Chapter 4 – Long-Range Service Concept

4.1 OVERVIEW

This chapter presents a conceptual sketch of the service levels that Corvallis could support within the next 20 years and the basic geographical layout of that service.

4.1.1 Purpose and Intended Level of Detail

The most important purpose of a long-range service plan is to support integrated transportation and land use planning. The long-range plan, once adopted, will indicate a commitment by the City to provide its best transit service in certain corridors, assuming that the needed resources are made available. The "primary" transit corridors will be those where the most intense development, including both infill densities and new focal points, would be encouraged. The long-range plan will also serve as a tool to encourage support for the expanded funding needed to meet the City's transit needs.

Many service design issues may be more appropriately addressed in the course of short term planning. For this reason, the long-range service is presented as a "concept" rather than a "plan." *However, this concept is meant to be specific about the locations of the primary corridors* where the best service should be provided. These corridors are identified in the long-range plan because they require that street planning, transit planning, and land use planning be done together to encourage the most transit-oriented patterns of development possible.

Since they express an intention to achieve a certain service quality, primary corridors adopted in policy can help to provide the assurance of service that developers and others need when making decisions about siting transit-oriented land uses. This assurance, of course, requires that the corridors be fixed over the long term. It may be appropriate to add new primary corridors if development is approved outside the current city limits. However, *the intent of this plan is that the primary corridors designated within the current city limits will not change*, except in the few cases where this plan indicates an uncertainty that still needs to be resolved.

Areas which will not have primary service do not require the same degree of focus on land use integration, and for this reason, the concept can remain more vague about what service to those areas will look like. The "secondary" corridors designated in this plan are more conceptual. Unlike the primary corridors, the secondary corridors designated in this plan does not necessarily reflect a proposed commitment to operate service on the exact streets indicated, though it does indicate a need in the general area.

4.1.2 Philosophy of Service Design

The proposed future service pattern differs from the existing system in several key ways. These differences reflect changes that the system must make to be more attractive to potential users as Corvallis grows. Most transit systems make similar transitions as their cities pass the 50,000 mark in population, if not sooner.

- Unlike the present routes, the proposed routes are consistently two-way on most segments, except for turnaround loops on the very ends of routes, so that passengers never need to ride far out of direction. *Transit must be convenient in both directions if it is to be attractive to users in either direction.*
- The present system attempts to spread service evenly across the entire City. By contrast, the proposed concepts concentrate service in certain corridors which have the most intense land uses, and therefore the

highest transit demand. The proposed concepts may appear inequitable on the map because service is not evenly distributed over the service area. *However, the proposed service increases equity because more service is provided where there are more people, and therefore more potential riders.*

Concentrated, high-frequency services in densely developed corridors are always the most productive services in any local transit system and the ones that compete most effectively with the automobile. CTS in 2005 has only one such route; it travels between downtown and Timberhill Shopping Center by way of Monroe and Kings Boulevard. This route consistently has the highest ridership per service hour. It is desirable for there to be 15 minute frequency of service on primary transit corridors.

- All of the proposed service concepts presume a continued program of fixed bus stops at a standard spacing of 800 to 1,000 feet, depending on local conditions. Fixed bus stops are essential to ensuring that transit can operate fast and efficiently enough to attract discretionary riders, while still remaining accessible to everyone along the route.

The proposed service concepts all require expansion of service hours above the present level. As the peer analysis in Chapter 2 demonstrated, the current CTS system of six buses is actually rather small compared to most university towns of Corvallis' size. More importantly, transit-oriented land uses cannot function well without a higher frequency of service than CTS currently provides.

4.1.3 Commitment to Seniors and Persons With Disabilities

The proposal to shift service to a pattern more focused on speed and frequency has historically led to extensive discussions throughout the Corvallis community. Some senior citizens, persons with disabilities, and their advocates have expressed particular concern about the proposed shift of focus because these citizens have much less tolerance for walking distance than for the rest of the population.

The CACOT and the City Council have reiterated the importance of retaining a commitment to providing senior/disabled mobility even while service is shifted to be more competitive for the general public.

The following strategies are recommended for addressing this issue:

- In the short term, retain direct access to major senior citizen developments and activity centers, as well as any locations of special importance to disabled persons. Senior locations which have historically generated a service demand have been identified and are all served, usually within one block by the proposed short range plan.
- Where possible, service major destinations with regular routes. However, in cases where this is not feasible, consider small vehicle "service routes" or "deviated fixed-routes" to cover senior and disabled destinations. These routes typically can run at lower frequencies, for more limited hours, and be more circuitous. They are designed in a way that gives priority to the senior and disabled markets. However, they must also be open to the general public in order to achieve maximum possible productivity and comply with the FTA rules for use of federal funds. Even so, these services will tend to be much less productive than the primary or secondary transit services, so they should be kept to the minimum necessary to meet senior needs that cannot be met by the regular service.
- Encourage the use of paratransit service in cases where fixed route does not provide service with the level of front-door convenience desired. Conversely, those seniors and persons with disabilities who can use the fixed-route bus service should be using the fixed-route bus service to reduce the demand on special transportation resources. The fixed-route bus service should offer incentives to capable individuals to use the fixed-route service rather than the more costly, specialized demand-responsive paratransit service.

- In the long range, work to minimize the need for special senior and disabled services, which will always be far less productive than the regular system. To do this, *permit new senior- and disabled-oriented housing and activity centers ONLY on the primary corridors or on other major arterials where transit will be easy and logical to provide.*

There is a common misperception that any development can be made "transit friendly" merely by putting a shelter and/or bus pullout in front of it. These amenities are helpful, but they do not compensate for the fact that by locating a facility where there is no existing service, the development is imposing on the City the huge potential cost of extending service there. For example, if a new senior facility is built off of the existing system and requests CTS to extend service to it, the cost can be $180,000 a year, not counting the impact of deviations on existing passengers. The developer may spend $15,000 on a shelter and pullout, but this obviously does not begin to make up for the cost of the new service required. The solution is simple: locate senior/disabled facilities on the *existing* transit network, or if not, be sure that the cost of extending transit has been considered in the process of approving the development.

4.1.4 Integration with other transit services

Two other public transportation services currently operate within the CTS service area. The Linn-Benton Loop travels between Albany, Linn-Benton Community College, Hewlett-Packard, OSU and downtown Corvallis. The Philomath Connection travels between Philomath and Corvallis. Within Corvallis, both of these services operate along some of the same roadway sections where CTS operates and both services utilize the Corvallis Downtown Transit Center. Additionally, OSU operates a campus shuttle that connects the campus with parking areas located on the fringe of the campus. Long-range plans should take into consideration operational improvements where these services overlap.

It is anticipated that as a result of the 2010 census an Albany Area MPO will be formed. If as a result of this, the Albany transit service is expanded, CTS and CAMPO would work with the new MPO to develop ways to integrate services between the regions.

