



Central Oregon Intergovernmental Council

# CENTRAL OREGON REGIONAL TRANSIT MASTER PLAN

## Volume IV: Service Plan

July 2013

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# SERVICE PLAN

## INTRODUCTION

This chapter of the Regional Transit Master Plan (RTMP) includes the recommended service plan for the short-, mid-, and long-term for Cascades East Transit. Also included in this chapter is supporting documentation of key findings, performance standards and service types appropriate for the region. This chapter is organized into the following eight sections:

- **Key Findings.** This section presents a series of opportunities (and challenges) based on the Existing Conditions and Community Input and Market Research reports. The summary of key findings is then used to develop the vision, goals and objectives, as well as the regional and local service plans.
- **Vision, Goals and Objectives.** Based on the key findings, a vision for transit in Central Oregon was developed. In support of this vision are a series of goals and more detailed objectives in support of the goals.
- **Transit Demand Estimates.** To better understand the demand for transit service now and in the future, transit demand estimates were developed based on the regional travel demand model. Future demand estimates were developed for all local areas as well as between communities.
- **Regional and Local Service Types.** This section provides a description of service types that are likely to be operated in Central Oregon as well as population and employment density thresholds for when those services are appropriate.
- **Service and Design Standards.** This section provides a set of service design and performance standards that allow CET to monitor performance on Community Connector, local public bus, and fixed-route services.
- **Regional Service Plan.** This section presents the short-, mid-, and long-term service plan for the transit services connecting the communities in Central Oregon. The short-term service plan is a “cost-neutral” plan, while the mid- and long-term service plans would require additional resources.
- **Redmond Service Concepts.** As an update to the Redmond Transit Master Plan completed in September 2009, this section provides short-, mid-, and long-term service concepts for local transit service in Redmond.
- **Madras and Prineville Service Concepts.** As the third and fourth largest communities in Central Oregon, local service concepts are presented for these communities – either for the short- or mid-term.

## KEY FINDINGS

Based on the findings documented in the first three volumes of the RTMP—Existing Conditions (Volume I), Surveys and Market Research (Volume II), and Community Input (Volume III)—a number of opportunities (and potential challenges) are identified for CET. The key findings listed below have been used to develop the vision, goals and objectives presented later in this chapter, which ultimately drive the service plan for the region.

### **The Importance of an Integrated Regional Transit System**

Currently, CET provides local transit services in eight communities in Crook, Deschutes, and Jefferson Counties—Bend, Culver, Madras, Metolius, La Pine, Prineville, Redmond, and Sisters—as well as regional connections between these communities including to Warm Springs. As part of the regional council of governments, CET’s primary focus will be to maintain regional transit services that connect the communities. Similarly, CET will also provide local service in member communities in support of the regional connections. There are significant benefits to managing and providing transit service at a regional scale, including lower operating costs; shared use of vehicles, facilities, and administrative staff; a unified transit brand and fare system; and improved coordination among other entities.

### **Funding for Transit Services**

Most of the communities where CET provides transit contribute local funds for services. These funds function as a “match” for other funding sources, including state and federal grants and formula funds. However, an enhanced level of local funding is needed to simply sustain existing services, given the decline in some existing funding programs and increase in operating costs (largely related to labor, fuel, insurance, etc.). Perhaps one of the most important outcomes of the RTMP is to identify a reliable, sustained funding source that will allow CET to maintain existing service levels and enable expansion of services as identified in the RTMP. A sustainable source of revenues will also free up CET staff time that is currently spent applying for grants and cobbling together different funding sources to instead focus on planning, implementation, and operations.

### **The Nature of Travel in Central Oregon**

Relatively long intercity travel distances in Central Oregon, combined with activity and employment centers located throughout the region, facilitate the need to provide regional transit connections. For residents with access to a car, the high cost of gas in recent years can create an incentive to use transit, if it is sufficiently convenient and gets them where they need to go when they need to get there. For residents without access to a vehicle, long travel distances make it impractical to get a ride from others without inconvenience and are a barrier to mobility if other travel options are not available. Based on the on-board surveys conducted on CET buses, existing riders on the Community Connector and local demand responsive services are generally grateful for the service offered, which indicates that transit is fulfilling an important need (and likely should be expanded in some areas).

### **Role of Transit in Central Oregon**

Given the level of transit service currently provided, i.e., a limited number of daily trips and service hours between communities and dial-a-ride (DAR) service in all communities except Bend, transit’s primary role in Central Oregon is to provide basic mobility to those who do not

have other transportation options, including to social services and educational opportunities, etc. While providing service to those with mobility challenges should remain an important role for CET throughout the life of the RTMP, CET could also focus on attracting “choice” riders that likely have other transportation options, such as commuters, students, and visitors/tourists. Based on the Community Preferences survey, there is broad agreement in the region that additional benefits of transit include reducing pollution and relieving congestion.

### **Transit-Supportive Growth**

Decentralized land use patterns make it challenging to deliver efficient transit services that go beyond basic mobility. Central Oregon communities, like many suburban and rural communities across the US, have not really been built with transit in mind. A general threshold for transit-supportive residential uses is 15 units per acre for high-frequency bus service, and 4-7 units per acre for regular but relatively low-frequency fixed-route service. Uses with high employment densities (e.g., offices, medical centers, colleges) support more transit use than uses with lower employment densities (e.g., industrial parks or warehousing). Extensive areas of retail can become auto-dominated if not scaled appropriately and mixed with other uses. The RTMP process can better engage and educate political leaders, planners, and developers to understand the true costs of building a new college campus, social services facility, school, or employment center on remote, inexpensive land that will require an expensive investment in parking facilities and may be too costly (or inconvenient) to serve by transit.

### **Service to Key Transit Activity Centers**

Regional CET services have been most successful when they serve high-demand activity centers, such as COCC in Bend. Key travel market factors in the success of this service include long travel distances (high cost of driving), presence of local, coordinated connecting services, and constraints on parking. Long term strategies for CET will include the need to work with local communities and developers to orient new growth and locate new facilities so they can be affordably and effectively served by transit. Tools developed through the RTMP process include service and design guidelines that ensure activity centers are diversified to maximize transportation choice, land use intensities encourage use of transit and support pedestrian and bicycle activity, and development standards (including parking requirements and parking provision) are compatible with compact, pedestrian and transit-supportive design and development. Because most of Central Oregon is rural in nature, this is clearly not feasible everywhere, but could be feasible in certain communities and in certain situations (such as for visitors or tourists).

### **Role of Traditional, Fixed-Route Transit in Central Oregon**

Based on current land use patterns (which are largely rural in nature), a fixed-route service model will not be feasible in all portions of the CET service area within the life of the RTMP. The transit demand estimates developed for the RTMP indicate that some local communities and regional connections have low demand for transit service and limited growth potential in the future. The RTMP will identify strategies to increase the utility of existing services, such as identifying a limited number of additional local stops for Community Connector services or other local service options responding to the rider-identified priority improvements, e.g., to allow same-day rides, offer fixed-route service, and not require reservations.

Based on the demand estimates, some portions of the CET service area, notably in Redmond, appear ready to transition from local fixed-route service in the near-term. This is supported by on-board surveys, which indicates that more Redmond residents say they would use fixed route transit. Other communities, like Prineville and Madras, could also reach the threshold for fixed-route service later in the life of the RTMP. In these communities, the RTMP can help encourage transit-supportive population and employment densities, ensure that transit-intensive uses are located along or near future/potential transit routes, and that development standards are in place that support future transit.

### **Alternatives to Traditional Transit**

In rural and small communities, fixed-route public transit may not always be the most cost-effective solution for providing mobility. Outside of the more populated communities (Bend, Redmond, Prineville, and Madras) most of the CET service area may never support traditional fixed-route local transit service.

In addition to transit service, some other strategies may be considered for maximizing mobility including human service agency-provided transportation, implementing a volunteer driver program<sup>1</sup>, increasing use of ridesharing (carpools/vanpools), or creating safe bicycle and pedestrian routes. As a Council of Governments, CET is not limited to implementing public transit strategies exclusively, but because other agencies in the region focus on these alternatives (e.g., Commute Options), CET's role in implementing these types of strategies is likely to remain a supporting one.

### **Transit Amenities and Improved Access for Bikes and Pedestrians**

Transit amenities (benches, shelters, etc.) and infrastructure that makes it possible to access transit (sidewalks, bike lanes, etc.) are an often overlooked aspect of providing transit service. Due to the nature of the service (local demand response and regional Community Connectors), these amenities largely do not exist in Central Oregon (outside of the Bend fixed-route system and transit centers elsewhere in the region). Amenities are important for passengers, and improving stop amenities received the most open-ended comments from passengers responding to the Community Connector onboard survey.

Access to the stops that do exist is inconsistent throughout the region – especially for people with limited mobility. To better meet future transit needs in Central Oregon, the RTMP should advocate to improve and maintain primary transit facilities. CET staff should continue to work with local jurisdictions to ensure that pedestrians and bicyclists have good access to transit. While the ADA requires that accommodations be made for people with disabilities, and provides guidance for making these improvements, it is the responsibility of CET and member jurisdictions to ensure that transit access and amenities are considered.

### **Equipment and Capital Investments**

As a relatively young system, CET's fleet of Community Connector and DAR buses is generally in good or excellent condition. However, vehicles are starting to reach the recommended age of

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<sup>1</sup> COIC is in the process of developing a volunteer driver program for the region in which CET would reimburse volunteers for the cost of gas. Seniors and people with disabilities would be the focus of the program and COIC would provide ride brokering and dispatch services.

retirement, and planning and securing the required capital funds for fleet replacement is necessary for CET to maintain bus reliability. Maintaining the condition of its vehicle fleet is also of value for CET to continue to improve the experience of riders, comfort of drivers, and visibility of the system.

## Public Information

While the Cascades East Transit brand is used consistently across vehicles and online and printed informational materials, the visibility and name recognition of CET is limited in Central Oregon. The Community Preferences survey found that outside of Bend, approximately one-third of residents were able to name the transit provider and an additional approximately one-third were able to identify the transit provider when prompted. The limited-stop nature of Community Connector services and the demand-responsive nature of intra-community services are among the obstacles that CET faces in trying to build awareness of transit in communities and the region. Some residents may not realize that service is available for use by the general public, understand how it operates, or be willing to use a reservation-based system (until recently, in place on the Community Connector as well as local service). Lack of awareness may translate into lower overall public support than is warranted for CET's mission, and as a result, there may be a lack of support for initiatives to help maintain and expand transit service in the region.

## VISION, GOALS AND OBJECTIVES

Defining a vision as part of this RTMP is essential to help COIC and CET define their role in providing transit for Central Oregon over the next 20 or more years.

In most regions, transit is a publicly provided service, just like police, fire, water, and sanitation. However, transit is different from other public services because it is the only one of these services whose use is discretionary (for most users). For example, Central Oregon residents have few options if they choose not to use the public water system or police/fire services, but most do have options when it comes to transportation. Residents can drive their own car, use transit, get a ride from somebody else, walk, or ride a bicycle.

If funding and resources were not a concern, transit in Central Oregon could be designed to meet everyone's needs. It could operate 24 hours per day, 7 days a week, 365 days each year. It could operate very frequently, with service operating up and down almost every single street. Unfortunately the amount of funding available to build and maintain a system is always a major constraint for public transit agencies, and thus it is critical to prioritize how resources are allocated when designing and operating a transit system. Because transit use is a discretionary activity for most people, it becomes critical for transit providers to fine tune their ability to estimate demand for transit and develop educated guesses about when and where people will actually use transit service.

The ability to plan for transit is easier when there is agreement about what role transit is supposed to play within a community. Having a clear vision about transit's role allows COIC/CET to define a service that is effective, efficient and valued by the community while doing so within financial constraints.

COIC has a clear vision statement for its transportation programs, the "overarching purpose" of which is to provide regional mobility, including ensuring coordination/connectivity of services:

*Strengthen regional transportation services and infrastructure through the development and implementation of regionally-based transportation plans, administration and operations, service coordination, and project development. A regional approach to transportation enhances efficiencies among transportation organizations and ensures regional connectivity for Central Oregon’s residents, businesses, and visitors.*

Five core functions are identified for the transportation services provided by COIC, and include assisting communities with developing and operating local transit services:

- *To identify regional transportation needs and objectives and develop long-term, coordinated plans to address them;*
- *To develop and administer regional transportation programs and inter-community transit systems, as identified in regional plans on a priority basis;*
- *To assist communities in the development and operation of intra-city transit, as needed;*
- *To ensure connectivity of intra- and inter-community transportation systems; and*
- *To provide technical support and project development assistance to local governments, organizations, and federal and state agencies to assist their transportation programs.*

While these goals and core functions are a great base, since CET service was initiated in 2008, there has not been a clear vision for how transit resources should be allocated or what types of services should be provided. The vision for CET, which operates inter- and intra-city transportation services for COIC, is simply to “help you get to where you need to go – whether your destination is in your hometown or in a neighboring town.” In addition, as part of recent (October 1, 2012) service changes, CET developed the following principles to help guide its policies and decisions to introduce new services or reduce/maintain different parts of its existing services:

- **Focus on providing services with the highest demand.** Prioritize CET services where demand is highest, as evidenced by data, to achieve to maximize efficiency and provide service to the most riders. Exceptions include when CET is subsidized to provide service to a specific group or area as per contract or grant agreement language.
- **Community and Rider Priority.** Prioritize services that have been given high priority by communities and riders, as evidenced by survey findings, community meeting input, and existing planning documents.
- **Maximize ride logistics efficiency.** Prioritize services where transit is the most efficient mobility option, optimize the number of riders on the bus, and do not provide service where other, lower-cost options (e.g., carpooling, volunteer driver programs, etc.) may be more appropriate.
  - **The first priority is to connect within and between the urban areas. Provide service to rural areas (outside UGBs) as subsidized to do so.** Pursue volunteer programs and partnerships with other agencies to develop lower-cost options outside UGBs.

- **Maintain the “regionality” of the system.** Ensure that all communities remain connected.

Refining the vision for transit in Central Oregon is a key motivation for this study. Based on the community preferences survey conducted as part of the RTMP, there is a general community consensus that transit has an important role in serving transportation needs in Central Oregon, especially the transit-dependent population. However, there is also a desire to attract “choice” riders to the system and a task for the RTMP is to identify primary markets for choice riders.

### **Vision for Cascades East Transit**

As noted above, COIC’s vision should remain focused on regional coordination and integration in a broad, flexible sense. CET’s role should therefore primarily be in support of COIC’s broader vision, focusing resources on regional and local connections within the region’s urban areas, while facilitating and coordinating with other regional and local partners to cost-effectively meet the region’s mobility needs. Based on this, as well as information gathered through the RTMP process, a refined vision for CET is:

***Provide safe, efficient, reliable and cost-effective regional transit connections within and between the urban growth boundaries of all communities in Central Oregon.***

### **Goals and Objectives**

The value of establishing goals is that they provide strategic direction for an agency in support of bigger vision. They also help an agency be proactive in how it shapes its service rather than being reactive to public sentiment. The following goals, in support of the CET vision presented above, are developed based on current operating characteristics, stated priorities of stakeholders, and the markets for transit services. The objectives to support each goal are, in most cases, actions that can be taken by CET to help move the agency toward reaching these goals.

#### **Goal 1: Ensure transit service is safe, efficient, and reliable**

A primary goal for CET is to maintain safe, efficient and reliable services. Objectives in support of this goal include:

- Consistently monitor and evaluate services in accordance with service standards (*see section later in this chapter*).
- Ensure availability of safe and reliable in-service vehicles to meet the daily pullout requirements for CET.
- Operate on schedule within on-time performance standards (*see section later in this chapter*).
- Maintain services built around a network of regional Community Connector routes and local feeder services (which should include fixed-route service in more urban areas, where it is warranted by land use conditions and service standards).
- Minimize non-revenue hours (deadhead) operated on all services
- Assign appropriate vehicle by service type to maximize system capacity.
- Maintain a minimum/maximum fleet size that ensures an optimal spare to in-service fleet ratio.

**Goal 2: Provide effective and easy-to-use service for CET riders**

An effective transit service focuses on simplification and ease of use, with logical route design and convenient transfers. Objectives include:

- Minimize service overlap/duplications.
- Provide access to major centers of demand from all parts of the CET service area.
- Ensure Community Connector routes are easy to understand.
- Transfers should be convenient and fast between Community Connector routes and to/from local fixed-route services (where available)
- Local fixed-route services (where available) should be bi-directional so that transit provides an equivalent alternative for travel in both directions.
- Operate routes directly, minimizing the amount of out-of-direction travel.
- Ensure adequate vehicle capacity to maintain passenger loads within the adopted maximum load standards established (different for Community Connector and fixed-route services, where available). (*See performance standards section later in this chapter*).

**Goal 3: Strive for financial sustainability that reflects community priorities and values.**

Objectives in support of this goal include:

- Identify and develop a stable source of local funding that can maintain (or improve) transit service in Central Oregon without further service reductions.
- Prioritize services that have been given high priority by communities and riders, as evidenced by survey findings, community meeting input, and existing planning documents.
- Develop capital and funding plans for new infrastructure/replacement/maintenance.
- Provide accurate and reliable revenue and expenditure forecasts and maintain budget practices that ensure sustainability and continuity of programs and services.
- Recognizing visitors and tourists are a good transit market, identify ways to better market services to and provide services for these potential users.

**Goal 4: Increase the visibility and elevate the image of transit in Central Oregon.**

Access to information about CET should be as easy to obtain as possible, and CET should project a positive image in Central Oregon. Objectives to increase visibility of CET include:

- Ensure effective communications and marketing tools are provided that promote transit use and to advance the vision and goals of CET
- Communicate to the region the role of transit and why it is valuable to the region.
- Maintain a high level of passenger experience through clean, accessible bus stops and passenger amenities.
- Provide easy-to-understand signage and passenger information that promotes the ease of use of CET services.
- Ensure transparency and openness to the public throughout all of CET's activities.

- Ensure accountability of CET services by comparing performance to other comparable regions.
- Continue to partner with local organizations, businesses, municipalities and other agencies to maintain COIC/CET's community outreach and information efforts.

**Goal 5: Provide appropriate service levels and types for CET's ridership markets.**

CET currently only operates fixed-route service in Bend, but demographic data suggests Redmond could support fixed-route service in the near or mid-term and that Prineville and/or Madras may be able to support fixed-route service within the timeframe of this plan. Other communities in the region will likely maintain demand-responsive service for local trips. With this context in mind, objectives in support of this goal include:

- Prioritize CET services and allocate resources where demand is highest.
  - Existing services that significantly exceed standards should be considered for improvement (*see section later in this chapter*).
  - Existing services that fail to achieve performance standards should be considered for remedial action (*see section later in this chapter*).
  - Transit service in communities where service is not currently available would be considered based on minimum service design standards (*see section later in this chapter*).
- Work with local and regional partners to provide the most cost-effective programs to meet mobility needs for those without other transportation options.
- Ensure that transit services are adequately meeting the needs of those without other transportation options, but also attractive to those who have other travel options (i.e., "choice riders").
- Explore alternative modes (carpool, vanpool, flexible route service, etc.) that may be appropriate in other areas of Central Oregon in the future.
- Ensure that each new service is financially feasible, meets performance standards, and does not negatively impact existing services.
- Provide service to rural areas (outside UGBs) only as subsidized to do so. Develop cost-effective services to provide mobility options outside urban growth boundaries (UGBs) for those without other transportation options, such as volunteer driver programs, through partnerships with other regional agencies and/or local communities

Note: Exceptions to these objectives include when CET is subsidized to provide service to a specific group or area as per contract or grant agreement language.

**Goal 6: Coordinate regional services with other local or intercity transit providers.**

COIC has historically been perceived as the entity best positioned to coordinate regional transit services in Central Oregon. However, now that COIC directly operates local and regional services through CET, it has at least a potential conflict of interest. COIC should nonetheless strive to be perceived as a neutral facilitator of regional and local transit services and programs through collaboration with regional partners. It is also possible that, like many larger urban centers, transportation planning functions could be located outside of CET, such as at a regional planning agency. Objectives to support this goal include:

- Meet quarterly with transit staff from other intercity or local service providers to review coordination opportunities.
- Co-author grant applications with regional agencies and planning entities and local jurisdictions.
- Consider joint operations/shared funding of transit services that cross jurisdictional lines.
- Coordinate with Commute Options to ensure promotion of vanpools and other ridesharing opportunities at major employers throughout Central Oregon.

**Goal 7: Advocate for transit-supportive development practices.**

Pedestrian-supportive development practices and community design help provide safe and convenient access routes to transit services. Transit-intensive land uses that locate away from transit create pressure for the transit agency to provide service where it cannot be done efficiently. Objectives in support of this goal include the following:

- Advocate for transit-friendly building practices, working with planning staff and developers to ensure planned and future development meets transit service access criteria.
- Work with jurisdictions throughout Central Oregon to advocate for zoning regulations that facilitate transit-oriented development near Community Connector hubs in each community. Ensure that the Regional Transit Master Plan is referenced in the Transportation System Plans (TSP's) and Comprehensive Plans developed in each city in CET's service area.
- Support the establishment of building orientation and pedestrian accessibility recommendations for new development, so that the development that occurs is convenient to the transit rider.
- Encourage higher-density development and relaxed parking requirements around Community Connector stops or transit hubs.
- Work with local jurisdictions to advocate for new transit-dependent land uses, such as social service offices and community colleges, to be located in central, easy-to-serve locations.
- Support and advocate for infrastructure projects that complement and/or enhance CET's operational needs (pedestrian access to bus stops, adequate location for passengers to wait for the bus, sufficient curb space for buses, passenger amenities, etc.).

## SUMMARY OF TRANSIT DEMAND ESTIMATES

Estimates of future transit demand were developed to identify the transit markets in the CET service area that have the strongest potential for future service enhancements. These estimates provide a *relative* assessment of future (2030) transit market potential/demand. They are relative in two respects:

1. They represent potential demand relative to the existing level of service provided for each corridor. For example, a connection rated as having “Low” future potential demand may have an existing level of service that is generally appropriate to demand for service. On the other hand, a connection with “High” demand has the most potential to respond to an increased level of service.
2. They represent potential demand relative to the connections and communities served by CET.

### Data Sources and Methodology

The initial basis for these estimates was regional travel demand model data for 2030, which Figure 1 illustrates for intercommunity trips and Figure 2 illustrates within communities.

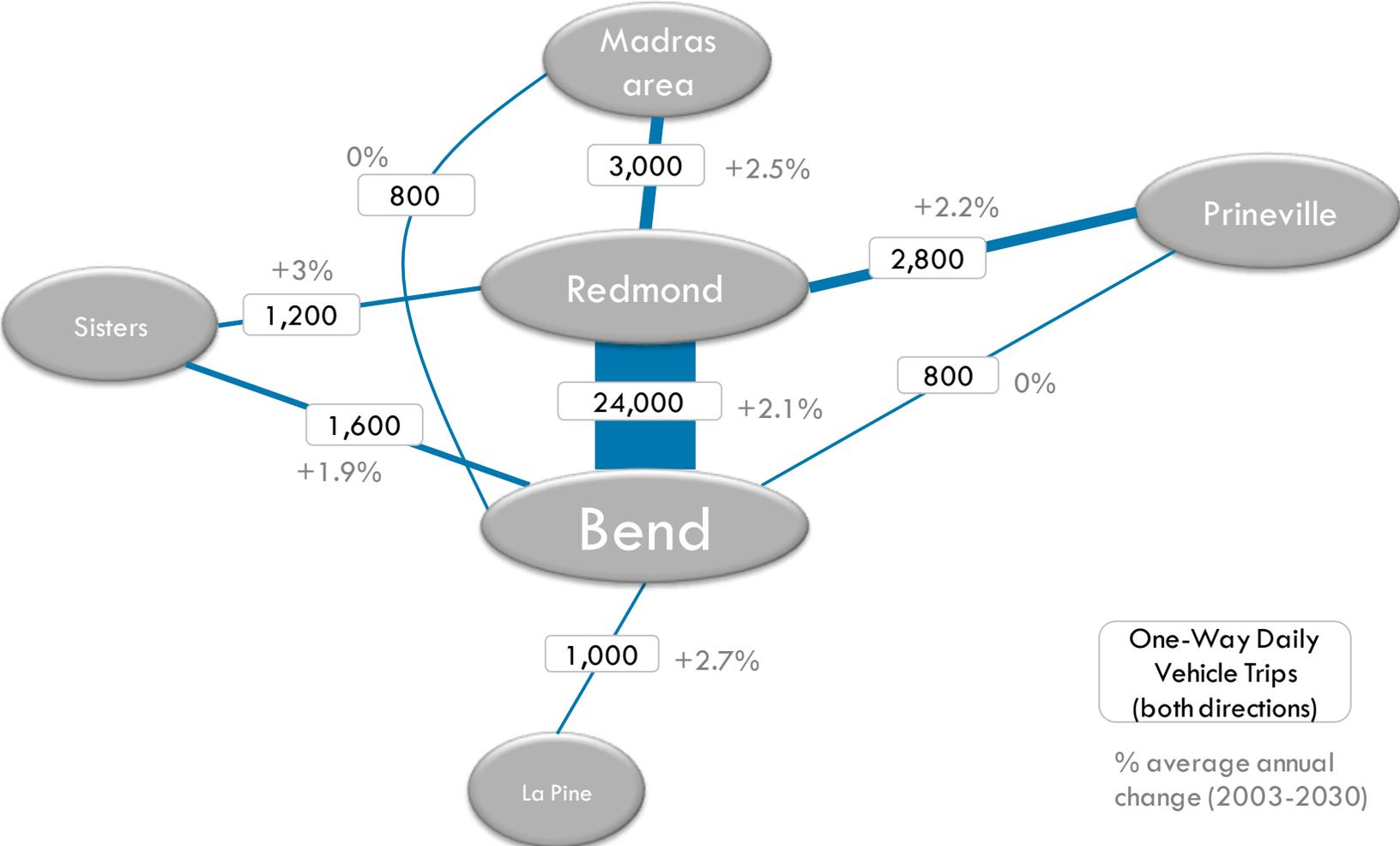
A number of other influential factors were taken into account in developing estimates of future demand:

- Projected growth in travel demand between the travel demand model baseline (2003) and 2030
- Work commute flows, identified through U.S. Census Bureau LEHD data (2010)
- Community demographics, e.g., transit-dependent population
- Existing ridership in each corridor and/or community
- Travel distance and/or congestion

### Demand Estimates

Figure 3 illustrates the assessment of future market potential for each intercommunity connection and local service in each community. Additional detail on the assessment is presented in Appendix A.

