Mobility Hub
MHCOC	Central Oregon Community College Mobility Hub

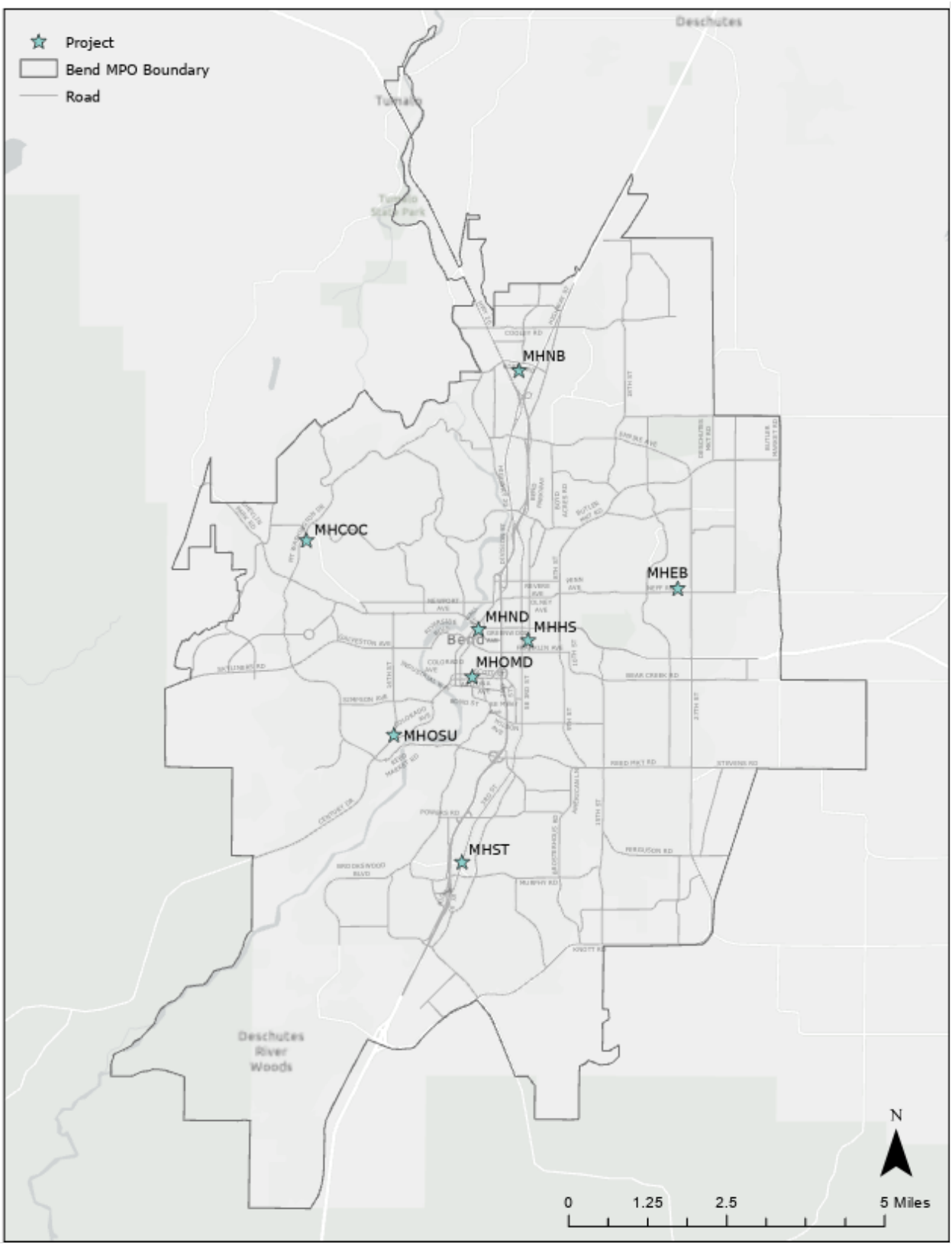

FIGURE 7. 2045 REFINED PROJECT LIST TRANSIT CONNECTIVITY PROJECTS

TABLE 10. TRANSIT SERVICE ENHANCEMENT PLAN 2045

2031-2040 Service Enhancement Cost: $24,582,000

MAP ID	PROJECT DESCRIPTION
CET 2	Bend Service Enhancement Route 2
CET 8	Bend Service Enhancement Route 8
CET 9	Bend Service Enhancement Route 9
CET 11	Bend Service Enhancement Route 11
CET 3	Bend Service Enhancement Route 3
CET 4	Bend Service Enhancement Route 4
CET 5	Bend Service Enhancement Route 5
CET 6	Bend Service Enhancement Route 6
CET 7	Bend Service Enhancement Route 7
000	Study for the Realignment of CET Routes to Service Mobility Hubs

TABLE 11. CET FUNDING PLAN BY QUALIFIED ENTITY[A]

BEND LOCAL SERVICE	EXISTING	SHORT-TERM	MID-TERM
FIXED-ROUTE	$2,290,000	$3,795,000	$9,163,000
DIAL-A-RIDE	$1,141,000	$1,554,000	$2,373,000
DAR/ MICROTRANSIT	$0	$725,000	$218,000

A. Obtained from Table 42 from the Cascades East Transit 2040 Transit Development Plan (2020)

TABLE 12. SYSTEMWIDE FUNDING PLAN[B]

PHASE NAME	EXISTING	NEAR TERM	SHORT-TERM	MID-TERM	LONG-TERM
PLAN YEARS	2019-2020	2020-2021	2022-2025	2026-2030	2031-2040
SERVICE COSTS-EXISTING/ MAINTAIN	$6,431,000	$6,984,000	$8,673,000	$11,298,000	$18,856,000
SERVICE COSTS-ENHANCEMENTS	$0	$1,684,000	$3,334,000	$10,173,000	$24,582,000
CAPTIAL/ MATCH REQUIREMENT	$0	$752,000	$814,000	$899,000	$1,096,000