4.2 IDENTIFICATION OF FUTURE TRANSIT CORRIDORS

4.2.1 Sources for Future Land Use

The most important factor in determining a future transit plan is the density of development and the location of major trip generators. These are influenced by existing development, existing zoning, and long-range plans for underdeveloped or redeveloped areas.

Within the current city limits, this transit plan generally follows the lead of existing development and zoning, as expressed in the City's Land Development Code, as well as other land use plans for specific areas of Corvallis. This transit plan provides intensive transit service where there is already some land use justification for it, and it follows that further intensification in those corridors will further support the transit plan's goals. Because the transit plan is rooted in existing development and short range plans for the area within the city limits, the transit plan will remain valid within this area, regardless of what ultimately occurs in the area outside the city limits.

In considering areas outside the existing city limits, this long-range transit plan process takes into consideration the Corvallis Transportation Alternatives Analysis[12] (TAA) and, in particular, with the land use concept

[12] The Transportation Alternatives Analysis was adopted by the City Council in 1998 as Chapter 11 of the Corvallis Transportation Plan.

developed for that study's "Land Use/Transit Alternative", as well as other land use plans. The land use concept from the Corvallis TAA aims to reduce automobile dependency and protect open space by providing a compact and yet livable urban form. The land use concept provides a guideline for drafting a long-range transit plan, particularly in its treatment of sites that are not currently developed.

The Land Use/Transit Alternative concept of the TAA concludes that all demands for intense development (at levels that could require transit service) can be accommodated within the present city limits. For example, the TAA envisioned no high-density residential, commercial, or institutional development west of 53rd or north of Walnut (except the Good Samaritan Regional Medical Center area). Development in these areas was to be mainly single-family in nature, below the threshold of five (5) units per acre that would not generate significant fixed route service demand. These areas, therefore, do not receive transit service in the basic long-range service plan. However, service to these areas would significantly impact the transit cost related to building dense development outside the current city boundaries. If transit service is required to these areas because of new development, the transit plan will be more costly and less efficient.

4.2.2 Primary and Secondary Corridors: Definition

Based upon current development and zoning within the city limits and on the TAA land use concept for outside the city limits, primary and secondary transit corridors have been identified.

Primary corridors are the street segments where the highest quality of transit service will be needed and where future transit-oriented developments would be encouraged. *Secondary corridors* are other streets that will clearly need transit service, or will have service as a result of providing connectivity to a primary corridor or other network requirement, but where the highest level of service is not justified, either because the existing and zoned densities are too low or because there is some other barrier to productive transit service.

To be a primary corridor, a street must be able to support transit service that is efficient and attractive to potential riders, to the point of being competitive with the automobile for at least some trips. This requires:

- **Intense development.** The street corridor must be intensely developed or zoned for intense development, so that there are many residents or activities within walking distance. For residential areas, an average density of at least seven (7) units per acre within 1/4 mile of the corridor is ideal. Typically, a primary corridor has a mixture of apartments, duplexes, and small-lot single-family homes, with highest densities adjacent to the transit street.
- **Diversity of transit-oriented land uses.** The street corridor should ideally feature a mixture of residential, commercial, employment, and institutional destinations so that there are many reasons for traveling up and down the street and so that there is transit demand at all times of day.
- **Anchors.** Development must be especially intense at the ends of primary corridors. Ideally, primary corridors end at nodes of commercial activity (either downtown or outlying commercial centers) or at major institutions such as universities or regional hospitals.
- **Pedestrian access and amenities.** A primary corridor should be a pleasant and safe street on which to wait and must have many street connections to adjacent neighborhoods for pedestrian access to a bus route.

In the future, primary corridors will also require:

- **Protection for transit operating speeds.** If congestion worsens to the point that buses are routinely and severely delayed, primary corridors may require preferential treatments that protect transit from the effects of congestion. Without this protection, delays will not only reduce the attractiveness of transit but

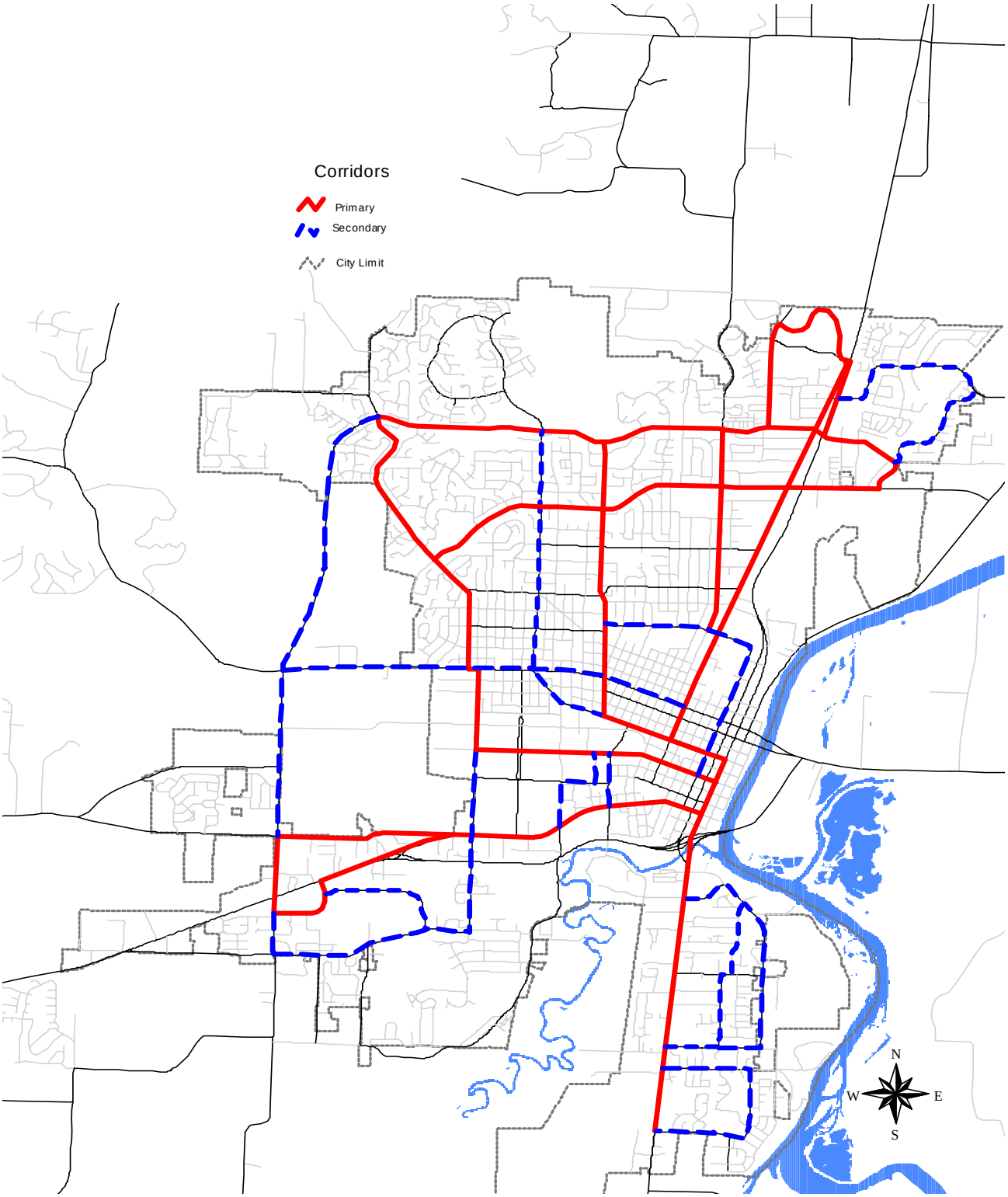
also increase the cost to the City of a given level of service. A system of transit operating speed standards should be developed and monitored to determine whether corrective action is needed to protect transit speeds. These standards should be integrated into the street functional classifications of primary corridors and are discussed in greater detail in Chapter 6.