Figure 1 Overall Intercommunity Travel Demand, 2030

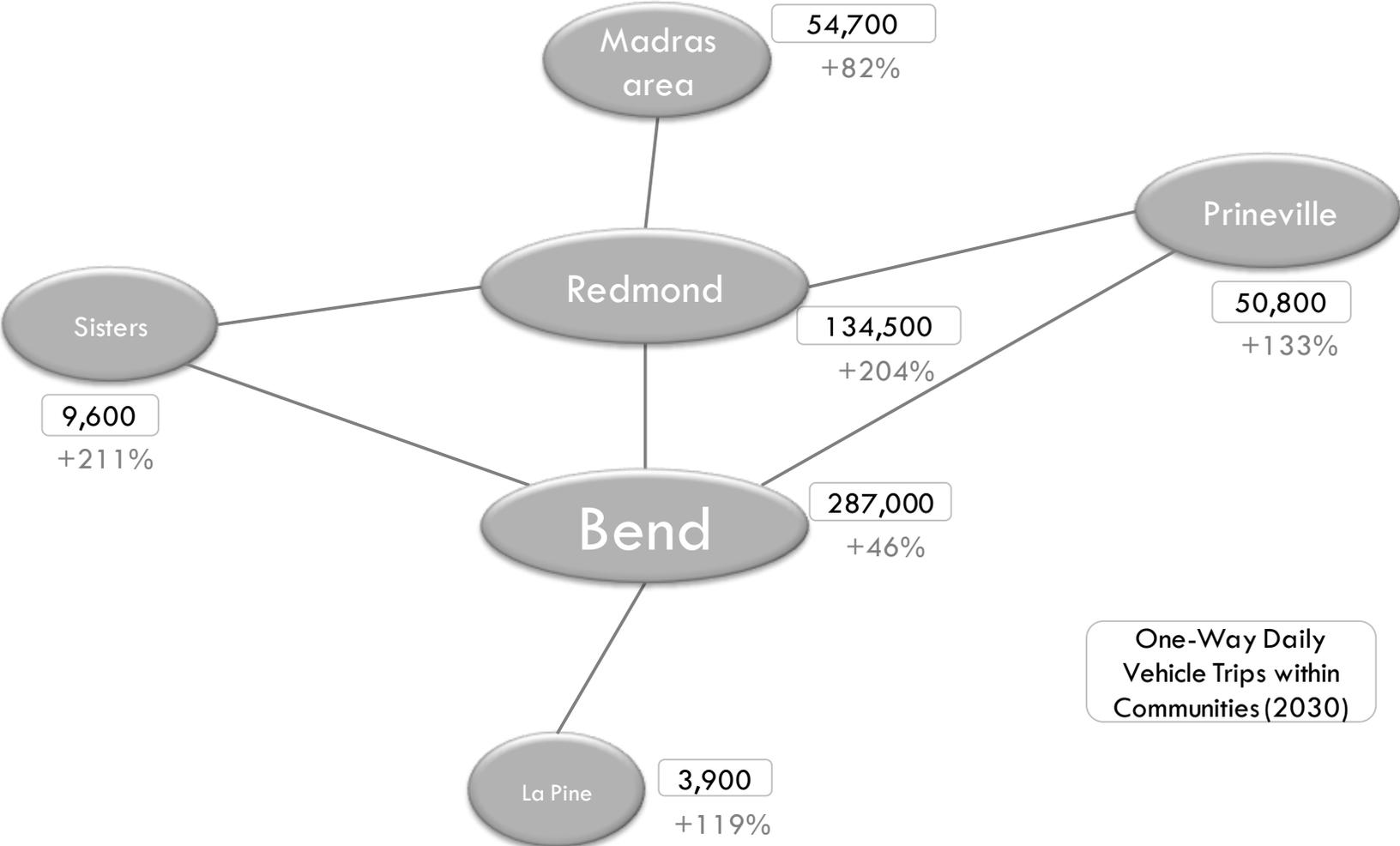


One-Way Daily  
 Vehicle Trips  
 (both directions)

% average annual  
 change (2003-2030)

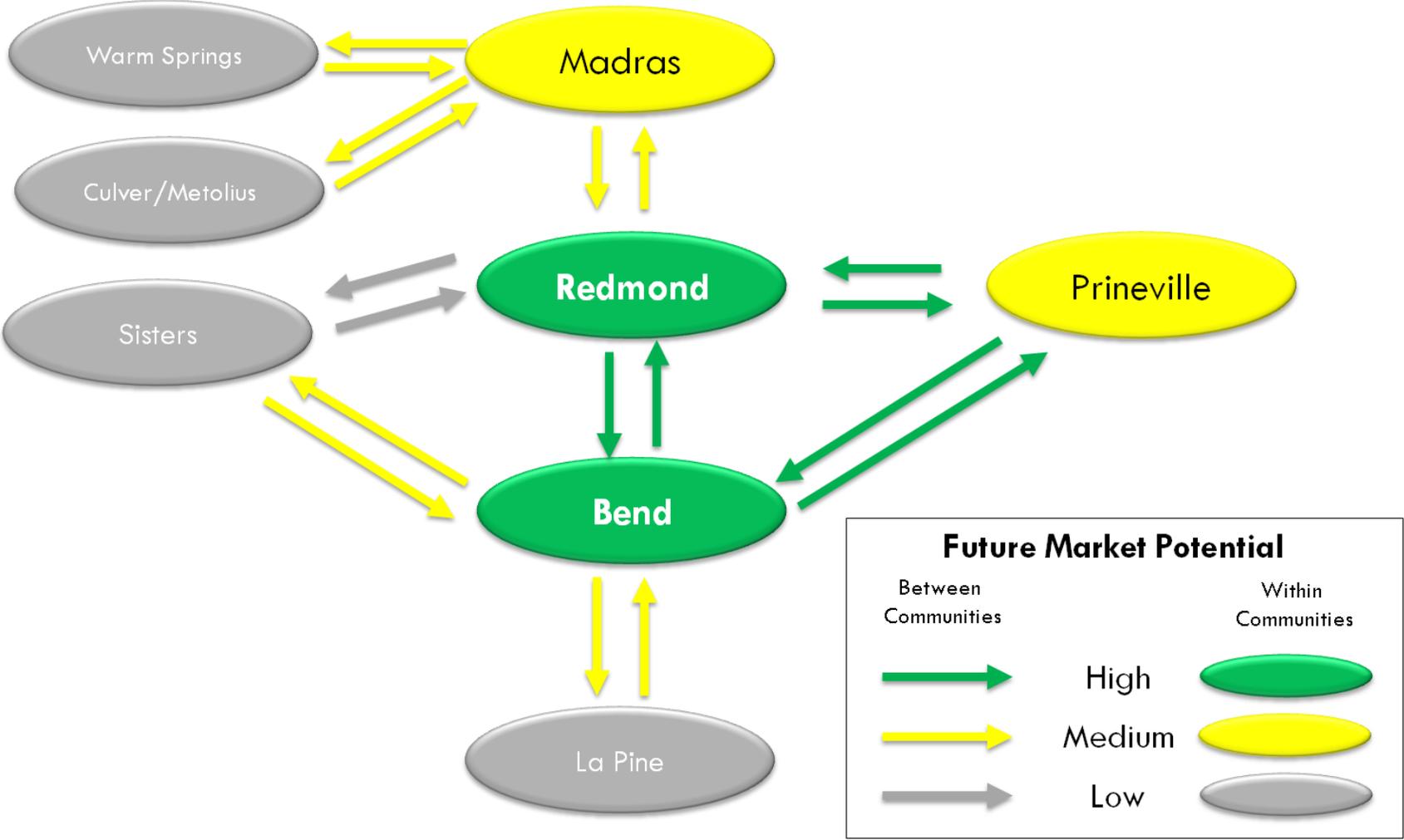
Source: Regional Travel Demand Model

Figure 2 Overall Intracommunity Travel Demand, 2030



Source: Regional Travel Demand Model

Figure 3 Assessment of Future Market Potential, 2030



## REGIONAL AND LOCAL SERVICE TYPES

Cascades East Transit operates a variety of transit service in their service area. In addition to the fixed route and dial-a-ride services provided in Bend, CET currently offers general-public dial-a-ride and regional Community Connector service. Several other service types may be considered throughout the life of this plan as described below. Figure 4 details the specific design and operating standards applicable to each service type.

### Community Connector (Regional Service)

CET operates Community Connector shuttles that provide limited or non-stop connections between communities in Central Oregon. The Community Connectors operate on a fixed schedule and do not require advance reservations. Most of the Community Connector shuttles connect in Redmond, with the exception of the La Pine to Bend shuttle, the Culver/Metolius to Madras shuttle, and the Madras to Warm Springs shuttle<sup>2</sup>.

Figure 4 describes specific design and operating standards for Community Connector service. Service frequency should be based on the demand in specific travel corridors. Service between communities should be direct and travel time should be only minimally longer than driving. This plan proposes that Community Connector routes provide a limited number of additional local stops within communities, without significantly compromising directness and operating speed between communities. This is intended to:

- Provide service to regionally-significant destinations, without requiring a transfer to local services, and attracting new riders by improving convenience
- Make more efficient use of available time in the Community Connector schedules

Figure 4 recommends minimum spacing of 1 mile for Community Connector stops within a community.

### Local Service Types

CET operates fixed-route transit service in Bend and provides demand-responsive, local public bus service (Dial-A-Ride) in all other communities served by CET (Redmond, Prineville, Madras, Metolius, Culver, La Pine, and Sisters). Fixed-route service is currently appropriate for Redmond and flex-route service may be appropriate in Prineville and Madras. Service concepts are provided in subsequent sections.

#### Dial-A-Ride (Local Public Bus)

Dial-a-ride service is open to the general public but reservations are required at least 24 hours in advance. The service area for each community generally covers the urbanized areas. CET utilizes smaller, 12-passenger cutaway vehicles on the dial-a-ride service. With the exception of Metolius, Culver and Sisters, the local dial-a-ride vehicles are based in the community where service is provided. The vehicles that provide service in Sisters is based out of Redmond, while the vehicles that provide service in Culver and Metolius are based in Madras.

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<sup>2</sup> The Warm Springs-Madras shuttle was not operating at the time this document was published.

## ADA Paratransit

The Americans with Disabilities Act (ADA) is a civil rights law that requires public transportation to be accessible to persons with disabilities. The ADA recognizes that some people with disabilities will not be able to utilize fixed route services, even ones that have wheelchair lifts, and that equal transit options be available to these individuals as to the general public. At a minimum, ADA Paratransit is required within  $\frac{3}{4}$  mile on any side of a fixed route. As with Dial-A-Ride (Local Public Bus), ADA paratransit requires an advanced reservation and provides curb-to-curb wheelchair accessible service. Unlike the Dial-A-Ride, however, ADA paratransit is only intended for eligible passengers.

CET operates an ADA paratransit service in Bend, and requires passengers to be eligible to use this service. The service in Bend, however, goes beyond the minimum requirements of the ADA by allowing eligible low-income seniors to also use the service.

## Local Fixed Route

Fixed route services are defined by regularly scheduled bus service throughout the day. Fixed route services generally serve specific routes, though some fixed route services allow “flag stops” to occur where land use patterns are dispersed. The frequency and service span of the fixed route service is largely dependent on the level of population and employment density, the two primary factors contributing to transit demand. CET currently operates fixed route service in Bend.

## Local Flex-Route

Flex-routes are similar to fixed-route services in that the service follows a defined route with some fixed bus stops, where passengers can catch the bus without an advance reservation. Because flex-route service is a consideration for Madras and Prineville in the RTMP, and because CET does not currently operate any flex-route service, more detail is provided below on this service type.

Flex-route stops can either be a timepoint or a location between two timepoints. Flex-route services also function like a demand responsive service in that upon request, the vehicle can deviate to provide more direct service within a specified boundary from the fixed route. This zone is often in the range of a quarter- to half-mile but can vary depending on operational feasibility, land use, and other community characteristics. The zone does not need to be continuous and can vary along the length of the route. While some flex-route services allow flag stops, this requires that the bus return to the route following any deviation and limits its flexibility. As the case studies provided below illustrate, there is considerable variation in how such zones are designed. It should also be noted that there is no requirement that a flex-route be able to serve all deviation requests. Dispatchers or the driver can attempt to schedule customers at a different time where there is capacity or direct them to a fixed-stop.

Flex-route services can employ various methods to encourage use of fixed stops. These include:

- A differential fare that is higher for deviations than for pick ups or drop offs at a fixed stop
- Requirements for advance reservations (these range from two hours to two days, depending on the provider)
- As operational experience is gained, placing additional fixed stops in high-use areas and encouraging customers who are able to do so to use the fixed stops.

Flex-route services are more appropriate than fixed-route service where population and employment densities are more dispersed (see design guidelines below). Unlike regular fixed-route service, flex-route service does not require complementary ADA paratransit to be provided within  $\frac{3}{4}$  mile on either side of the route because the bus can deviate to provide equal service to people with disabilities.

Many examples of flex-route services are available in Oregon, including Chemekata Area Regional Transportation System (CARTS) serving Marion and Polk Counties<sup>3</sup> and Columbia County Rider<sup>4</sup>, and nationally, including Call-n-Ride service<sup>5</sup> operated by the Denver area Regional Transportation District (RTD) and MVTA in the Twin Cities region. The national flex-route service examples are described in callout boxes on the following pages. In addition, a Transportation Cooperative Research Program publication, TCRP Synthesis 53, is one resource that provides a more comprehensive discussion of flexible transit services and additional case studies.<sup>6</sup>

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<sup>3</sup> <http://cherriots.org/en/services/carts>

<sup>4</sup> <http://www.columbiacountyrider.com/FlexRoutes.html>

<sup>5</sup> <http://www.rtd-denver.com/callNRide.shtml>

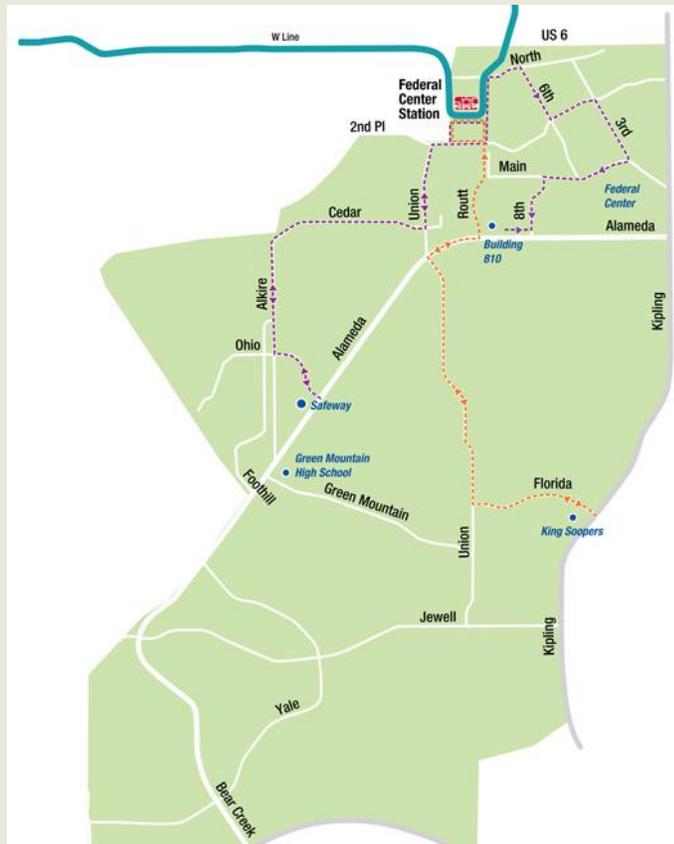
<sup>6</sup> [http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp\\_syn\\_53.pdf](http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_syn_53.pdf)

## RTD Call-n-Ride Service (Denver, CO)

RTD runs Call-n-Ride transit service in approximately 20 communities in the region. Some RTD Call-n-Ride services operate as flex routes. These services run on a specified route with some scheduled stops. Riders can be picked up/dropped off at one of the regularly scheduled timed checkpoints without calling in advance. Passengers can make advance reservations (at least two hours and up to 2 weeks before the desired time) to be picked up/dropped off anywhere within the local Call-n-Ride service area. Subscription trips are RTD's service model is unique in that riders can call the bus operator to schedule a pick up/drop off anywhere in within the Call-n-Ride boundary. Rider are directed to leave a message on the driver's cell phone. RTD aims to return calls within 1 hour. Passengers can also reserve on the web after they first register with the driver and routing software attempts to fulfill and group requests for optimum routing. RTD uses a dispatch system provided by DemandTrans for the Call-n-Ride service.<sup>1</sup>

RTD service standards specify Call-n-Ride areas to be between 4 and 10 square miles with 2 to 4 persons per acre and 1 to 3 employees per acre. Call-n-Ride services typically range from about 3 (minimum standard) to 10 daily boardings per revenue hour. Productivity in the range of 4-6 boardings per hour is considered to be good. An example from the Green Mountain area of Lakewood, CO is provided below. RTD also recently implemented a flex-route Call-n-Ride in Golden, CO.

### Green Mountain Call-n-Ride



Two routes make scheduled stops are made at Federal Center Station every 60 minutes from 5:53 a.m. to 6:53 p.m. Reservation Call-n-Ride service to and from the Federal Center is available between 9:00am-2:30pm.

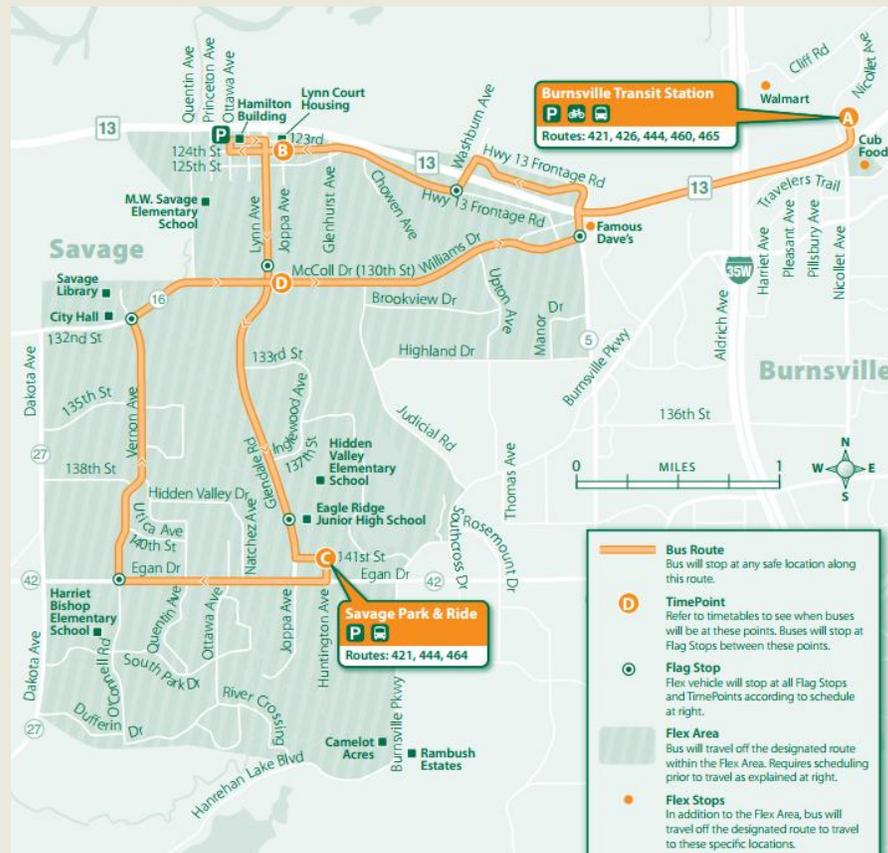
Source: <http://www.rtd-denver.com/callNRide.shtml#greenmountain>

Notes: (1) <http://www.demandtrans.com/>

## MVTA Flex Route (Minneapolis-St. Paul Region, MN)

Minnesota Valley Transit Authority, in the Minneapolis-St. Paul (Twin Cities) region, operates Route 421 in the community of Savage. Route 421 is a deviated/flex route that travels between the Burnsville Transit Station and the Savage Park and Ride. The area shaded with diagonal stripes is the flex route deviation area in which the bus will depart from the regularly scheduled route to make stops reserved in advance. Reservations are accepted up to two days in advance. Previous day reservations are encouraged however same day requests are accepted as capacity permits. Scheduled timepoints, shown in the map, are located at the Burnsville Transit Station, in downtown Savage at 124<sup>th</sup> St/Joppa Ave, at the Savage P&R, and near McColl Dr/Lynne Ave. Between timepoints, buses stop at identified flag stops that are located along the route at key destinations such as elementary and junior high schools, City Hall and the library, and major commercial areas. Burnsville Transit Station is located out of the primary flex area, although there are flex stops (reservation required) at major retail centers located near Burnsville Station. MVTA also operates the Route 420 flex-route in the community of Apple Valley.<sup>1</sup>

### Route 421 Map



Source: [http://www.mvta.com/uploads/421\\_17.pdf](http://www.mvta.com/uploads/421_17.pdf)

Notes: (1) [http://www.mvta.com/uploads/420\\_33.pdf](http://www.mvta.com/uploads/420_33.pdf)

## Vanpools

Vanpools are a shared ride service type, typically driven by one of the passengers to a place of employment. The sidebar below discusses several different types of vanpool services that Pace provides in the suburban Chicago region, including its Municipal Vanpool Program. Developing one or more of these types of offerings, either directly or with a partner such as Commute Options, could be considered for instances where CET regional or local service are unable to cost-effectively meet demand for service.

### Pace Municipal Vanpool Program, (Chicago, IL)

Pace, the suburban bus operator in the Chicago region, provides a variety of vanpool services under its Vanpool Incentive Program (VIP). These services include:

- **Traditional Vanpool Program** provides a van for commuters who share similar work locations and schedules. A monthly fee per participant covers all costs including fuel, tolls, maintenance, and insurance. For example, the cost is \$85 per month per rider for 7-8 employees traveling less than 20 miles.<sup>1</sup>
- **Metra Feeder Program** provides a van to travel to and from a Metra commuter rail station. Participants pay \$58 per month, but parking and Metra fares are not included.<sup>1</sup>
- **Employer (Corporate) Shuttle Program** provides vans to employers to transport their employees to worksites from nearby transit stops. Participating employers pay \$750 monthly for the van rental and supply a driver. There is a discounted rate of \$600 per month for non-profit agencies.<sup>2</sup>
- **Advantage Program** focuses on providing transportation options to people with disabilities who travel to workplaces or rehabilitation centers, and serves people who are not able to use regular ADA paratransit service or live outside of the ¾ mile ADA service area.<sup>1</sup>
- **Municipal Vanpool Program** provides vans to municipalities or not-for-profit agencies to provide community-based services. Pace charges a monthly fee of \$100 in addition to a \$1,000 security deposit per vehicle. Municipalities pay for all operating costs including fuel, insurance, maintenance, which differentiates this program from other Pace vanpool programs.<sup>3</sup>

Sources:

(1) <http://www.pacebus.com/sub/vanpool/default.asp>

(2) [http://www.pacebus.com/sub/vanpool/employer\\_shuttle.asp](http://www.pacebus.com/sub/vanpool/employer_shuttle.asp)

(3) [http://www.pacebus.com/pdf/vanpool/municipal\\_program\\_guide.pdf](http://www.pacebus.com/pdf/vanpool/municipal_program_guide.pdf)

## SERVICE DESIGN AND PERFORMANCE STANDARDS

This section provides service design and performance standards to help CET implement, monitor the performance of, and modify its regional and local transit services. Service standards provide a consistent, quantifiable structure for CET to use in allocating scarce resources to best meet its goals and objectives, which reflect and support the overall vision for and mission of public transit in Central Oregon.

Two terms are used in describing service standards:

- A **measure** is the factor being evaluated, e.g., productivity or the number of passenger trips divided by the number of service hours provided
- A **standard** sets the bar for performance against a measure, e.g., productivity of 6-10 passenger for service hour for a Community Connector shuttle or 16-20 passengers per hour for a fixed-route.

### The Value of Performance and Design Standards

The use of measures and standards in service planning helps avoid potentially inequitable and/or inefficient allocations of service. Without such standards, there is little rationale for telling constituents “yes” or “no” when necessary. Service design standards also assist in creating consistency and predictability of responses to emerging community needs. As decision-makers reach conclusions about various aspects of growth in their communities, they will have some frame of reference to know how transit services will respond to those changes. When asked whether a particular development will be served, service standards provide a policy basis for response. Standards can also provide insight on how to focus investments, reductions, or reallocations of service as demographics shift, services underperform, or available funding changes.

These standards are intended as general guidelines to help staff implement different types of services and identify how services are performing relative to typical thresholds. Based on these standards, CET staff may examine why a route is underperforming expectations or consider changing to a new service type (such as from Dial-A-Ride to flex-route or fixed-route service). These standards are intended to be flexible and operationally useful, and therefore should be reviewed by staff on a periodic basis. Since the standards include new service types such as flex-routes not previously operated by CET, they may require adjustment as CET gains operational experience with them.

### Service Design Standards

Figure 4 identifies specific service design standards for each type of service discussed above. Design standards are particularly useful in guiding the implementation of service in new/potential markets or of new service types.

### Service Efficiency Standards

The service efficiency standards provided in Figure 5 use operational data to measure how efficiently the transit system is performing and identify trends affecting systemwide or route-level performance. These measures are included in the monthly CET Management Report or can easily be calculated from data tracked by CET and provided in the report. The data are tracked for the

overall system and separately for individual routes or services so that planning decisions about these service can be made separately. The efficiency standards comply with the basic performance indicators required by the National Transit Database (NTD).

## Passenger Comfort and Safety Standards

The passenger comfort and safety standards provided in Figure 6 ensure that CET transit services meet standards for attracting and maintain ridership and customer satisfaction.

**Figure 4 Regional Service Design Standards**

	Community Connector	Fixed-Route or Flex-Route	Local Public Bus <sup>1</sup> and ADA Paratransit
Density Characteristics	N/A – serves major corridors	Fixed Route: 8 – 12 persons or jobs per acre within ¼ mile of route Flex Route: 6 – 8 persons or jobs per acre within ¼ mile of route	Local Public Bus: > 0.5 persons or jobs per acre ADA Paratransit: same as fixed route
Frequency of Service <sup>2</sup>	60-120 min	40-60 min (Coordinated with regional service)	Local Public Bus: Coordinated with regional service ADA Paratransit: Coordinated with fixed route and regional service
Travel Time Ratio (Bus to Auto) <sup>3</sup>	1.3	3.0	2.0 to 4.0
Stop Spacing	<i>Intra-Community:</i> 1 mile <i>Inter-Community:</i> +5 miles	>1/8 to ¼ mile	N/A
Scheduling Practices	Meet Demand Clockface Timed Transfer with local feeder services	Meet Demand Clockface Timed Transfer with Community Connector	On-Time Performance: Pickup/dropoff within +/- 10 minutes of scheduled, 95% of the time Cancellations and No Shows: Less than 5% cancellations within 1 hour; Less than 2% last-minute cancellations; less than 2% no-shows Trip Denials: 100% of all ADA-eligible trips should be accommodated
Average Travel Speed (including stops)	>25 mph	Fixed route: 10-18 mph Flex route: 10-12 mph	>10 mph
Guideline for Amenities Along Route	Shelters at all major transit centers and stops with at least 20 boardings per day	Shelters prioritized at stops with at least 20 boardings per day	DAR: n/a Flex: At major transfer points and high boarding locations only (see fixed-route)

Notes: (1) Local public bus refers to general public Dial-A-Ride service. (2) Dependent on demand. (3) Travel time ratio compares bus travel time between route endpoints with the time the same trip can be accomplished by auto during peak travel periods.

