KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
610 SW Alder Street, Suite 700, Portland, OR 97205 P 503.228.5230 F 503.273.8169

TRANSIT AND RAPID TRANSIT — WHITE PAPER

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To: Jim Olson, City of Ashland

From: Paul Ryus, P.E. and Tom Litster

cc: Project Management Team, Planning Commission, Transportation Commission

DIRECTION TO THE PLANNING COMMISSION AND TRANSPORTATION COMMISSION

Five sets of white papers are being produced to present information on tools, opportunities, and potential strategies that could help Ashland become a nationwide leader as a green transportation community. Each white paper will present general information regarding a topic and then provide ideas on where and how that tool, strategy, and/or policy could be used within Ashland. You will have the opportunity to review the content of each white paper and share your thoughts, concerns, questions, and ideas in a joint Planning Commission/Transportation Commission meeting. Based on discussions at the meeting, the material in the white paper will be: (1) revised and incorporated into the alternatives analysis for the draft TSP; or (2) eliminated from consideration and excluded from the alternatives analysis. The overall intent of the white paper series is to explore opportunities for Ashland and increase the opportunities to discuss the many possibilities for Ashland.

TRANSIT WHITE PAPER INTRODUCTION

This white paper describes the role of transit within a community, types of transit modes and services, transit access needs, and cost factors involved in providing service. Light rail, heavy rail, and commuter rail are discussed briefly in this paper; forthcoming white papers address these commuter rail modes as well as the streetcar mode in more detail. Therefore, discussions regarding use of existing rail in Ashland for passenger rail and commuter rail will be brought forth in the next group (group #4) of the white papers. This white paper focuses on rubber-tired modes: demand-response transit and the bus mode. This paper also focuses on urban transit service and does not cover intercity passenger bus and rail service that serve longer-distance trips within a state or between states.

THE ROLE OF TRANSIT

Transit serves three main types of riders:

- **Captive riders,** those passengers who cannot afford to own or operate a car, are too young or too old to drive, or have a disability that prevents them from driving, and therefore rely on public transportation to meet their mobility needs. Transit service fulfills a basic social need for these passengers.
- **Captive-by-choice riders,** people who could afford to own and operate a car, but choose not to for environmental, lifestyle, or other reasons. These people will seek out locations to live in that provide quality walking and bicycling facilities for shorter trips and quality transit service for longer trips.
- **Choice riders,** people who own a car, but will choose to use transit when it offers an advantage over the automobile (e.g., parking cost savings, travel time savings, ability to use travel time in more productive ways). Improving transit service quality by improving service frequencies, service spans, travel speeds, etc. attracts choice riders to use transit service.

From a community perspective, transit service can be a tool for supporting a diverse community in terms of ages, incomes, and abilities; an environmentally friendly means to address the community's transportation needs; a way to avoid costly and impactful street widening projects; and a catalyst for new development that enhances the community's livability.

TYPES OF TRANSIT

Demand-Response Transit

Demand-response transit has defined service hours and service areas, but flexible origins, destinations, and routings, typically using smaller vehicles such as passenger vans or minibuses. Service typically requires an advance reservation. In an urban setting, demand-response transit is most often "ADA complementary" service, that is to say, demand-response service provided to persons not able to use fixed-route (e.g., bus) service due to age or disability, under the requirements of the Americans with Disabilities Act (ADA). The ADA requires that complementary service be provided, at a minimum, within ¾ mile of all fixed-route stops and stations during the same times of day and week that fixed-route service is provided. Transit providers can require that customers make a request for service the day before it is needed.

In rural areas and small cities, demand-response service may be the only service available to the general public. Because the potential number of transit users is small, due to the overall small population, service is provided directly to customers' origins and destinations, rather than forcing customers to walk long distances to major streets or creating circuitous routes that pick up very few customers along the way. Advance reservations are needed and service may not be offered every day. Because the service goes directly to the customer, it serves both the general transit function and the ADA complementary transit function.