- **Priority for transit amenities.** Since primary corridors are where transit will be used most intensively, they would deserve a higher priority for amenities such as passenger shelters.

New Comprehensive Plan and district designations to accommodate transit-friendly development should be adopted to support the concepts of this transit service strategy. These needs are discussed in greater detail in Chapter 6.

Although all arterials and collectors could be transit corridors, the primary and secondary corridor designations recommended for the next 20 years are shown in figure 4-1.

Figure 4-1 Primary and Secondary Corridors



The following discussion explains why each corridor was identified.

4.2.3 Foundational Primary Corridors: East-West Corridor Through OSU

The east-west corridor through OSU is, and will continue to be, the core of the CTS system. CTS will continue to need its Downtown Transit Center to coordinate trips among its different routes. However, the other predominant transit generator is the center of the OSU campus. From the standpoint of CTS, the urban core really extends from the river to 35th Street, and from Monroe to Western. This core requires a strong east-west axis of especially good transit service, which will need to be on either Jefferson or Monroe, or both. For the purpose of this report, Monroe is assumed because the current speed bumps (as opposed to speed humps) on Jefferson in the campus core do not support adequate transit speeds. However, OSU plans anticipate transit service on Jefferson and reduce other vehicular conflicts to make pedestrian, bike and transit the transportation modal choices on campus. Jefferson may be the more appropriate east-west campus corridor location in the long term due to its proximity to dormitories, the Administration building, Valley Library, Memorial Union and the OSU Book Store. Even if Jefferson continues to be used as a primary corridor, Monroe would remain a primary corridor east of Kings Boulevard.

This service plan provides direct access to OSU from all parts of the City. In addition, all the service plans aim to provide especially high frequencies along the east-west axis so that CTS is attractive even for very short trips, such as between campus and downtown.

Recommended City policies related to OSU transportation planning, including the issue of Jefferson Street, are discussed in greater detail in Section 4.3.2 below.

4.2.4 Other Primary Corridors

SOUTH THIRD STREET - HIGHWAY 99W

Highway 99W extending south from downtown is a primary corridor as far as Rivergreen Avenue, in anticipation of a new neighborhood focus area just north of Goodnight Avenue and the high density residential complex between Goodnight and Rivergreen Avenues. The current development pattern on South Third Street includes relatively scattered auto-oriented commercial uses and the development of a large apartment complex on the east side of 99W.

South of Rivergreen Avenue, development plans envision employment growth in the industrially zoned properties on the west side of the highway and around the airport and extensive growth in the form of single-family housing on the east side. These land uses are appropriate for secondary service, but they do not provide the intensity needed for a primary corridor.

Extending primary service to the airport would require dense housing and/or major commercial centers around the airport entrance, which are not envisioned in the current plan.

WESTERN BLVD./WEST HILLS ROAD

This corridor is identified as primary based on intensive residential density zoning between downtown and the future neighborhood focus area at 35th. From there, the corridor crosses a currently mostly rural gap to a future neighborhood focus area on 53rd extending from West Hills Road to south of Philomath Boulevard. Eventually this corridor could be extended to Philomath if future development meeting primary corridor criteria occurs

between Corvallis and Philomath. By themselves, the residential development on the north side of West Hill Road west of 53rd Street, Grand Oaks Summit, and the adult living facility near it are too far off the existing system and do not have the necessary street network design to support the primary transit service deviation that would be required.

The segment of West Hills Road between 35th and 53rd is an obvious area where additional high-density development will be appropriate if the street remains a primary corridor.

WITHAM HILL/35TH-36TH STREETS

North of Jefferson, the 35th-36th Street corridor extends through some low-density residential areas and then continues as Witham Hill Road, which serves an area of dense apartments near Circle Boulevard. After another low-density gap, Witham Hill ends at Walnut Boulevard in another area of high-density apartments.

The area just west of the apartments at Witham Hill and Circle provides one of the few opportunities for development along this corridor. If the corridor is to be primary, as the current apartments justify, then additional density in this area is appropriate.

KINGS/MONROE

Kings Boulevard is a textbook primary corridor based on the diversity and density of existing development. Extending from downtown (as Monroe Avenue) the corridor serves the north side of OSU and many apartments and small businesses, then extends north past several commercial developments (including a Fred Meyer) and more apartments to the anchor provided by the Timberhill Shopping Center.

WALNUT/CIRCLE

From Witham Hill Drive in the west to the Hewlett-Packard campus in the east, Walnut Boulevard is lined mostly with apartments and commercial uses, including Timberhill Shopping Center. As such, it is logical to continue service from the Witham Hill corridor eastward through this corridor. Hewlett-Packard combined with the K-Mart, Staples, Safeway, Carmike 12 cinema complex and small commercial uses at Circle and Highway 99W form an eastern anchor. Service would continue from this point into Corvallis via the 9th Street or Highland corridor (see below).

Circle Boulevard has mixed density residential, strip commercial, the aquatic center, Boy's and Girl's Club and the Linus Pauling middle school along it. Circle also provides for an east-west connection between the primary corridors on With Ham Hill, Kings Boulevard, Highland Drive and 9th Street.

Between Satinwood and 9th Street, two alternate alignments of this corridor area shown. One follows Walnut, while the other deviates to serve the Good Samaritan Regional Medical Center. While a regional medical center is a major transit destination and should be on the primary network, the Good Samaritan Regional Medical Center is unfortunately very remote from other transit destinations and out of the way for all other trips, which makes it awkward for transit to serve.

The service concepts presented in this chapter all show Primary service to the Good Samaritan Regional Medical Center, including along Satinwood Drive, at the expense of imposing a deviation on trips from the Hewlett-Packard area to northwest Corvallis. Alternatively, the Good Samaritan Regional Medical Center may be served by a radial corridor from downtown, intersecting with the Walnut corridor but not continuous with it.