**Figure 5 Service Efficiency Standards**

Performance Standard	Community Connector <sup>1</sup>	Fixed-Route <sup>2</sup>	Dial-A-Ride <sup>1</sup> or Flex-Route <sup>3</sup>	ADA Paratransit <sup>1</sup>	Notes/Comments <sup>4</sup>
<b>Service Efficiency:</b> Unlinked Passenger Trips per Revenue Hour <sup>a</sup>	6 - 10	16 -20	DAR: 4 - 6 Flex: 5 - 8	4.0	OR Rural Peer Median: 7.8 (2012)
<b>Service Efficiency:</b> Unlinked Passenger Trips per Revenue Mile <sup>a</sup>	0.25 - 0.5	1.2	DAR: 0.25 - 0.5 Flex: 0.4 - 0.8	0.2	OR Rural Peer Median: 0.5 (2012)
<b>Cost Efficiency:</b> Operating Cost per Revenue Hour	Maintain at \$65 (2012 \$) Limit average annual cost increases to no more than 3% (approximately \$110 by 2030)				OR Rural Peer Median: \$54 (2012)
<b>Cost Effectiveness:</b> Operating Cost per Unlinked Passenger Trip	\$6 - \$12	Maintain under \$5.00	DAR: \$10 - \$15 Flex: \$8 - \$12	Maintain under \$25	OR Rural Peer Median: \$8 (2012)
<b>Cost Effectiveness:</b> Farebox Recovery Ratio	20% - 40% (10% minimum)	15%	DAR: 10% Flex: 10%	8% -10%	N/A

Notes: (1) Based on analysis of Community Connector and Local Public Bus performance from Oct 2012-Mar 2013. (2) Based on industry standards, recent service trends, and peer review conducted for the Bend MPO Public Transit Plan. Peer data includes Medford (OR), Everett and Yakima (WA), Redding (CA), Pueblo (CO), and Santa Fe (NM). (3) Based on typical industry standards and/or data from comparable services, since CET currently does not operate this service type. (4) Statistics for Oregon rural providers are listed as one point of reference, but the types of service operated vary and therefore these figures are not a direct comparison. (a) Vehicle revenue hour standard is used for NTD reporting of fixed-route service. Internally, CET reports fixed-route service efficiency by vehicle *service* hour: 22.1 passengers per vehicle service hour in 2010 and 24.9 passengers per vehicle service hour in 2011 for Bend fixed-route services. A service hour standard is appropriate for CET, however the above standard is based on vehicle revenue hours for comparability with peers.

Source: Peer data from National Transit Database (NTD), 2010

**Figure 6 Passenger Comfort and Safety Standards**

Standard	Community Connector	Fixed Route	Dial-a-Ride / ADA Paratransit	Comment
On-time Performance	No trip should depart prior to the scheduled departure time. 90% of all arrival times should be within 5 minutes of scheduled time, tracked at the halfway point and final route destination. Track at timepoints as data collection capabilities improve.		All Dial-a-Ride trips shall arrive at pick-up points no earlier than 15 minutes before and no later than 15 minutes after the scheduled pick up time, 95% of the time.	This performance standard can be monitored on the fixed-route service by occasional point checks at key time points. Dial-a-Ride performance can be measured from regular data collected on all trips.
Passenger Complaints	Objective is to minimize legitimate passenger complaints, but no more than 25 per 100,000 boardings.			
Maintenance	The number of road calls should not exceed 10 per 100,000 revenue miles. At least 85% of all regular fleet vehicles should be available for operations at all times. The ratio of spare vehicles to regular fleet vehicles should not exceed 20%. 95% of scheduled vehicle inspections shall be completed on time			Road calls are the number of times a vehicle must be taken out of service while in operation. A high number of road calls indicates the need for a more aggressive vehicle replacement program or changes to maintenance procedures.
Bus Trips Cancelled	No scheduled trips should be cancelled, with exception of cancellations due to safety or weather conditions.			Service cancellation can be eliminated or minimized through increased reliability and sufficient spare vehicles.
Accidents	The objective should be no preventable accidents, but the number of preventable accidents should not exceed: 1 preventable accident per 100,000 revenue miles 2 accidents per 100,000 revenue miles 2 major accidents per 1,000,000 revenue miles			Operator training efforts should be adjusted to address specific types of preventable accidents.
Cancellations and No-Shows		N/A	No more than 5% of scheduled trips should be cancelled by passengers within one hour of scheduled trip, and no more than 2% of trips due to last-minute cancellations.	Cancellations and no-shows are an unproductive use of resources; occurrences should be tracked to identify customers and reasons. Actions should be taken to minimize recurrence.
Trip Coverage / Trip Denials		N/A	100% of all ADA-eligible trips should be accommodated.	A trip is considered "denied" if the trip cannot be accommodated one hour before or one hour after the desired time. Denials are not permitted under the ADA.

## Passenger Amenity Standards

Safe and comfortable passenger amenities at stops and other facilities are an important element of any successful transit service. At major transit stops, shelters provide needed protection from inclement weather and sun; seats provide passengers a comfortable option while waiting for transit; and trash receptacles ensure that the stop remains clean and attractive. Route/time information should be posted at every stop. Higher-end station amenities include bicycle parking and real-time bus arrival information to let passengers know when their bus will arrive.

Figure 7 provides recommended thresholds for investing in stop amenities at transit facilities, including three tiers of improvements ranging from a basic package of amenities at a neighborhood stop to shelters and higher-end amenities and upgrades at high-demand stops and major transit centers or Park & Rides.

**Figure 7 Passenger Amenity Tiers and Investment Guidelines**

	<b>Tier 1: Basic Neighborhood Bus Stop</b>	<b>Tier 2: Major Bus Stop with Shelter</b>	<b>Tier 3: Enhanced Bus Stop</b>
Examples of Uses	Typical stop with a concrete pad, seat, route sign, map/schedule, and information in Braille	High Use Stops, Minor Transit Center or Park & Ride, Transfer Points	Transit Centers, Major Park & Ride
Threshold for Prioritizing*	Low = <25 Daily Boardings	Medium = 25-49 Daily Boardings	High = >50 Daily Boardings
Estimated Cost	\$2,000 (with basic seat) / \$3000 (with bench and expanded concrete pad)	\$6,500 - \$10,000	\$35,000 - \$95,000
Required / Preferred Elements	<ul style="list-style-type: none"> <li>▪ Basic seat desired but not required</li> <li>▪ Benches at high-end of boarding range</li> <li>▪ Posted route/time information</li> <li>▪ Meets ADA requirements (e.g., pad)</li> <li>▪ Good pedestrian access desirable</li> </ul>	<ul style="list-style-type: none"> <li>▪ Shelter/Seating</li> <li>▪ Posted route/time information</li> <li>▪ Good pedestrian access preferred (sidewalk, curb ramps, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>▪ High capacity shelter(s)</li> <li>▪ Enhanced signage and maps</li> <li>▪ Lighting</li> <li>▪ Excellent pedestrian and bicycle access (e.g., protected crossings)</li> </ul>
Optional Elements		<ul style="list-style-type: none"> <li>▪ System map</li> <li>▪ Bicycle parking</li> </ul>	<ul style="list-style-type: none"> <li>▪ Real time bus arrival information</li> <li>▪ Secure bicycle parking and/or bicycle sharing</li> <li>▪ Public art</li> </ul>
Current Examples	 <p>Bend</p>	 <p>Redmond COCC Campus</p>	 <p>Bend (Hawthorne Station)</p>

\* Based on available funding for facility improvements.

Sources: Unit costs adapted from Cascades East Transit estimates for grant applications for Redmond fixed-route and transit center improvements, 2012. Photos from Nelson\Nygaard

## REGIONAL SERVICE PLAN

Based on the vision, goals and objectives presented above, as well as an understanding of CET's current and future financial picture, the Service Plan element of the Regional Transit Master Plan has been developed in three timeframes over the next 20 years:

- **Short-Term (1-3 years).** The short-term service plan assumes that transit service is funded with existing revenue sources and that these sources continue to be unstable and declining. Thus, a short-term service reduction (and restructuring) plan was developed until a more stable local funding source can be established. The short-term service plan primarily focuses on unproductive route segments on the Community Connector shuttles, although potential reductions could also be considered on the local dial-a-ride service in some or all of the communities (such as a reduction in service hours or the service area). Because Redmond could support fixed route service in the short-term, a plan for a new fixed route service is also presented, which would utilize existing resources currently spent on local dial-a-ride service.
- **Mid-Term (3-10 years).** The mid-term service plan assumes a preferred regional and local service network designed to meet local and regional demand. It is assumed that a new, stable source of funding would be approved to support the service improvements presented in the mid-term—an increase of approximately 20%. The primary improvements in the mid-term include expansion of the fixed route network in Redmond, as well expansion of the highest demand connections on the Community Connectors (based on the demand estimates). The mid-term service plan is presented as a prioritized menu of service improvements that can be implemented as funding becomes available.
- **Long-Term (10-20 years).** The long-term service plan provides a vision for CET (outside of Bend) beyond a 10-year time frame. As with the mid-term service plan, the long-term vision is presented as a prioritized menu of service improvements that can be implemented as funding becomes available.

A set of tables and graphic illustrations summarize the service plan:

- Figure 8 summarizes existing and proposed regional service levels (short-, mid-, and long-term) in a table.
- Figure 9 provides a graphic overview of the regional service plan over the three time periods compared to existing services for weekday daytime trips.
- Figure 10 provides an overview of evening and weekend service in the mid- and long-term time frames.

A more detailed description of each element of the service plan is provided in subsequent sections.

Figure 8 Regional Service Plan Overview: Community Connectors

	Existing	Short-Term	Mid-Term	Long-Term
Timeframe:		Next 1-3 Years	3-10 Years	10-20 Years
Funding:	Existing Sources	Existing Sources	Existing + Additional Sources	Existing + Additional Sources
<b>Round Trip Cycle Time</b>	<ul style="list-style-type: none"> <li>80 minutes</li> </ul>	<ul style="list-style-type: none"> <li>80 minutes</li> </ul>	<ul style="list-style-type: none"> <li>80 or 120 minutes (coordinated with Redmond-Bend shuttle and Bend fixed routes)</li> </ul>	<ul style="list-style-type: none"> <li>80 or 120 minutes (coordinated with Redmond-Bend shuttle and Bend fixed routes)</li> </ul>
<b>Redmond-Bend</b>	<ul style="list-style-type: none"> <li>4 AM and 4 PM round trips</li> </ul>	<ul style="list-style-type: none"> <li>No change; potential SB stop at Cascade Village</li> </ul>	<ul style="list-style-type: none"> <li>Re-routed to serve airport and then Redmond Library</li> <li>Add 3 midday round trips</li> <li>Add evening service (until 8 pm)</li> <li>Add Saturday service (5 R/Ts)</li> </ul>	<ul style="list-style-type: none"> <li>Re-routed to serve airport and then Redmond Library</li> <li>Expand to hourly service all day</li> <li>Extend service (until 10 pm)</li> <li>Add Sunday service (5 R/Ts)</li> </ul>
<b>Redmond-Airport</b>	<ul style="list-style-type: none"> <li>2 AM and 2 PM round trips</li> <li>Three midday round trips</li> </ul>	<ul style="list-style-type: none"> <li>No change from Existing</li> </ul>	<ul style="list-style-type: none"> <li>Route eliminated; Combined with Redmond-Bend shuttle</li> </ul>	<ul style="list-style-type: none"> <li>Route eliminated; Combined with Redmond-Bend shuttle</li> </ul>
<b>Prineville-Redmond</b>	<ul style="list-style-type: none"> <li>3 AM and 2 PM round trips</li> </ul>	<ul style="list-style-type: none"> <li>Eliminate 1 AM round trip; eliminate P&amp;R and potentially extend to east</li> </ul>	<ul style="list-style-type: none"> <li>3 AM and 3 PM round trips</li> <li>Add 1 midday round trip</li> <li>Add evening service (until 8 pm)</li> <li>Add Saturday service (3 R/Ts)</li> </ul>	<ul style="list-style-type: none"> <li>Add 1 midday round trip</li> <li>Extend service (until 10 pm)</li> <li>Add Sunday service (3 R/Ts)</li> </ul>
<b>Madras-Redmond</b>	<ul style="list-style-type: none"> <li>2 AM and 3 PM round trips</li> </ul>	<ul style="list-style-type: none"> <li>Eliminate 1 PM round trip</li> </ul>	<ul style="list-style-type: none"> <li>3 AM and 3 PM round trips</li> <li>Add 1 midday round trip</li> <li>Add evening service (until 8 pm)</li> <li>Add Saturday service (3 R/Ts)</li> </ul>	<ul style="list-style-type: none"> <li>Add 1 midday round trip</li> <li>Extend service (until 10 pm)</li> <li>Add Sunday service (3 R/Ts)</li> </ul>
<b>Culver-Metolius-Madras</b>	<ul style="list-style-type: none"> <li>2 AM inbound trips; 2 PM outbound trips</li> </ul>	<ul style="list-style-type: none"> <li>One-way trips become bidirectional</li> <li>No change; potential to extend to hospital</li> </ul>	<ul style="list-style-type: none"> <li>2 AM and 2 PM round trips</li> <li>Add 1 midday round trip</li> <li>Extend service (until 8 pm)</li> <li>Add Saturday service (2 R/Ts)</li> </ul>	<ul style="list-style-type: none"> <li>Add additional midday trip (2 total)</li> <li>Add Sunday service (2 R/Ts)</li> </ul>
<b>Sisters-Redmond</b>	<ul style="list-style-type: none"> <li>2 AM round trips; 1 PM round trip</li> </ul>	<ul style="list-style-type: none"> <li>No direct service, converted to Sisters - Bend</li> </ul>	<ul style="list-style-type: none"> <li>1 AM and 1 PM round trip</li> </ul>	<ul style="list-style-type: none"> <li>Add 1 midday round trip</li> </ul>
<b>Sisters-Bend</b>	<ul style="list-style-type: none"> <li>No direct service</li> </ul>	<ul style="list-style-type: none"> <li>1 AM and 1 PM round trip</li> </ul>	<ul style="list-style-type: none"> <li>Add 1 midday round trip</li> <li>Extend service (until 8 pm)</li> <li>Add Saturday service (2 R/Ts)</li> </ul>	<ul style="list-style-type: none"> <li>2 AM and 2 PM round trips</li> <li>Add additional midday trip (2 total)</li> <li>Add Sunday service (2 R/Ts)</li> </ul>
<b>La Pine-Bend</b>	<ul style="list-style-type: none"> <li>2 AM inbound trips; 1 AM outbound trip</li> <li>2 PM outbound trips; 1 PM inbound trip</li> </ul>	<ul style="list-style-type: none"> <li>No change</li> </ul>	<ul style="list-style-type: none"> <li>2 AM and 2 PM round trips</li> <li>Add 1 midday round trip</li> <li>Extend service (until 8 pm)</li> <li>Add Saturday service (2 R/Ts)</li> </ul>	<ul style="list-style-type: none"> <li>Add additional midday trip (2 total)</li> <li>Add Sunday service (2 R/Ts)</li> </ul>

Figure 9 Overview of Regional Service Plan: Weekday Daytime Service

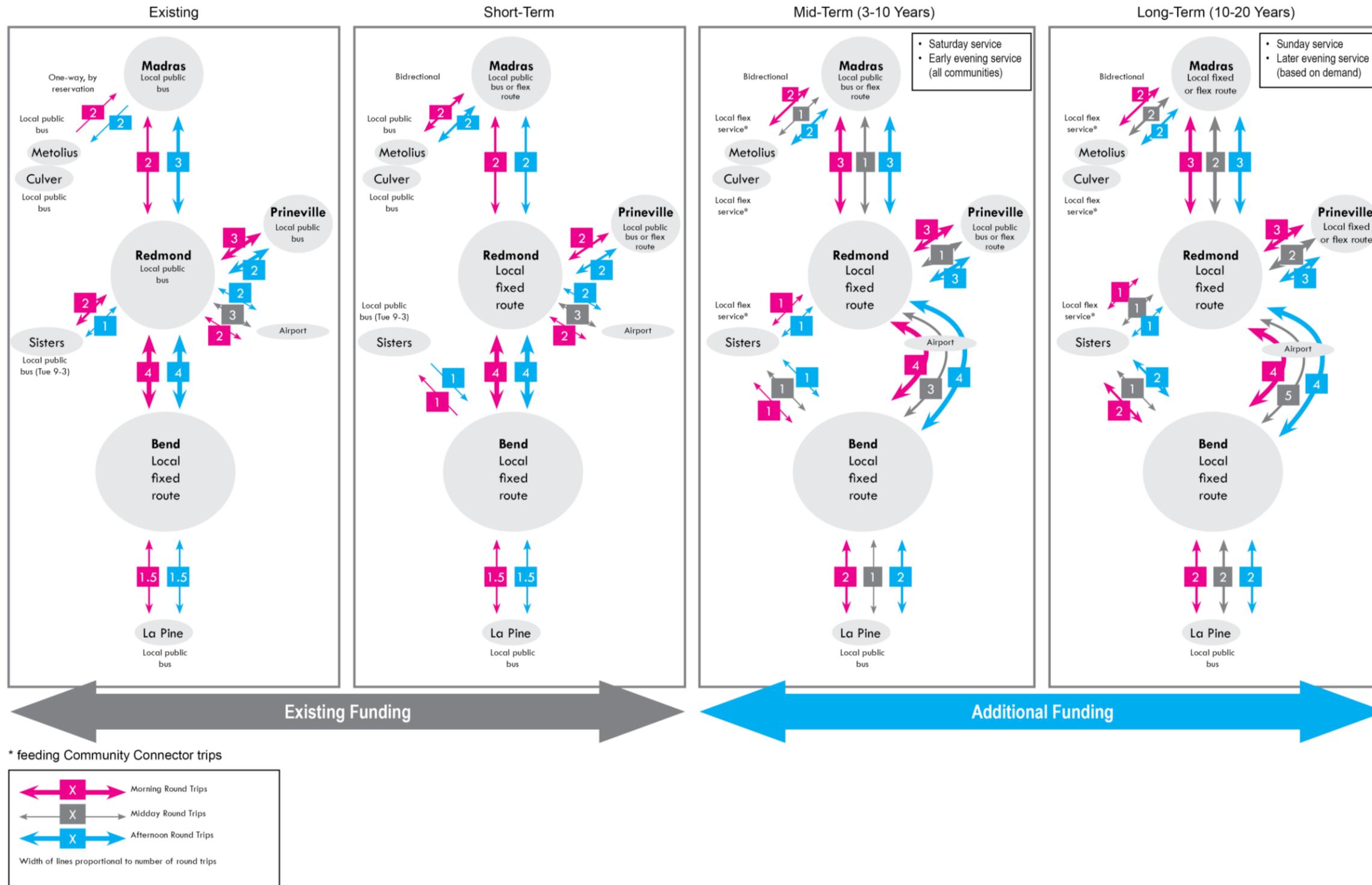
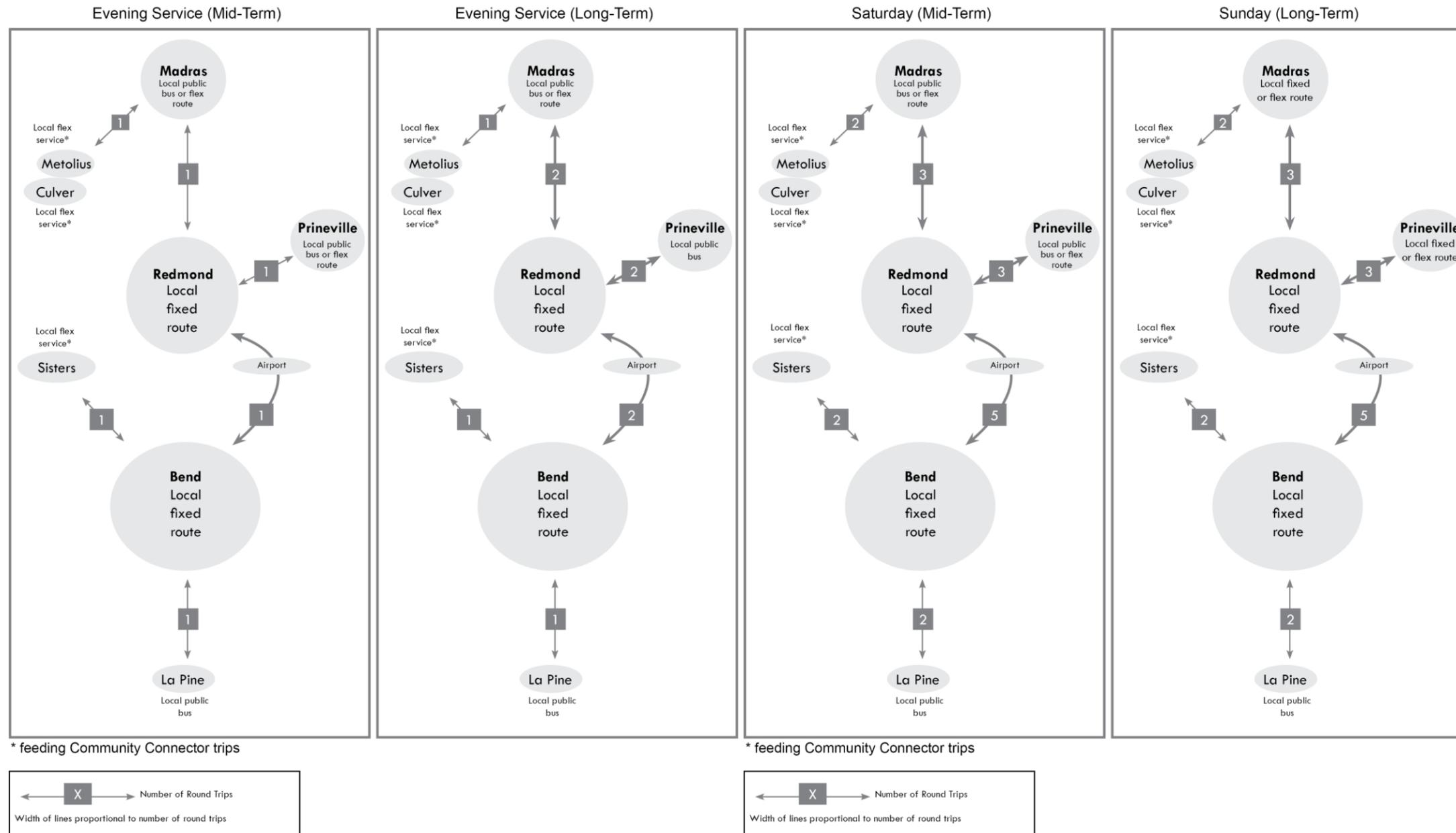


Figure 10 Overview of Regional Service Plan: Evening and Weekend Service



## SHORT-TERM SERVICE PLAN (1-3 YEARS)

The primary assumption for the short-term service plan is that CET will continue operating with existing revenue sources but that those funding sources are unstable and expected to decline. As such, it is estimated that the operating budget for CET (outside of Bend) will need to be reduced slightly. Potential reductions in service (at certain times of the day) may also be considered on the local dial-a-ride if additional service cuts are necessary. While service reductions are not desirable, they are an opportunity to closely evaluate the existing services and identify services that are not meeting performance standards. The following assumptions are made for the Short Term Service Plan:

- Unproductive Community Connector round trips carrying less than 5 passengers per trip (on average for both directions) are considered for elimination
- Where time in the schedule permits, additional stops on the Community Connector are suggested so that riders can reach more local destinations without requiring a transfer to a local public bus (or fixed route in Bend).
- Community Connector routes remain on an 80 minute cycle time

Specific changes proposed for the short-term service plan are provided below.

### Community Connector Improvements

Suggested improvements to the Community Connector shuttles in the Short-Term are summarized below. All improvements by community are listed in priority order.

#### Redmond-Bend

- **No change in number of trips.** All trips on the Redmond to Bend shuttle are currently well utilized, and some trips are experiencing full or nearly full loads. As such, it is not recommended to eliminate or shift the times of any of the trips between Redmond and Bend.
- **Possible stop at Cascade Village in Bend.** Only if time permits, it is suggested that CET explore the feasibility of making a stop at the Cascade Shopping Center. This would allow passengers traveling from Redmond to access this shopping center without being required to transfer at Hawthorne Station. In the southbound direction, there appears to be a pull-out suitable for transit, as well as a good pedestrian connection to the shopping center. In the northbound direction, a stop would require a new bus pullout and sidewalk that would connect to the crosswalk. Both stop locations would need to be fully ADA accessible.

#### Prineville-Redmond

- **Eliminate one morning round trip.** While ridership on the Prineville to Redmond Community Connector is strong on some trips, some trips have poor ridership with a maximum of 5 passengers per trip and an average between 2 and 3 passengers per trip. This was especially true on the last trip of the day, which has recently been eliminated. The morning trips have stronger ridership, but the last round trip in the morning averages around 5 passengers between Prineville and Redmond but fare fewer than that between Redmond and Prineville.
- **Eliminate existing P&R and extend route further east.** It is suggested that CET explore the feasibility of a stop further to the east of Stryker Park, and that to do so they abandon the existing Park & Ride at the intersection of US 26 and OR 126. This Park & Ride is relatively inaccessible and not as well utilized as Stryker Park. COIC is conducting a park and ride study and exploring new Park & Ride options, including at a satellite parking lot for the Erickson's market in the downtown retail district and/or at the planned new hospital / former Ochoco Lumber site on

the eastern side of Prineville (on the south side of US 26 across from the Ray's Food Place, Bi-Mart, and Grocery Outlet retail area).

### La Pine-Bend

- **No change in number of trips.** While the return trips from Bend to La Pine in the morning have relatively low ridership, the trips from La Pine to Bend average between 8 and 13 passengers per trip and as many as 18 on some trips. For this reason, no changes are suggested for the Bend to La Pine shuttle.
- **Promote stop at Deschutes River Woods.** While this stop is new (and only being served in the southbound direction), driver feedback suggests that more people would use this stop if they knew about it. In addition, the stop at the church is somewhat removed and the Country Store may be a more appropriate location. It is also suggested that a local fare be explored between DRW and Bend so that passengers do not need to pay the same fare as longer-distance trips. This issue is currently being addressed in a concurrent study of CET's fare structure.
- **Stop at Walmart on 3rd Street in Bend.** Only if time permits, it is recommended that CET explore the feasibility of a stop on the south end of Bend, likely at the Walmart. It was observed that some people who work at the Walmart must travel on the Bend Route 1 to Hawthorne Station, transfer to the Bend-La Pine Community Connector and then travel back by the Walmart that they just came from. Because Route 1 serves this area, stops already exist in this vicinity.

### Madras-Redmond

- **Eliminate one evening round trip.** With the exception of the last Community Connector round trip between Madras and Redmond, ridership is on average more than 5 passengers per trip, and as high as 15-17 passengers on some trips. The last round trip, however, did not have more than 5 passengers per trip, and averaged between 1 and 3 passengers. As such, this last round trip should be considered for elimination.
- **Stop at Walmart and Medical Center in Redmond.** Only if time permits, it is recommended that CET explore the feasibility of a stop on the north end of Redmond serving St. Charles Medical Center and/or Walmart, in at least one direction.
- **Southbound Terrebonne stop.** To provide a more reliable southbound travel time, potentially enabling a stop on the north end of Redmond, it is recommended that CET and Terrebonne (in coordination with ODOT) explore the possibility of developing a southbound bus pullout on the west side of US 97 with a signalized pedestrian crossing connecting to the Terrebonne Mini Market Park & Ride.

### Culver-Metolius

- **Expand to two full round trips in the morning and evening (weekday).** Currently the Culver-Metolius-Madras shuttle provides one-way outbound trips (from Madras to Metolius/Culver) in the morning and one-way inbound trips (from Culver/Metolius to Madras) in the afternoon, by reservation. Assuming most of these trips are reserved, it would be possible to offer scheduled, bidirectional round-trips between Culver/Metolius and Madras with minimal added cost.
- **Extend Community Connector trips to hospital and Safeway.** Because of the limited service to and from Culver/Metolius, no changes to this service are recommended. However, if time permits in the schedule, it is suggested that the Community Connector trips continue north from the DMV Worksource stop (with a timed connection to the Redmond to Madras shuttle) and serve the St. Charles Madras hospital and Safeway. Based on the local dial-a-ride data, a

significant number of local trips are made to the hospital (or in this vicinity) as well as trips to the Safeway vicinity. Thus a direct connection on the Community Connector could reduce the number of local dial-a-ride trips.