B. Obtained from Table 41 from the Cascades East Transit 2040 Transit Development Plan (2020)

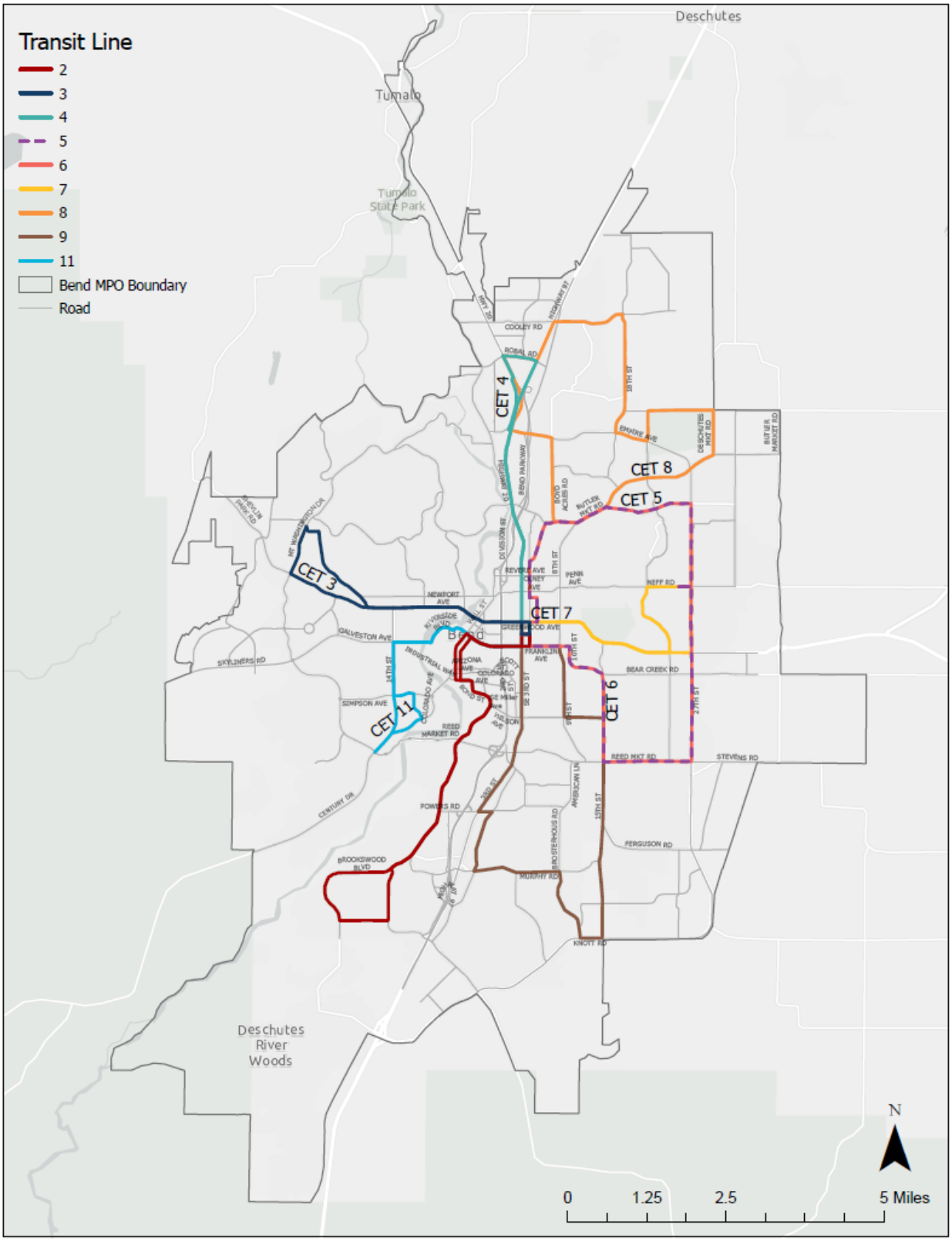

FIGURE 8. 2045 DRAFT PROJECT LIST TRANSIT ROUTES

ATTACHMENT C: MOTOR VEHICLE PROJECTS

TABLE 13. MOTOR VEHICLE CONNECTIVITY PROJECTS

MAP ID	PROJECT DESCRIPTION	COST ESTIMATE[1]
201	New collector - Skyline Ranch Rd from Shelvin Park to NW Xing	Funded
202	Crossing Drive Extension	Funded
219	Skyline Ranch Road Shevlin UGB Expansion Area	$3,465,000
230	New Road Shelvin UGB Expansion	$2,952,000
C-1	Yeoman Road Extension	$6,417,000
C-2	Purcell Boulevard Extension	$2,937,000
C-24	Sisemore Street Extension	$2,790,000
C-25	Brentwood Ave extension from Whitetail St to American Ln	$2,779,000
C-48	New North Frontage Road near Murphy Road	$6,931,000
C-49	New South Frontage Road near Murphy Road	$17,712,000
C-50	Britta Street extension (north section)	$3,465,000
C-51	Britta Street extension (south section)	$1,283,000
C-58	Ponderosa Street / China Hat Road overcrossing	$17,437,000
C-5A	Aune Street extension (East)	$6,394,000
C-5B	Aune Street Extension (West)	$9,881,000
C-64	US 97 Frontage Road (Ponderosa to Baker Road)	$7,614,000
C-65	Stevens Road realignment	$56,496,000
C-66	Hunnell Road extension	$3,080,000
C-69	New Road in the Elbow UGB expansion area	$5,134,000
C-72	New Road in the Thumb UGB expansion area	$5,519,000
C-73	New Road in the Thumb UGB expansion area	$3,209,000
C-74	Loco Road extension	$6,802,000
C-75	New Road in Triangle UGB expansion area	$3,209,000
C-76	Yeoman Road Extension	$13,990,000
C-78	Collector between US20 and Hunnell Rd	$4,650,000
C-80	Robal Road extension from US 20 to O.B. Riley	$3,371,000
CC-18	Cooley Road Extension	$3,140,000
C-71	New Collector road between Ferguson and Knott	$11,551,000
SEAP	Local Road between SE Caldera Drive and Knott Road	$2,695,000
C-70	Extension of SE Caldera Drive between SE 15th and SE 27th	$9,498,000
SRMP	Extension of Wilderness Way	$4,223,000
SRMP	Eubanks Street collector between SE Ferguson and SE Stevens	$5,739,000
SRMP	SE Ferguson Road Extension	$2,815,000
SRT	Extension of the SE Ward Road Alignment from Reed Market Rd to Ferguson Rd	TBD