In suburban areas, hybrid routes are possible that include a fixed-route element at one, higher-activity, end of the route and a demand-response zone at the other, low-density end of the route. Passengers originating within the demand-response zone call to make a request for service during a specified window of time prior to each trip. Passengers with destinations within the demand-response zone inform the driver of their destination as they board the bus along the fixed-route portion of the route. The maximum number of pick-ups and drop-offs allowed within the demand-response zone is usually set, in order to maintain schedules, particularly when the route acts as a feeder to other routes.

In Ashland, there are areas within the City Limits that are further than ¾ of a mile from a fixed bus route stop. These areas are generally located at the most northern and southern extents of the City Limits; essentially locations that are ¾ of mile or further from Siskiyou Boulevard, North Main Street and/or Ashland Street.

Fixed-Route Transit

As its name suggests, fixed-route transit operates along a set route at set times during the day. Fixed-route transit includes a variety of transit modes (e.g., bus, light rail, heavy rail, commuter rail) and service types (e.g., local, express). The most common forms of fixed-route transit are described in this section.

Bus

The bus mode uses rubber-tired vehicles that typically operate in mixed traffic on streets and highways, although it is also possible for buses to operate in lanes reserved exclusively for them, or to operate on their own dedicated roadways. Standard buses are 40 feet long, but shorter (30- and 35-foot) and longer (45- and 60-foot) buses also exist. The choice of vehicle length is mainly dependent on the number of passengers expected to be carried and the types of streets on which service will be provided (e.g., collector and arterial streets vs. neighborhood streets).

The bus mode provides a variety of service types:

- *Local bus* service stops frequently—typically every 2–3 blocks. Local bus routes can be *trunk routes* that operate frequently and directly between major activity centers (e.g., Route 10) or can be *feeder routes,* that collect passengers in a more spread-out area and deliver them to a trunk route (bus or rail), a transfer center, or an activity center such as a downtown. These routes typically operate throughout a transit provider's defined service day, with frequencies set to match passenger demand.

- *Express service* stops infrequently—only at the most busy locations—providing a significantly quicker trip for passengers compared to a local route. Express routes typically operate between major activity centers or between a park-and-ride lot and an activity center. Depending on demand, these routes might operate throughout the service day, or only during high-demand times of day, such as rush hours (e.g, *commuter bus*).

- *Circulator* service operates relatively frequently within a relatively small area, typically a downtown and/or tourist area. Potential markets are customers needing to run quick or multiple errands (e.g., lunch, shopping), customers traveling back and forth between adjacent activity centers (e.g., a university and an entertainment district), and tourists traveling between hotels, restaurants, and tourist destinations. Frequent service is required to compete with the auto mode, by minimizing the amount of time people need to wait for a bus to arrive, while the small service area allows a small number of buses to serve a route frequently, thereby minimizing costs. Frequent service also allows the bus to compete with the walk mode, by allowing passengers to make trips faster and more conveniently than they could make the trip on foot.

- *Bus rapid transit* (BRT) is a package of service, limited stops, branding elements (e.g., logos, names, colors, special buses), upgraded passenger amenities, and (often) transit priority measures that combine to produce a frequent, reliable, high-capacity transit service that can be as attractive to passengers as light rail service. It can serve as a transitional mode to light rail, but many BRT lines have been developed without that intent. Typically, only the very highest-ridership existing bus routes are considered for conversion to BRT, as these are the routes with the greatest potential for providing the ridership needed to economically justify the high frequencies.

Light Rail

The light rail mode operates using electrically powered trains that run on tracks, which may be located in city streets (in a travel lane, in the median, or along the side of the street), in private rights-of-way that cross streets at railroad crossings, or in grade-separated rights-of-way where the tracks go over or under streets. Light rail systems have been constructed in a number of larger North American cities that have sufficient population to require the higher capacities this mode offers.

There are significant infrastructure costs associated with constructing a light rail line. Streetcar is a sub-mode of light rail that uses shorter trains that mostly operate in mixed traffic on city streets; it is discussed in detail in another white paper.