9TH STREET AND/OR HIGHLAND

Between downtown and 9th and Circle, a north-south primary route is required. This could be either on 9th Street or on Highland. Highland is lined with greater residential densities, while 9th Street is characterized more by commercial activity. The aquatic center at Circle and Highland is also an important destination, as well as the adjacent Boys and Girls Club and the Linus Pauling Middle School. Ninth Street has the advantage of being faster for trips from downtown to Hewlett-Packard and 9th Street businesses since it is an arterial street, whereas Highland Drive is a collector and has traffic calming devices and two school zones on it. Ninth Street, since it serves mostly commercial uses is convenient to most of the densities in this area. Primary service may be appropriate on both streets, since they do not overlap in most of the markets served.

53rd ST/TECHNOLOGY LOOP/PHILOMATH BVLD

Fifty-third Street is a county road under Benton County jurisdiction and Philomath Blvd. is a state highway under ODOT jurisdiction; any changes to these roads related to transit must be coordinated with and approved by the appropriate agency. A primary corridor will serve the vicinity of Technology Loop and 53rd Street south of Philomath Boulevard. This area has high-density residential on and adjacent to Technology Loop and backs up against the Sunset shopping center at the corner of 53rd and Philomath Boulevard. The shopping center has expanded to include Safeway, Bi-Mart, a video store, restaurants, and other commercial activity to serve as an anchor for this area. Multi-family residential properties include ADA accessible units for persons who use mobility devices such as wheelchairs or motorized scooters.

4.2.5 Secondary Coverage Segments

RESEARCH WAY

Research Way, east of the anchor between Technology Loop and Philomath Boulevard, may be too circuitous to be a primary route and the employment centers are not dense enough to support primary service all day. However, at least secondary service is clearly required here. Research Way also provides a connection between Technology Loop and Country Club Road.

29th STREET

Twenty-ninth Street lacks the residential densities of either Kings or 35th/36th/Witham Hill, and most of the area served is also within walking distance of one of those primary corridors. However this corridor has close proximity to the Corvallis Senior Center, the Benton County Health Department building, some high density housing along 29th Street, a commercial center that has been growing at the intersection of 29th Street and Grant Avenue and an elementary school (Jefferson) located close to the corridor at 27th and Circle. For those reasons, this street is identified as a secondary corridor. If the ridership data gathered by the auto-passenger count system shows high usage, this corridor could become a primary corridor.

5th STREET/BUCHANAN

This segment requires some service to the residential areas and commercial uses along the roadway and serves the Corvallis High School. This corridor also provides a network connection between downtown, 9th Street and Kings Blvd. However, there are enough other primary corridors in the area that this corridor should be identified as secondary.

HARRISON (DOWNTOWN TO 53rd ST)

This segment is a major arterial street and requires some service between the downtown to the residential and commercial uses along the roadway. This corridor provides an east/west network connection between downtown, 9th St, Kings Blvd, 29th St, 35th/36th St. and 53rd St. Service could be provided anywhere along Harrison, so all of it should be identified as a secondary corridor.

CONIFER/CONSER

Conifer Drive in northeastern Corvallis is a densely developed residential area with Cheldelin Middle School and Village Green park near the eastern end of the city portion of the street. Primary service on this street would be desirable, but such service lacks a clear anchor. Conifer Drive leads out of the City to the east so the secondary corridor uses a loop with Conser as the connection between Walnut and Conifer. For this reason Conifer and Conser Drive are identified as a secondary corridors.

BETHEL/THOMPSON/PARK

This area of predominantly single-family houses has neither the population nor the commercial density to sustain primary service. The largest existing ridership generator is a work-training facility for persons with disabilities, located on Crystal Lake Drive, about 1/4 mile east of the highway. However, the poor street connectivity makes it difficult to access Highway 99W from much of the area. The 2005 bus service uses SE Ryan as the north/south connector between Park and Alexander, but since it is classified as a local street and Thompson is a collector, SE Thompson is designated as part of this secondary corridor rather than SE Ryan. Making this change will require the relocation of bus stops and one shelter. As a secondary corridor, service would provide access to residents in this area both to downtown and the OSU campus.

CRYSTAL LAKE DRIVE (PARK TO SOUTH 3RD STREET)

This roadway is a mix of city street and county road. It has long sections constructed to a rural county road standard and will not support buses. However, Crystal Lake Drive may make a good north/south connection along the east side of the residential developments in southeast Corvallis and runs along the training facility and commercial/industrial businesses. When Crystal Lake Drive is improved to urban collector standards, or better, it could replace the Bethel/Thompson portion of the secondary corridor discussed above. It is not anticipated that either residential developments or commercial developments in the future would justify primary transit service on this corridor.

GOODNIGHT/MIDVALE/RIVERGREEN

This segment requires some service to serve the mixed density residential developments in this area of Corvallis. It also provides the end loop for the South 3rd Street primary corridor, with the high density housing serving as the anchor.

35TH STREET (JEFFERSON TO COUNTRY CLUB RD)

This segment requires some service to OSU and the Environmental Protection Agency offices, the residential areas and the 509-J School District office and Adams school. This corridor, combined with the Research Drive

secondary service, provides a network connection between southwest and northwest Corvallis. However, there are enough other Primary corridors in the area that this corridor should be identified as Secondary.

COUNTRY CLUB RD (35th STREET TO 53rd STREET)

This segment requires service and a network connection. The service needed is primarily residential, both high density and low and services a large adult-living facility. It provides a useful east-west connection for this part of the community. The densities and the lack of a major service anchor, however, make this a secondary rather than a primary service corridor.

53rd STREET COUNTRY CLUB RD TO TECHNOLOGY LOOP

This segment is under Benton County jurisdiction, so transit issues should be coordinated with the county. This segment provides service and a network connection. Along 53rd Street are mixed residential densities including a high density development at the intersection with Country Club Dr. This segment also provides the network connection between Country Club Rd and Technology Loop. No criteria for a primary corridor is met for this short segment and so it is designated as secondary.

53rd STREET (WEST HILLS TO WITHAM HILL RD)

As stated above, 53rd Street is a county road and issues need to be coordinated with the county. This segment has very little residential or commercial development along it and would be a secondary corridor primarily because it provides a north/south network connection between southwest and northwest Corvallis. There is some residential demand along this segment, along with the Benton County Fair Grounds and a small commercial center, so it is likely that the service will be used here, but it is expected to be a relatively high speed section with few stops.

4.2.6 Lower-Density Areas

Areas lacking the density to support even Secondary service generally have no fixed route service in the long-range plans unless service can be extended to them at no cost. The only services that would be appropriate in these areas would be demand-responsive or dial-a-ride access for the general public. This service can be attractive, but it is intrinsically very unproductive, never exceeding 10 boardings per hour compared to 20 boardings per hour or higher for an effective fixed route. For this reason, demand-responsive service may be considered as an option for these areas, but it cannot be expected to serve as a long-range transportation strategy that will substantially affect transit's mode share or auto use.