1. All costs are in 2023 dollars. Costs from prior plan years were adjusted to 2023 dollars.

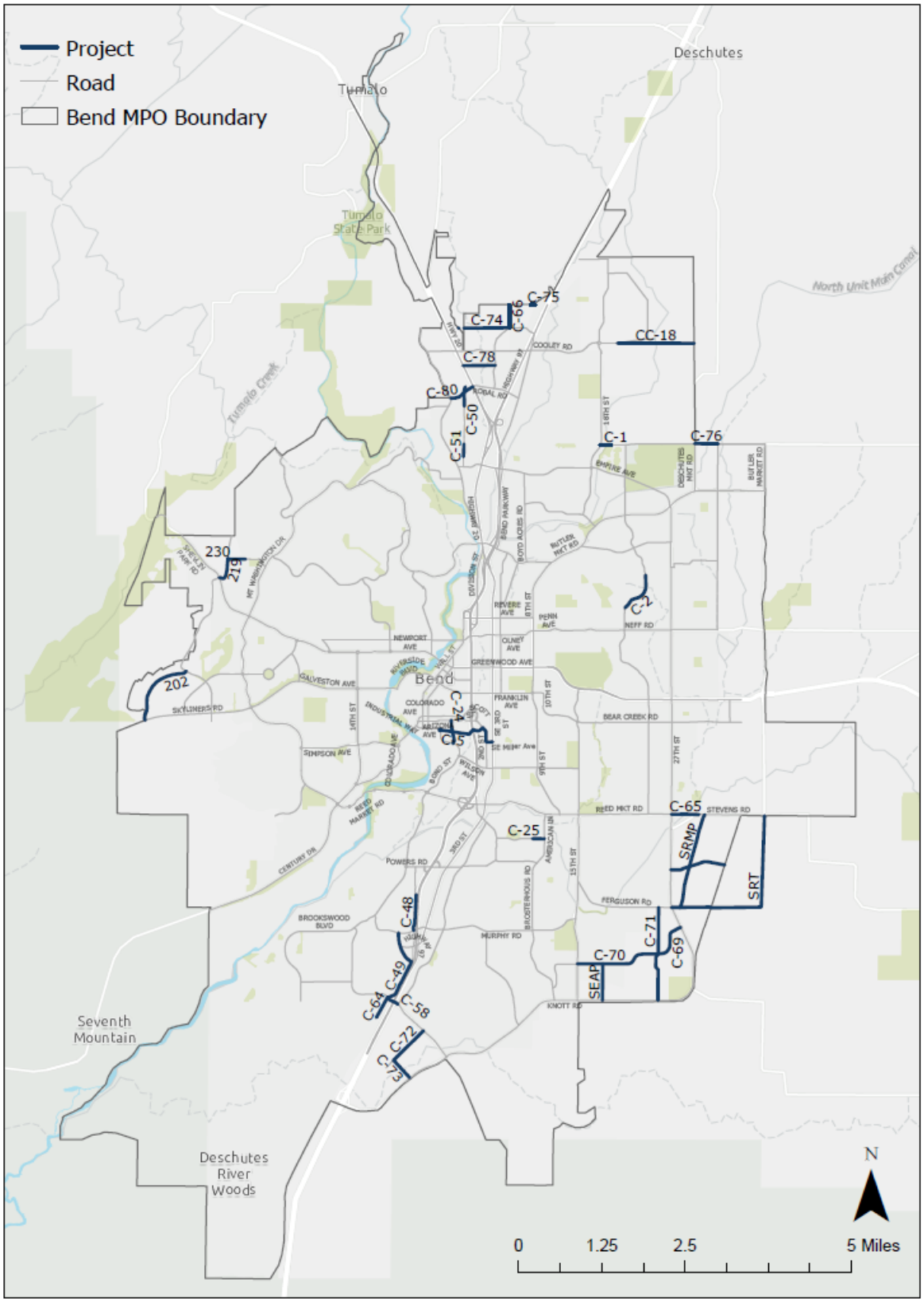

FIGURE 9. 2045 REFINED PROJECT LIST MOTOR VEHICLE CONNECTIVITY IMPROVEMENTS

TABLE 14. MOTOR VEHICLE CORRIDOR ENHANCEMENT PROJECTS

MAP ID	PROJECT DESCRIPTION	COST ESTIMATE[1]
20378	Archie Briggs Road (Deschutes River) Bridges	$5,852,000
21756	US 20: Central Oregon Hwy Culverts Corridor	$533,000
22607	Revere Ave Rail Crossing (Bend)	$500,000
22774	NE Norton Ave (Bend)	$579,000
22776	US 97: Redmond-Bend Phase 2	$9,309,000
22791	US 20: (3rd Street) at Empire (Planning and Design Only)	$250,000
97.A	Tight Urban Diamond Interchange US 97 North Interchange	$81,212,000
97.B	Realignment of 18th Street Relative to Juniper Ridge	-
B-19	Hamby Road Corridor Safety Improvements	$65,456,000 [3]
BR-10	Old Deschutes Road Pilot Butte Canal Bridge Replacement	$433,000
C-13	Empire Avenue widening near US 97 interchange	$11,625,000
C-18	US 97 ramps at Murphy Road	$12,835,000
C-23	18th Street arterial corridor upgrade from Cooley to Butler Market	$9,424,000
C-3	O.B. Riley Road Corridor upgrade from Hardy to Archie Briggs	$8,599,000 [4]
C-31	Safety improvements to Empire Boulevard/27th Street Corridor from Boyd Acres Road to Reed Market Road	$48,591,000
C3A	Southbound Deceleration Lane Modification at Hawthorne Avenue	$1,162,000
C3C	Extend Revere Avenue northbound on-ramp acceleration lane	$2,325,000
C3D	Acceleration lane modification for Colorado northbound on-ramp	$4,650,000
C-40	US 97 North parkway extension (Phase 2)	$34,874,000
C-41	Powers Road interchange	$23,249,000
C-43	15th Street corridor safety and capacity improvements	$19,529,000
C-44	Reed Market rail crossing implementation	$29,062,000
C5	US 97 Shoulder-width improvements	$6,975,000
C-52	Mervin Samples Road / Sherman Road Collector Corridor upgrade	$7,829,000
C-53	27th Street Arterial Corridor upgrade from Bear Creek to Ferguson	$10,390,000
C-54	3rd Street railroad undercrossing widening	$15,926,000
C-55	Country Club Road Urban Upgrade from Knott to Murphy	$12,671,000
C-56	Powers Road urban upgrades from 3rd Street to Parrell Road	$1,208,000
C-57	Powers Road urban upgrades from Brookswood to 3rd	$5,074,000
C-6	Colorado Avenue corridor capacity improvements from Simpson Ave to Arizona Avenue	$24,412,000
C-9	Revere Avenue interchange improvements at Wall Street/ Revere Avenue intersection	$9,881,000
CC-28	Bailey Road Widen and Overlay from US 20 to Tumalo Reservoir Rd	$1,408,000
CC-29	Bear Creek Road Widen and Overlay from City Limits to US 20	$3,465,000
CC-30	Cinder Butte Road Widen and Overlay from Baker Rd to Minnetonka Lane	$1,408,000
CC-5	Rickard Road Widening from Knott Road to Bozeman Trail	$2,491,000
F-7	China Hat Road Widen and Overlay from Knott Road to one mile south of Knott Road at the Deschutes National Forest Boundary	$975,000
I6	SE 3rd Corridor SE Cleveland Ave to SE Davis Ave Safety	-
NEW-1	Ward Road Upgrade- US 20 to Stevens Road	$15,300,000
PHASE 1	US 97 Baker Interchange West Side Improvements	$15,182,000
PHASE 2	US 97 Baker Interchange Bridge and East Side Improvements	$23,798,000