### **Sisters-Redmond**

- **Eliminate one morning round trip.** The first round trip of the day has fewer than 3 passengers per trip on average and should be considered for elimination.

### **Mount Bachelor Mountain Service**

- No changes are recommended at this time.

### **Madras-Warm Springs**

- **Reinstate connection to Warm Springs.** Pending a funding contribution from the Warm Springs tribe, service would be reinstated between Madras and Warm Springs. This service would entirely be paid for by the Warm Springs tribe and thus would not require additional CET revenues.

## **Local Service**

- **New fixed route in Redmond.** Due to the high productivity (passengers per hour) on the local dial-a-ride in Redmond, as well as the desire for same-day rides without a reservation, it is recommended that CET and the City of Redmond consider implementing a new fixed route system in Redmond (as soon as the next 1-3 years depending on local support in Redmond). Initially, this system would be constrained to existing resources currently spent in Redmond on the local dial-a-ride, which is about 9,000 annual revenue hours (or 35 service hours/day). More detail related to the local service in Redmond is provided in a later section of this chapter.
- **New flex routes in Prineville and Madras.** The local dial-a-ride services in Prineville and Madras are performing well, despite the need for advanced reservations. Because providing same-day rides is one of the top priorities among existing passengers, it is recommended that CET further explore a flex route service in both of these communities (either in the short-term or in the mid-term). As such, service concepts are presented for local flex route services in Prineville and Madras that would replace the local public bus service that requires an advance reservation. More information about these service concepts is provided in a later section of this chapter.
- **Seamless transfers between local service and Community Connectors.** As noted above, one of the primary requests from all riders (especially in Redmond, but also in other communities) is the desire to make same-day rides on the local public bus, which can be inferred that there is a desire for more spontaneous travel – both locally as well as between communities. As such, it is recommended that CET ensure that all Community Connector riders are able to seamlessly connect to the local services without a reservation. For those communities that will still have dial-a-ride, this is only suggested on the return trip – for example, in La Pine when the bus returns from Bend, or in Madras when the bus returns from Redmond. Because a local fixed route service is suggested in Redmond, and flex-route options suggested in Prineville and Madras, it is assumed that these services would be designed to have a timed transfer to the Community Connector trips.

Figure 11 below provides a summary of each of the service changes recommended in the short-term, as well as an assessment of priority for each service reduction.

**Figure 11 Summary of Short-Term Service Plan and Estimated Costs**

Route	Modification	Priority	Change in Annual Revenue Hours	Change in Annual Operating Costs <sup>1</sup>	Change in Capital Costs
<b>Community Connectors</b>					
Redmond - Bend	Consider new stop at Cascade Village.	L	0	\$0	\$50,000 <sup>2</sup>
Redmond - Prineville	Eliminate one morning round trip	M	-340	-\$22,000	\$0
	Consider closing existing park and ride at Hwy 126 and 26; explore new park and ride on east side of Prineville and expansion of Community Connector to serve this new facility.	L	0	\$0	TBD <sup>3</sup>
Redmond - Madras	Eliminate one evening round trip	H	-340	-\$22,000	\$0
	Stop on north end of Redmond (Walmart and Medical Center)	L	N/A <sup>6</sup>	N/A <sup>6</sup>	\$6000
Sisters - Redmond	Eliminate one morning round trip	-	-340	-\$22,000	\$0
La Pine - Bend	Promote stop in Deschutes River Woods	M	0	\$0	\$5,000
	Consider new stop at Walmart on 3 <sup>rd</sup> Street	L	0	\$0	\$3,000 <sup>4</sup>
Culver - Metolius - Madras	Expand to two full, scheduled round trips in the morning and evening from one-way trips, by reservation (potentially cost-neutral assuming most available trips are made)	M	0	\$0	\$0
	Consider extension of Community Connector route to St. Charles Madras hospital and Safeway.	L	0	\$0	\$13,000 <sup>5</sup>
<b>Local</b>					
Redmond	Implement a new fixed route system	H	Cost neutral - see Redmond section below		
All Cities	Consider allowing return trips on local public bus (from Community Connectors) be made without a reservation	M	0	\$0	\$0
<b>Total (Short-Term Service Plan)</b>			<b>-1,020 (-2%)</b>	<b>-\$66,000</b>	<b>\$77,000</b>
<b>% of Existing (2011-2012)</b>			<b>-2.4%</b>		<b>N/A</b>

Notes:

(1) Assumes \$65.00 per revenue hour (2012 dollars), rounded to the nearest thousand. (2) Assumes a new sidewalk extension in the northbound direction, two shelters and stop signage. Costs to be refined at project development phase. (3) Estimated capital costs to be determined by the COIC sponsored Park & Ride study. (4) Assumes one new stop in the northbound direction opposite the Walmart (bench stop assumed). (5) Assumes two new shelters and stop signage. (6) Assumed to be cost-neutral (implemented only contingent upon available time in the Community Connector schedule)

## MID-TERM SERVICE PLAN (3-10 YEARS)

The Mid-Term Service Plan is presented as the optimal CET network in the 3-10 year timeframe. Service levels in the Mid-Term Service Plan are designed around the demand estimates presented earlier and reflect the service priorities expressed by riders. As opposed to the Short-Term Service Plan, the Mid-Term Service Plan assumes an increase in funding over what is currently available for service and that COIC and CET will need local support for this new source of local funding. As with the Short-Term Service Plan, the Mid-Term Service Plan is presented as a menu of options and costs that are prioritized based on the assessment of need outlined above. The prioritized list of improvements is provided in Figure 12 at the end of this section. Figure 9 and Figure 10 (above) provides an overview of service changes compared to existing service for weekday daytime service and evening and weekend service, respectively.

### Major Elements

There are several key elements included in the Mid-Term Service Plan, listed in priority order:

- **Introduce Saturday service.** Providing service on weekends (especially Saturday) was the highest priority for existing riders – both for regional and local trips. Weekend service is often a priority service request on systems that do not have weekend service because transit riders, like non-transit riders, still need to travel on the weekends. As such, limited Saturday should be introduced in the mid-term. Because ridership on Saturday is typically between 60-80% of weekday ridership, service levels do not need to mirror that of weekdays.
- **Reinstate eliminated service on the Community Connector shuttles as demand warrants.** Some of the Community Connector shuttles were eliminated in the short-term due to low ridership and the need to reduce operating costs. While service cuts may be necessary, it is also desirable to provide a higher level of service between communities to ensure adequate trip options to meet multiple markets (commuters, students, shoppers, etc.). As such, CET should closely monitor ridership on the remaining Community Connectors to determine where additional trips should be added (per the performance standards presented later). At a minimum, at least one midday trip should be provided between all communities<sup>7</sup>.
- **Introduce evening Community Connector trips.** Providing some evening service will not only make service more attractive to existing riders, but also help attract new riders (especially commuters). As such, adding at least one additional round trip in the early evening is recommended in the mid-term as funding becomes available.
- **Restructure Community Connector shuttles around 120 minute cycle times.** Currently, all Community Connector routes in the region are structured around an 80 minute round trip cycle time, which are designed to connect to other routes in Redmond or the local fixed route in Bend (which operates on 40 minute headways). However, when the Bend local services are restructured around 30/60 minute headways instead of 40 minute headways (see Bend Public Transit Plan for more details), it will be important to ensure timed connections between those routes and the Community Connector routes. Therefore, it is recommended that when Bend makes this transition, the Community Connector routes be modified from the 80 minute to 120 minute round trip cycle time. This change will have several benefits:

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<sup>7</sup> The two round trips between Sisters and Redmond are proposed primarily to serve students, so the evening round trip would be provided early in the evening.

- Timed connections would occur between the Community Connectors and the Bend local fixed routes.
- With additional time in the schedule, the Community Connectors can provide additional local stops – but maintain fast, direct inter-community service
- Provide feeder service in local community with Community Connectors, especially in La Pine and Sisters that are not recommended for local fixed or flex route service.

## Community Connector Improvements

Suggested improvements to the Community Connector shuttles in the Mid-Term are summarized below. All improvements by community are listed in priority order.

### Redmond-Bend

- Introduce Saturday services (five round trips)
- Add three additional midday trips (weekdays)
- Add one additional later evening trip (weekdays)
- Combine with Route 12 when round trip cycle times are extended to 120 minutes

### Prineville-Redmond

- Introduce Saturday service (three round trips)
- Add one midday trip early in the mid-term timeframe (weekday)
- Restore one morning and one evening round trip during peak periods (weekdays)
- Add a second midday trip later in mid-term as demand warrants (weekday)
- Add one evening trip (weekdays)
- Consider using the Community Connector vehicle(s) to provide local service in Prineville when round trip cycle times are extended to 120 minutes (see discussion later in this chapter on local service options)

### La Pine-Bend

- Introduce Saturday service (two round trips)
- Provide two full round trips in morning and two round trips in the evening (weekdays)
- Add one midday trip (weekdays)
- Add one later evening trip (weekdays)
- Provide local circulating service in La Pine when round trip cycle times are extended to 120 minutes (see discussion later in this section on local service options)

### Madras-Redmond

- Introduce Saturday service (three round trips)
- Restore 1 round PM trip and add 1 AM round trip (weekdays)
- Add one midday round trip (weekday)
- Add one evening round trip (weekdays)
- Add a second midday round trip (weekday)

- Consider using the Community Connector vehicle(s) to provide local service in Madras when round trip cycle times are extended to 120 minutes (see discussion later in this chapter on local service options)
- Coordinate with ODOT and the municipality of Terrebonne to develop a southbound bus pullout and a signalized pedestrian crossing at the Terrebonne Park & Ride; this would provide faster and more reliable southbound travel times

### **Culver-Metolius**

- Introduce Saturday service (two round trips)
- Add one midday trip (weekday)
- Add one later evening trip (weekday)

### **Sisters-Bend**

- Introduce Saturday service (two round trips)
- Add one midday round trip (weekday)
- Add one later evening trip (weekday)
- Provide local circulating service in Sisters when round trip cycle times are extended to 120 minutes (see discussion later in this section on local service options)

### **Sisters-Redmond**

- Restore one morning round trip and one evening round trip (weekday)
- Provide local circulating service in Sisters when round trip cycle times are extended to 120 minutes (see discussion later in this section on local service options)

## **Local Service**

Improvements to the local services in Redmond, Madras and Prineville are discussed in a separate section below. The local public bus service in La Pine would remain the same in the short- and mid-term, but when the Community Connectors are changed to operate on a 120 minute cycle time, there will be extra time in the schedule to provide local coverage. It is also suggested that in the mid-term, service in Sisters be provided on a regular basis just like other communities. Local public bus service would be provided during the same hours and days as the Community Connector shuttles.

## **Non-Service Improvements**

Transit service is just one element of a successful transit system. As the transit system in Central Oregon matures in the mid-term time frame, CET should consider other improvements that enhance the complete transit experience, including:

- **Real-Time Passenger Information.** Utilizing GPS and/or wireless technology, this would allow passengers to view actual arrival times of all CET buses. This information could be available via mobile devices, a website, or via LED displays at key transit stops.
- **Improved Fare Systems.** This includes a contactless smart card that could be used to pay the fare on CET buses. A smart card system can significantly speed up boardings, alleviate wear and tear on fare boxes, and offer passengers other payment options. Other options would be to explore the use of mobile technology, such as TriMet's mobile ticketing app, which is expected to go live in Summer 2013 (<http://www.trimet.org/mobiletickets/howitworks.htm>).

- **Onboard Wi-Fi.** Onboard Wi-Fi is a relatively low-cost amenity that can enhance passenger experience, especially on long-distance trips. As such, CET should consider providing free Wi-Fi on all Community Connector services in Central Oregon. New cellular 4G technology is making Wi-Fi access on transit vehicles faster and more reliable than previous technology.
- **Mobile Transit Information.** This would include a mobile app that can be downloaded for free and offers passengers information on fares, schedules, routes, etc.

**Figure 12 Summary of Mid-Term Service Plan and Estimated Costs (Community Connector Services)**

Route	Modification	Priority	Years	Change in Annual Revenue Hours	Change in Annual Operating Costs <sup>1</sup>
Redmond - Bend	Add three additional midday trips (weekdays)	M	6-10	1,020	\$66,000
	Add one additional later evening trip (weekdays)	M	3-5	340	\$22,000
	Introduce Saturday services (five round trips)	H	3-5	350	\$23,000
	Combine with Route 12 when round trip cycle times are extended to 120 minutes	L	6-10	0	\$0
Prineville - Redmond	Restore one morning and one evening round trip during peak periods (weekdays)	M	3-5	680	\$44,000
	Add one midday trip (weekday)	M	3-5	340	\$22,000
	Add a second midday trip later in mid-term as demand warrants (weekday)	L	6-10	340	\$22,000
	Add one evening trip (weekdays)	M	3-5	340	\$22,000
	Introduce Saturday service (three round trips)	H	3-5	210	\$14,000
	Use the Prineville-Redmond Community Connector to provide local service when round trip times are extended to 120 minutes	L	6-10	See local service concepts	See local service concepts
La Pine-Bend	Provide two full round trips in morning and two round trips in the evening (weekdays)	M	3-5	340	\$22,000
	Add one midday trip (weekdays)	L	3-5	340	\$22,000
	Add one later evening trip (weekdays)	M	6-10	340	\$22,000
	Introduce Saturday service (two round trips)	M	3-5	140	\$9,000
	Use Community Connector to provide local circulating service in La Pine when round trip times are extended to 120 minutes	M	6-10	See local service concepts	See local service concepts
Madras-Redmond	Restore 1 round PM trip and add 1 AM round trip (weekdays)	M	3-5	680	\$44,000
	Add one midday trip early in the mid-term timeframe (weekday)	M	3-5	340	\$22,000
	Add one evening trip (weekdays)	M	3-5	340	\$22,000
	Add a second midday trip later in mid-term (weekdays)	L	6-10	340	\$22,000
	Introduce Saturday service (three round trips)	H	6-10	210	\$14,000
	Use the Madras-Redmond Community Connector to provide local service when round trip times are extended to 120 minutes	L	3-10	See local service concepts	See local service concepts
Culver/Metolius-Madras	Add one midday trip (weekday)	M	6-10	340	\$22,000
	Add one later evening trip (weekday)	M	6-10	340	\$22,000
	Introduce Saturday service (two round trips)	M	6-10	140	\$9,000
	Add one midday and one evening round trip (weekday)	M	6-10	680	\$44,000
Sisters-Bend	Add one later evening trip (weekday)	L	6-10	340	\$22,000
	Introduce Saturday service (two round trips)	M	6-10	140	\$9,000
	Provide local circulating service in Sisters when round trip times are extended to 120 minutes	L	6-10	See local service concepts	See local service concepts
	Restore one morning round trip and one evening round trip (weekday)	L	3-5	680	\$44,000
Sisters-Redmond	Provide local circulating service in Sisters when round trip times are extended to 120 minutes	L	6-10	See local service concepts	See local service concepts
	<b>Additional Resources (Mid-Term)</b>			9,350	\$606,000
	<b>% of Existing (2011-2012)</b>			<b>+22.4%</b>	<b>N/A</b>

Notes: (1) Assumes cost of \$65.00 per service hour (2012 dollars)

## LONG-TERM SERVICE PLAN (10-20 YEARS)

The Long-Term Service Plan is presented as the vision for the CET network beyond the 10 year timeframe. As with the Short- and Mid-Term Service Plans, service levels in the Long-Term Service Plan are designed around the demand estimates presented earlier. Like the Mid-Term, the Long-Term Service Plan assumes an increase in funding over what is currently available for service and that COIC and CET will need local support for this new level of local funding. A prioritized list of improvements is provided in Figure 13 at the end of this section. Figure 9 and Figure 10 (above) provide an overview of service changes compared to existing service for weekday daytime service and evening and weekend service, respectively.

### Major Elements

The major service elements in the Long Term Service Plan include:

- Extended evening service up to 10 PM in key corridors/communities
- Consistent hourly headways between Redmond and Bend (early morning until early evening)
- Local fixed route frequency/service span improvements in Redmond
- Fixed or flex route in Prineville and Madras
- Introduce Sunday service

### Community Connector Improvements

Suggested improvements to the Community Connector shuttles in the Long-Term are summarized below. All improvements by community are listed in priority order and are in addition to the improvements discussed in the Mid-Term Service Plan.

#### Redmond-Bend

- Two additional midday trips to provide consistent hourly headways all day (weekday)
- One additional evening round trip on weekdays (two total)
- Five round trips on Sunday

#### Prineville-Redmond

- One additional midday round trip on weekdays (three total)
- One additional evening round trip on weekdays (two total)
- Three round trips on Sunday

#### La Pine-Bend

- One additional midday trip on weekdays (two total)
- Two round trips on Sunday

#### Madras-Redmond

- One additional midday round trip on weekdays (three total)
- One additional evening round trip on weekdays (two total)
- Three round trips on Sunday

**Culver-Metolius**

- One additional midday trip on weekdays (two total)
- Two round trips on Sunday

**Sisters (Sisters-Bend and Sisters-Redmond)**

- One midday round trip on weekdays between Sisters and Redmond
- One additional morning and one additional evening round trip on weekdays between Sisters and Bend
- Two round trips on Sunday between Sisters-Bend

**Local**

Refer to the local service section below for details on local service concepts for Redmond, Prineville, and Madras.

**Figure 13 Summary of Long-Term Service Plan and Estimated Cost (Community Connector Services)**

Route	Modification	Year	Change in Annual Revenue Hours	Change in Annual Operating Costs <sup>1</sup>
Redmond - Bend	Two additional midday trips to provide consistent hourly headways all day (weekday)	10-20	680	\$44,000
	One additional evening round trip on weekdays (two total)	10-20	340	\$22,000
	Five round trips on Sunday	10-20	350	\$23,000
Prineville - Redmond	One additional midday round trip on weekdays (three total)	10-20	340	\$22,000
	One additional evening round trip on weekdays (two total)	10-20	340	\$22,000
	Three round trips on Sunday	10-20	210	\$14,000
La Pine-Bend	One additional midday trip on weekdays (two total)	10-20	340	\$22,000
	Two round trips on Sunday	10-20	140	\$9,000
Madras-Redmond	One additional midday round trip on weekdays (three total)	10-20	340	\$22,000
	One additional evening round trip on weekdays (two total)	10-20	340	\$22,000
	Three round trips on Sunday	10-20	210	\$14,000
Culver/Metolius-Madras	One additional midday trip on weekdays (two total)	10-20	340	\$22,000
	Two round trips on Sunday	10-20	140	\$9,000
Sisters (Sisters-Bend and Sisters-Redmond)	One midday round trip on weekdays between Sisters and Redmond	10-20	340	\$22,000
	One additional morning and one additional evening round trip on weekdays between Sisters and Bend	10-20	680	\$44,000
	Two round trips on Sunday between Sisters-Bend	10-20	140	\$9,000
	<b>Additional Resources (Long-Term Service Plan)</b>		<b>5,270</b>	<b>\$342,000</b>
	<b>% of Existing (2011-2012)</b>		<b>12.7%</b>	<b>12.6%</b>

Notes: (1) Assumes cost of \$65.00 per service hour (2012 dollars)

## CONCEPTUAL REGIONAL SERVICE SCHEDULES

As the Regional Transit Master Plan is implemented over time, it is important to ensure that Community Connector routes are timed to connect to each other as well as timed to connect to local services in Bend and Redmond.

This section describes conceptual schedules for the short- and mid-term time frames. Because the mid-term schedules would simply be expanded on for the Long-Term to include additional midday, evening, Saturday and Sunday service, no conceptual schedules are presented for the long-term.

The number of trips in each set of conceptual schedules reflects those presented in the schematics provided in Figure 9 and Figure 10 (above), which compares existing service to the Short-, Mid-, and Long-Term.

### Short-Term Conceptual Schedules

In the short-term time frame, it is assumed the Bend and Redmond local fixed-route services operate on 40-minute headways and that the Redmond-Bend, Madras-Redmond, and Prineville-Redmond Community Connector shuttle operate on 80-minute headways, as they do today.

Figure 14 below provides the conceptual schedules for the short-term time frame. The schedules differ slightly from existing CET schedules in that they are primarily intended to illustrate timed connections between new fixed-route service in Redmond and Community Connector shuttles. Assumptions related to the short-term conceptual schedules are provided for the following Community Connector shuttles:

- **Redmond-Bend (Route 24).** Route 24 would have timed connections with the Madras-Redmond and Prineville-Redmond shuttles as well as to/from Redmond local fixed-routes, including Route 12 to the Redmond Airport and COCC campus on most trips.
- **Madras-Redmond (Route 22) and Prineville-Redmond (Route 26).** Routes 22 and 26, respectively, are timed with the Redmond-Bend shuttle as well as local fixed-routes in Redmond (see Redmond Service Concepts section for more detail). One daily round trip for each route has been identified for possible elimination in the short-term, depending on budget constraints; these trips are included in the conceptual schedules (shown in gray type). In Madras and Prineville, connections would be timed to local flex-route or public bus service, depending on local service decisions in each community. In Prineville, the existing daily round trip shown on the Community Connector schedule to Juniper Canyon is not included in the Community Connector schedule. This trip is provided as part of local public bus service. If local service in Prineville is converted to a flex-route, an alternative mechanism for providing this service would need to be explored. One option is a vanpool type service (see sidebar in the Service Types section of this chapter).
- **Culver-Metolius-Madras (Route 21).** No significant changes are proposed to Route 21 in the short-term. An initial recommendation of this plan to make this service scheduled in both directions has already been implemented.
- **Sisters-Redmond (Route 28), Sisters-Bend (Route 29).** Routes 28 is recommended for conversion to Sisters-Bend service (Route 29) in the short-term. It is

assumed that one potential work-trip market for this service is teachers, therefore the conceptual schedules for Route 29 show a morning departure from Bend that is timed with the first Bend fixed-route pulse. A late afternoon trip is also timed to meet the pulse in Bend. If resources become available, additional trips could be targeted to the tourist/visitor market and scheduled in the later morning and earlier afternoon.

- **La Pine-Bend (Route 30).** Route 30 is designed to connect to Bend local fixed-routes at Hawthorne Station in Bend on all trips. As noted on the conceptual schedules, slightly earlier morning and later afternoon departures from Bend are assumed for better connections with the Bend fixed-route system.

Conceptual short-term schedules for Redmond local service are provided in Figure 18.

## Mid-Term Conceptual Schedules

As noted earlier, the Bend routes are planned to operate on either 30- or 60-minute headways starting in the mid-term time frame (see the Bend MPO Public Transit Plan). The proposed local fixed-routes in Redmond, as will be discussed in more detail in the Local Service Concepts section of this volume, will operate on 40-minute headways throughout the life of the plan. Conceptual mid-term schedules for Redmond local service are provided in Figure 20.

Currently and in the short-term time frame, Community Connector shuttles make 80-minute round trips and have 80-minute headways between trips. In order to provide timed connections to local services in both Bend and Redmond, the Community Connector shuttles would make 120-minute round trips. Two buses would serve the Redmond-Bend, Prineville-Redmond, and Madras-Redmond routes during peak periods to provide 60-minute headways. Longer headways would be provided outside of peak periods and on other routes.

Using the additional time available within a 120-minute round trip, the Community Connector routes are used to provide additional local services in Prineville, Madras, Culver/Metolius, La Pine, and Sisters. These are assumed to operate as flex routes for the purpose of this discussion, however it is possible to continue operating local public bus service, as described in the Local Service Concepts section of this volume. Using the Community Connector shuttles to provide local services provides cost efficiencies compared to operating separate local and regional services in each community. The cost efficiencies for integrating services are primarily realized for service in Prineville and Madras and for the Prineville-Redmond and Madras-Redmond Community Connectors. They are not assumed in the mid- and long-term regional service plan, since they depend in part on local decisions in Prineville and Madras, but they are identified in the Local Service Concepts section below.

below provides the conceptual schedules for the mid-term. Assumptions related to the mid-term conceptual schedules are provided for the following Community Connector shuttles:

- **Redmond-Bend (Route 24).** Route 24 connects the local systems in Redmond and Bend. Two buses would serve this route during peak periods, providing 60-minute headways. This route is proposed to operate as a 120-minute round trip and include the Redmond Library-Airport local route in Redmond (Route 12). It would run from the Redmond Library to the Redmond COCC campus, Redmond Airport, and terminate at Hawthorne Station in Bend. This would increase travel times between Redmond and Bend, but provide a direct connection between the Redmond Airport, Redmond COCC campus, and Bend. All trips would have timed connections with Bend local fixed routes (operating on 30- or 60-minute headways). Some trips would have a timed transfer

- to/from Redmond local fixed-routes (operating on 40-minute headways), while some trips would require a 20-minute wait.
- **Madras-Redmond (Route 22) and Prineville-Redmond (Route 26).** Two buses serve Routes 22 and 26, respectively, during peak periods providing 60-minute headways (requiring four buses total). Within a 120-minute round-trip, each shuttle would provide 40-minutes of local flex service in Prineville or Madras before returning to Redmond. Each trip arriving in Redmond would have a timed connection to the Bend-Redmond shuttle (shown in black outline). Some trips would also have a timed transfer to/from Redmond local fixed-routes (highlighted in green), while some trips would require a 20-minute wait. At the conclusion of the AM peak, one bus would go out of service, while the other bus would remain in Madras or Prineville to provide local service.
  - **Culver-Metolius-Madras (Route 21).** Route 21 is scheduled to connect to the Madras-Redmond shuttle (Route 22) on most trips, though some trips require a 20-minute wait. The Culver-Metolius shuttle would provide local flex service in Madras (e.g., Medical Center and Safeway) to drop off and pick up passengers on each trip between Madras and Culver. These trips could be in addition to the local flex-route service (assumed to be provided by the Route 22) or could replace the local flex-route at some times to reduce operating costs. Route 21 would stop at the Madras Transit Center (DMV) before returning to Metolius and Culver. Ten minutes is built into the schedule to allow for on-demand flex service in Metolius and Culver. The route would then return to Madras, where it would serve the Madras transit center and operate a local flex segment as described above. Because the local flex route is designed to operate in the counter-clockwise direction, passengers traveling from Redmond could transfer to the bus from Culver-Metolius to get a more direct connection to the hospital, as well as to COCC. A tradeoff with using this route to provide flex service is some trips will not be timed to the Madras-Redmond shuttle; these tradeoffs will need to be evaluated against the benefits.
  - **Sisters-Bend (Route 29).** Routes 29 would connect to Bend local fixed-routes at Hawthorne Station in Bend on all trips. It is assumed that the Bend routes will operate on 30- or 60-minute headways, and thus be timed to connect to each Sisters shuttle trip. All trips of the Sisters-Bend shuttle would provide flex or door-to-door local public bus service in Sisters prior to and after each round trip to Bend; an estimated 10-20 minutes would be available in the schedule. This could be operated as a flex-route with some fixed stops or as demand-responsive service. Reservations for any local on-demand service would be required, just like existing local public bus service.
  - **La Pine-Bend (Route 30).** Routes 30 would connect to Bend local fixed-routes at Hawthorne Station in Bend on all trips. It is assumed that the Bend routes will operate on 30- or 60-minute headways, and thus be timed to connect to each La Pine shuttle trip. The La Pine-Bend shuttle could be used to provide flex or door-to-door local public bus service in each La Pine 20 minutes prior and 20 minutes after each round trip to Bend (up to 40 minutes). Reservations for local on-demand service would be required, just like existing local public bus service.

It is important to note that these schedules are conceptual and are only intended to illustrate how services could connect to each other. More detailed schedules would need to be developed after CET is able to time each of the routes and ensure they are able to cycle within the assumed running time.