SERVICE ROUTES

In most cases, the emphasis on primary and secondary corridors will enhance mobility by offering fast and convenient services throughout the area. However, some people will not be able to access the fixed route system because physical or mental limitations do not allow them to reach transit unless it provides curb-to-curb service. The Corvallis Paratransit Service will continue to provide service to those persons with disabilities who cannot access fixed routes. It may also be viable to operate "service routes", which are fixed or semi-fixed routes that link a number of trips that would otherwise be served by Corvallis Paratransit Service. With smaller, low-floor vehicles, a "service route" could serve in places where traditional fixed route vehicles simply cannot fit or where

the routing would be prohibitively long and expensive. If there is a sufficient number of trips that are not highly time-sensitive and can be linked, this would allow mobility needs to be met at a lower cost. "Service routes" may also serve the general public if appropriate. Where "service routes" offer potential savings without unreasonable inconvenience for transit patrons, they should be explored as an option.

LOW-DENSITY AREAS WITHIN THE CURRENT CITY LIMITS

In addition, a few areas now served by CTS have not been identified as requiring any fixed route service in the long term either because:

- the development is too sparse, or
- the streets are not adequately constructed to support transit service, too slow and circuitous for efficient transit operations, or
- they are too close to other primary services, which will draw most passengers from these areas.

In most cases, all three of these are true. Fixed route transit service along these streets does not appear to be essential in the long term. Some of these areas may continue to be served in the short term., but this does not imply that there is an adequate demand for fixed route service in these areas, given the present and envisioned development.

4.3 MAJOR TRANSIT CENTERS AND IMPACTS

4.3.1 Downtown Transit Center

A Downtown Transit Center is needed in any scenario, including an expansion of the existing transit center. The Downtown Transit Center must continue to be a location that buses can enter and exit quickly and safely, and also to park for timed-transfer connections and driver breaks. As frequencies increase, CTS will become increasingly sensitive to access time. For example, looping out of direction to serve a transit center is a small hassle on an hourly route, but a much larger one for a route running every 15 minutes. Frequency compounds the problems in any route design, both for passengers (because there are more of them) and for the transit operator (because a difficult, unsafe, or delaying movement must be made more often each day).

Apart from bus stops themselves, the most difficult, unsafe, and delaying part of transit operations are stopping (for passengers, other pedestrians, bicyclists, motorized vehicles, stop signs, or traffic signals) and turning. For this reason, frequent routes need to keep stops and turns to a minimum. Any transit center should be evaluated partly in terms of how many turns and stops it imposes on the frequent Primary routes that serve it. The off-street transit center may still want to have an on-street portion for some or all Primary routes to reduce the delay of looping through an off-street site. This could result in a shift of the current routes using the transit center.

The Downtown Transit Center is a major transfer point and includes amenities for passengers to wait safely and comfortably. Essential transit center amenities include shelters, benches, bike parking facilities, information kiosks, and driver restrooms. The bike lockers and racks provide a "park and ride" for bicyclists who ride to the center and then access CTS, the Linn-Benton Loop and/or the Philomath Connection. Dedicated driver restrooms are necessary to ensure that drivers do not waste limited break time waiting for restroom access, which risks delaying their departure. There are also distinctive and prominent bus stop signs to clarify which bus stops at which location.

A good transit center also provides other amenities that allow passengers to make good use of their time. Transit center sites should encourage small scale vendors or food and drink and provide a public phone, newsracks, etc. The City is pursuing a vendor for its site and it should be staffed by June 2005.

Several cities have developed integrated multimodal transportation centers that combine the local transit center function with Greyhound and other intercity services. These are often located at rail stations, even where no passenger rail service exists, so as to support future rail planning efforts. However, integration with Greyhound tends to be more valuable in generating ridership in the short term. Greyhound-generated traffic can also increase the potential for vendors, who in turn contribute value to the transit rider's waiting time. The existing Downtown Transit Center serves the Corvallis Transit System, Philomath Connection, and the Linn-Benton Loop. The Greyhound station, which also serves the Valley Retriever, is less than two blocks from the transit center. Additionally, the Downtown Transit Center is located adjacent to the railroad line that leads to Albany and Philomath, supporting any future passenger rail service between the region.

4.3.2 OSU Transit Access

Effective service to OSU is fundamental to the long term success of CTS and, hence, to CTS's ability to serve the rest of the City. Likewise, CTS has an important role to play in supporting OSU efforts to reduce parking demand on campus, which will reduce campus traffic and open up more land for OSU expansion.

From the standpoint of transit, the "center" of Corvallis includes both downtown and the campus core of OSU. These areas together form the overwhelming focal point of transit demand in the City. As a result, the core of the CTS system must be not just the Downtown Transit Center, but an east-west axis running from downtown west, serving OSU to at least 35th Street. All the service scenarios envision very frequent service along this axis. In the High Scenario, service along the axis would be every 7 ½ minutes all day, so that it would serve an important shuttle function for local trips within the campus and between the campus and downtown. Even the short-term improvements would provide 15-minute service on a portion of this axis from downtown to Kings Boulevard.

Given the City's high degree of investment in transit access and its mutual benefits to OSU and the City, an east-west corridor near the core of the OSU campus should be established and improved to maintain efficient transit access, while also serving pedestrian, bicycle, and delivery needs. The current operations on Jefferson are excellent from the standpoint of transit access, however the speed bumps west of 26th Street excessively slow the buses and should be removed or replaced with speed humps. The traffic through the OSU core is slowed by not only the speed bumps and humps, but by the congestion caused by bikes and pedestrians crossing the street at locations other than intersections, or other controlled crossings. OSU should be advised to consider creating street-side obstructions to crossings, such as bushes or other landscaping or fences to better control where crossings are safe and desired. This street provides a degree of access that is not available by car and is a good example of the facilities that may be needed in the future to protect transit from congestion.

As OSU grows, accommodating buses along Jefferson may become increasingly difficult since their interactions with bicycles, pedestrians, and other modes can be problematic. Regarding transit access, the City's position toward OSU should be as follows:

- CTS must have access to the campus that is much more direct than that provided by available parking. Moving all buses from Jefferson to a less central street would be appropriate only if parking is even less convenient to the campus core and there is an effective and efficient on-campus shuttle service available to students, faculty, staff and the general public. There must be efficient and coordinated transfers between the on-campus shuttle and CTS. Currently, parking is available at very central locations, so that any removal of CTS service would reduce transit's ability to compete with the car.

- CTS must be able to travel through the campus in a reliable way. A low average speed is acceptable, consistent with the need to interact with bicycles and pedestrians. However, it must be possible to pass through the campus in a consistent amount of time so that campus-generated disruptions do not undermine the rest of the CTS system. To this end, appropriate transit preferences should be considered.[13]
- The City should encourage any and all OSU policies that reduce the attractiveness of driving to the campus, especially for students, so as to maximize the ridership return for the City's considerable investment.

4.3.3 Timberhill Shopping Center

Outside of downtown and OSU, one of the busiest transfer points in the system is at the Timberhill Shopping Center. Although not currently laid out for optimal transit access, it is possible to operate reasonably good service through the Timberhill area. Before the High Scenario is implemented, it will be important to study possible circulation improvements around Timberhill to reduce running time.