MAP ID	PROJECT DESCRIPTION	COST ESTIMATE[1]
RMRP1A	Reed Market Rd/ Brookswood Blvd Turn Lane Improvement Phase 1	$4,000,000
RMRP1B	Reed Market Rd/ Brookswood Blvd Turn Lane Improvement Phase 2	$700,000
RMRP3	Reed Market Road/ US 97 Southbound Ramps	$5,700,000
RMRP4A	Reed Market Road/ US 97 Northbound Ramps/ Division Street: Traffic Signal	$4,000,000
RMRP4B	Reed Market Road/ US 97 Northbound Ramps/ Division Street: Separate Northbound Entrance Ramp	$9,400,000
RMRP5	Reed Market Road/ 3rd Street protected intersection & turn lanes	$10,300,000
US20.3	US 20/ NE Purcell Boulevard Widening and Turn Lane Addition	$800,000
US20.4	US 20/ NE 27th Widening and Turn Lane Addition	$800,000
US20.5	US 20/ Hamby Road Right Turn Bypass lane addition	$800,000

1. All costs are in 2023 dollars. Costs from prior plan years were adjusted to 2023 dollars.
2. Capital Cost Estimate not quantified in the Bend North Interchange Study Final Report
3. Project cost estimate will be re-evaluated to ensure no duplicate cost with New-1 and to remove projects that have already occurred (e.g., US 20/Hamby Road roundabout).
4. Project cost estimate will be re-evaluated to focus on pedestrian and bicyclist improvements only (no new roadwy capacity).