Figure 14 Short-Term Regional Conceptual Schedules

24 Bend - Redmond					Route 26 Redmond - Prineville					Route 22 Redmond-Madras					Route 21 Culver-Metolius			Route 29 Sisters-Bend				Route 30 La Pine-Bend								
T		T		T		T		T		T		T		T		T		T		T		T		T						
0:10		0:30		0:10		0:30		0:10		0:35		0:05		0:35		0:05		0:25		0:25		0:05		0:40		0:05		0:40		
Bus #	Redmond Lib	Arr Bend	Lv Bend	Redmond Lib	Bus #	Redmond Lib	Arr Prineville	Lv Prineville	Redmond Lib	Bus #	Redmond Lib	Arr Madras	Lv Madras	Redmond Lib	Bus #	Culver	Madras	Culver	Bus #	Sisters	Arr Bend	Lv Bend	Sisters	Bus #	La Pine	Arr Bend	Lv Bend	La Pine		
105	6:00 AM	6:30 AM	6:40 AM	7:10 AM	CC1 (a,d)	6:00 AM	6:30 AM	6:40 AM	7:15 AM	CC2 (a,d)	-	-	6:40 AM	7:15 AM	CC3 (a)	--	7:05 AM	7:30 AM	CC4 (a)	-	-	6:40 AM	7:20 AM	CC5 (a)	6:30 AM	7:10 AM	7:15 AM	7:55 AM		
105	7:20 AM	7:50 AM	8:00 AM	8:30 AM	CC1 (a)	7:20 AM	7:50 AM	8:00 AM	8:35 AM	CC2 (a)	7:20 AM	7:55 AM	8:00 AM	8:35 AM	CC3	7:35 AM	8:00 AM	-	CC4 (a)	7:25 AM	8:05 AM	-	-	CC5 (a)	8:00 AM	8:40 AM	-	-		
105	8:40 AM	9:10 AM	9:20 AM	9:50 AM	CC1 (a,c)	8:40 AM	9:10 AM	9:20 AM	9:55 AM	CC2	8:40 AM	9:15 AM			CC3	-	9:45 AM	10:10 AM												
105	10:00 AM	10:30 AM	10:40 AM	11:10 AM											CC3	10:15 AM	10:40 AM													
105 (a)	1:20 PM	1:50 PM	2:00 PM	2:30 PM	CC1 (b,d)	2:40 PM	3:10 PM	3:20 PM	3:55 PM						CC3	--	3:20 PM	3:45 PM												
105	2:40 PM	3:10 PM	3:20 PM	3:50 PM	CC1 (b)	4:00 PM	4:30 PM	4:40 PM	5:15 PM	CC2			3:20 PM	3:55 PM	CC3	3:50 PM	4:15 PM	-	CC4 (a)	-	-	3:55 PM	4:35 PM	CC5 (b)	-	-	3:55 PM	4:35 PM		
105	4:00 PM	4:30 PM	4:40 PM	5:10 PM						CC2 (b)	4:00 PM	4:35 PM	4:40 PM	5:15 PM	CC3 (b)	-	4:45 PM	5:10 PM	CC4 (a)	4:40 PM	5:20 PM	-	-	CC5 (b)	4:40 PM	5:20 PM	5:25 PM	6:05 PM		
105	5:20 PM	5:50 PM	6:00 PM	6:30 PM						CC2 (b,c)	5:20 PM	5:55 PM	6:00 PM	6:35 PM	CC3	5:15 PM	5:40 PM	-												
										CC2 (b,c,d)	6:40 PM	7:15 PM	-	-																
	a	In short-term, Redmond local fixed-route runs on 80 min headways midday. Timed transfer is assumed with Routes 12 and 14 only				a	Stops in Powell Butte (westbound only)				a	Stops in Terrebonne (southbound only)				a	Stops at Adams & Tracie and Deschutes Valley Water Co (southbound only)				a	Assumes Bend local routes arrive by 7:15 AM for timed transfer				a	First morning run departs from La Pine 25 minutes earlier than current schedules, allowing a timed transfer with 7:20 Bend pulse (for trips to La Pine, assumes local routes arrive at Hawthorne Station by 7:15) and 8:40 Bend pulse			
Morning					b	Stops in Powell Butte (eastbound only)				b	Stops in Terrebonne northbound only)				b	Stops at Adams & Tracie and Deschutes Valley Water Co (northbound only)				b	Assumes Bend local routes arrive by 3:55 PM for timed transfer									
Midday					c	Trip subject to elimination based on budget constraints				c	6:00 PM departure from Madras subject to elimination based on budget constraints																			
Afternoon					d	Existing service to Juniper Canyon is not shown on the schedule. This service is currently provided by a Dial-A-Ride vehicle, but a municipal vanpool service type could be considered if Prineville local Dial-A-Ride service is converted to a flex route				d	Bus is based in Redmond																			
Evening																														



## SUMMARY OF LOCAL SERVICE CONCEPTS

Figure 16 summarizes local service concepts for each community. A brief description of the Bend MPO Transit Plan (BTP) is provided. Detailed service concepts are provided below for Redmond, Prineville, and Madras. COIC and the City of Redmond prepared an update of the City of Redmond's Transit Master Plan in coordination with the RTMP and a discussion of the service concepts for Redmond is provided in this document. There is assumed to be community and elected official support for moving from demand-responsive local service to a fixed-route system in Redmond, with complementary ADA Paratransit service. In Prineville and Madras, the RTMP presents initial concepts for flex-route service, along with a discussion of tradeoffs of maintaining a demand-responsive service model which require additional community discussion and feedback. Flex-route service could be implemented in several different ways and a discussion of possible approaches is provided in each section.

**Figure 16 Overview of Service Plan: Local Service**

	Existing	Short-Term	Mid-Term	Long-Term
Timeframe		Next 1-3 Years	Next 3-10 Years	10-20 Years
Funding	Existing Sources	Existing Sources	Funding Ask	Established Funding Source
Bend	<ul style="list-style-type: none"> <li>▪ Fixed-Route and ADA Paratransit (6:15 AM – 6:15 PM)</li> <li>▪ Saturday service with 80 minute headways</li> </ul>	<ul style="list-style-type: none"> <li>▪ Cost-neutral operational changes</li> </ul>	<ul style="list-style-type: none"> <li>▪ Restructure around 30/60 minute headways</li> <li>▪ New Route 7</li> <li>▪ All-Day and Saturday service on Route 11</li> <li>▪ Early evening and Hourly Saturday service</li> </ul>	<ul style="list-style-type: none"> <li>▪ Increase frequency of local fixed route service</li> <li>▪ Earlier morning, later evening, and Sunday service</li> </ul>
Redmond	<ul style="list-style-type: none"> <li>▪ Local public bus (6:30 am – 6:00 pm)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Potential reduction in service hours</li> <li>▪ Potential introduction of cost-neutral fixed-route service</li> </ul>	<ul style="list-style-type: none"> <li>▪ Introduce local fixed route (40-minute headways coordinated with Community Connectors); ADA paratransit</li> <li>▪ Early evening and Saturday service*</li> </ul>	<ul style="list-style-type: none"> <li>▪ Expand local fixed route (frequency and service hours)</li> <li>▪ Later evening and weekend service*</li> </ul>
Prineville	<ul style="list-style-type: none"> <li>▪ Local public bus (7:00 am – 5:30 pm)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Potential reduction in service hours</li> <li>▪ Potential introduction of cost-neutral flex-route service</li> </ul>	<ul style="list-style-type: none"> <li>▪ Local public bus (service until 8:00 pm weekdays, limited Saturday)*</li> <li>▪ Potential introduction of flex-route service</li> </ul>	<ul style="list-style-type: none"> <li>▪ Potential fixed or flex route service</li> <li>▪ Later evening/weekend service*</li> </ul>
Madras	<ul style="list-style-type: none"> <li>▪ Local public bus (7:00 am – 5:30 pm)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Potential reduction in service hours</li> <li>▪ Potential introduction of cost-neutral flex-route service</li> </ul>	<ul style="list-style-type: none"> <li>▪ Local public bus (service until 8:00 pm weekdays, limited Saturday)*</li> <li>▪ Potential introduction of flex-route service</li> </ul>	<ul style="list-style-type: none"> <li>▪ Potential fixed or flex route service</li> <li>▪ Later evening/weekend service*</li> </ul>
Culver / Metolius	<ul style="list-style-type: none"> <li>▪ Local public bus (7:00 am – 5:30 pm)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Potential reduction in service hours</li> </ul>	<ul style="list-style-type: none"> <li>▪ Local flex service feeding Community Connector trips (weekday/Saturday)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Local flex service feeding Community Connector trips (weekday/weekend)</li> </ul>
Sisters	<ul style="list-style-type: none"> <li>▪ Local public bus (Tuesday only 9:00 am – 3:30 pm)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Potential reduction in service hours</li> </ul>	<ul style="list-style-type: none"> <li>▪ Local flex service feeding Community Connector trips (weekday/Saturday)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Local flex service feeding Community Connector trips (weekday/weekend)</li> </ul>
La Pine	<ul style="list-style-type: none"> <li>▪ Local public bus (7:00 am – 5:30 pm)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Potential reduction in service hours</li> </ul>	<ul style="list-style-type: none"> <li>▪ Local public bus (service until 8:00 pm weekdays, limited Saturday)*</li> </ul>	<ul style="list-style-type: none"> <li>▪ Local public bus (early evening/limited weekend service)*</li> </ul>

\* Evening and weekend local service coordinated with Community Connector

## BEND MPO TRANSIT PLAN

The Bend Metropolitan Planning Organization (Bend MPO), in coordination with COIC and the City of Bend, completed a long-range transit plan for the Bend Urbanized Area in March 2013. This plan is available at <http://www.bendoregon.gov/index.aspx?page=759>.

The planning time frames for the RMTP and key service elements with regional implications are consistent with the BTP. These are described briefly below for short-term, mid-term, and long-term elements:

- **Short-Term:** The short-term service concepts in the BTP focus on cost-neutral fixes to key operational issues affecting the Bend fixed-route system, primarily the ability of some routes to maintain 40-minute cycle times and timed transfers with other local routes as well as regional connections.
- **Mid-Term:** The mid-term time frame focuses on restructuring the Bend fixed-routes to use 30- or 60-minute cycle times and headways, which is a more flexible and scalable model that will support continued growth of the system. The restructuring around 30/60-minute cycle time has significant implications for maintaining the coordination of regional services, which is illustrated in the mid-term conceptual schedules provided above. A network of primary transit corridors was identified and routes serving these corridors are prioritized for the most frequent service, including a new route with more direct service to the St. Charles Medical Center area. The mid-term time frame also included expansion of early evening service and potential restructuring of two routes contingent on development of a new OSU campus in the southwest part of Bend.
- **Long-Term:** The long-term time frame is structured as a flexible service plan that can be implemented based on available resources and land use targets for increasing service frequency.

Other specific elements of the BTP that relate closely to regional service include:

- Using the Bend-La Pine Community Connector to serve Deschutes River Woods (implemented in November 2012).
- Considering key local stops for the Community Connector (Cascade Village and Walmart area) as time permits in the regional shuttle schedules.
- Evaluating a stop serving Sunriver contingent on a Park & Ride located in close proximity to US 97, i.e., minimal added running time to the Bend-La Pine shuttle.
- Evaluating service to Tumalo, which is within the Bend MPO boundary based on the 2010 U.S. Census, in conjunction with potential service between Bend and Sisters.

## REDMOND SERVICE CONCEPTS

The local service concepts for Redmond described in this document were developed as part of the Regional Transit Master Plan (RTMP) and will be used by the Central Oregon Intergovernmental Council (COIC) and the City of Redmond to update the Redmond Transit Master Plan. These concepts focus on the Short- and Mid-Term time frames (1-3 Years and 3-10 Years, respectively), but a more conceptual Long-Term service concept is included that provides for one additional route on the west side of Redmond (specific routing is to be determined at a later time, based on future development).

This section first explains the rationale for recommending fixed-route service in Redmond, details the short- and mid-term service concepts, and provides quantitative metrics and a qualitative evaluation of the service concepts. Each time frame outlines the service concepts planned for implementation at a regional level and for local service in Redmond, which will need to be coordinated to maintain a cohesive regional transit system.

### Rationale for Fixed-Route Service in Redmond

Based on analysis conducted for the Regional Transit Master Plan, it is recommended that COIC and the City of Redmond plan to implement fixed-route service in the city within the short-term time frame. This recommendation is based on the following considerations:

- Current local public bus service is at capacity and unable to meet demand (trips are being denied).
- Performance of existing demand-responsive local public bus service (productivity of 6.7 riders per service hour) exceeds industry standards for demand-responsive service, which are more typically in the range of 3 to 4 riders per service hour.
- The existing local public bus service is also performing at the moderate-to-high end of industry standards for flex-route service (which operates on a fixed route but can deviate to offer curb-to-curb service on demand).
- The analysis of the short-term service concept provided in this section indicates that population and employment density in the city of Redmond (and in particular, along the recommended transit routes) is at the threshold level to support introduction of fixed-route service (see service standards provided in the Regional Transit Master Plan). These thresholds, which are based on research and industry standards, identify the minimum density required for fixed-route service to operate efficiently.
- Analysis of existing trips on the Redmond local public bus service also indicates that a fixed-route design will be able to serve most existing local public bus trips.

Based on these considerations, a fixed-route service design is recommended (as opposed to an intermediate step of implementing a flex-route service, one of the options presented in the 2008 Redmond Transit Master Plan). The following sections detail the short- and medium-term fixed-route service concepts. It should be noted that these service concepts would require additional detail prior to implementation, such as appropriate and accessible placement of bus stops and more refined (and tested) travel times.

## Redmond Short-Term Service Concept (1-3 Years)

### Regional Service

The major short-term elements of the Regional Transit Master Plan of particular relevance to the city of Redmond include:

- Existing funding sources are assumed and some service reductions are imminent due to declining funding from these sources
- The regional Community Connector shuttles maintain the current 80-minute cycle times
- Some unproductive Community Connector trips will be eliminated (1 AM round trip from Redmond-Prineville; 1 PM round trip from Redmond-Madras), if necessary based on budget constraints.
- Additional local stops on the Community Connector *as time permits*, e.g., a southbound stop at Cascade Village in Bend
- Improved facilities at the transit center in Redmond (Library) (COIC has received a grant to implement these improvements and is in the planning stages for that work)

### Local Service

In the Short-Term, it is assumed that the Dial-A-Ride service could be replaced by a basic fixed route network and complementary/ADA paratransit. There are three fixed routes:

- **Route 12.** This is the existing Route 12 to the Airport currently in operation. It is assumed that each trip on this route would connect to the Community Connector trips arriving at the Redmond Library. This route is also assumed to start and end at the airport, so that connections to and from the airport (and COCC) can be made. This route assumes 3.5 revenue hours/weekday.
- **Route 13.** This would be a new route serving the northwest part of the city. The route would operate on 40 minute headways during peak periods and 80 minutes during the midday. Service would be provided from 6:30 AM until 6:00 PM (11.5 hours) on weekdays only. This route assumes 9.5 revenue hours/weekday.
- **Route 14.** This would be a new route serving the southwest part of the city. The route would operate on 40 minute headways during peak periods and 80 minutes during the midday. Service would be provided from 6:30 AM until 6:00 PM (11.5 hours) on weekdays only. This route assumes 9.5 revenue hours/weekday.

Routes 13 and 14 would operate in the clockwise direction. Routes 13 and 14 would provide bidirectional service between downtown Redmond and the Redmond Proficiency Academy / Redmond High School area.

In addition to the fixed route services, it is assumed that one ADA/DAR vehicle would provide service for the entire 11.5 hours during the day and a second vehicle would provide service during peak periods (5 hours per day). Thus, 16.5 revenue hours would be provided for ADA/DAR service.

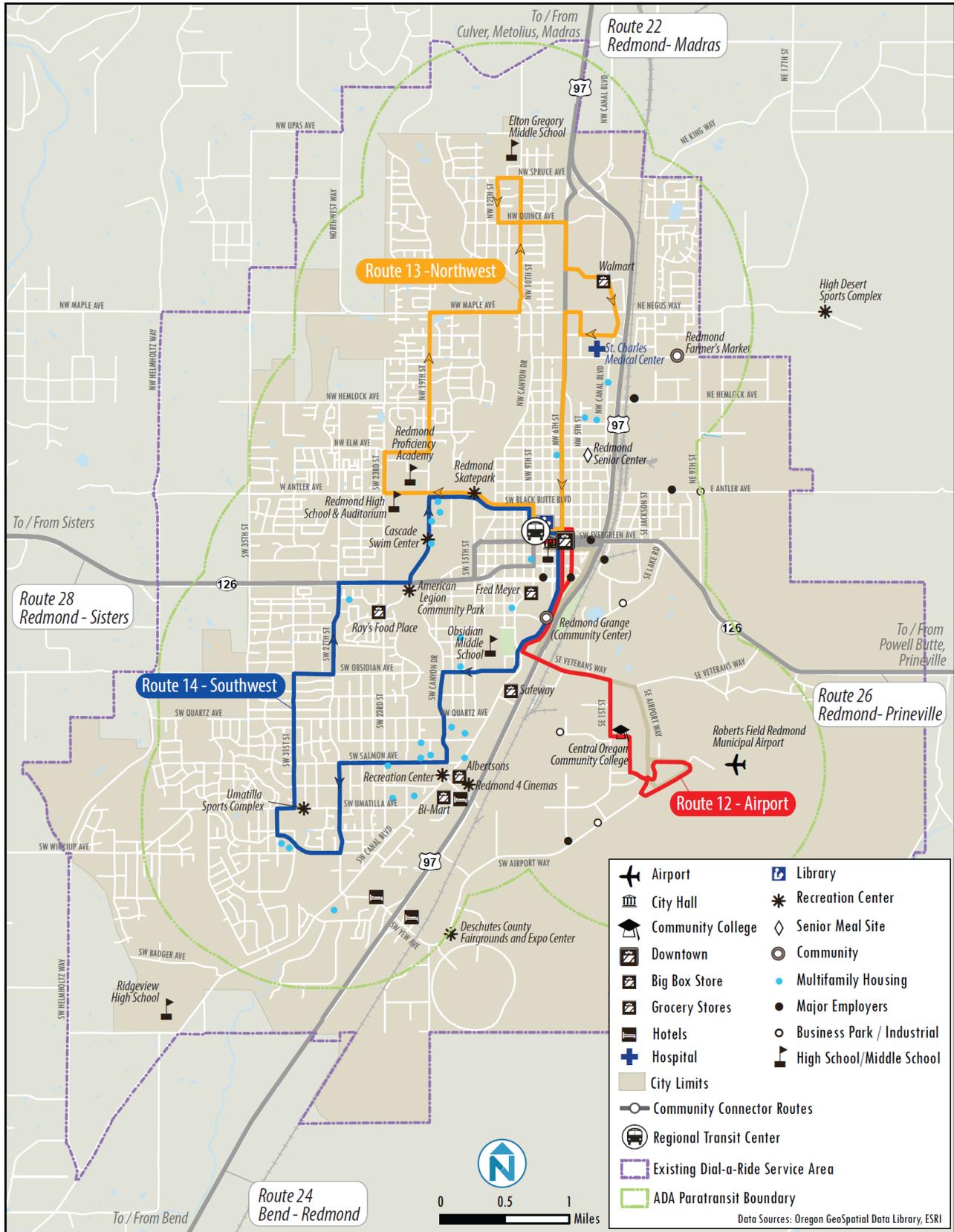
It is assumed that the cost of Route 12 is accounted for elsewhere, and thus the cost for the two new fixed routes and the ADA paratransit service is about 35.5 hours/daily, or about 9,000 revenue hours annually.

### **Short-Term Conceptual Map and Schedules**

Figure 17 shows a map of the recommended alignments for the two new routes and Route 12.

Figure 18 below provides conceptual schedules for the three Redmond routes. All trips are scheduled to connect to the Community Connector trips arriving at the Redmond library.

Figure 17 Redmond Short-Term Service Plan (1-3 Years)



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**Figure 18 Redmond Short-Term Conceptual Schedules**

	Route 13 Northwest				Route 14 Southwest				Route 12 Airport / COCC				
	0:05	0:20	0:15		0:05	0:20	0:15		0:11	0:09	0:08	0:08	0:04
Bus #	Library	Walmart	Library	Bus #	Library	Heights ALF	Library	Bus #	Airport	Worksource/COCC	Library	Worksource/COCC	Airport
A	6:40 AM	7:00 AM	7:15 AM	B	6:40 AM	7:00 AM	7:15 AM						
A	7:20 AM	7:40 AM	7:55 AM	B	7:20 AM	7:40 AM	7:55 AM	c (ii)	7:03 AM	7:12 AM	7:20 AM	7:28 AM	7:32 AM
A	8:00 AM	8:20 AM	8:35 AM	B	8:00 AM	8:20 AM	8:35 AM						
A	8:40 AM	9:00 AM	9:15 AM	B	8:40 AM	9:00 AM	9:15 AM	c (ii)	8:23 AM	8:32 AM	8:40 AM	8:48 AM	8:52 AM
A	9:20 AM	9:40 AM	9:55 AM	B (i)	9:20 AM	9:40 AM	9:55 AM						
A	10:00 AM	10:20 AM	10:35 AM		10:00 AM	10:20 AM	10:35 AM	c (ii)	9:43 AM	9:52 AM	10:00 AM	10:08 AM	10:12 AM
	10:40 AM	11:00 AM	11:15 AM	A	10:40 AM	11:00 AM	11:15 AM						
A	11:20 AM	11:40 AM	11:55 AM		11:20 AM	11:40 AM	11:55 AM						
	12:00 PM	12:20 PM	12:35 PM	A	12:00 PM	12:20 PM	12:35 PM						
A	12:40 PM	1:00 PM	1:15 PM		12:40 PM	1:00 PM	1:15 PM						
	1:20 PM	1:40 PM	1:55 PM	A	1:20 PM	1:40 PM	1:55 PM	c (ii)	1:03 PM	1:12 PM	1:20 PM	1:28 PM	1:32 PM
A	2:00 PM	2:20 PM	2:35 PM	B	2:00 PM	2:20 PM	2:35 PM						
B	2:40 PM	3:00 PM	3:15 PM	A	2:40 PM	3:00 PM	3:15 PM	c (ii)	2:23 PM	2:32 PM	2:40 PM	2:48 PM	2:52 PM
A	3:20 PM	3:40 PM	3:55 PM	B	3:20 PM	3:40 PM	3:55 PM						
B	4:00 PM	4:20 PM	4:35 PM	A	4:00 PM	4:20 PM	4:35 PM	c (ii)	3:43 PM	3:52 PM	4:00 PM	4:08 PM	4:12 PM
A	4:40 PM	5:00 PM	5:15 PM	B	4:40 PM	5:00 PM	5:15 PM						
B	5:20 PM	5:40 PM	5:55 PM	A	5:20 PM	5:40 PM	5:55 PM	c (ii)	5:03 PM	5:12 PM	5:20 PM	5:28 PM	5:32 PM
Timed Transfer to Community Connector													
i	Bus goes out of service. In short-term, Redmond fixed-routes operate on 80-minute headways and trips shown in gray are not served)												
ii	Airport bus goes out of service between trips (may be used for ADA paratransit or local public bus service)												

## Redmond Mid-Term Service Concept (3-10 Years)

### Regional Service

The major mid-term elements of the Regional Transit Master Plan of particular relevance to the city of Redmond in the Mid-Term include:

- A stable, local funding source is assumed, enabling earlier service reductions to be reinstated (where warranted by demand and expected to meet performance standards).
- Service enhancements to Community Connector service, including additional midday and evening service and introduction of Saturday service. By the end of this time period, the Redmond-Bend Community Connector could have hourly service at peak times.
- The regional Community Connector shuttles will be restructured around 120-minute cycle times. This will (1) maintain regional connections when fixed-routes in Bend are restructured to 30 or 60-minute cycle times; and (2) allow the Community Connector shuttles to provide additional local stops (while maintaining fast and direct inter-community service).

### Local Service

The Mid-Term service concept includes five fixed routes in Redmond and consistent 40-minute headways all-day, assuming an increased level of investment. It is also assumed that at some point during the Mid-Term, the routes in Bend would transition to 30/60 minute cycle times, and thus the Community Connectors would transition to 120 minute cycle times. When that occurs, it is recommended that Route 12 and Route 24 be merged into a single route.

- **Route 12.** This is the same as Route 12 to the Airport. It is assumed that each trip on this route would connect to the Community Connector trips arriving at the Redmond Library. This route is also assumed to start and end at the airport, so that connections to and from the airport (and COCC) can be made.
- **Route 13.** This would be the same as in the Short-Term but would operate on consistent 40 minute headways throughout the day. Service would be provided from about 6:15 AM until 7:00 PM (12.75 hours) on weekdays only. This route assumes 12.75 revenue hours/weekday. Additional evening and Saturday service would be added to this route.
- **Route 14.** This would be the same as in the Short-Term but would operate on consistent 40 minute headways throughout the day. Service would be provided from about 6:15 AM until 7:00 PM (12.75 hours) on weekdays only. This route assumes 12.75 revenue hours/weekday. Additional evening and Saturday service would be added to this route.
- **Route 15.** This would be a new route serving the northeast part of the city. The route would operate on 40 minute headways throughout the day. Service would be provided from about 6:15 AM until 7:00 PM (12.75 hours) on weekdays only. This route assumes 12.75 revenue hours/weekday. Additional evening and Saturday service would be added to this route.
- **Route 16.** This would be a new route serving the southeast part of the city. The route would operate on 40 minute headways throughout the day. Service would be provided from about 6:15 AM until 7:00 PM (12.75 hours) on weekdays only. This route assumes 12.75 revenue hours/weekday. Additional evening and Saturday service would be added to this route.

Routes 13, 14, 15, and 16 would operate in the clockwise direction. Routes 13 and 15 would provide bidirectional service between downtown Redmond and the Medical Center/Walmart area. Routes 14 and 16 would provide bidirectional service along the general Canal Blvd. corridor south of downtown Redmond.

Initially, the same level of ADA Paratransit service is assumed as in the short-term—one ADA/DAR vehicle would provide service for the entire 12.75 hours during the day and a second vehicle would provide service during peak periods (5 hours per day). Thus, 17.75 revenue hours would be allocated for ADA/DAR service. As with the Short-Term service concept, it is assumed that the cost of Route 12 is accounted for elsewhere, and thus the cost for the four fixed routes (in addition to Route 12) and the ADA paratransit service is about 56 hours/daily, or just over 14,300 revenue hours annually.

Adding evening and weekend service, including ADA Paratransit, would increase service hours (and costs) as follows:

- The addition of evening service would add nearly 1,500 additional fixed-route hours per year; this assumes service from about 7:00 PM until nearly 9:00 PM (meeting the last Community Connector trip) with 40 minute headways. It is assumed that one ADA/DAR vehicle would provide service for the entire day (14.75 hours) and a second vehicle would provide service during peak periods (8 hours is assumed). Thus, 22.75 revenue hours of ADA service would be provided each weekday for a total of 2,800 additional fixed-route and ADA revenue hours per year.
- The addition of Saturday service would add about 1,200 fixed-route hours/year; this assumes 8 hours of service and 40-minute headways all day. It is assumed that one vehicle would provide ADA service for the entire day (8 hours) and a second vehicle would provide additional ADA service during peak periods (4 hours is assumed). Thus, 12 revenue hours of ADA service would be provided on Saturdays, for a total of 1,800 additional fixed-route and ADA revenue hours per year.