Pending an improvement that would provide more direct east-west access, the following appears to be the best possible arrangement:

- Service passing through westbound on Walnut would turn left on Rolling Green, and right on Kings to serve the northbound stop on Kings adjacent to the shopping center, then left on Walnut.
- Service arriving from the south along Kings would stop at the northbound stop on Kings adjacent to the shopping center, then loop clockwise via Walnut and Rolling Green and back south on Kings.

4.3.4 West Campus Transfer Point

Finally, a small, but valuable, transfer point will emerge northwest of the OSU campus, where the radial primary service from downtown to Witham Hill intersects secondary routes extending north on 29th Street and south on 35th Street. This transfer point would be used for trips between southwest and northwest Corvallis. Eventually, the 29th and 35th routes might be combined into a continuous crosstown route (Research Drive to Timberhill) instead of going downtown, which would require downtown-oriented passengers to transfer at this point. Because the routing of the Witham Hill primary corridor is uncertain, the exact location of this transfer point cannot be determined. However, when the site is established, appropriate on-street facilities should be planned, including safe pedestrian crossings between connecting bus stops at an intersection.

4.4 SERVICE CONCEPTS FOR LOW-DENSITY AREAS

Both the High and Low Scenarios constrain fixed route service to the area where dense development is envisioned. Fixed route service is generally supported by household densities of 7 units per acre or greater over

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[13] One strategy that is increasingly common on campuses is to provide clearly marked and curbed streets for bikes, transit, and delivery vehicles even where autos are excluded. These streets have parallel pedestrian paths and pedestrians are discouraged in the streets except at clearly marked crossings. OSU and the City should work together to ensure that all modes are given appropriate priorities within the campus.

a contiguous area of ½ square mile or more, and also by any significant commercial development. Primary fixed route service requires even higher density.

The City already contains some areas that are fully developed at too low a density to support fixed route service. The largest example is the hillside area extending west from Brooklane Drive. If the City continues to develop as envisioned in the land use concept, with dense development encouraged only along the proposed Primary corridors, then significant new areas of low-density development may still occur in areas with no transit service. As a result, the fixed route transit system will not serve every resident directly.

Some people perceive this as an "equity" problem since all residents pay for service through property taxes.[14] On the other hand, the point of the transit system may not be to serve every resident but to achieve benefits in air quality, congestion mitigation, open space preservation potential, and economic development that benefits all residents. Not all residents can be served equally in an efficient manner. If a transit system expends too much service trying to reach residents who are hard to serve because of low density, then less service can be spent in the most intensive corridors where it will receive the heaviest use and, thus, serve the most people and do the most for the community's goals of air quality, reduced traffic, etc.

Every community must make this judgment for itself. This plan puts the highest priority on maximizing ridership and competing most effectively with the automobile. As a result, it achieves the maximum possible benefits for air quality, congestion mitigation, open space preservation potential, etc. for the unit of investment

The City may wish to provide some transit access to the low-density areas, even though they do not support fixed route service. This could be done either by:

- providing fixed routes to those areas knowing that they will be unproductive.
- providing general-public, demand-responsive service to those areas. This kind of service tends to be more popular and more heavily used in low-density areas, but still achieves very poor performance compared to fixed routes in denser areas.
- providing opportunities for convenient park-and-ride access to the fixed route system for residents of low-density areas.
- peak hour service only

The last of these strategies is always the most cost-effective, because it requires only a small, one-time capital investment and avoids the on-going operating cost of unproductive service. On the other hand, park-and-ride is effective for short, intracity trips only if there is a strong disincentive to parking at the intended destination combined with other disincentives to drive.

If the City chooses to provide actual transit service to areas developed below seven (7) units per acre, despite the loss of system productivity that will result, then the recommended strategy is "fixed point dial-a-ride". Under this strategy, demand-responsive service is provided within a designated zone. Service is available for local trips within that zone and also for trips to a fixed point where connections to the rest of the transit system are available.

A good "fixed point" should satisfy three criteria: it must (1) be adjacent to the dial-a-ride service area, (2) provide connections to many fixed routes, and (3) attract transit trips itself.

For example, a demand-responsive service covering the area north of Walnut might use Timberhill as its "fixed point" destination. It would serve that point at the same time each hour to make connections with local routes.

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[14] Only landowners pay property taxes directly, but renters pay them indirectly as part of their rent.

Passengers could board the bus at its scheduled time and request to be taken to any destination in the zone. Passengers originating in the zone would call for a ride at least an hour in advance. Before leaving the fixed point each hour, the driver would plan a routing that drops off the passengers who have boarded and picks up those that have requested service during the hour.

Again, devoting resources to demand-responsive service instead of core-area fixed route service will reduce the overall effectiveness of any transit strategy in meeting city-wide and regional goals. They should be developed only if they are considered essential for equity purposes or if they can be funded in a way that does not compete with the system of Primary and Secondary fixed routes. For this reason, these services are not explicitly proposed as part of this plan.