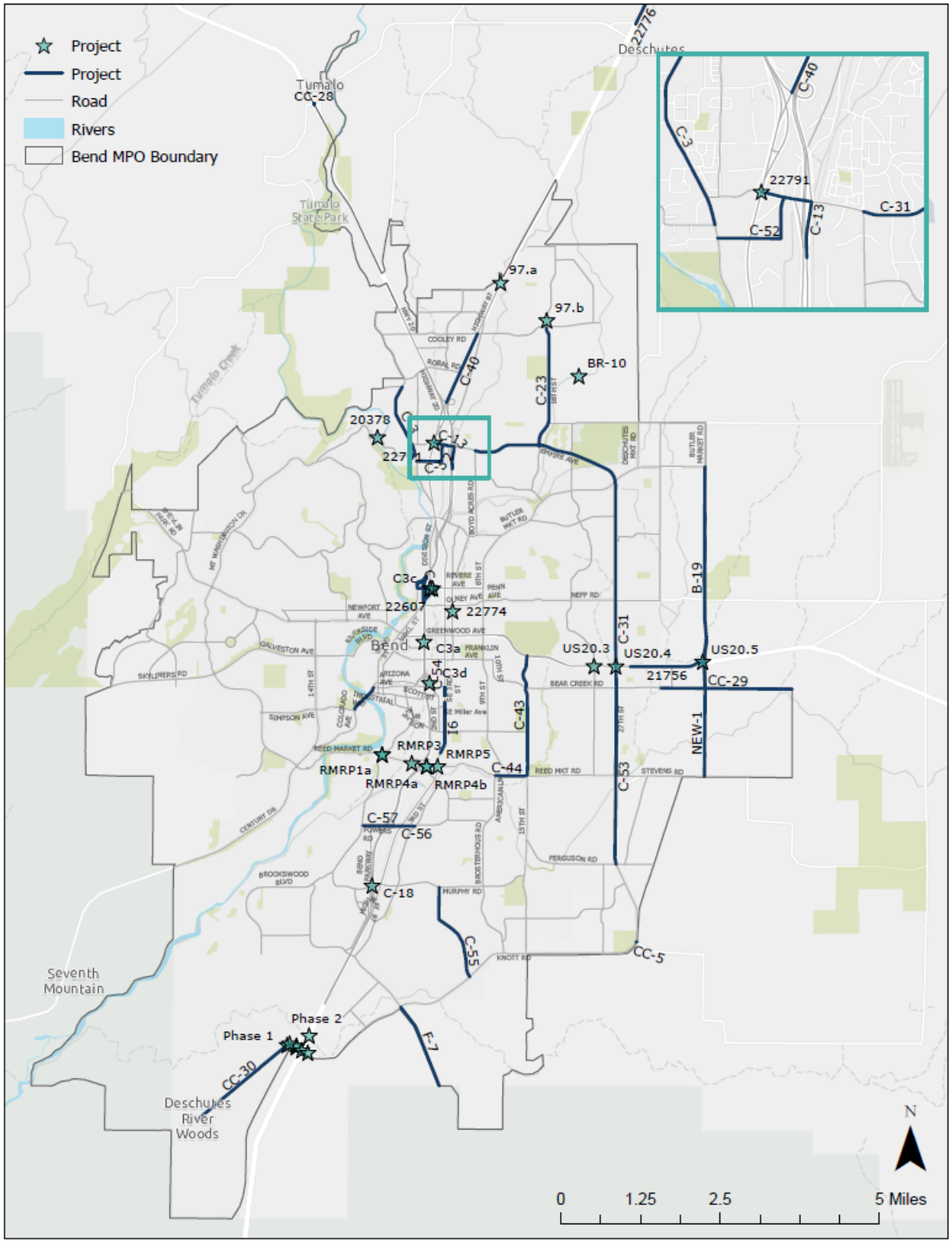

FIGURE 10. 2045 REFINED PROJECT LIST MOTOR VEHICLE CORRIDOR ENHANCEMENT PROJECTS

ATTACHMENT D: INTERSECTION PROJECTS

TABLE 15. INTERSECTION PROJECTS

MAP ID	PROJECT DESCRIPTION	COST ESTIMATE[1]
C-14	Reed Market /15th intersection improvements	$1,279,000
C-15	Olney Avenue/8th Street intersection improvement	$4,301,000
C-16	Revere Avenue/8th Street intersection improvement	$4,301,000
C-21	Butler Market Road/US 20/US 97 Improvement.	$7,184,000
C-22	3rd Street/Wilson Avenue intersection improvement	$6,041,000
C-27	Butler Market intersection improvements from US 97 to 27th	$8,137,000
C-28	Revere Avenue/4th Street intersection improvement	$4,301,000
C-29	Olney Avenue/4th Street intersection improvement	$4,301,000
C2A	Lafayette Avenue/ US 97 Improvements	$2,325,000
C2B	Close Hawthorne Avenue right turn onto Parkway	$1,162,000
C2C	Close Truman Avenue RIRO intersections with Parkway	$1,162,000
C2D	Close Reed Lane RIRO intersection with Parkway	$1,162,000
C2E	Close Badger Road RIRO intersections with Parkway	$1,162,000
C2F	Close Pinebrook Blvd RIRO intersections with Parkway	$1,162,000
C2H	Close Rocking Horse RIRO intersections with Parkway	$1,162,000
C-33	Country Club /Knott intersection improvement	$4,301,000
C-34	Ferguson Road/15th Street intersection improvement	$4,301,000
C-35	NE 27th /Wells Acres intersection improvement	$4,301,000
C-39	Brosterhous /Knott intersection improvement	$4,301,000
C-45	O.B. Riley/Empire intersection improvement	$2,439,000
C-46	4th /Butler Market intersection improvement	$4,470,000
C-59	Hawthorne /3rd Intersection improvement	$4,417,000
C-60	Century Drive/Skyline Ranch Road roundabout	$4,301,000
C-61	Mt. Washington Drive/Metolius Drive roundabout	$4,301,000
C-63	China Hat Road/Knott Road Intersection Improvement	$4,301,000
C-7	Colorado/US 97 NB ramp intersection improvements	$4,999,000
C-79	Cooley Road/Hunnell Road Intersection Improvement	$4,301,000
C-8	Portland Avenue corridor project from College Way to Deschutes River	$20,576,000
CL-14	Cinder Butte Rd/ Cheyenne Rd intersection improvement	$217,000
CL-16	Cline Falls Hwy Cook Ave/Tumalo Rd intersection improvement	$1,949,000
CL-22	Baker Rd/ Brookswood Blvd intersection improvement	$1,516,000
RMRP6B	3rd Street/ Brosterhous Road Protected Intersection	$750,000
S-3	Pettigrew Road/Bear Creek Road safety improvement	$4,749,000
S-4	US 97/Powers Road interim improvements	$128,000

MAP ID	PROJECT DESCRIPTION	COST ESTIMATE[1]
S-5	3rd/Miller intersection improvements and 3rd Street modifications study (Phase 1)	$128,000
S-6	3rd/Miller intersection improvements and 3rd Street modifications implementation (Phase 2)	$3,979,000
S-7	Empire Avenue/Jamison Street Turning Restrictions	$129,000