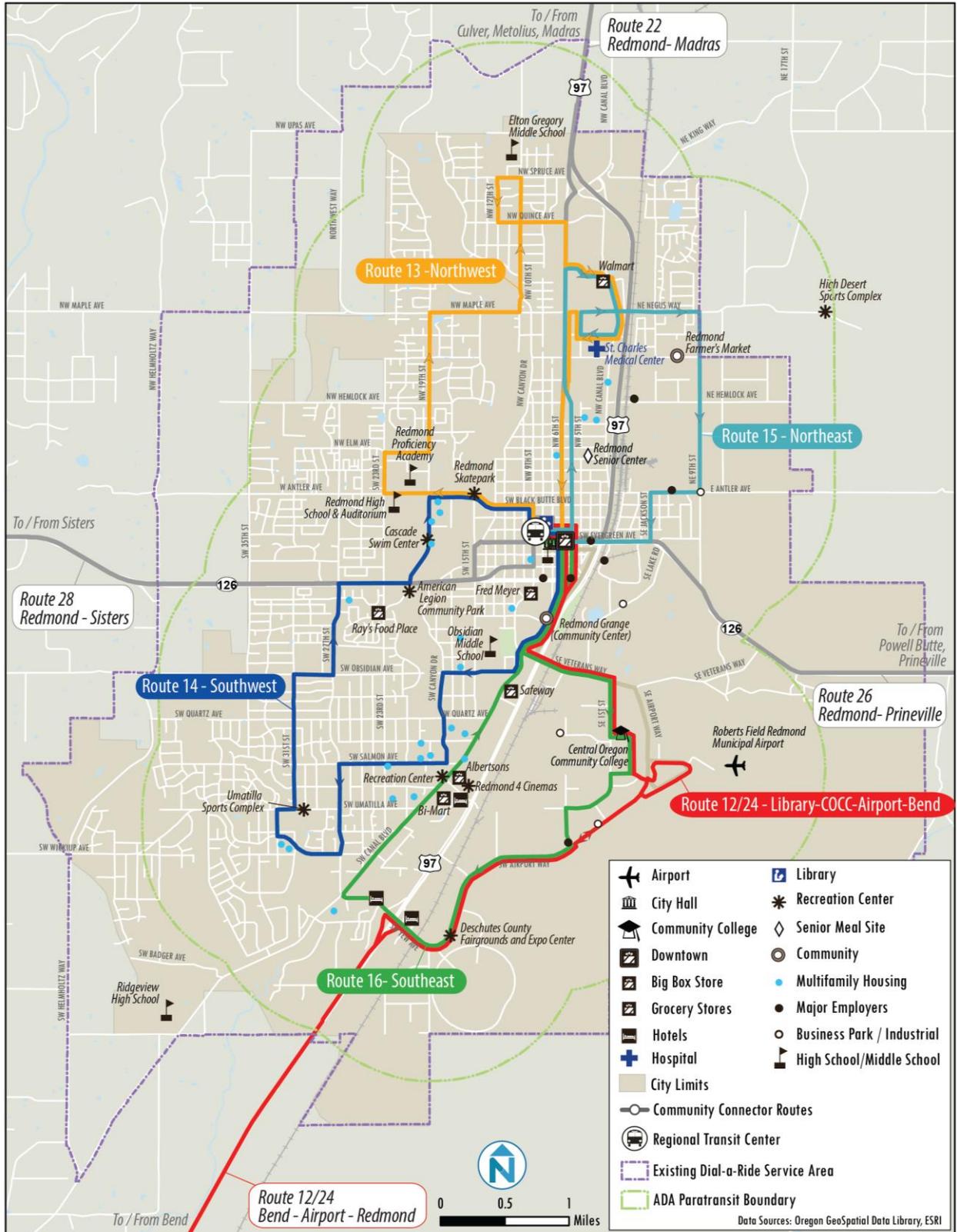
### **Mid-Term Conceptual Map and Schedules**

Figure 19 shows a map of the conceptual alignments for the two new routes (15, 16) in addition to the two short-term routes (13, 14) and Route 12.

Figure 20 shows conceptual schedules for the Mid-Term, which assume the Community Connector routes have transitioned to 120 minute round trip cycle times. It is also assumed that Routes 12 and 24 would be combined into a single route that serves the Airport and Redmond COCC campus on each trip to and from Bend.

The schedules illustrate trips that have a timed-transfer with the Community Connector shuttles. With 40-minute headways on the local fixed-route system, some connections require a 20-minute wait. As additional trips are provided on the Community Connector shuttles in the later mid-term and long-term, additional timed connections will be possible.

Figure 19 Redmond Mid-Term Service Map (3-10 Years)





## Redmond Long-Term Service Concept (10-20 Years)

### Regional Service

The long-term elements of the Regional Transit Master Plan of particular relevance to the city of Redmond include service enhancements to Community Connector routes including additional trips on selected routes, later evening service (up to 10 PM) and Sunday service. The Redmond-Bend Community Connector could have hourly service all-day, depending on demand.

### Local Service

In the long-term, a sixth fixed route (arbitrarily named Route 17) is envisioned in Redmond, expanding service coverage in the far western portion of the city. The specific alignment for this route is not identified at this time due to insufficient development and an incomplete street network. Over time, it is envisioned that this route would be implemented along with modified versions of Routes 13 and 14 to improve coverage in the north and southwest areas of town. This new route would operate at the same service frequency (every 40 minutes) throughout the day and have the same service span as other fixed routes.

At an even higher level of investment (which would only be justified in the long-term and as warranted by ridership demand), local service could be improved by providing bidirectional service on some, or all, of the fixed routes that are proposed as one-way loops.<sup>8</sup> Bidirectional service allows greater travel flexibility by allowing passengers to travel in either direction rather than only in one direction (which may be out of direction). Routes 13 and 14 would be the priority for conversion to bidirectional service, followed by Routes 15, 16, and the new Route 17. The costs associated with bidirectional service are not outlined in this memo, but the costs are assumed to be twice that of service in just one direction.

Figure 21 shows conceptual schedules for the Long-Term, which assume a longer service span (both early morning and later evening) and include the conceptual Route 17.

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<sup>8</sup> The one-way routes are, however, designed to complement each other by providing bidirectional service in the core of the service area, e.g., Routes 13/15 on 5<sup>th</sup> and 6<sup>th</sup> between the transit center and the Medical Center and Walmart; Routes 13/14 on Black Butte and Antler; and Routes 15/16 on Canal.

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**Figure 21 Redmond Long-Term Conceptual Schedules**

Route 13 Northwest			Route 14 Southwest			Route 15 Northeast			Route 16 Southeast			Route 17 West							
Bus #	0:05	0:20	0:15	Bus #	0:05	0:20	0:15	Bus #	0:05	0:20	0:15	Bus #	0:05	0:20	0:15	Bus #	0:05	0:20	0:15
	Library	Walmart	Library		Library	Heights ALF	Library		Library	Heights ALF	Library		Library	Heights ALF	Library		Library	Heights ALF	Library
101	5:40 AM	6:00 AM	6:15 AM	102	5:40 AM	6:00 AM	6:15 AM	103	5:40 AM	6:00 AM	6:15 AM	104	5:40 AM	6:00 AM	6:15 AM	105	5:40 AM	6:00 AM	6:15 AM
101	6:20 AM	6:40 AM	6:55 AM	102	6:20 AM	6:40 AM	6:55 AM	103	6:20 AM	6:40 AM	6:55 AM	104	6:20 AM	6:40 AM	6:55 AM	105	6:20 AM	6:40 AM	6:55 AM
101	7:00 AM	7:20 AM	7:35 AM	102	7:00 AM	7:20 AM	7:35 AM	103	7:00 AM	7:20 AM	7:35 AM	104	7:00 AM	7:20 AM	7:35 AM	105	7:00 AM	7:20 AM	7:35 AM
101	7:40 AM	8:00 AM	8:15 AM	102	7:40 AM	8:00 AM	8:15 AM	103	7:40 AM	8:00 AM	8:15 AM	104	7:40 AM	8:00 AM	8:15 AM	105	7:40 AM	8:00 AM	8:15 AM
101	8:20 AM	8:40 AM	8:55 AM	102	8:20 AM	8:40 AM	8:55 AM	103	8:20 AM	8:40 AM	8:55 AM	104	8:20 AM	8:40 AM	8:55 AM	105	8:20 AM	8:40 AM	8:55 AM
101	9:00 AM	9:20 AM	9:35 AM	102	9:00 AM	9:20 AM	9:35 AM	103	9:00 AM	9:20 AM	9:35 AM	104	9:00 AM	9:20 AM	9:35 AM	105	9:00 AM	9:20 AM	9:35 AM
101	9:40 AM	10:00 AM	10:15 AM	102	9:40 AM	10:00 AM	10:15 AM	103	9:40 AM	10:00 AM	10:15 AM	104	9:40 AM	10:00 AM	10:15 AM	105	9:40 AM	10:00 AM	10:15 AM
101	10:20 AM	10:40 AM	10:55 AM	102	10:20 AM	10:40 AM	10:55 AM	103	10:20 AM	10:40 AM	10:55 AM	104	10:20 AM	10:40 AM	10:55 AM	105	10:20 AM	10:40 AM	10:55 AM
101	11:00 AM	11:20 AM	11:35 AM	102	11:00 AM	11:20 AM	11:35 AM	103	11:00 AM	11:20 AM	11:35 AM	104	11:00 AM	11:20 AM	11:35 AM	105	11:00 AM	11:20 AM	11:35 AM
101	11:40 AM	12:00 PM	12:15 PM	102	11:40 AM	12:00 PM	12:15 PM	103	11:40 AM	12:00 PM	12:15 PM	104	11:40 AM	12:00 PM	12:15 PM	105	11:40 AM	12:00 PM	12:15 PM
101	12:20 PM	12:40 PM	12:55 PM	102	12:20 PM	12:40 PM	12:55 PM	103	12:20 PM	12:40 PM	12:55 PM	104	12:20 PM	12:40 PM	12:55 PM	105	12:20 PM	12:40 PM	12:55 PM
101	1:00 PM	1:20 PM	1:35 PM	102	1:00 PM	1:20 PM	1:35 PM	103	1:00 PM	1:20 PM	1:35 PM	104	1:00 PM	1:20 PM	1:35 PM	105	1:00 PM	1:20 PM	1:35 PM
101	1:40 PM	2:00 PM	2:15 PM	102	1:40 PM	2:00 PM	2:15 PM	103	1:40 PM	2:00 PM	2:15 PM	104	1:40 PM	2:00 PM	2:15 PM	105	1:40 PM	2:00 PM	2:15 PM
101	2:20 PM	2:40 PM	2:55 PM	102	2:20 PM	2:40 PM	2:55 PM	103	2:20 PM	2:40 PM	2:55 PM	104	2:20 PM	2:40 PM	2:55 PM	105	2:20 PM	2:40 PM	2:55 PM
101	3:00 PM	3:20 PM	3:35 PM	102	3:00 PM	3:20 PM	3:35 PM	103	3:00 PM	3:20 PM	3:35 PM	104	3:00 PM	3:20 PM	3:35 PM	105	3:00 PM	3:20 PM	3:35 PM
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101	4:20 PM	4:40 PM	4:55 PM	102	4:20 PM	4:40 PM	4:55 PM	103	4:20 PM	4:40 PM	4:55 PM	104	4:20 PM	4:40 PM	4:55 PM	105	4:20 PM	4:40 PM	4:55 PM
101	5:00 PM	5:20 PM	5:35 PM	102	5:00 PM	5:20 PM	5:35 PM	103	5:00 PM	5:20 PM	5:35 PM	104	5:00 PM	5:20 PM	5:35 PM	105	5:00 PM	5:20 PM	5:35 PM
101	5:40 PM	6:00 PM	6:15 PM	102	5:40 PM	6:00 PM	6:15 PM	103	5:40 PM	6:00 PM	6:15 PM	104	5:40 PM	6:00 PM	6:15 PM	105	5:40 PM	6:00 PM	6:15 PM
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101	8:20 PM	8:40 PM	8:55 PM	102	8:20 PM	8:40 PM	8:55 PM	103	8:20 PM	8:40 PM	8:55 PM	104	8:20 PM	8:40 PM	8:55 PM	105	8:20 PM	8:40 PM	8:55 PM
101	9:00 PM	9:20 PM	9:35 PM	102	9:00 PM	9:20 PM	9:35 PM	103	9:00 PM	9:20 PM	9:35 PM	104	9:00 PM	9:20 PM	9:35 PM	105	9:00 PM	9:20 PM	9:35 PM
101	9:40 PM	10:00 PM	10:15 PM	102	9:40 PM	10:00 PM	10:15 PM	103	9:40 PM	10:00 PM	10:15 PM	104	9:40 PM	10:00 PM	10:15 PM	105	9:40 PM	10:00 PM	10:15 PM
101	10:20 PM	10:40 PM	10:55 PM	102	10:20 PM	10:40 PM	10:55 PM	103	10:20 PM	10:40 PM	10:55 PM	104	10:20 PM	10:40 PM	10:55 PM	105	10:20 PM	10:40 PM	10:55 PM
	Timed Transfer to Redmond-Bend, Redmond-Prineville, or Redmond-Madras Community Connectors																		
	(Other trips require an approximately 20 minute wait for transfer to/from Community Connector)																		

## Evaluation of Redmond Service Concepts

### Performance Metrics

Figure 22 identifies the population, employment, and existing local public bus (Dial-A-Ride) trips served by each route individually and in the short- and mid-term time frames. These figures were calculated based on a quarter-mile walking (street network) distance from each route individually or each set of routes. A quarter-mile is typically considered as the distance a typical person will walk to fixed-route transit, although research has shown that some people, particularly those who are transit-dependent, will walk longer distances (a half-mile or more).<sup>9</sup>

Figure 22 provides total population, employment, and existing DAR trips; the density of population and employment (persons per acre); and percentages of total Redmond population, employment, and DAR trips served by fixed-route service.

In the short-term, 3-route scenario:

- About 57% of Redmond's population, 59% of employees, and 75% of existing local public bus (DAR) trips are within a quarter-mile walk of fixed-route bus service. About 75% of existing local public bus (DAR) trips are within a quarter-mile walk of the short-term fixed route system. *By comparison, 31% of Bend's population is currently within a quarter-mile walk of a fixed-route bus stop; 60% of Bend residents are within a half-mile walk of a fixed-route bus stop.*<sup>10</sup>
- Average 2010 population density within the quarter-mile buffer is 4.9 persons per acre. *By comparison average population density of Bend's highest-performing bus route (Route 5 Wells Acres) is 5.9 persons per acre within a quarter-mile walking distance.*
- Average 2010 employment density within the quarter-mile buffer is 1.8 persons per acre. Major concentrations of employment in the southeast quadrant, including Redmond's largest employer, Consumer Cellular, and employment along US 97, are not directly served by this initial set of routes. *By comparison, average employment density along major transit corridors in Bend is higher, ranging from 3.9 to 9.7 jobs per acre. (These corridors do not include the full length of all routes.)*
- Combined population and employment density is 6.7 persons and jobs per acre. *Combined population and employment density along major transit corridors in Bend ranges from 8.4 to 14.4 persons and jobs per acre.*

The share of population, employment, and existing local public bus trips within a quarter-mile walk of fixed-route bus service increases with the addition of routes 15 and 16 in the mid-term scenarios shown in Figure 22. The most significant change is an increase to 83% of jobs within a quarter-mile of fixed-route service with the addition of Route 16 in the later mid-term concept. This route serves employment areas in southeast Redmond.

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<sup>9</sup> For example, a ¼ mile walk is about 5 minutes and a half-mile walk is about 10 minutes. In a survey of Bend bus riders conducted in 2012, 44% of riders walked 6 minutes or more to access the bus, including 13% who walked more than 10 minutes. Redmond Proficiency Academy is about a 0.8 mile walk from the Redmond library and anecdotally, a number of students walk to access the Community Connector.

<sup>10</sup> These statistics are slightly different; the Redmond calculations are for the full route since stops are not yet defined; in Bend the calculations are within a quarter-mile of individual stops.

Nearly all existing local public bus trips (95% or more) are within the ADA service area (3/4-mile distance from fixed-route service), therefore the fixed-route system with ADA Paratransit covers nearly all existing travel patterns served by Dial-A-Ride service. There is no significant difference between the short-term (3 route) and mid-term (5 route) scenarios; fewer than 100 additional residents are added to the ADA service area. However, nearly 1,700 additional residents would be within 1/4-mile of fixed-route service in the mid-term scenario with the addition of Routes 15 and 16.

### **Operating Costs**

Figure 23 provides the number of service (vehicle) hours and operating costs for fixed-route and ADA Paratransit service for each service concept. The table provides cost breakdowns for:

- Existing system: Assumes 9,000 annual hours of local public bus service
- Short-term: 3-route system (Routes 12, 13, and 14) with ADA Paratransit
- Mid-term: 4-route system (addition of Route 15) and 5-route system (addition of Route 16), both with early evening and Saturday service options
- Long-term: 5-route system (Route 17) with 2 additional hours of later evening service. Note that bidirectional service (if desired) could be calculated by simply doubling costs for each route.

**Figure 22 Redmond Service Plan Evaluation**

Route or Service Concept	Population (2010) within 1/4 mile walk of fixed-route <sup>1</sup>	Population Density within 1/4 mile walk of fixed-route <sup>2</sup>	% of Population within 1/4 mile walk of fixed-route <sup>3</sup>	Employment (2010) within 1/4 mile walk of fixed-route <sup>4</sup>	Employment Density within 1/4 mile walk of fixed-route <sup>5</sup>	% of Employment within 1/4 mile of fixed-route <sup>36</sup>	Pop+ Emp Density within 1/4 mile walk of fixed-route <sup>7</sup>	DAR Trips within 1/4-mile walk of fixed-route <sup>8</sup>	% DAR Trips within 1/4-mile walk of fixed-route <sup>9</sup>	% DAR Trips within 3/4 mile of fixed-route (ADA Svc. Area) <sup>10</sup>	Population beyond 1/4 mile walk of fixed-route but within ADA area <sup>11</sup>
<b>Individual Routes</b>											
Route 12 - Airport	570	0.9	2%	2,716	4.1	30%	5.0	911	36%	-	-
Route 13 - Northwest	7,067	4.8	27%	2,983	2.0	32%	6.8	1,405	56%	-	-
Route 14 - Southwest	9,343	6.1	36%	2,716	1.8	30%	7.9	1,410	56%	-	-
Route 15 - Northeast	2,758	2.3	11%	3,235	2.7	35%	5.1	1,204	48%	-	-
Route 16 - Southeast	2,418	1.8	9%	4,487	3.4	49%	5.3	1,130	45%	-	-
<b>Service Concept</b>											
Short-Term: 3 Routes (12, 13, 14)	15,056	4.9	57%	5,451	1.8	59%	6.7	1,878	75%	95%	10,980
Initial Mid-Term: 4 Routes (12, 13, 14, 15)	16,050	4.4	61%	5,986	1.6	65%	6.0	1,956	78%	95%	10,002
Later Mid-Term: 5 Routes (12, 13, 14, 15, 16)	16,826	4.0	64%	7,656	1.8	83%	5.8	2,059	82%	96%	9,291

Notes: (1) Population from 2010 U.S. Census within ¼ mile walking (street network) distance of each route(s). (2) Persons per acre, within ¼ mile walking buffer around route (area weighted mean). (3) Percentage of 2010 Redmond population (26,215). (4) Oregon Employment Department, 2010. (5) Employees per acre, within ¼ mile walking buffer around route (area weighted mean). (6) Percentage of 2010 employment within Redmond city limits (total of 9,183 jobs). (7) Combined population and employment density. (8) Existing trips on Redmond local public bus, excluding trips to Opportunity Foundation. (9) % of existing Redmond local public bus trips within ¼ mile walking (street network) distance of proposed route(s). (10) % of existing Redmond local public bus trips within ¾ mile straight-line distance of proposed route(s), i.e., within required ADA Paratransit service area. (11) Estimated number of Redmond residents who live beyond a ¼ mile walk of proposed fixed-route service but within ¾-mile straight-line distance of proposed fixed-route service, i.e., required ADA Paratransit service area. Calculated as the total population within a ¾-mile distance of fixed-route service (potential ADA population) minus the population within ¼-mile walking distance of fixed-route service. Over 99% of Redmond's population lives within a ¾-mile distance of fixed-route service in all three time frames.

**Figure 23 Redmond Service Plan Operating Costs**

Service Concept	Route 12		Fixed-Route Service (Excluding Route 12)		ADA Paratransit		Total (Excluding Route 12)		Total (Including Route 12)	
	Hours	Cost <sup>1,2</sup>	Hours	Cost <sup>1,2</sup>	Hours	Cost <sup>2</sup>	Hours	Cost <sup>1,2</sup>	Hours	Cost <sup>1,2</sup>
Existing Local Public Bus and Route 12	900	\$59,000	-	-	-	-	9,000 <sup>a</sup>	\$585,000 <sup>a</sup>	9,900	\$644,000
Short-Term: 3 Routes (12, 13, 14) with 40-min peak, 80-min midday headways	900	\$59,000	4,800	\$312,000	4,200	\$273,000	9,000	\$585,000	9,900	\$644,000
Mid-Term: 4 Routes (12, 13, 14, 15) with 40-minute all-day headways and slightly later and earlier hours	-	Note 1	9,800	\$637,000	4,500	\$293,000	14,300	\$930,000	-	-
Mid-Term: 4 Routes (12, 13, 14, 15) with <i>early evening</i> service (until 9:00 PM)	-	Note 1	11,300	\$735,000	5,800	\$377,000	17,100	\$1,112,000	-	-
Mid-Term: 4 Routes (12, 13, 14, 15) with early evening and <i>Saturday</i> service	-	Note 1	12,500	\$813,000	6,400	\$416,000	18,900	\$1,229,000	-	-
Mid-Term: 5 Routes (12, 13, 14, 15, 16) with 40-minute all-day headways and slightly later and earlier hours	-	Note 1	13,000	\$845,000	4,500	\$293,000	17,500	\$1,138,000	-	-
Mid-Term: 5 Routes (12, 13, 14, 15, 16) with <i>early evening</i> service (until 9:00 PM)	-	Note 1	15,000	\$975,000	5,800	\$377,000	20,800	\$1,352,000	-	-
Mid-Term: 5 Routes (12, 13, 14, 15, 16) with early evening and <i>Saturday</i> service	-	Note 1	16,700	\$1,086,000	6,400	\$416,000	23,100	\$1,502,000	-	-
Long-Term: 6 Routes (12, 13, 14, 15, 16, 17) with <i>early and later evening</i> and <i>Saturday and Sunday</i> service	-	Note 1	24,400	\$1,586,000	7,800	\$507,000	32,200	\$2,093,000	-	-

Notes: (1) Mid-term and long-term scenarios do not include hours or cost of Route 12, which is assumed to be funded separately (and integrated with the Redmond-Bend Community Connector in the mid-term time frame and beyond). (2) Assumes a cost of \$65 per service hour. (a) Current local public bus costs are assumed to be \$585,000 annually, based on an average of 750 hours per month (9,000 per year).

## Capital Costs

Figure 24 identifies estimated capital costs for buses and stop infrastructure.

**Figure 24 Summary of Capital Costs by Service Concept**

Scenario	# New Buses <sup>1</sup>	Bus Costs <sup>2</sup>	Stops <sup>3</sup>	Total
Short-Term: 3 Routes (12, 13, 14) <sup>1</sup>	2	\$300,000	\$137,500	\$437,500
Mid-Term: 4 Routes (Addition of Route 15)	1	\$150,000	\$37,000	\$187,000
Mid-Term: 5 Routes (Addition of Route 16)	1	\$150,000	\$48,000	\$198,000
Long-Term: 6 Routes (Addition of Route 17) <sup>4</sup>	1	\$150,000	\$46,000	\$196,000
<b>TOTAL</b>	<b>5</b>	<b>\$750,000</b>	<b>\$268,500</b>	<b>\$1,014,000</b>

Notes: (1) Assumes that buses for Route 12 are accounted for separately and that CET's existing Dial-A-Ride vehicle fleet can be used to provide ADA paratransit service. (2) Assumes a cost of \$150,000 per bus. (3) It is assumed that stop infrastructure for Route 12 is accounted for separately, although costs for one major (shelter) stop are assumed. (4) Does not include cost of providing bidirectional service on all routes.

## Stops

Figure 25 provides a more detailed breakdown of estimated planning-level capital costs for stop infrastructure by route. These are based on high-level assumptions for where major stops with shelters may be desirable and more basic stops distributed over the length of each route. It is assumed that a basic stop would include a one-person seat, assumed to fit within a small ADA pad; an example is provided in Figure 26. A bench stop would provide a multiple-person bench and expanded concrete pad, for stops with greater passenger demand. Shelters would be prioritized at the highest-demand stops at major destinations. Figure 25 identifies some potential shelter locations along each route. The total cost, in current dollars, is estimated to be nearly \$138,000 for the 3-route short-term system; this does not include Route 12, where stops at COCC and the Airport have or do not require shelters and any other improvements are assumed to be accounted for separately, or improvements at the Redmond Library transit center. CET has applied for grant funding to cover both stop infrastructure costs and transit center improvements. The full long-term stop infrastructure costs are estimated to be nearly \$269,000. These costs do not include providing full bidirectional service on each route.

While it would be desirable to develop infrastructure at major locations in advance of fixed-route service, it is also advisable to create temporary stops at other locations to allow for refinement of the routes and stop locations over the first several months of operation, before making permanent stop infrastructure investments. These investments could be implemented in phases.

It is important to note that more detailed evaluation will need to be conducted by the City of Redmond and CET to identify specific stop locations. It is also assumed that all stop locations will meet the Americans with Disabilities Act (ADA) minimum requirements for new bus stops, which will allow for safe passenger access to and from the bus stop. Further guidance for siting ADA accessible bus stops can be found at the Transit Cooperative Research Program (TCRP) Report 19, Guidelines for the Location and Design of Bus Stops.<sup>11</sup>

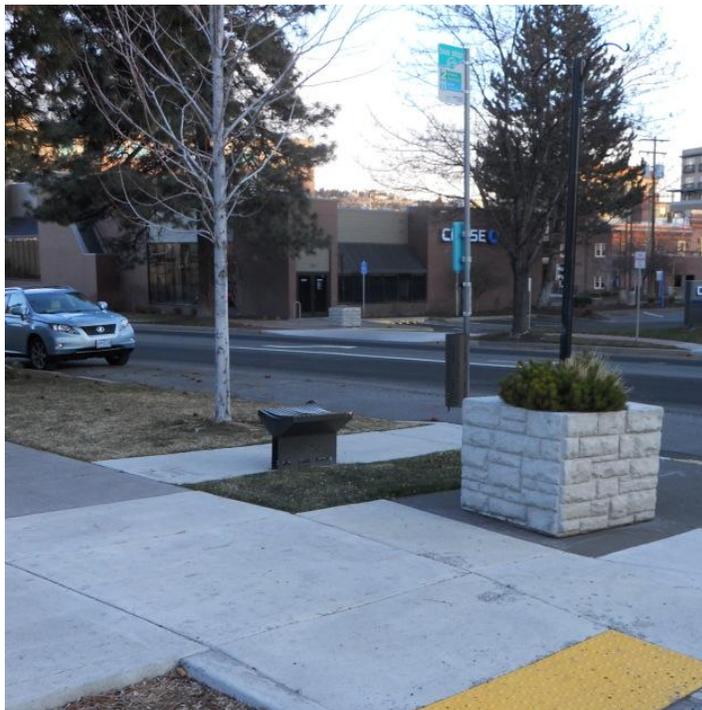
<sup>11</sup> [http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp\\_rpt\\_19-a.pdf](http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_19-a.pdf)

**Figure 25 Estimated Stop Infrastructure Capital Costs by Individual Route**

Route	Directional Miles	Shelter Stops <sup>1a</sup>	Bench Stops <sup>1b</sup>	Basic Stops <sup>1c</sup>	Cost <sup>2</sup>	Potential Major Stops with Shelters
12		1	a	a	\$6,500 <sup>a</sup>	Veterans & Canal
13	6.8	4	4	14	\$65,500	Redmond Proficiency Academy/Redmond H.S., Middle School, Walmart, 5 <sup>th</sup> (Senior Center)
14	6.8	4	4	14	\$65,500	Redmond H.S., Umatilla Sports Complex, Obsidian Middle School, Canal Blvd (TBD)
15	5.4	1	3	11	\$37,000	6 <sup>th</sup> (Senior Center)
16	7.1	1	4	15	\$48,000	TBD
17	7.0 <sup>b</sup>	1	4	14	\$46,000	TBD
	<b>33.1</b>	<b>12</b>	<b>19</b>	<b>68</b>	<b>\$268,500</b>	

Notes: (1) Planning-level cost estimates are based on the following unit cost assumptions: (a) Major (shelter) stop, \$6,500; (b) Bench stop, \$3,000; (c) Basic stop, \$1,950. A basic stop includes a sign/pole, schedule holder, stop information in Braille, trash can, and ADA pad, including design. A basic, single-person seat may be possible at this cost within the basic pad footprint. (2) Costs estimated based on assumptions for desirable major stop locations and an average of 2.5 bench or basic stops per directional mile. This results in average stop spacing of one-third of a mile across all routes, not including Route 12. (a) It is assumed that stop infrastructure for Route 12 is accounted for separately, although costs for one major stop are assumed. (b) Route 17 is conceptual therefore an approximate length of seven miles is assumed.