Heavy Rail (Rail Rapid Transit)

The heavy rail mode operates with long, electrically powered trains in grade-separated rights-of-way—typically elevated or in tunnels (e.g., *subways*). It is found in the largest cities with the highest populations, downtown parking costs, and congestion that require moving very large numbers of people very quickly. The tunnels and aerial structures required for this mode make it very expensive to construct.

Commuter Rail

Commuter rail consists of passenger trains that operate on tracks that are part of the regional or national rail network. Service can be relatively infrequent (e.g., every 30 minutes) and may only be available during peak commuting periods. This mode is discussed in detail in another white paper.

TRANSIT ACCESS

Where and when transit service is provided play a large role in determining the usefulness and attractiveness of transit service to potential customers. At the same time, providing quality service on the street is not sufficient: potential passengers need to be able to safely and conveniently access the service—by foot, bicycle, or automobile—for it to get used. Each of these aspects of access are explored in this section.

Transit Accessibility

Transit accessibility can be described in two dimensions: in time (how often and how long during the day service is offered) and space (where service is offered). "How often" is determined by the *frequency* of service, "how long" is determined by the *span* of service, and "where" is determined by the *coverage* of service. Each of these factors has important cost and ridership generation implications. Higher-frequency service attracts choice riders, but operating costs and capital costs for additional buses increase proportionately to the increase in frequency. Span of service

determines what types of customer markets are served by transit—for example, shoppers, commuters, students attending night classes, and tourists. Increasing the span of service increases the types of trips that can be made by transit (again attracting ridership), but operating costs increase proportionately to the increase in service hours. Finally, coverage determines the origins and destinations within the community that are served by transit. Increasing coverage increases the number of people who have access to transit, but operating costs and capital costs for additional buses increase proportionately to the increase in service hours required to serve new areas.

As an example of how increases in funding can influence transit accessibility, assume a city or transit agency currently spends $300,000 a year to operate a single bus up and down the city's main street every 30 minutes from 6:30 a.m. to 6:30 p.m., Monday through Friday. If the city could afford to double the amount of money it spends each year on operating transit service, it would have several options:

- It could choose to add a second bus to the current route, improving the frequency to every 15 minutes. There would also be capital costs associated with purchasing a second bus to provide the added frequency. This is currently done in Ashland with the overlapping routes of Route 10 and 15.
- It could create a second route that served a different portion of the city every 30 minutes. The round-trip distance that the bus could travel within 30 minutes, including time for a driver break, would determine how large an area would benefit from the new service. There would also be capital costs associated with purchasing a second bus to serve the new route.
- It could increase the service hours on the current route to 6:30 a.m. to 12:30 a.m. Monday through Saturday and 6:30 a.m. to 6:30 p.m. on Sunday. Because the same bus could operate the additional service hours, there would be no immediate capital costs involved, but the bus might need to be replaced sooner than otherwise, due to the additional miles it would be travelling each day and week.

Access to Transit

Most transit passengers are pedestrians at one or both ends of their transit trip. Therefore, it is particularly important to have a good pedestrian network in the vicinity of transit stops, to maximize the number of locations that can be reached by the transit service is provided. Most passengers are willing to walk up to ¼ mile to access local bus service and up to ½ mile to access high-frequency and/or high-speed service such as bus rapid transit and rail modes, trading off added walking time for reduced waiting time at stops and/or shorter travel times while on a transit vehicle. A "good pedestrian network" includes such things as a continuous sidewalk network to and from transit stops; safe ways to cross streets, particularly at stops; and ADA compliance (e.g., curb cuts) to minimize barriers that might keep persons with disabilities from using the service.