1. All costs are in 2023 dollars. Costs from prior plan years were adjusted to 2023 dollars.

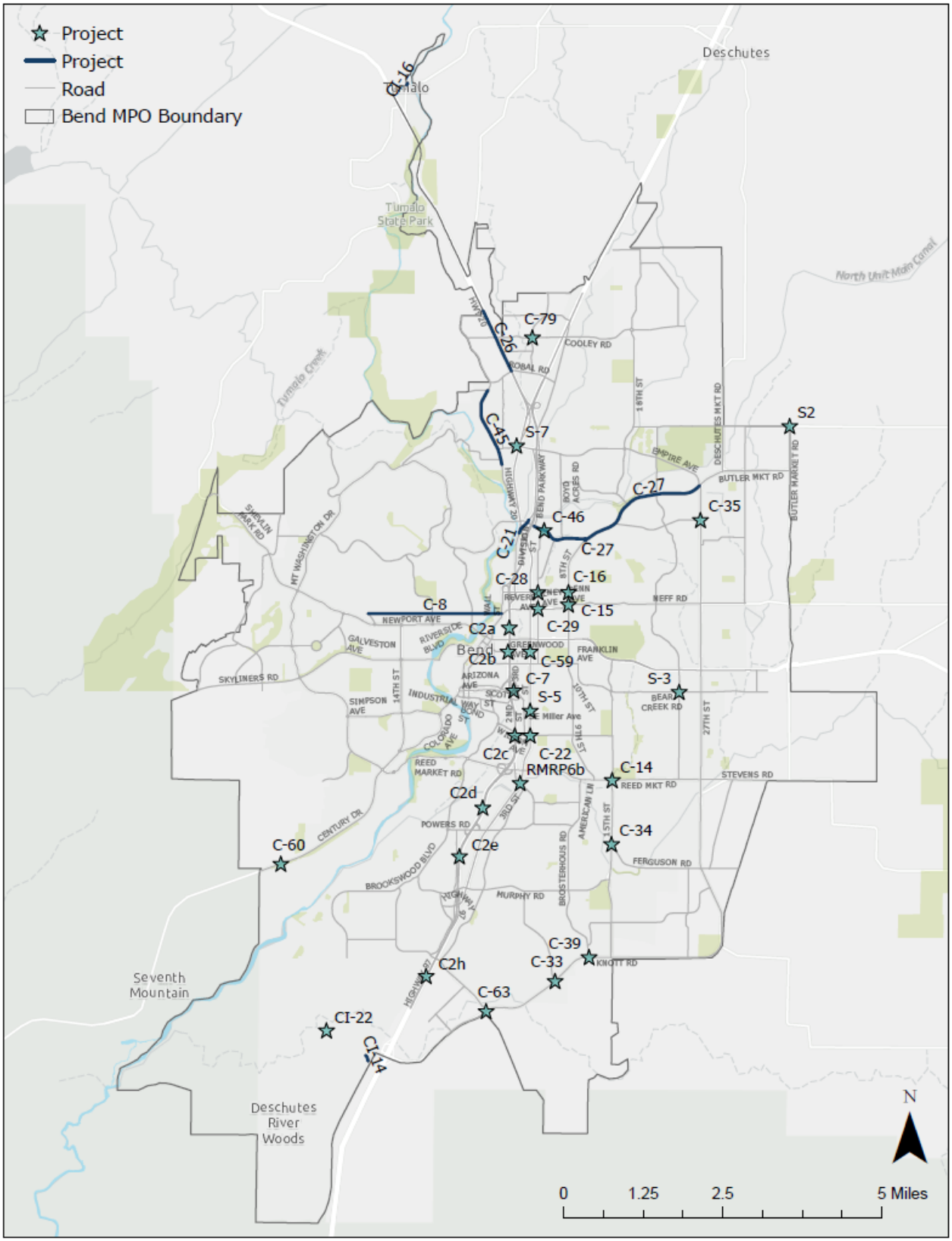

FIGURE 11. 2045 REFINED PROJECT LIST INTERSECTION PROJECTS

ATTACHMENT E: TECHNOLOGY PROJECTS

TABLE 16. TECHNOLOGY PROJECTS

MAP ID	PROJECT DESCRIPTION	COST ESTIMATE[1]
101	3rd Street Safe and Smart Corridor	$1,651,000
102	US 97 Safe and Smart Corridor	$1,331,000
104	Hwy 20/ Greenwood Ave Smart Corridor	$3,552,000
105	27th Street Safe and Smart Corridor	$2,662,000
108	Wall Street and Bond Street Fiber Communications	$1,584,000
109	Century Drive Safety and Efficiency Improvements	$3,801,000
111	Hwy 97 Active Traffic Management (ATM) and Integrated Corridor Management	$3,405,000
112	Revere Ave Fiber Communications	-
113	Neff Road Fiber Communications	$416,000
114	Empire Ave Fiber Communications	$1,515,000
115	Purcell Blvd Fiber Communications	$398,000
203	Deploy Video Traffic Counting Stations at Bottleneck Locations	$534,000
501	OID CAD 911 BUS Upgrade	statewide initiative
503	Rapid Response Situational Awareness Capabilities Responder Video System	$119,000
701	Regional Data Warehouse	$742,000
802	Congestion Warning System	$297,000
803	In-Vehicle Communications for SPaT/MAP and ODOT CV Portal Integration	$356,000
22739	US 97: I-84 to California Border	$5,809,000
22742	US 20: from US101 to the Idaho border	$8,971,000
22767	Driver Feedback Signs (Deschutes County)	$1,033,000
C1	US 97 Install ramp meters	$17,437,000
C10	US 97 Traveler information signing	$19,000
C-36	3rd Street/Franklin Avenue signal modification	$604,000
C-37	3rd Street/Powers Road signal modification	$604,000
C-38	3rd Street/Badger Road signal modification	$604,000
C6	US 97 Weather warning system	$264,000
C7	US 97 Variable speed signs	$320,000
C9	US 97 Enhanced signal operations at ramp terminals	$320,000