4.5 TRANSIT IMPACTS OF MORE DECENTRALIZED DEVELOPMENT

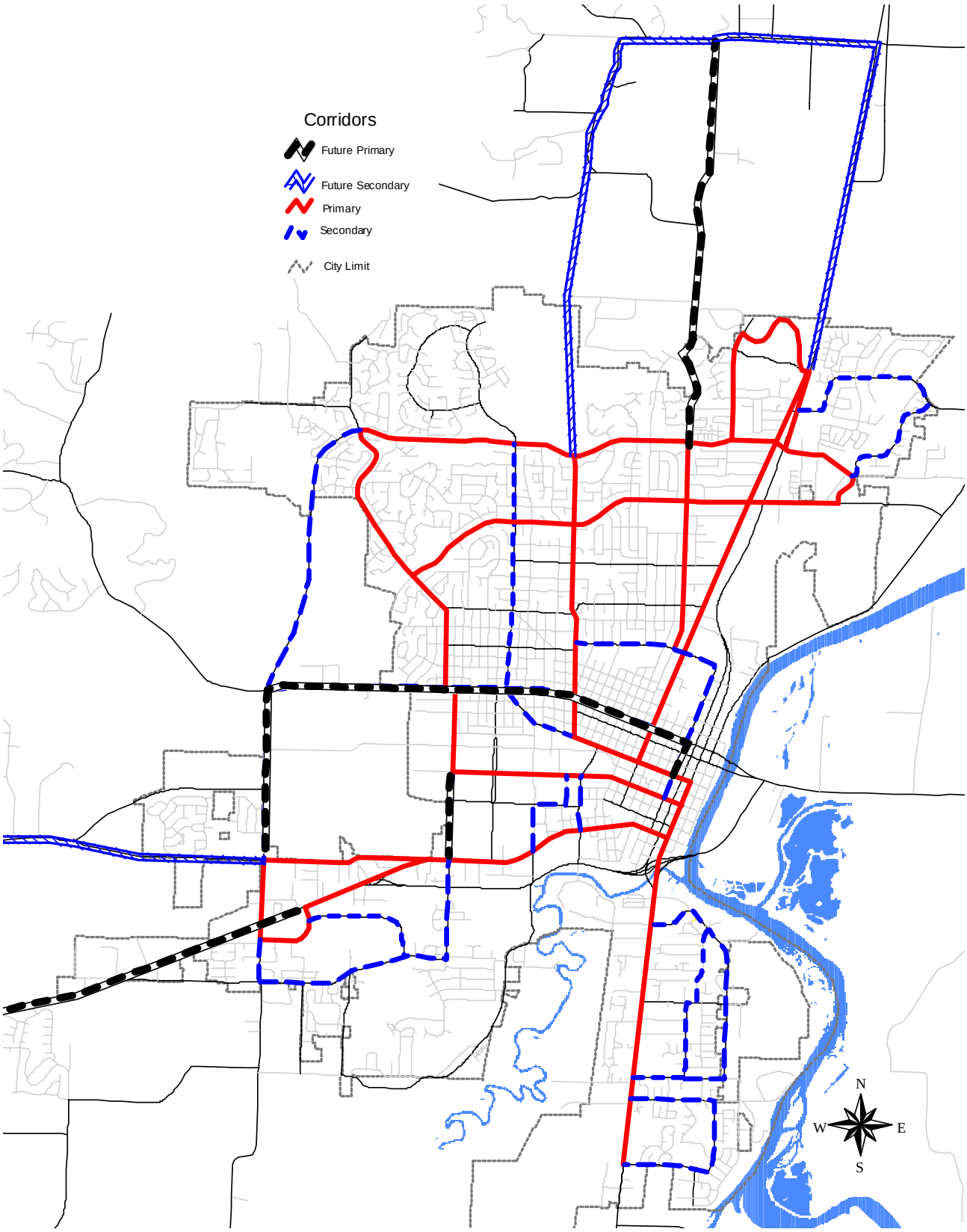
The core idea of this plan is to devote the highest level of transit service to the most efficient land use. For the most effective possible plan, it has been assumed up to this point that increases in development, with accompanying increases in density, would all occur in areas already served by transit. This is consistent with the intensive Land Use/Transit concept developed as part of the Transportation Alternatives Analysis (TAA). Under this concept, very low density development would be permitted in the North Corvallis and West Corvallis urban fringes but not enough to require extension of transit services. The Land Use Analysis in the TAA showed that the projected population growth of the next 20 years could in fact be accommodated in this way.

However, transit-oriented development may not occur so compactly but, instead, may be extended into the urban fringe. To the North, there is considerable land between the city limits and Lewisburg Avenue, near the northern Urban Growth Boundary (UGB). To the West, there are several square miles near the Benton County Fairgrounds that are within the UGB. These areas do not support transit now but could develop in a way that would require extensions to the proposed networks.

The West Corvallis and North Corvallis plans show extensive growth in these areas, including new neighborhood centers with some residential density. This growth would require CTS to extend substantial amounts of service into these new areas, possibly including some primary corridors.

In order to adequately serve these new areas, should development occur, the route additions and extensions (shown in Figure 4-2) would be necessary. These extensions would not generate much additional ridership, since the overall population would be similar to the more compact growth scenario. Extension of transit services to these areas would cause approximately $180,000 to $250,000 (2005 costs) increase in the costs of the system for each extension.

Figure 4-2 Future Extensions



4.5.1 North Corvallis (80-year plan, final draft July 27, 2001)

Three north-south Secondary routes would provide access from these areas to Timberhill, the Good Samaritan Regional Medical Center, and the rest of Corvallis. One of these routes would serve as a primary route, with either 15- or 30-minute headways depending on budget and actual development densities. The other two would serve at 60-minute headways.

The City of Corvallis' Comprehensive Plan gives a hint as to the pattern of development in this northern area if significant development occurs. The North Corvallis plan identifies three Major Neighborhood Centers: (1) Timberhill builds upon the existing neighborhood located at the intersection of Walnut and Kings Boulevards. The center's expansion north of Walnut is proposed to include Professional Office and Medium and Medium-High Density Residential, located primarily north and northwest of the Kings Boulevard extension. (2) The Lewisburg Neighborhood Center is proposed to be located west of Highway 99W along Lewisburg Road. This center is proposed as a mixed-use employment and transportation center and includes development of a new north-south collector street west of Highway 99W to avoid strip development along the highway. (3) The Crescent Valley Neighborhood Center is proposed to be located south of Crescent Valley High School at the crossroads of Highland Drive and a new east-west collector to include a focus on educational and recreational activities. The core would include Mixed-Use Commercial, surrounded by Medium-High and Medium Density Residential.

Given that most of any new dense development would likely occur in the "intensive" major neighborhood centers, the following new route segments would be necessary:

- Timberhill to Lewisburg via an extended Kings Boulevard. This would be a secondary route.
- From Timberhill via Highland to Lewisburg, serving Crescent Valley High School on the way. Because it most directly serves two Major Neighborhood Centers (Crescent Valley and Lewisburg) and a Minor Proposed Minor Neighborhood Center at Highland and Lewisburg Road, this route would offer primary service.
- Good Samaritan Regional Medical Center to Lewisburg via Highway 99W. This route would be secondary.

With adequate pedestrian connections, the above routes would provide transit service no more than ½ mile away from all development in this area.

4.5.2 West Corvallis

If development in West Corvallis follows the West Corvallis - North Philomath Plan dated July 1996, expanded transit service would be needed along West Hills Road and 53rd Street. Major neighborhood village/centers would be located at the intersections of an arterial street and a collector street. Major neighborhood villages/centers are proposed for the intersections of 35th and West Hills Road, West Hills Road and 53rd, as well as 53rd and Harrison Boulevard.

The intersections of 53rd and Harrison, 35th and West Hills Road, and 53rd and West Hills Road are already served by the two routes that serve the Sunset Shopping Center along West Hills Road from 35th to Western and along 53rd from Harrison south to Technology Loop or Country Club Drive. A future primary corridor is, therefore, shown in this area.

Since the adoption of the West Corvallis - North Philomath Plan, the Sunset Shopping Center has developed into a major neighborhood center at the intersection of Philomath Boulevard and 53rd. The shopping center includes a grocery store, pharmacy, restaurants, hardware and other specialty stores at the core. Several large, high-

density residential complexes have been developed to the south of the center, including apartments serving students, residences serving low-income persons, and a senior and assisted living retirement center. This neighborhood center is served by two transit routes, providing 30-minute service to the area. Additionally, the Philomath Connection transit service also serves the area, adding another alternative for residents in the area to travel to and from the OSU campus and downtown Corvallis.

4.6 SERVICE SCENARIOS

What does all this service cost? That depends on the exact level of service that is achieved. This section quantifies the range of transit services that may be possible or appropriate, given the layout of service corridors outlined above. The scenarios are summarized in Figure 4-3.