Some passengers may wish to use their bicycle to access transit. An average bicyclist can travel four times as fast on a bicycle than on foot, which greatly expands the area a bicyclist can reach

from a transit stop in the same amount of time as walking. Providing bicycle racks on buses allows bicyclists to be able to use their bicycle at both ends of their transit trip. In smaller communities where travel distances are short and buses run infrequently, a given trip can be made by bicycle in about the same time as by bus. However, even in these cases, bicycle racks can be useful in serving, for example, bicyclists who experience flat tires as well as origins and destinations in hilly areas. In some cases (e.g., service to universities), the demand for bicycle rack space on some trips is greater than the number of spaces available (typically 2 or 3). Attention should focus at that point to providing (1) secure bicycle parking at transit stops and (2) service close to bicyclists' destinations, to minimize the need to bring a bicycle along on a bus or train.

For longer-distance trips (e.g., from Ashland to Medford), park-and-ride lots can also play a role in accessing transit service. Passengers drive their own automobile to the lot (or are dropped off there) and take bus or rail service for the remainder of the trip.

Access vs. Efficiency

A fundamental trade-off faced by transit service providers is whether service hours should be spread over the agency's entire service area (prioritizing access), or whether service hours should be concentrated in the highest-ridership corridors (prioritizing efficiency). Rogue Valley Transportation District (RVTD), for example, emphasizes efficiency, with service focused along main streets, while Corvallis Transit operates under a city policy to provide transit service within ¼ mile of 95% of the city's residents. Prioritizing access means that more locations have access to service, but that most locations will receive service relatively infrequently. Prioritizing efficiency focuses service on the areas with the highest population and job densities and transit-supportive demographics, giving those areas more frequent service than would be possible if service covered the entire area (given a fixed budget). Choosing to prioritize either access or efficiency is ultimately a policy decision that should consider the transit provider's goals and objectives (e.g., the customer markets that the agency plans to serve) and funding sources (e.g., issues of fairness if city residents are asked to pay taxes for service they cannot readily use).

SUBSIDIES AND RIDERSHIP

The City of Ashland currently subsidizes RVTD service in Ashland, thereby providing more service within the City than it would otherwise receive from RVTD. The subsidy also reduces the fare for passengers who travel within the City, lowering it from $2 to $1. Between 2003 and 2006, the City's subsidy allowed fare-free travel within Ashland and ridership reached a high of 150,000 annual passengers. After the subsidy was reduced and a fare charged, annual ridership dropped to 45,000 and has since declined to 40,000. In addition to direct subsidy to RVTD, the City also offers bus vouches to low income residents that have qualified through the Ashland Low Income Energy Assistance Program (ALIEAP). These are available to all low income residents and are distributed through the senior center.

Operating Arrangements and Costs

Fixed-route transit service in Ashland is provided by RVTD. Two routes are operated: Route 15, Ashland Loop, and Route 10, Medford–Ashland. Figure 1 compares RVTD's operating cost per revenue hour (a measure of how much it costs to provide an hour of service on the street) to that of comparably sized peers in the western U.S. As shown in Figure 1, RVTD's operating costs over the last three years have been the highest of any of its peers and its costs have risen more sharply than any of its peers during the last five years. Because RVTD's costs are high, the money that Ashland invests in transit service subsidies does not go as far as it might if Ashland were located in the service area of one of RVTD's peers.