1. All costs are in 2023 dollars. Costs from prior plan years were adjusted to 2023 dollars.

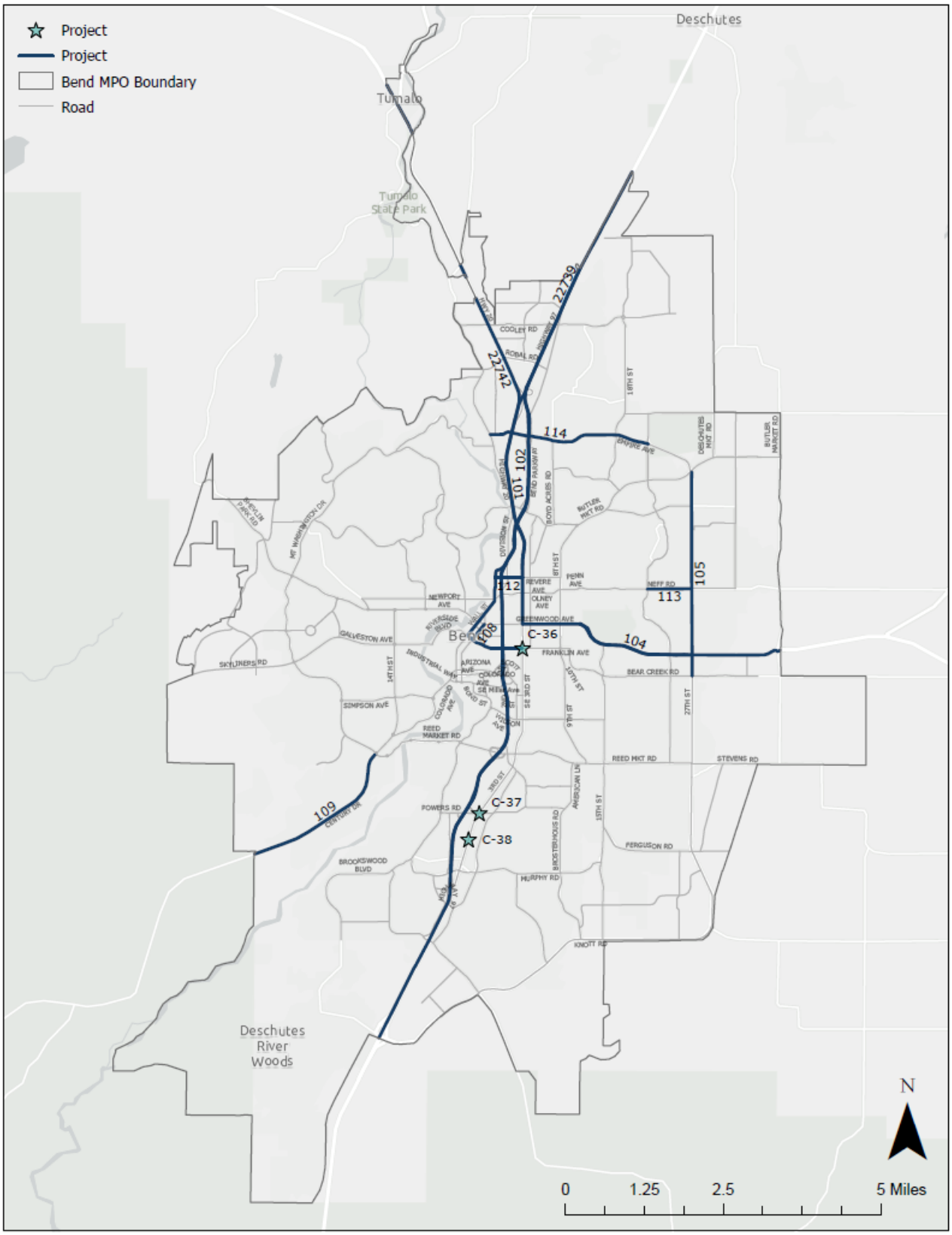

FIGURE 12. 2045 REFINED PROJECT LIST TECHNOLOGY PROJECTS

ATTACHMENT F: PROPOSED STUDIES

TABLE 17. PROPOSED STUDIES

PROJECT ID	STUDY DESCRIPTION	COST ESTIMATE[1]
2.16	Review Priorities for eliminating at-grade railroad crossings	-
3.10	Conduct a comprehensive assessment of CET's marketing and branding and develop action plan.	-
4.5	Evaluate a mechanism to formalize developer contributions to funding for transit infrastructure	-
97.D	North Interchange Refinement Study – US 97 Type, Size, and Location Study of the structure of the interchange. Location of access roads serving properties and circulation study on the west side of US 97.	$400,000
C-17	Powers Road/US 97 preliminary engineering and ROW acquisition for interchange	$7,556,000
C-4	Study for southern river crossing	$581,000
M4	Colorado Avenue improvement to NB ramps intersection (Study)	$250,000
NEW-1	"Z" Study – Refinement Plan for Revere Avenue/Wall Street Corridor from Division Street to Olney Avenue	$500,000
NEW-2	Key Route Cross Section Elements Review and Cost Estimate Update Study	$200,000
NEW-3	TSP Programs Funding Plan (identify funding for programmatic solutions)	$200,000

1. All costs are in 2023 dollars. Costs from prior plan years were adjusted to 2023 dollars.

ATTACHMENT G: PROPOSED PLANS AND PROGRAMS

TABLE 18. PROPOSED PLANS AND PROGRAMS

PROJECT ID	PROGRAM AND PLAN DESCRIPTION	COST ESTIMATE[1]
A1-A55	Bend TSAP Safety Outreach and Educational Action Items[2]	-
1.1	Ensure that local funding for Bend Dial-A-Ride service is maintained beyond the City of Bend's current funding commitment.	-
1.2	Acquire low-floor buses as part of new/replacement vehicle purchases and prioritize on routes with high levels of wheelchair boardings and/or ridership.	$92,997,000
1.3	Assess balance between fixed-route and Dial-A-Ride services on a periodic basis, based on available financial resources and as fixed-route service is enhanced in the future	-
2.1	Develop bike parking facilities, preferably covered, at secondary hub locations and other outlying stop locations	-
2.15	Secure funding for an implement pedestrian access corridors from Bear Creek Road to Greenwood Ave to support implementation of Route 7	-
2.2	Ensure that local funding for fixed-route transit is maintained beyond the City of Bend's funding commitment.	-
2.3	Renegotiate terms of the bulk ticket discount program with COCC, with the aim of developing a group pass program.	-
2.4	Adopt Transit Stop Enhancement Plan standards	$2,992,000
2.5	Develop specifications for new/replacement CET vehicles that modernize the fleet in order to be more appealing and attractive to a broad range of users and align vehicle capacity to passenger demand/needs on each route.	-
2.6	Develop a program of transit-supportive capital improvements	-
2.7	Develop a sidewalk repair and infill program	-
3.1	Pilot Test CET Service to DRW	-
3.11	Review / update CET marketing materials on a regular basis	-
3.4	Promote vanpools to dispersed employment sites	-
3.7	Build upon the "open" transit data published in Google Transit	-
3.8	Develop capabilities for targeted communication with customers (CET)	-
4.1	Adopt a Primary Transit Corridors Policy (City led process)	-
4.2	Develop a transit overlay zoning ordinance and adopt it around primary transit corridors and/or major transit nodes (e.g., Hawthorne Station)	$50,000
4.3	Require review of transit service needs as part of the development review process (City led)	$50,000
4.4	Coordinate public facility master plans (e.g., sewer, water, etc.) with priorities/opportunities for intensifying land use along primary transit corridors	-
201	Multi-Agency regional Operations Center	$1,162,000
203	City of Bend Traffic Data Collection	$523,000
204	Special Event Management System (Deschutes County Fairgrounds and Expo Center and Hayden Homes Amphitheater)	$232,000
305	Flex Park-and-Ride lots for special events	$116,000
308	Transit Signal Priority	$349,000
404	Traveler Information System Enhancements for Construction and Detour info	$349,000
502	Provide Traffic Management System Information at EOCs	$291,000

PROJECT ID	PROGRAM AND PLAN DESCRIPTION	COST ESTIMATE[1]
506	Scenario Planning for Tri-County evacuations, emergencies, and incidents	$232,000
601	Smart Work Zone Management and Safety Monitoring Systems	$232,000
602	Regional Work Zone and Winter Maintenance information sharing system	$349,000
603	Implement an ODOT Maintenance Decision Support System	$872,000
804	Automated Speed Enforcement Pilot	$291,000
C11	US 97 Roadside traveler information dissemination	-
C-19	Traffic Signal Coordination Improvements along Signalized Corridors	-
C8	US 97 Incident management	-
P-1	Address ongoing maintenance needs for new capital projects identified within the City of Bend TSP	N/A / $17,437,000 [3]
P-2	TDM Program for major employers and institutions	$232,000/$3,487,000 [3]
P-4	Bicycle Program – On-going implementation of the Bicycle Low Stress Network Plan	$232,000/$1,162,000 [3]
P-5	Pedestrian Program – On-going implementation of the Pedestrian Low Stress Network Plan	$232,000/$23,249,000 [3]
P-7	Parking pricing and management in downtown Bend	$1,162,000/ TBD [3]
P-9	Transportation Equity Program to address equity in funding and implementation of transportation projects	N/A /$3,487,000 [3]

1. All costs are in 2023 dollars. Costs from prior plan years were adjusted to 2023 dollars. For programs with two values, the first cost is the initial cost and the second cost is the subsequent annual cost.
2. See Bend Area Transportation Safety Action Plan Table 9
3. Cost represents escalaed initial setup costs / estimated annual program costs between 2024-2045.