**Figure 26 Example of Amenities at a Basic Stop**



Bend Fixed Route Bus Stop

Source: Nelson\Nygaard

## Redmond Service Concepts Overall Evaluation

Figure 27 summarizes the implications of each option, illustrating the benefits of increased service levels at each additional level of investment.

Figure 27 Redmond Service Concepts Implications

	Short-Term (3 Routes)	Initial Mid-Term (4 Routes and All-Day 40 min)	Full Mid-Term (5 Routes + Evening and Saturday)	Long-Term (6 Routes + Later Evening+Sunday)
Annual Service Hours (# Routes)	9,900 (3 routes)	14,300 (4 routes)	23,100 (5 routes)	32,200 (6 routes)
Daily Service Span	● 11.5 hours/weekday	● 12.75 hours/weekday	● 14.75 hours/weekday	● 17.5 hours/weekday
Midday Frequency	● 80 minute service midday	● 40 minute service all day	● 40 minute service all day	● 40 minute service all day
Weekday Service Span	● 6:30 AM – 6:00 PM	● 6:15 AM – 7:00 PM	● 6:15 AM – 9:00 PM (early evening service)	● 5:30 AM – 11:00 PM (later evening service)
Weekend Service	● None	● None	● Assumes 8 daily hours on Saturdays with 40-minute headways	● Assumes 8 daily hours on each weekend day, with 40-minute headways
Annual Operating Cost	● \$644,000 (cost-neutral; includes Route 12)	● \$930,000 (lowest cost increase)	● Moderate to higher cost increases: \$1.14 M (5 routes) \$1.35 M (with early evening) \$1.50 M (with Saturday)	● Significant cost increases \$2.01M
Capital Costs (buses and stops)	● \$437,500	● Additional \$187,000	● Additional \$198,000	● Additional \$196,000
Coverage	● 75% of DAR trips, 57% of population, 59% of employment	● 78% of DAR trips, 61% of population, 65% of employment	● 82% of DAR trips, 64% of population, 83% of employment (increased employment coverage is due to addition of Route 16.	● Not quantified, but addition of Route 17 serving, western part of city will further improve residential coverage as development occurs.
Integration with regional system	● All Community Connector trips (80 min. headways) are timed to the local routes.	● Assuming 120 min cycle times and 60 min. peak service on the Redmond-Bend Community Connector, some connections to local Redmond routes will be 20 min. off of cycle.	● Same as initial mid-term	● Same as full mid-term

Key: ● Poor / Least Favorable ● Fair ● Good ● Best / Most Favorable

## MADRAS LOCAL SERVICE CONCEPTS

The local service concepts for Madras described in this section were developed as part of the Regional Transit Master Plan (RTMP) and will be used by the Central Oregon Intergovernmental Council (COIC) to guide local service provided in Madras and may be incorporated by the City of Madras into local plans, e.g., Comprehensive Plan or Transportation System Plan.

### Local Service Decisions in Madras

Based on the analysis conducted for the Regional Transit Master Plan, local service in Madras could be provided in two ways. One option would be to continue operating the local public bus that requires advanced reservations and expand the service hours as the Community Connectors are expanded. A second option would be to implement a new “flexible” fixed route service (or flex route) that operates on a regular schedule and allows for same-day rides without a reservation. While both services could serve Madras well, key factors that warrant consideration for a flex route service include:

- Based on the capacity of current local public bus (Dial-A-Ride) service there is no/limited ability to meet demand for same-day local trips given available resources.
- Some trip requests are being denied due to high demand at certain times of the day.
- Performance of existing demand-responsive local public bus service (average productivity of 7.1 riders per service hour from October 2012 to March 2013) exceeds industry standards for demand-responsive service, which are more typically in the range of 3 to 4 riders per service hour.
- The analysis of the flex-route service concept provided in this section indicates that population and employment density in the city of Madras is at the threshold level to support introduction of flex-route service (see service standards provided in the Regional Transit Master Plan). These thresholds, which are based on research and industry standards, identify the minimum density required for fixed-route service to operate efficiently.
- Analysis of existing trips on the Madras local public bus service also indicates that a flex-route design will be able to serve most (96%) of the existing local public bus trips.

Based on these considerations, this section provides detail on a conceptual flex-route service design that could replace the local Dial-A-Ride service in the short- to mid-term time frames. This section concludes with a comparison of the costs and relative benefits of the existing Dial-A-Ride service model with a flex-route service model. Fixed-route service may be appropriate in the long-term, but is not assumed as part of this plan. It should be noted that these service concepts would require additional detail prior to implementation, such as appropriate and accessible placement of bus stops and more refined (and tested) travel times.

### Madras Flex-Route Service Concept

#### Regional Service

The major short-term elements of the Regional Transit Master Plan of particular relevance to the city of Madras include:

- Existing funding sources are assumed and some service reductions are imminent due to declining funding from these sources
- The regional Community Connector shuttles maintain the current 80-minute round trip cycle times
- Some unproductive Community Connector trips will be eliminated (1 PM round trip from Redmond-Madras), if needed due to budget constraints
- Additional local stops on the Community Connector *as time permits*:
  - The Madras-Redmond Community Connector could stop in Walmart / Medical Center in Redmond in one or both directions; in the long-term a stop in the south part of Madras could be considered as discussed below
  - The Culver-Metolius-Madras Community Connector could stop at the Medical Center and COCC campus/aquatic center/middle school in Madras
- Improved local transit center facilities, e.g., visibility and directional signage.

### **Local Flex-Route Service**

As early as the Short-Term time frame, the public Dial-A-Ride service could be replaced by a flex-route service (see earlier section of the RTMP for a description of this service type), following the general route illustrated in Figure 29. This route would operate in a counter-clockwise direction, serving the following key destinations:

- Downtown Madras Transit Center (DMV/City Hall)
- Senior Center
- Bi-Mart
- High School
- Downtown Madras east of Hwy 97 (Post Office and Courthouse vicinity)
- St. Charles Medical Center
- Safeway

The route could be served by a single vehicle with the same service hours as existing Dial-A-Ride service (10.5 revenue hours per weekday).

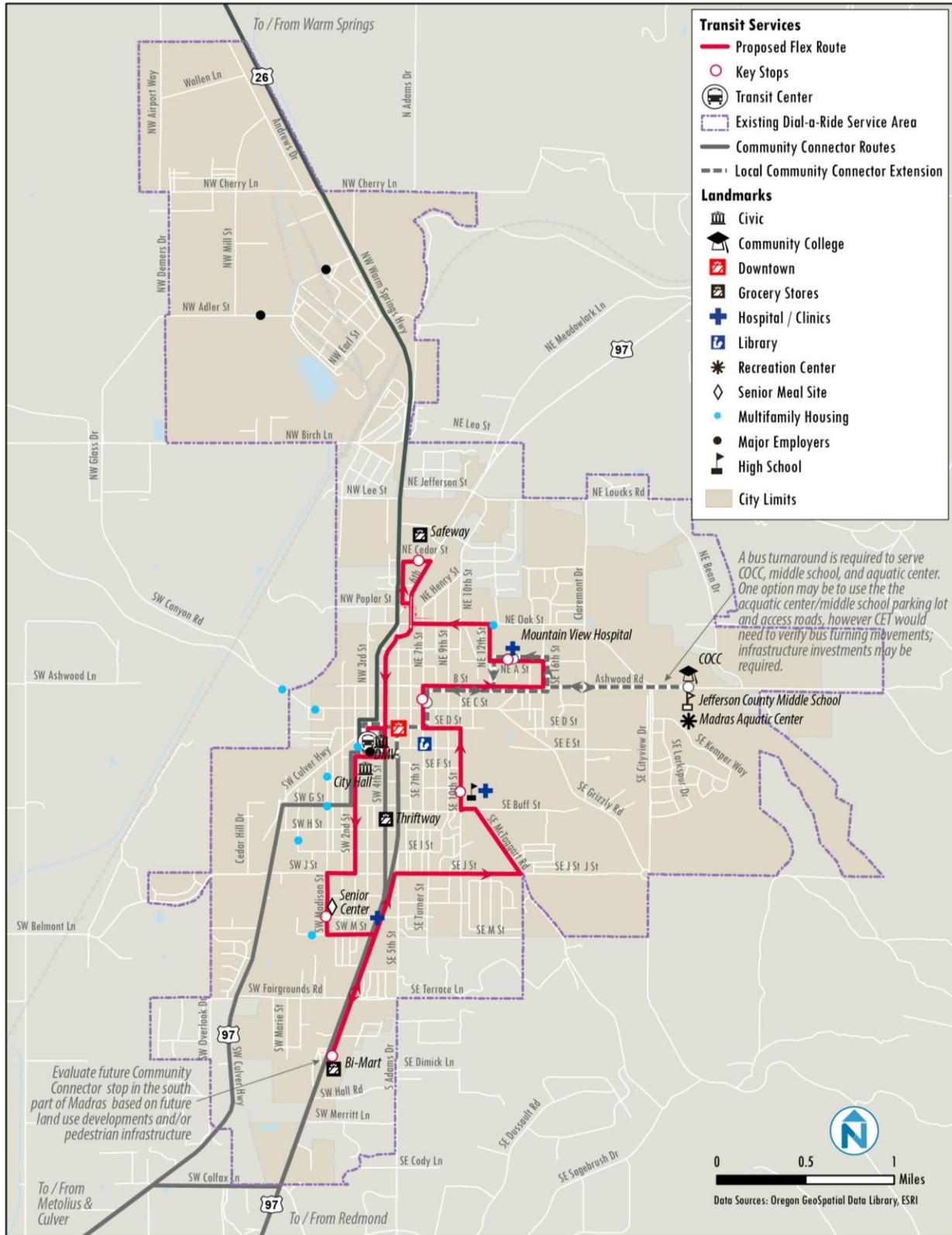
### **Local Extensions of Redmond-Madras and Culver-Metolius-Madras Community Connectors**

As described above, it is envisioned that the Redmond-Madras and/or Culver-Metolius-Madras Community Connector Shuttle could provide additional local service as an extension of the existing inter-community routes. Such extensions should provide service to regionally significant destinations for passengers on the shuttles with minimum impact to intercommunity travel times or directness, and as possible given round trip cycle times and headways. Service to the following destinations could be considered (final service design should include local and passenger input).

**Figure 28 Potential Local Community Connector Extensions/Phasing**

Time Frame	Community Connector	Description
Short- or Mid-Term	Redmond-Madras	<ul style="list-style-type: none"> <li>▪ A stop serving Walmart and St. Charles Medical Center in Redmond.</li> </ul>
Short- or Mid-Term	Culver-Metolius-Madras	<ul style="list-style-type: none"> <li>▪ Stops serving the St. Charles Medical Center in Madras, COCC campus/aquatic center/middle school.</li> </ul>
Long-Term	Redmond-Madras	<ul style="list-style-type: none"> <li>▪ A stop along the southern part of US 97 in Madras, e.g., Bi-Mart area (contingent on land use development and a signalized pedestrian crossing of US 97).</li> </ul>

Figure 29 Madras Flex-Route Service Concept



### Madras Mid-Term Service Concept (3-10 Years)

In the mid-term time frame, the Regional Transit Master Plan assumes a stable, local funding source. This would enable the following mid-term elements of particular relevance to the city of Madras:

- Earlier service reductions may be reinstated (where warranted by demand and expected to meet performance standards).
- Service enhancements to Community Connector service, including additional midday and evening service and introduction of Saturday service.
- Expanded service hours for the local flex-route (or local public bus service, depending on a local decision) in coordination with regional Community Connector service, i.e., addition of early evening and Saturday service hours (where warranted by demand and expected to meet performance standards).
- The flex-route could be integrated with the Community Connector shuttles, as illustrated in the conceptual schedule provided in Figure 30. Integrating the Community Shuttles and local services would provide operating efficiencies, helping to enable more frequent service to Redmond—hourly headways for the Community Connector during peak periods. When each Community Connector shuttle arrives in Prineville, it is assumed to operate the flex-route loop. The flex-route would also operate with hourly headways, but would only have an estimated 10 minutes available for deviations during the peak periods; in addition larger Community Connector vehicles may not be able to access all local streets. However, at the end of the morning peak period, one bus would remain in local service, continuing to operate the local flex-route on an hourly headway. There would be additional capacity for flex service (20 minutes or more) during the midday.

**Figure 30 Conceptual Integrated Community Connector / Flex-Route Schedule (Madras)**

	Route 50	Madras Flex	
Peak	0:25	0:35	
Midday	0:05	0:55	<i>Approx.</i>
Bus #	Lv DMV	Arr DMV	Flex Time
CC2	6:40 AM	7:15 AM	10 min
CC7	7:40 AM	8:15 AM	10 min
CC2	8:40 AM	9:15 AM	10 min
CC7	9:40 AM	10:35 AM	10 min
CC7	10:40 AM	11:35 AM	20 min
CC7	11:40 AM	12:35 PM	20 min
CC7	12:40 PM	1:35 PM	20 min
CC7	1:40 PM	2:35 PM	20 min
CC7	2:40 PM	3:15 PM	10 min
CC2	3:40 PM	4:15 PM	10 min
CC7	4:40 PM	5:15 PM	10 min
CC2	5:40 PM	6:15 PM	10 min
CC2	7:40 PM	8:15 PM	10 min

## Madras Long-Term Service Concept (10-20 Years)

Long-term elements of the Regional Transit Master Plan of particular relevance to the city of Madras include:

- Service enhancements to Community Connector routes including additional trips on selected routes, later evening service (up to 10 PM) and Sunday service.
- Expanded service hours for the local flex-route in coordination with regional Community Connector service, e.g., addition of later evening and Sunday service hours (where warranted by demand and expected to meet performance standards).
- Potential for fixed route service if the flex route is implemented and is meeting established performance standards. A complementary paratransit service would need to be provided in addition to the fixed route service (see earlier section on service types).

## Other Considerations

Service to the COCC campus, Aquatic Center, and Middle School is assumed to be provided by the Culver-Madras Community Connector as part of this plan. However, these locations are located away from other residential and employment density, and would require a significant deviation from the route. A turnaround location would also need to be identified. Providing service may require negotiation of a service partnership arrangement and/or a capital project to provide an time-efficient bus turnaround.

In addition, a local and Community Connector stop along the southern portion of Hwy 97 (e.g., Bi-Mart vicinity) would be desirable in the mid- to long-term as part of land use and/or transportation infrastructure development projects that provide residential and/or employment density and provide a signalized pedestrian crossing of Hwy 97, allowing the Community Connector shuttle to serve stops on either side of Hwy 97.

## Performance Metrics

Figure 31 identifies the population, employment, and existing local public bus (Dial-A-Ride) trips served by the flex-route. These figures were calculated based on quarter- and half-mile straight-line distances from the general route. A quarter-mile is typically considered as the distance a typical person will walk to fixed-route transit, although research has shown that some people, particularly those who are transit-dependent, will walk longer distances (a half-mile or more).<sup>12</sup> A flex-route can deviate from the between defined stops or timepoints and the deviation zone can vary along the general route.

- About 83% of Madras' population lives within a quarter-mile straight-line distance of the flex-route, and 96% lives within a half-mile straight-line distance. *By comparison, 31% of Bend's population is currently within a quarter-mile walk of a fixed-route bus stop; 60% of Bend residents are within a half-mile walk of a fixed-route bus stop.*<sup>13</sup>

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<sup>12</sup> For example, a ¼ mile walk is about 5 minutes and a half-mile walk is about 10 minutes. In a survey of Bend bus riders conducted in 2012, 44% of riders walked 6 minutes or more to access fixed-route local bus service, including 13% who walked more than 10 minutes.

<sup>13</sup> These statistics are slightly different: the Madras calculations are for a quarter-mile *straight-line distance from the full route*; in Bend the calculations are for a quarter-mile walking (network) distance from individual stops, which is typically longer than the straight-line distance.

- The average 2010 population density within a quarter-mile buffer around the flex-route is 3.7 persons per acre. *By comparison average population density of Bend's highest-performing bus route (Route 5 Wells Acres) is 5.9 persons per acre within a quarter-mile walking distance.*
- About 66% of jobs in Madras are located within a quarter-mile straight-line distance of the flex-route, and 68% are within a half-mile straight-line distance. A major concentration of employment located north of Birch Lane and east of US 26 is not directly served by the flex-route; this includes Bright Wood Corporation and Keith Mfg. Co. If time is available in the schedule, the route could flex to serve this area at specific times of the day.
- Average 2010 employment density within a quarter-mile buffer around the flex-route is 1.5 persons per acre. *By comparison, average employment density along major transit corridors in Bend is higher, ranging from 3.9 to 9.7 jobs per acre (these corridors do not include the full length of all routes).*
- Combined population and employment density is about 5.2 persons and jobs per acre. *Combined population and employment density along major transit corridors in Bend ranges from 8.4 to 14.4 persons and jobs per acre.*
- About 96% of existing local public bus (DAR) trips in Madras are within a quarter-mile straight-line distance of the flex-route, and 97% are within a half-mile straight-line distance.

**Figure 31 Madras Flex Route Evaluation**

Population (2010) <sup>1</sup>	Population Density <sup>2</sup>	% of Population <sup>3</sup>	Employment (2010) <sup>4</sup>	Employment Density <sup>5</sup>	% of Employment <sup>6</sup>	Pop+ Emp. Density <sup>7</sup>	DAR Trips <sup>8</sup>	% DAR Trips <sup>9</sup>
<b>Within 1/4 Mile of Flex Route</b>								
5,046	3.68	83%	2,060	1.50	66%	5.18	298	96%
<b>Within 1/2 Mile of Flex Route</b>								
6,475	2.51	96% <sup>3a</sup>	2,110	0.82	68%	3.33	302	97%

Notes: (1) Population from 2010 U.S. Census within ¼ or ½ mile straight-line distance of flex-route (area weighted sum) (2) Persons per acre, within ¼ or ½ mile straight-line buffer around route. (3) Percentage of total 2010 Madras population (6,046) within ¼ or ½ mile straight-line distance of flex-route. (3a) The ½ mile straight-line buffer of the flex-route includes a number of Census blocks covering areas outside of city limits. The area-weighted sum of population within the ½ mile buffer (6,475) therefore includes persons outside of Madras city limits. The % of population for the ½ mile buffer was calculated by dividing the area-weighted total of 6,475 persons by the 2010 City of Madras population plus 695 persons within Census blocks overlapping the ½ mile buffer and with a centroid (center point) outside the ½ mile buffer. (4) 2010 employment within ¼ or ½ mile straight-line distance of flex-route (area-weighted sum). Source: Oregon Employment Department, 2010. (5) Employees per acre, within ¼ or ½ mile walking buffer around route (area-weighted mean). (6) Percentage of 2010 employment within ¼ or ½ mile straight-line distance of flex-route, as a percentage of employment within city limits (3,100 jobs). (7) Combined population and employment density. (8) Existing trips on local public bus within ¼ or ½ mile straight-line distance of flex-route. (9) % of existing local public bus trips within ¼ or ½ mile straight-line distance of flex-route.

## Operating Costs

Figure 32 provides the number of service (vehicle) hours and operating costs for flex-route service. The table provides cost breakdowns for the existing Dial-A-Ride service, initial implementation of the flex-route, and a range of mid- and long-term options.

**Figure 32 Madras Service Plan Operating Costs**

Time Frame	Description	Annual Hours	Annual Cost <sup>1,2</sup>	Change vs. Existing
Existing	Dial-A-Ride, 7:00 AM - 5:30 PM	2,700	\$176,000 <sup>a</sup>	-
Short	Flex-Route, 7:00 AM - 5:30 PM	2,700	\$176,000	-
Early Mid-Term	Flex-Route, Add earlier morning and early Evening service (6:00 AM - 8:40 PM)	3,700	\$241,000	\$65,000
Later Mid-Term	Flex-Route, Add Saturday service (8 hours)	4,200	\$273,000	\$97,000
Long-Term	Flex-Route, Assume additional weekday peak service (6 hours)	5,900	\$384,000	\$208,000
Long-Term	Flex-Route, Add Later Evening service, (6:00 AM - 10:00 PM)	6,200	\$403,000	\$227,000
Long-Term	Flex-Route, Add Sunday service (8 hours)	6,600	\$429,000	\$253,000

Notes: (1) Does not include cost of local service provided on the Community Connector in the mid-term time frame and beyond, or of potential operating efficiencies from integrating Community Connector and local services. (2) Assumes a cost of \$65 per service hour. (a) Current local public bus costs are assumed to be about \$176,000 annually, based on 10.5 service hours per weekday.

### Cost Analysis of Integrating Community Connector and Local Services

The costs presented in the RTMP assume that regional and local services are provided separately, similar to today. This model continues to make sense for the fixed-route systems in Bend and Redmond. However in other communities, including Madras and Prineville, buses serving Community Connector routes could be used to operate local services starting in the mid-term time frame, when a 120-minute round trip cycle time is introduced. The table provided in Figure 33 compares the cost of providing local public bus service in the short-term under the current operating model with the cost of providing integrated local and regional services in the early mid-term time frame (includes early evening service):

- **Existing/Short-Term.** The combined cost of running separate local public bus service (10.5 hours per day) and Community Connector service (assumes 5 daily round trips, with 80-minute headways) is \$280,000.
- **Early Mid-Term.** The Community Connector shuttle is assumed to provide local public bus service with hourly headways in Madras. The Community Connector shuttles are assumed to have hourly headways between Madras and Redmond in the AM and PM peak periods (two buses operate during peak periods). Each Community Connector trip has 40 minutes available to provide local service (pickups and drop-offs) for the conceptual flex-route described above. In the peak periods approximately 10 minutes are available for deviations and the larger Community Connector buses may not be able to serve all deviations. During the midday, one of the Community Connector buses can provide local service with hourly headways from about 9:40 AM – 3:20 PM with about 20 minutes available for deviations. The other bus is assumed to go out of service during the

middy. The combined cost under this approach is estimated to be \$345,000, which represents an increase of only \$65,000 over existing/short-term costs. This is also a savings of \$72,000 compared to maintaining an 80-minute cycle time for the Community Connector and running a separate local public bus or flex route.

Note: This scenario does not include the Culver-Madras Community connector, which is assumed to provide additional local service in Madras, including to COCC.

**Figure 33 Comparison of Local and Community Connector Operating Costs in Madras**

Scenario / Service	Assumptions / Service Hours	Daily Hours	Annual Hours	Annual Cost	Change Relative to Existing
<b>Existing/Short-Term: 80-minute Community Connector round trip cycle times</b>					
Local	Existing/Short-Term Local Public Bus	10.5	2,700	\$176,000	-
Community Connector <sup>1</sup>	Assumes Service Hours for 5 Community Connector Round Trips <sup>1</sup>	6.2	1,600	\$104,000	-
<b>TOTAL</b>		<b>16.7</b>	<b>4,300</b>	<b>\$280,000</b>	--
<b>Early Mid-Term: 120-minute Community Connector round trip cycle times</b>					
Local	Local Flex 9:40 AM - 3:20 PM with hourly headways (operated by one of the Community Connector buses)	5.7	1,400	\$91,000	-
Community Connector (1-2 buses, hourly peak headways)	<ul style="list-style-type: none"> <li>▪ Hourly AM headways 6:00-9:40 AM (2 buses)</li> <li>▪ Hourly PM headways 3:20-7:00 PM (2 buses)</li> <li>▪ 1 Evening R/T 7:00-9:00 PM</li> <li>▪ Each Community Connector bus provides 40-minutes of local service upon arrival in Madras (pickups and drop-offs, with about 10-minute of flex time available)</li> <li>▪ One bus goes into local service midday ( 9:40 AM -3:20 PM) - see local</li> </ul>	15.3	3,900	\$254,000	-
<b>TOTAL</b>		<b>21.0</b>	<b>5,300</b>	<b>\$345,000</b>	<b>\$65,000</b>

Notes: (1) Based on the Prineville-Redmond shuttle, but assumed to be equivalent for the Madras-Redmond shuttle, although these differ somewhat in practice.

## Capital Costs

Figure 34 identifies estimated capital costs for buses and stop infrastructure. It is assumed that the existing CET fleet will accommodate local needs in Madras.

**Figure 34 Madras Flex-Route Capital Costs**

Scenario	# New Buses <sup>1</sup>	Bus Costs <sup>2</sup>	Stops <sup>3</sup>	Total
Short-Term	-	-	\$19,500	\$19,500
Mid-Term	-	-	\$19,500	\$19,500
Long-Term	-	-	\$13,000	\$13,000
<b>TOTAL</b>	-	-	<b>\$52,000</b>	<b>\$52,000</b>

Notes: (1) Assumes that CET's existing Dial-A-Ride vehicle fleet can be used to provide service.

Figure 35 provides a more detailed breakdown of stop infrastructure requirements, based on planning-level assumptions for where major stops with shelters may be desirable and potential phasing. Although a flex-route does not require stops distributed over the length of the route, an allowance for basic stops is included. Shelters would be prioritized at the highest-demand stops at major destinations. Bench stops could be substituted for shelter stops depending on total resources available.

While it would be desirable to develop infrastructure at major locations in advance of flex-route service, it is also advisable to create only temporary stops at other locations to allow for refinement of the routes and stop locations over the first several months of operation, before making permanent stop infrastructure investments. These investments could be implemented in phases.

More detailed stop evaluation will need to be conducted by the City of Madras and CET. It is assumed that all stop locations will meet the Americans with Disabilities Act (ADA) minimum requirements for new bus stops, which will allow for safe passenger access to and from the bus stop. Further guidance for siting ADA accessible bus stops can be found in Transit Cooperative Research Program (TCRP) Report 19, Guidelines for the Location and Design of Bus Stops.<sup>14</sup>

**Figure 35 Madras Potential Stop Infrastructure Types and Locations**

Scenario	Shelter Stops <sup>1a</sup>	Bench Stops <sup>1b</sup>	Basic Stops <sup>1c</sup>	Potential Major Stops with Shelters
Short-Term	3		3	Safeway, Medical Center, Downtown (E. of Hwy 97)
Mid-Term	3		2	Senior Center, COCC/Aquatic Center, High School
Long-Term	2		2	Southern Hwy 97 (Bi-Mart area), TBD
	<b>8</b>		<b>7</b>	

Notes: (1) Planning-level cost estimates are based on the following unit cost assumptions: (a) Major (shelter) stop, \$6,500; (b) Bench stop, \$3,000; (c) Basic stop, \$1,950. A basic stop includes a sign/pole, schedule holder, stop information in Braille, trash can, and ADA pad, including design. A basic, single-person seat may be possible at this cost within the basic pad footprint.