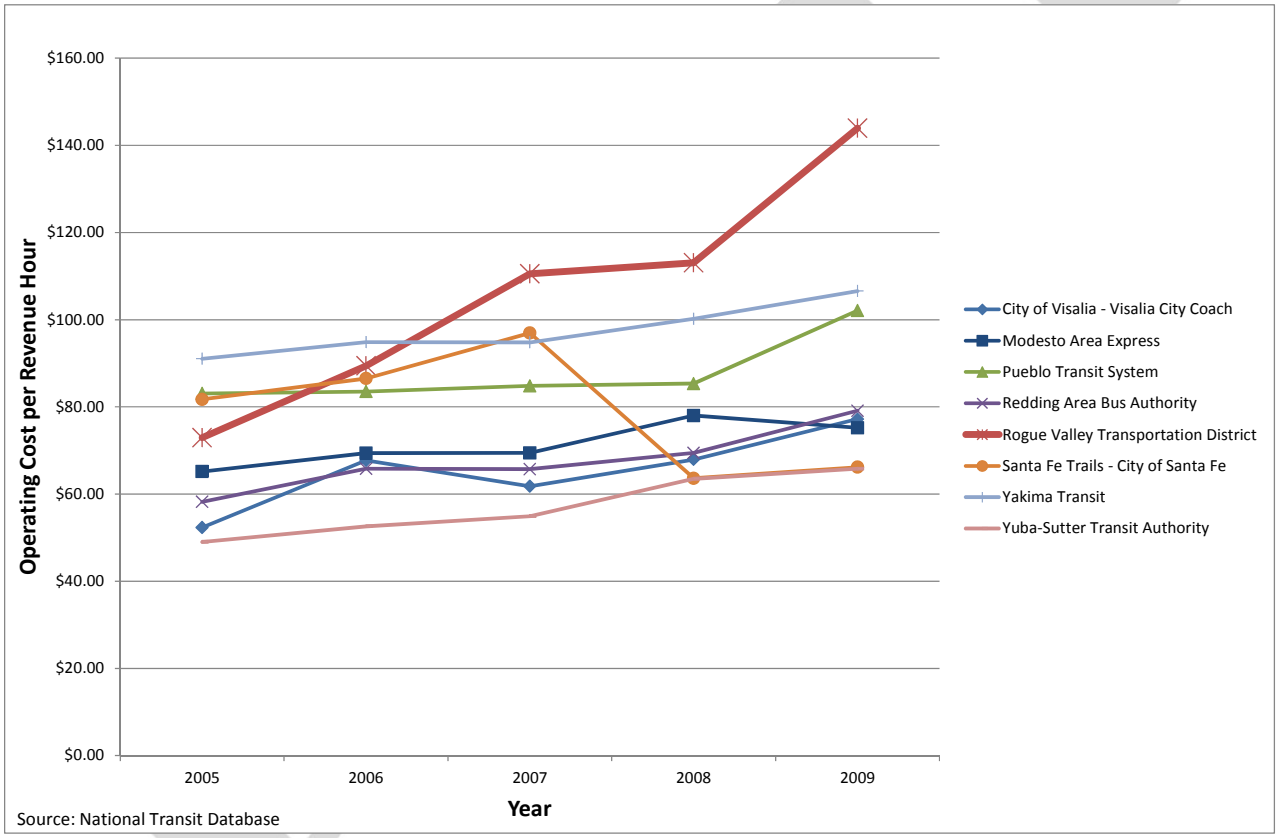

Figure 1. Peer Comparison of RVTD Operating Cost per Revenue Hour

Some cities choose to contract out their local transit service to private operators rather than to the local transit district. Boulder, Colorado, for example, contracts the HOP shuttle that circulates between downtown Boulder and the University of Colorado to a private operator rather than to RTD. Denver RTD continues to operate other shuttle routes in Boulder; however, RTD's service guidelines would have provided HOP service less frequently than Boulder desired. Considering private operators creates competition among potential contractors in terms of costs and service quality.

Another consideration, however, is that smaller transit agencies' revenue comes mainly from non-fare sources, in particular direct or indirect tax revenue. Figure 2 shows RVTD's revenue sources, which are typical for an agency of its size. A city that wishes to enhance the transit service being

offered by its local transit provider may be able to do so at less than the full cost when it contracts through its local transit agency. In this situation, non-fare revenue may cover a portion of the operating cost, depending on the agreement negotiated between the city and transit agency. In addition, incremental improvements to service, such as increased service spans or fare subsidies, are relatively easy to implement when a transit agency is already providing service within a city.