ATTACHMENT H: COMMITTED PROJECT LIST

TABLE 19. COMMITTED PROJECT LIST

PROJECT ID	PROJECT NAME	PROJECT DESCRIPTION	FUNDING SOURCE
1TNPS	Neff/ Purcell Boulevard	Intersection Capacity and Safety Improvements	Bend CIP
20378	Archie Briggs Road Bridges	Replace bridge with one that meets current standards	Federal
20714	US 97: Multi-Use Trail	Bend to Lava Butte Multi-Use Path	Federal
21756	US 20: Central Oregon Hwy Culverts Corridor	Design right-of-way and utility relocation for a future culvert replacement and repair	Federal
22739	US 97: I-84 to California Border	Install National Electric Vehicle Infrastructure	Federal
22742	US 20: From US101 to the Idaho Border	Install National Electric Vehicle Infrastructure	Federal
22767	Driver Feedback Signs	Install two speed feedback signs on each of the following roads: Alfalfa Market Rd, Burgess Rd, Cline Falls Hwy, Day Rd, Old Bend-Redmond Hwy, Powell Butte Hwy, South Canal Blvd and South Century Dr.	Federal
22774	NE Norton Ave	Installation of bike boulevard along NE Norton Avenue from 4th Street to 12th Street	Federal
22791	US 20: (3rd Street) at Empire	Replace the Traffic signals at the intersection of US 20 at Empire Avenue (planning and design only)	Federal
B-20	US 20 and Cook Avenue	Intersection safety and capacity Improvements	Federal and County
B-21	US 20 and Old Bend-Redmond Highway	Intersection safety and capacity improvements	Federal and County
C-2	Purcell Blvd Extension	Purcell Boulevard extension from Full Moon Drive to Jackson Avenue	City CIP
C-5	Aune Road Extension	Aune Road extension from Bond Street to 3rd Street	GO Bond
C-18	US 97 NB On Ramp and SB Off Ramp	Northbound and southbound ramp improvements at Murphy Road	GO Bond
C-22	3rd and Wilson Avenue	Intersection improvements	GO Bond
C-26	US 20 Intersection Safety	Intersection improvements at US 20 and Robal Road and the roadways in the vicinity	Federal, ODOT, City
C-40	US 97 North Pkwy Extension (Phase 2)	Improvements in the US 97 Bend North Corridor Project	Federal, ODOT, City
CET 8	Bend Service Enhancement Plan	Enhancement to Route 8	Federal and ODOT
M-4	Greenwood Avenue and 2nd Street	Intersection improvements	ARTS
23494	Hawthorne Ave Pedestrian and Bike Overcrossing	Shared Use Path between NE 1st and NE 5th Street	ODOT and City

PROJECT ID	PROJECT NAME	PROJECT DESCRIPTION	FUNDING SOURCE
R2-E	Bear Creek Rd: Cessna Ave to east UGB	Shared Use Path adjacent to roadway	GO Bond
R7-A	Railroad and Wilson Ave	3rd Street crosswalk between railroad and Wilson Ave	GO Bond
R7-B	Railroad and Franklin Ave	3rd Street crosswalk between railroad and Franklin Ave	GO Bond
R7-C	Underpass	3rd Street underpass of railroad	GO Bond
R12-A	Wilson Ave Improvements	Pedestrian and bicycle improvements from 2nd Street to SE 9th Street	GO Bond
RMRP 1A	Reed Market Road and Brookswood Boulevard and Bond Street	Turn lane improvements	City CIP
RMRP 2	Reed Market Road and Chamberlain Street	Pedestrian improvements	GO Bond
RMRP 6A	3rd Street and Brosterhous Road	Striping and lighting improvements	City CIP

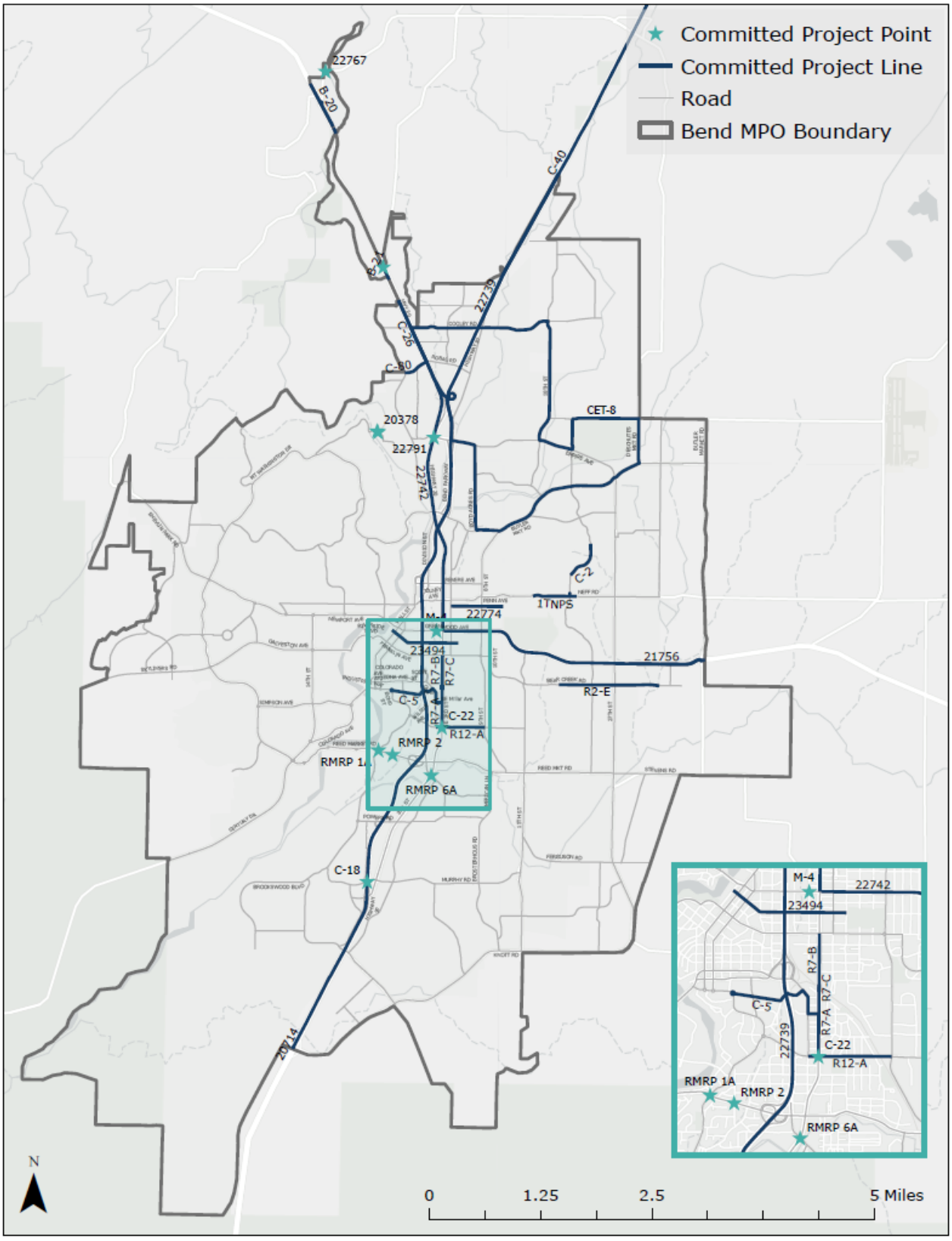

FIGURE 13. COMMITTED PROJECT LIST