<sup>14</sup> [http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp\\_rpt\\_19-a.pdf](http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_19-a.pdf)

## Madras Service Concepts Overall Evaluation

Figure 36 summarizes the implications of each local service option. The primary difference between a Dial-A-Ride and Flex-Route service model is the ability to provide service without reservations. The table illustrates the benefits of increased service levels at each additional level of investment.

**Figure 36 Madras Service Concepts Implications**

	Existing	Proposed Flex-Route		
	Dial-A-Ride	Short-Term	Full Mid-Term	Full Long-Term
Annual Service Hours	2,700	2,700	4,200	6,600
Flexibility of Use	● Advance reservations required for all trips	● No reservations required at flex-route stops. Advance reservations required off of defined stops/route.	● Same as short-term	● Same as short-term
Weekday Service Span	● 10.5 hours/weekday (7:00 AM – 5:30 PM)	● 10.5 hours/weekday (7:00 AM – 5:30 PM)	● 14.7 hours/weekday (6:00 AM – 8:40 PM - early evening service)	● 16 hours/weekday (6:00 AM – 10:00 PM - early morning and later evening service)
Weekday Midday Frequency	N/A - Demand-responsive service	● 40 minute service midday	● 40 minute service all day	● 40 minute service all day with an additional peak vehicle, e.g., operating a bidirectional loop route
Weekend Service	● None	● None	● Assumes 8 daily Saturday hours, with 40-minute headways	● Assumes 8 daily Sunday hours, with 40-minute headways
Annual Operating Cost <sup>2</sup>	● \$176,000	● \$176,000 (cost-neutral)	● \$273,000 (Moderate cost increase: \$97,000)	● \$429,000 (Significant cost increase: \$253,000)
Capital Costs (buses and stops)	N/A	● \$19,500	● Additional \$13,000	● Additional \$13,000
Coverage (within ¼ mile straight-line distance) <sup>1</sup>	● Demand-response service within city limits	● 96% of DAR trips, 83% of population, 66% of employment	● Same as short-term	● Same as short-term, but additional peak service
Integration with regional system	● Local Public Bus meets Community Connector trips	● Local flex-route timed to meet all Community Connector trips	● No Change	● No Change

Key: ● Poor / Least Favorable ● Fair ● Good ● Best / Most Favorable

Notes: (1) A flex-route may deviate within defined area(s). This is typically a quarter-mile to half-mile but may vary along the length of a route. The primary constraint is directness of service for other passengers and the ability to complete a round-trip within the specified cycle time. (2) Rounded to nearest thousand.

## PRINEVILLE LOCAL SERVICE CONCEPTS

The local service concepts for Prineville described in this section were developed as part of the Regional Transit Master Plan (RTMP) and will be used by the Central Oregon Intergovernmental Council (COIC) to guide local service provided in Prineville and may be incorporated by the City of Prineville into local plans, e.g., Comprehensive Plan or Transportation System Plan.

### Local Service Decisions in Prineville

Based on the analysis conducted for the Regional Transit Master Plan, local service in Prineville could be provided in two ways. One option would be to continue operating the local public bus that requires advanced reservations and expand the service hours as the Community Connectors are expanded. A second option would be to implement a new “flexible” fixed route service (or flex route) that operates on a regular schedule and allows for same-day rides without a reservation. While both services could serve Prineville well, key factors that warrant consideration for a flex route service include:

- Performance of existing demand-responsive local public bus service (average productivity of 4.7 riders per service hour from October 2012 to March 2013) exceeds industry standards for demand-responsive service, which are more typically in the range of 3 to 4 riders per service hour.
- Based on the capacity of current local public bus (Dial-A-Ride) service there is no/limited ability to meet demand for same-day local trips given available resources.
- Some trip requests are being denied due to demand at certain times of the day.
- The analysis of the flex-route service concept provided in this section indicates that population and employment density in the city of Prineville is at the threshold level to support introduction of flex-route service (see service standards provided in the Regional Transit Master Plan). These thresholds, which are based on research and industry standards, identify the minimum density required for fixed-route service to operate efficiently.
- Analysis of existing trips on the Prineville local public bus service also indicates that a flex-route design will be able to serve most existing local public bus trips.

Based on these considerations, this section provides detail on a conceptual flex-route service design that could replace the local Dial-A-Ride service in the short- to mid-term time frames. This section concludes with a comparison of the costs and relative benefits of the existing Dial-A-Ride service model with a flex-route service model. Fixed-route service may be appropriate in the long-term, but is not assumed as part of this plan. It should be noted that these service concepts would require additional detail prior to implementation, such as appropriate and accessible placement of bus stops and more refined (and tested) travel times.

### Prineville Flex-Route Service Concept

#### Regional Service

The major short-term elements of the Regional Transit Master Plan of particular relevance to the city of Prineville include:

- Existing funding sources are assumed and some service reductions are imminent due to declining funding from these sources
- The regional Community Connector shuttles maintain the current 80-minute round trip cycle times
- Some unproductive Community Connector trips will be eliminated (one AM round trip from Redmond- Prineville), if needed due to budget constraints
- Additional local stops on the Prineville-Redmond Community Connector *as time permits*. The Community Connector could provide additional local circulation along US 26 (Ochoco Highway) through Prineville, serving a potential new Park & Ride located in the eastern part of Prineville (new Hospital/former Ochoco Lumber site).
- Improved local transit center facilities, e.g., visibility and directional signage.

### **Local Flex-Route Service**

As early as the Short-Term time frame, the general public Dial-A-Ride service could be replaced by a flex-route service (see earlier section of the RTMP for a description of this service type), following the general route illustrated in Figure 37. This route would operate as a pair of continuous loops in the counter-clockwise direction, serving the following key destinations:

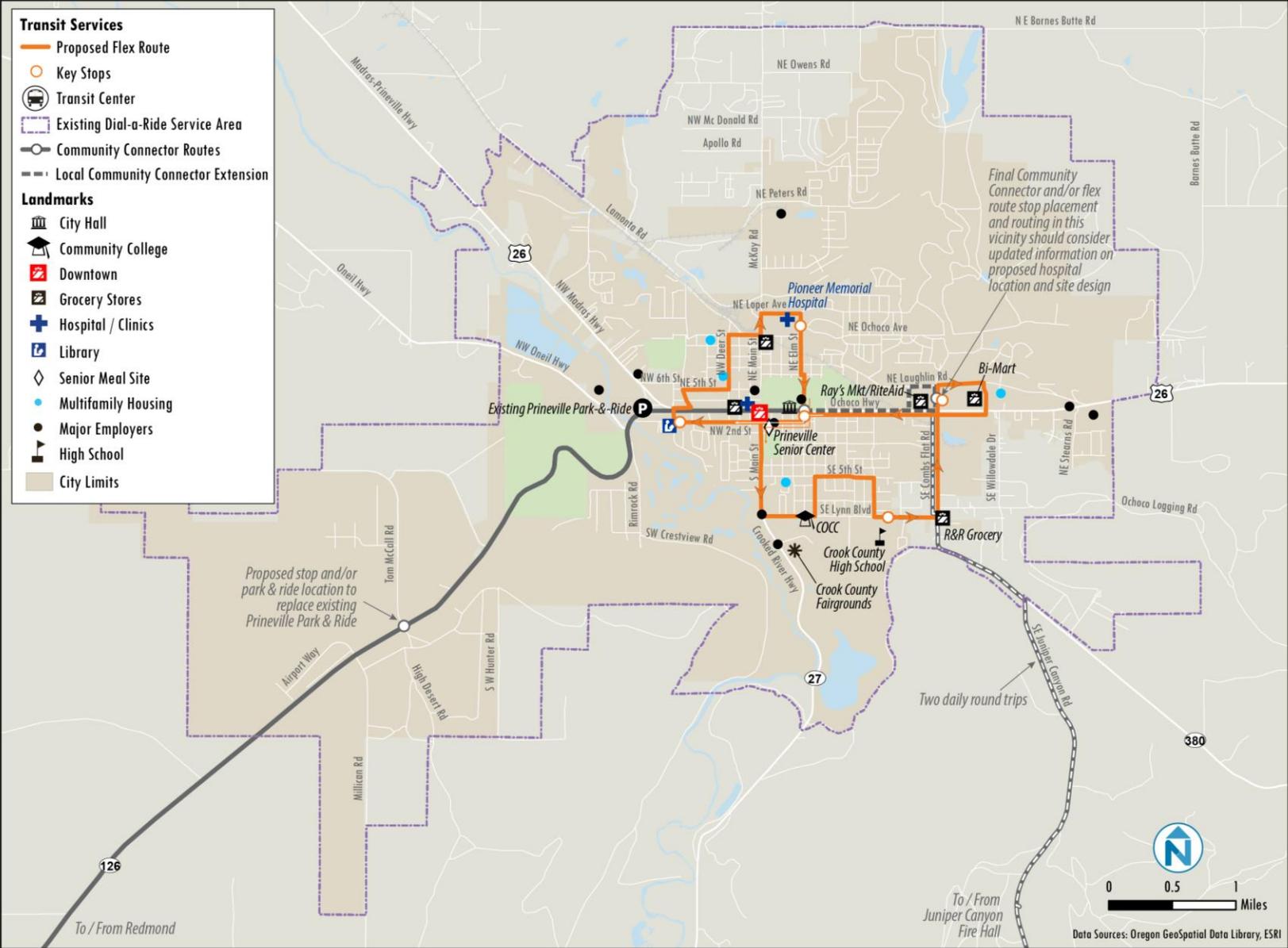
- Downtown Prineville/City Hall (vicinity of 2<sup>nd</sup> Street and Elm Street) – served by both loops
- Downtown Prineville/Senior Center (vicinity of 2<sup>nd</sup> Street and Main Street) – served by both loops
- COCC Campus
- High School
- Bi-Mart, Rite Aid, and Ray’s Market retail area (future routing and/or stops should consider site design of the planned new hospital development)
- Library
- Hospital

The route would be served by a single vehicle with the same service hours as existing Dial-A-Ride service (10.5 revenue hours per weekday).

### **Local Extensions of Prineville-Redmond Community Connectors**

As described above, it is envisioned that the Redmond-Prineville Community Connector Shuttle could provide additional local service along Ochoco Highway as an extension of the existing inter-community route. Any such extension should provide service to regionally significant destinations for passengers on the shuttles with minimum impact to intercommunity travel times or directness, and as possible given round trip cycle times and headways.

Figure 37 Prineville Flex-Route Service Concept



### Prineville Mid-Term Service Concept (3-10 Years)

In the mid-term time frame, the Regional Transit Master Plan assumes a stable, local funding source. This would enable the following mid-term elements of particular relevance to the city of Prineville:

- Earlier service reductions may be reinstated (where warranted by demand and expected to meet performance standards).
- Service enhancements to Community Connector service, including additional midday and evening service and introduction of Saturday service.
- Expanded service hours for the local flex-route (or local public bus service, depending on a local decision) in coordination with regional Community Connector service, i.e., addition of early evening and Saturday service hours (where warranted by demand and expected to meet performance standards).
- The flex-route could be integrated with the Community Connector shuttles, as illustrated in the conceptual schedule provided in Figure 38. Integrating the Community Shuttles and local services would provide operating efficiencies, helping to enable more frequent service to Redmond—hourly headways for the Community Connector during peak periods. When each Community Connector shuttle arrives in Prineville, it is assumed to operate the flex-route loop. The flex-route would also operate with hourly headways, but would only have an estimated 10 minutes available for deviations during the peak periods; in addition larger Community Connector vehicles may not be able to access all local streets. However, at the end of the morning peak period, one bus would remain in local service, continuing to operate the local flex-route on an hourly headway. There would be additional capacity for flex service (20 minutes or more) during the midday.

**Figure 38 Conceptual Integrated Community Connector / Flex-Route Schedule (Prineville)**

	Route 40	Prineville Flex	
Peak	0:25	0:35	
Midday	0:05	0:55	<i>Approx.</i>
Bus #	Lv DMV	Arr DMV	Flex Time
CC1	6:40 AM	7:15 AM	10 min
CC6	7:40 AM	8:15 AM	10 min
CC1	8:40 AM	9:15 AM	10 min
CC6	9:40 AM	10:35 AM	10 min
CC6	10:40 AM	11:35 AM	20 min
CC6	11:40 AM	12:35 PM	20 min
CC6	12:40 PM	1:35 PM	20 min
CC6	1:40 PM	2:35 PM	20 min
CC6	2:40 PM	3:15 PM	10 min
CC1	3:40 PM	4:15 PM	10 min
CC6	4:40 PM	5:15 PM	10 min
CC1	5:40 PM	6:15 PM	10 min
CC1	7:40 PM	8:15 PM	10 min

## Prineville Long-Term Service Concept (10-20 Years)

Long-term elements of the Regional Transit Master Plan of particular relevance to the city of Prineville include:

- Service enhancements to Community Connector routes including additional trips on selected routes, later evening service (up to 10 PM) and Sunday service.
- Expanded service hours for the local flex-route in coordination with regional Community Connector service, e.g., addition of later evening and Sunday service hours (where warranted by demand and expected to meet performance standards).

### Other Considerations

Service design and stop placement should consider final siting of a Park & Ride location to replace the existing Prineville Park & Ride, e.g., at the new Hospital / former Ochoco Lumber site.

In addition, a potential Park & Ride location at Tom McCall Road should be designed to allow efficient transit vehicle access in both travel directions.

### Performance Metrics

Figure 39 identifies the population, employment, and existing local public bus (Dial-A-Ride) trips served by the flex-route. These figures were calculated based on quarter- and half-mile straight-line distances from the general route. A quarter-mile is typically considered as the distance a typical person will walk to fixed-route transit, although research has shown that some people, particularly those who are transit-dependent, will walk longer distances (a half-mile or more).<sup>15</sup> A flex-route can deviate from the between defined stops or timepoints and the deviation zone can vary along the general route.

- About 59% of Prineville's population lives within a quarter-mile straight-line distance of the flex-route, and 80% lives within a half-mile straight-line distance. *By comparison, 31% of Bend's population is currently within a quarter-mile walk of a fixed-route bus stop; 60% of Bend residents are within a half-mile walk of a fixed-route bus stop.*<sup>16</sup>
- The average 2010 population density within a quarter-mile buffer around the flex-route is about 3.5 persons per acre. *By comparison average population density of Bend's highest-performing bus route (Route 5 Wells Acres) is 5.9 persons per acre within a quarter-mile walking distance.*
- About 62% of jobs in Prineville are located within a quarter-mile straight-line distance of the flex-route, and 86% are within a half-mile straight-line distance. Some concentrations of employment, e.g., in the northwest part of the city and north of the hospital area, are not directly served by the flex-route. If time is available in the schedule, the route could flex to serve these areas at specific times of the day.

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<sup>15</sup> For example, a ¼ mile walk is about 5 minutes and a half-mile walk is about 10 minutes. In a survey of Bend bus riders conducted in 2012, 44% of riders walked 6 minutes or more to access fixed-route local bus service, including 13% who walked more than 10 minutes.

<sup>16</sup> These statistics are slightly different: the Prineville calculations are for a quarter-mile *straight-line distance from the full route*; in Bend the calculations are for a quarter-mile walking (network) distance from individual stops, which is typically longer than the straight-line distance.

- Average 2010 employment density within a quarter-mile buffer around the flex-route is 1.8 persons per acre. *By comparison, average employment density along major transit corridors in Bend is higher, ranging from 3.9 to 9.7 jobs per acre (these corridors do not include the full length of all routes).*
- Combined population and employment density is about 5.2 persons and jobs per acre. *Combined population and employment density along major transit corridors in Bend ranges from 8.4 to 14.4 persons and jobs per acre.*
- About 83% of existing local public bus (DAR) trips in Prineville are within a quarter-mile straight-line distance of the flex-route, and 96% are within a half-mile straight-line distance.

**Figure 39 Prineville Flex Route Evaluation**

Population (2010) <sup>1</sup>	Population Density <sup>2</sup>	% of Population <sup>3</sup>	Employment (2010) <sup>4</sup>	Employment Density <sup>5</sup>	% of Employment <sup>6</sup>	Pop+ Emp Density <sup>7</sup>	DAR Trips <sup>8</sup>	% DAR Trips <sup>9</sup>
<b>Within 1/4 Mile of Flex Route</b>								
5,480	3.5	59%	2,835	1.8	62%	5.2	419	83%
<b>Within 1/2 Mile of Flex Route</b>								
7,366	2.6	80%	3,979	1.4	86%	4.0	488	96%

Notes: (1) Population from 2010 U.S. Census within ¼ or ½ mile straight-line distance of flex-route (area weighted sum) (2) Persons per acre, within ¼ or ½ mile straight-line buffer around route. (3) Percentage of total 2010 Prineville population (9,253) within ¼ or ½ mile straight-line distance of flex-route. (4) 2010 employment within ¼ or ½ mile straight-line distance of flex-route (area weighted sum). Source: Oregon Employment Department, 2010. (5) Employees per acre, within ¼ or ½ mile walking buffer around route (area weighted mean). (6) Percentage of 2010 employment within ¼ or ½ mile straight-line distance of flex-route as a percentage of employment within city limits – 4,601 jobs). (7) Combined population and employment density. (8) Existing trips on local public bus within ¼ or ½ mile straight-line distance of flex-route. (9) % of existing local public bus trips within ¼ or ½ mile straight-line distance of flex-route.

## Operating Costs

Figure 40 provides the number of service (vehicle) hours and operating costs for flex-route service. The table provides cost breakdowns for the existing Dial-A-Ride service, initial implementation of the flex-route, and a range of mid- and long-term options.

**Figure 40 Prineville Service Plan Operating Costs**

Time Frame	Description	Annual Hours	Annual Cost <sup>1,2</sup>	Change vs. Existing
Existing	Dial-A-Ride, 7:00 AM - 5:30 PM	2,700	\$176,000 <sup>a</sup>	-
Short	Flex-Route, 7:00 AM - 5:30 PM	2,700	\$176,000	-
Early Mid-Term	Flex-Route, Add earlier morning and early Evening service (6:00 AM - 8:40 PM)	3,700	\$241,000	\$65,000
Later Mid-Term	Flex-Route, Add Saturday service (8 hours)	4,200	\$273,000	\$97,000
Long-Term	Flex-Route, Assume additional weekday peak service (6 hours)	5,900	\$384,000	\$208,000
Long-Term	Flex-Route, Add Later Evening service, (6:00 AM - 10:00 PM)	6,200	\$403,000	\$227,000
Long-Term	Flex-Route, Add Sunday service (8 hours)	6,600	\$429,000	\$253,000

Notes: (1) Does not include cost of local service provided on Community Connector in the mid-term time frame and beyond) or of potential operating efficiencies from integrating Community Connector and local services. (2) Assumes a cost of \$65 per service hour. (a) Current local public bus costs are assumed to be about \$176,000 annually, based on 10.5 service hours per weekday.

### Cost Analysis of Integrating Community Connector and Local Services

The costs presented in the RTMP assume that regional and local services are provided separately, similar to today. This model continues to make sense for the fixed-route systems in Bend and Redmond. However in other communities, including Madras and Prineville, buses serving Community Connector routes could be used to operate local services starting in the mid-term time frame, when a 120-minute round trip cycle time is introduced. The table provided in Figure 33 compares the cost of providing local public bus service in the short-term under the current operating model with the cost of providing integrated local and regional services in the early mid-term time frame (includes early evening service):

- **Existing/Short-Term.** The combined cost of running separate local public bus service (10.5 hours per day) and Community Connector service (assumes 5 daily round trips, with 80-minute headways) is \$280,000.
- **Early Mid-Term.** The Community Connector shuttle is assumed to provide local public bus service with hourly headways in Prineville. The Community Connector shuttles are assumed to have hourly headways between Prineville and Redmond in the AM and PM peak periods (two buses operate during peak periods). Each Community Connector trip has 40 minutes available to provide local service (pickups and drop-offs) for the conceptual flex-route described above. In the peak periods approximately 10 minutes are available for deviations and the larger Community Connector buses may not be able to serve all deviations. During the midday, one of the Community Connector buses can provide local service with hourly headways from about 9:40 AM – 3:20 PM with about 20 minutes available for deviations. The other bus is assumed to go out of service during the

middy. The combined cost under this approach is estimated to be \$345,000, which represents an increase of only \$65,000 over existing/short-term costs. This is also a savings of \$72,000 compared to maintaining an 80-minute cycle time for the Community Connector and running a separate local public bus or flex route.

**Figure 41 Comparison of Local and Community Connector Operating Costs in Prineville**

Scenario / Service	Assumptions / Service Hours	Daily Hours	Annual Hours	Annual Cost	Change Relative to Existing
<b>Existing/Short-Term: 80-minute Community Connector round trip cycle times</b>					
Local	Existing/Short-Term Local Public Bus	10.5	2,700	\$176,000	-
Community Connector <sup>1</sup>	Assumes Service Hours for 5 Community Connector Round Trips <sup>1</sup>	6.2	1,600	\$104,000	-
<b>TOTAL</b>		<b>16.7</b>	<b>4,300</b>	<b>\$280,000</b>	<b>--</b>
<b>Early Mid-Term: 120-minute Community Connector round trip cycle times</b>					
Local	Local Flex 9:40 AM - 3:20 PM with hourly headways (operated by one of the Community Connector buses)	5.7	1,400	\$91,000	-
Community Connector (1-2 buses, hourly peak headways)	<ul style="list-style-type: none"> <li>▪ Hourly AM headways 6:00-9:40 AM (2 buses)</li> <li>▪ Hourly PM headways 3:20-7:00 PM (2 buses)</li> <li>▪ 1 Evening R/T 7:00-9:00 PM</li> <li>▪ Each Community Connector bus provides 40-minutes of local service upon arrival in Prineville (pickups and drop-offs, with about 10-minute of flex time available)</li> <li>▪ One bus goes into local service midday ( 9:40 AM -3:20 PM) - see local</li> </ul>	15.3	3,900	\$254,000	-
<b>TOTAL</b>		<b>21.0</b>	<b>5,300</b>	<b>\$345,000</b>	<b>\$65,000</b>

Notes: (1) Based on the Prineville-Redmond shuttle

## Capital Costs

Figure 42 identifies estimated capital costs for buses and stop infrastructure. It is assumed that the existing CET fleet will accommodate local needs in Prineville.

**Figure 42 Prineville Flex-Route Capital Costs**

Scenario	# New Buses <sup>1</sup>	Bus Costs <sup>2</sup>	Stops <sup>3</sup>	Total
Short-Term	-	-	\$19,500	\$19,500
Mid-Term	-	-	\$19,500	\$19,500
Long-Term	-	-	\$13,000	\$13,000
<b>TOTAL</b>	-	-	<b>\$52,000</b>	<b>\$45,500</b>

Notes: (1) Assumes that CET's existing Dial-A-Ride vehicle fleet can be used to provide service.

Figure 43 provides a more detailed breakdown of stop infrastructure requirements, based on planning-level assumptions for where major stops with shelters may be desirable and potential phasing. Although a flex-route does not require stops distributed over the length of the route, an allowance for basic stops is included. Shelters would be prioritized at the highest-demand stops at major destinations. Bench stops could be substituted for shelter stops depending on total resources available.

While it would be desirable to develop infrastructure at major locations in advance of flex-route service, it is also advisable to create only temporary stops at other locations to allow for refinement of the routes and stop locations over the first several months of operation, before making permanent stop infrastructure investments. These investments could be implemented in phases.

More detailed stop evaluation will need to be conducted by the City of Prineville and CET. It is assumed that all stop locations will meet the Americans with Disabilities Act (ADA) minimum requirements for new bus stops, which will allow for safe passenger access to and from the bus stop. Further guidance for siting ADA accessible bus stops can be found in Transit Cooperative Research Program (TCRP) Report 19, Guidelines for the Location and Design of Bus Stops.<sup>17</sup>

**Figure 43 Prineville Potential Stop Infrastructure Types and Locations**

Scenario	Shelter Stops <sup>1a</sup>	Bench Stops <sup>1b</sup>	Basic Stops <sup>1c</sup>	Potential Major Stops with Shelters
Short-Term	3		2	Bi-Mart/RiteAid/Ray's Market area, Medical Center, Downtown/Pioneer Park vicinity
Mid-Term	3		2	Downtown/Senior Center vicinity, High School, Library
Long-Term	2		2	COCC, TBD
	<b>8</b>		<b>6</b>	

Notes: (1) Planning-level cost estimates are based on the following unit cost assumptions: (a) Major (shelter) stop, \$6,500; (b) Bench stop, \$3,000; (c) Basic stop, \$1,950. A basic stop includes a sign/pole, schedule holder, stop information in Braille, trash can, and ADA pad, including design. A basic, single-person seat may be possible at this cost within the basic pad footprint.

<sup>17</sup> [http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp\\_rpt\\_19-a.pdf](http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_19-a.pdf)

## Prineville Service Concepts Overall Evaluation

Figure 44 summarizes the implications of each local service option. The primary difference between a Dial-A-Ride and Flex-Route service model is the ability to provide service without reservations. The table illustrates the benefits of increased service levels at each additional level of investment.

**Figure 44 Prineville Service Concepts Implications**

	Existing	Proposed Flex-Route		
	Dial-A-Ride	Short-Term	Full Mid-Term	Full Long-Term
Annual Service Hours	2,700	2,700	4,200	6,600
Flexibility of Use	● Advance reservations required for all trips	● No reservations required at flex-route stops. Advance reservations required off of defined stops/route.	● Same as short-term	● Same as short-term
Weekday Service Span	● 10.5 hours/weekday (7:00 AM – 5:30 PM)	● 10.5 hours/weekday (7:00 AM – 5:30 PM)	● 14.7 hours/weekday (6:00 AM – 8:40 PM - early evening service)	● 16 hours/weekday (6:00 AM – 10:00 PM - early morning and later evening service)
Weekday Midday Frequency	N/A - Demand-responsive service	● 40 minute service midday	● 40 minute service all day	● 40 minute service all day with an additional peak vehicle, e.g., operating a bidirectional loop route
Weekend Service	● None	● None	● Assumes 8 daily Saturday hours, with 40-minute headways	● Assumes 8 daily Sunday hours, with 40-minute headways
Annual Operating Cost	● \$176,000	● \$176,000 (cost-neutral)	● \$273,000 (Moderate cost increase: \$97,000)	● \$429,000 (Significant cost increase: \$253,000)
Capital Costs (buses and stops)	N/A	● \$19,500	● Additional \$19,500	● Additional \$13,000
Coverage (within ¼ mile straight-line distance) <sup>1</sup>	● Demand-response service within city limits	● 83% of DAR trips, 59% of population, 62% of employment	● Same as short-term	● Same as short-term, but additional peak service
Integration with regional system	● Local Public Bus meets Community Connector trips	● Local flex-route timed to meet all Community Connector trips	● No Change	● No Change

Key: ● Poor / Least Favorable ● Fair ● Good ● Best / Most Favorable

Notes: (1) A flex-route may deviate within defined area(s). This is typically a quarter-mile to half-mile but may vary along the length of a route. The primary constraint is directness of service for other passengers and the ability to complete a round-trip within the specified cycle time.