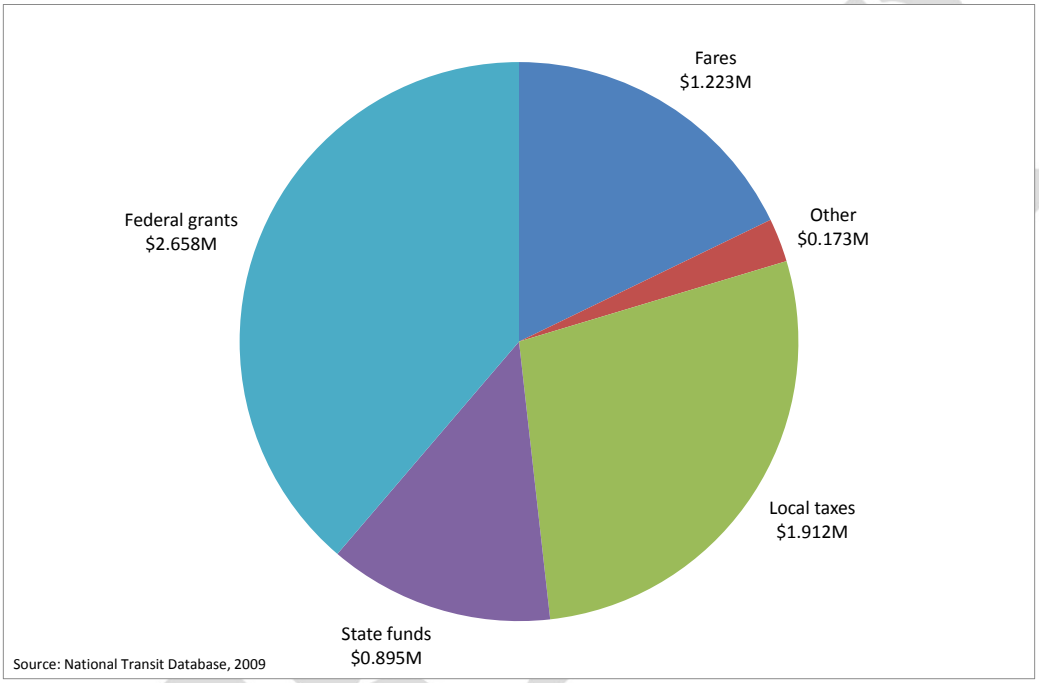

Figure 2. Sources and Amounts of RVTD Revenues (millions of dollars)

Fareless Service

Although most transit services charge a fare, examples of fareless service can also be found. These typically fall into one of four categories:

- **Downtown service** (either specified circulator routes or all routes within a defined downtown zone)—providing downtown service for free is a policy decision designed to encourage people to run errands downtown without bringing their car.

- **Local taxes fund service**—Some rural Washington transit agencies that placed sales tax measures on the ballot to fund transit service offered fareless service as part of the package: the first 0.3% of tax funded the local share of operating costs, while the final 0.1% replaced farebox revenue.

- **A route is primarily used by passengers who have already paid a fare**—if most passengers must transfer to or from a route from another route where they pay a fare, or if most passengers would be covered by a group pass program (e.g., university students and employees) and would therefore not pay a fare, then transit agencies sometimes make the route fare-free to help speed up passenger boarding and alighting.

- **Fare revenue is offset by the cost of collecting fares**—Collecting, securing, and accounting for fare revenue has a cost. If the fare revenue expected to be generated is relatively low, it may not be cost-effective to charge a fare.

Providing fareless service may come with hidden costs. People tend to use a service more than they need to when it is free. For example, when New York City introduced free bus-to-rail transfers, the bus system became overwhelmed because passengers who formerly walked to subway stations rode the bus instead. The transit agency needed to add service to accommodate the added bus passengers, which cost the agency money. Offering free bus service may convert walking and bicycling trips into transit trips, thereby boosting transit ridership but not necessarily impacting automobile usage. In addition, when there is no cost to ride, a transit agency may find it difficult to keep persons from riding the bus the whole day, which may discourage other passengers from using the bus. Therefore, when considering fareless service, a key consideration is the objective in providing the fareless service. Is the objective to increase transit ridership regardless of the previous mode or is it to decrease automobile use or is it something else? Once the objective is clear then consider how fareless service or other tools and strategies can be used to reach the identified objective.