4.6.1 Low Scenario: 30-Minute Primary Headways

The Low Service Scenario shows the minimum level of service growth needed to give priority to all the primary corridors. This system would provide *consistent 30-minute headways* on most primary corridors, with 60-minute headways on secondary corridors. Thirty-minute headways are not adequate to compete effectively with the automobile, but they would improve the attractiveness of service to users in the densest parts of the City.

In addition, the Low Scenario provides a net 15-minute headway along Monroe Street between Kings Boulevard and 5th Street, so that the service can also be used for short trips in this core area.

The Low Scenario slightly expands the service span by adding weekday evening service until 11:00 p.m. on the primary network. This improvement is important to provide a transit system that people can rely on for most of their trips, so as to encourage lower auto ownership within the City. In the Low Scenario, these evening services are offered only when OSU is in session, consistent with the practice many systems that serve a large university employ. No Sunday service is offered in the Low Scenario.

The Low Scenario is a very modest system expansion. It requires 9 buses (plus 2-3 spares) running in all-day service, compared to the present six (plus 2 spares and the trolley). As such it represents roughly a 70 percent increase of the present level of service.

4.6.2 High Scenario: 15-Minute Primary Headways

The High Scenario presents the highest level of service that might be desirable in Corvallis in the next 20 years. This system features 15-minute headways all day on the primary corridors. In addition, by offsetting their schedules, two routes would combine to provide *consistent 7 1/2-minute headways* along Monroe Street all the way from downtown to Monroe and Kings (the most active OSU stop on Monroe), giving very convenient service to this foundational primary corridor.

Fifteen-minute headways require doubling of service hours (and operating costs) compared to 30-minute headways. However, 15-minute service is also qualitatively different because it provides much better connections between routes. When buses run every 15 minutes or better, passengers can transfer quickly wherever routes cross. By contrast, in a system of 30- or 60-minute headways, connections must be deliberately scheduled, as they are at the Downtown Transit Center. The High Scenario, then, provides a much more decentralized system of service, where many more trips can be made quickly without going downtown.

The High Scenario also expands the service span. Evening service on the primary network runs all year, instead of just during the OSU year as in the Low Scenario. Sunday service is also added on the primary network.

Of course, the High Scenario represents a dramatic service expansion above the present level of service. Its fleet requirement of 18 buses (plus 4-5 spares) is double that of the Low Scenario and more than twice the size of the fleet today. The overall operating cost would also be more than twice that of the present service, if operating costs remain the same per revenue hour since all routes would be a minimum of 30 minute headways, requiring more buses on the street.

The High Scenario is a large expansion, but it is consistent with the levels of service now being offered in many cities comparable to Corvallis. As Chapter 2 makes clear, many cities of Corvallis's size provide 150% or more annual hour of service per capita than Corvallis with Davis, CA providing over 1.0 hour per capita. Corvallis's current system offers 0.38 hours per capita, one of the lowest service intensities of any peer city. Even the High Scenario would amount to just over 1.0 annual hours per capita, still below the service level offered in Davis.

The High Scenario could only be implemented in the context of a much more generous funding environment, including a state funding source for transit operations. Most of the higher service levels of peer systems in Washington and California would not be possible without a state funding source.

Figure 4-3 Bus Requirements and Revenue Hours by Scenario

BUS REQUIREMENTS AND REVENUE HOURS BY SCENARIO *

LOW SCENARIO

30 Minute Headways on Primary Corridors, 60 Minute Headways on Secondary Corridors

WEEKDAY DAYTIME 6:30 AM to 11:00 PM FOR 9 MONTHS						WEEKDAY DAYTIME 6:30 AM to 7:00 PM FOR 3 MONTHS						SATURDAY 9:30 AM to 5:00 PM FOR 12 MONTHS						ANNUAL HOURS
Route	Round Trip (min)	Span (hours/day)	Frequency	Buses	Daily Hours	Route	Round Trip (min)	Span (hours/day)	Frequency	Buses	Daily Hours	Route	Round Trip (min)	Span (hours/day)	Frequency	Buses	Daily Hours	
1	60	16.2	30	2	31.4	1	60	12.8	30	2	24.6	1	60	7.3	60	1	7.3	8,067.6
2	30	16.3	30	1	16.3	2	30	12.3	30	1	12.3	2	30	6.5	60	0.5	3.3	4,207.0
3	30	16.3	30	1	16.3	3	30	12.3	30	1	12.3	3	30	6.5	60	0.5	3.3	4,207.0
4	30	16.0	30	1	16.0	4	30	12.5	30	1	12.5	4	30	6.5	60	0.5	3.3	4,154.0
5	30	16.3	30	1	16.3	5	30	12.8	30	1	12.8	5	30	6.9	30	1	6.9	4,421.8
6	30	16.5	30	1	16.5	6	30	13.0	30	1	13.0	6	30	7.0	30	1	7.0	4,479.0
7	60	16.5	60	1	16.5	7	60	12.5	60	1	12.5	7	60	7.5	60	1	7.5	4,480.0
8	30	16.0	30	1	16.0	8	30	12.5	30	1	12.5	8	30	7.5	60	0.5	3.8	4,180.0
				9	145.3					9	112.5					6	42.2	38,196.4

HIGH SCENARIO

15 Minute Headways on Primary Corridors, 30 Minute Headways on Secondary Corridors

WEEKDAY DAYTIME 6:30 AM to 11:00 PM FOR 12 MONTHS						SATURDAY 9:30 AM to 11:00 PM FOR 12 MONTHS						SUNDAY 9:30 AM to 5:00 PM FOR 12 MONTHS						ANNUAL HOURS
Route	Round Trip (min)	Span (hours/day)	Frequency	Buses	Daily Hours	Route	Round Trip (min)	Span (hours/day)	Frequency	Buses	Daily Hours	Route	Round Trip (min)	Span (hours/day)	Frequency	Buses	Daily Hours	
1	60	16.2	15	4	62.8	1	60	13.3	30	2	25.6	1	60	7.3	30	2	13.6	18,366.4
2	30	16.3	15	2	31.6	2	30	12.5	30	1	12.5	2	30	6.5	30	1	6.5	9,204.0
3	30	16.3	15	2	31.6	3	30	12.5	30	1	12.5	3	30	6.5	30	1	6.5	9,204.0
4	30	16.0	15	2	31.0	4	30	12.5	30	1	12.5	4	30	6.5	30	1	6.5	9,048.0
5	30	16.3	15	2	31.6	5	30	12.9	30	1	12.9	5	30	6.9	30	1	6.9	9,245.6
6	30	16.5	15	2	32.0	6	30	13.0	30	1	13.0	6	30	7.0	30	1	7.0	9,360.0
7	60	16.5	30	2	32.0	7	60	13.5	60	1	13.5	7	60	7.5	60	1	7.5	9,412.0
8	30	16.0	15	2	31.0	8	30	13.5	30	1	13.5	8	30	7.5	30	1	7.5	9,152.0
				18	283.6					9	116.0					9	62.0	82,992.0

*** The design of the 2004-05 route system was used as a basis for these estimates. Route designs to fit these service scenarios are likely to be different**