If there is sufficient capacity on buses to accommodate the extra demand generated by fareless service, then no problems may arise. One potential compromise is to charge a nominal fare (e.g., 25 or 50 cents) rather than make the service completely free.

Vehicle Size Impacts on Operating Costs

A common question asked by the general public is why a transit agency operates full-size buses instead of smaller buses, particularly if the buses don't have many passengers on them in the middle of the day. There are several reasons for this:

- Labor is by far the greatest component of a transit agency's costs. In addition to the bus operators themselves, there are mechanics, schedulers, dispatchers, supervisors, etc. behind the scenes that help make the whole system function. These costs tend not to be influenced by vehicle size.
- As shown in Figure 3, fuel is a relatively small component of overall costs. While a smaller bus will likely be somewhat more fuel-efficient, it will not have a dramatic impact on overall costs.
- Transit agencies need sufficient capacity to accommodate passengers during peak periods. Larger buses are capable of serving both peak and off-peak demand.
- Large buses are heavy-duty vehicles that have a long lifespan. A minibus may need to be replaced 2½ times during the lifetime of a standard bus.

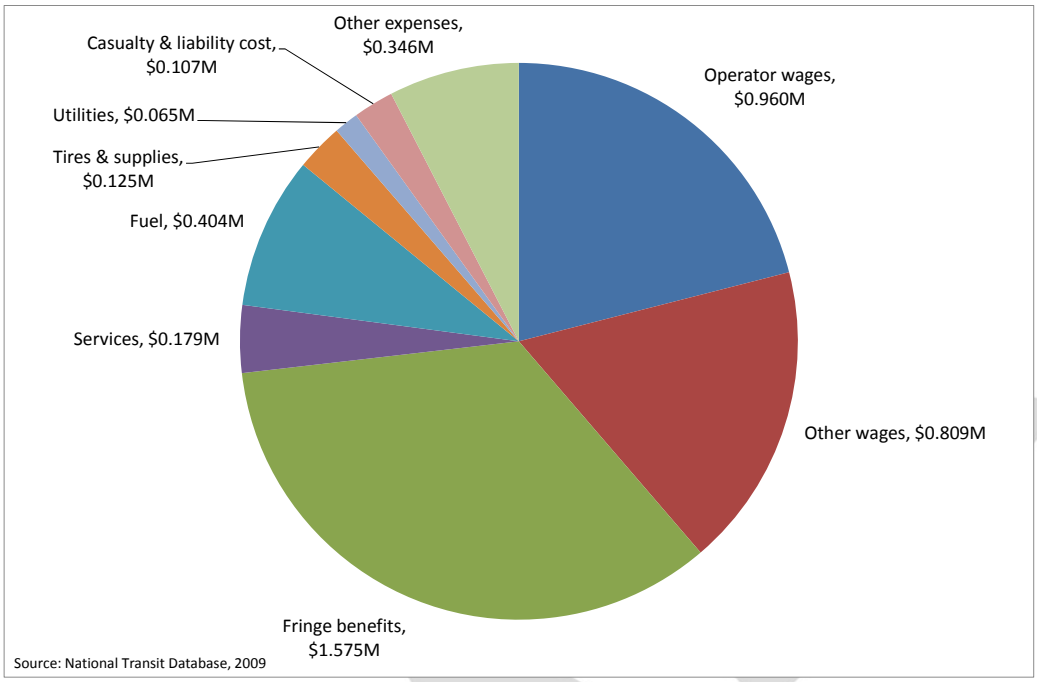

Figure 3. Sources of RVTD Operating Costs (millions of dollars)

Smaller buses may be appropriate for neighborhood service, where passenger demand is lower and the smaller buses can maneuver more easily. Bus size can also help with branding, to help intended customers readily identify which bus they should take (e.g., the large bus goes to Medford, the small bus circulates around Ashland).

NEXT STEPS

Given Ashland's relatively small population (which limits the potential demand for high-capacity transit) and the high cost of constructing and operating rail-based transit modes, bus-based transit service appears to be the most suitable for the city for the foreseeable future. (These costs are described in more detail in the companion white papers on streetcar and commuter rail.) Therefore, it is suggested that Ashland focus its attention on making its bus service as good as possible.

One key question the City should ask itself is what customer market(s) does the City want to serve? Many areas of the City are already located within a 5-minute walk of the existing bus service; however, the hours that RVTD transit service is offered (roughly between 5:30 a.m. and 7:30 p.m. weekdays only) make the service useful mainly to employees working traditional office hours, students with daytime classes, and non-working residents who are able to run errands or go shopping during the day. Customer markets not currently being served include:

- Employees working non-traditional hours (e.g., weekends and evenings). These tend to be the kinds of jobs that are attractive to students, and the jobs tend to be lower-paying, which makes transit service an attractive alternative to driving to work for those employees.

- Low income households that are unable to afford an automobile and who are burdened by the cost of bus ridership.

- Southern Oregon University (SOU) students who take evening classes, need to study or go to activities on campus in the evening, or want to patronize area restaurants and bars without having to drive.

- Tourists attending evening and weekend Oregon Shakespeare Festival events. Summer evening performances begin at 8:30 p.m. (8:00 p.m. the rest of the festival season) and tours, lectures, and matinee and evening performances are offered on weekends throughout the festival season.

- Residents who would like to live in Ashland without owning a car, but need to travel to Medford on weekends to shop, visit friends, etc.

The answer to the customer market question will help guide the City in determining how to prioritize desired transit improvements: through service span, frequency, coverage improvements, cost of ridership, or some combination of these. For example, consider if the City and community decides to focus on increasing transit ridership by targeting summer tourists attending evening and weekend events in Ashland:

- This decision would focus resources on expanding the existing service span.

- An expanded service span to evenings and weekends would also have the benefit of serving employees working non-traditional hours as well as SOU students taking evening and/or weekend classes.

- If expanding the existing service span is the priority, the City and community members in cooperation with RVTD would then need to identify how to implement that change. Considerations include:

    - Funding

    - Owner/Operator of the Expanded Service

    - Relationship to Existing Service

Although transit service is operated by RVTD, there are a number of things under the City's control that can make the service as easy and safe as possible for customers to access. These include:

- Making sure ADA-compliant sidewalk facilities are provided along and leading to streets with transit service.

- Providing adequate street lighting at bus stops and along streets leading to bus stops.

- Providing secure bicycle storage facilities at key stops, and evaluating major streets for opportunities to improve pedestrian crossing opportunities. (As portions of some major

streets are owned by the state, ODOT's approval will be needed to make improvements along those streets; however, this also presents a potential funding opportunity.)

- Supporting other alternative modes—such as improving bicycle facilities, developing a bike-sharing program, or supporting car-sharing programs—can make it easier for City residents to forego owning a car; those residents will then likely use transit service for a portion of their trips.

- Encouraging higher-density and mixed-use development along transit routes through its land use planning efforts.

Additional actions the City may consider in cooperation and/or collaboration with partnering agencies and/or institutions include:

- The City might wish to encourage RVTD to comprehensively examine its operations for potential efficiencies. As was illustrated above, RVTD's 2009 operating cost per revenue hour was about 75% higher than the average of its peers. To the extent that RVTD can reduce its costs without reducing service, it would have the ability to provide more service at a given budget level.

- The City may also wish to encourage Southern Oregon University to participate again in RVTD's group-pass program (and set an example by participating in the program itself, if it doesn't already do so). At $3.85 per person per month, the cost per student would be nominal, but the program has the potential to generate $200,000 annually (less the amount of fare revenue currently generated from SOU students). This suggestion is based on successful programs in larger cities with universities such as Denver, CO and Vancouver, BC, Canada.

An additional option for the City to consider would be paying for and contracting service itself is also an option for the City. Although it would likely be possible to contract service for less per revenue hour than RVTD, the City would not have access to the federal operating support and local taxes that RVTD receives. This means that the City would have to pay most or all of the full cost of service itself, which could turn out to cost more than simply subsidizing RVTD service like the City does now.