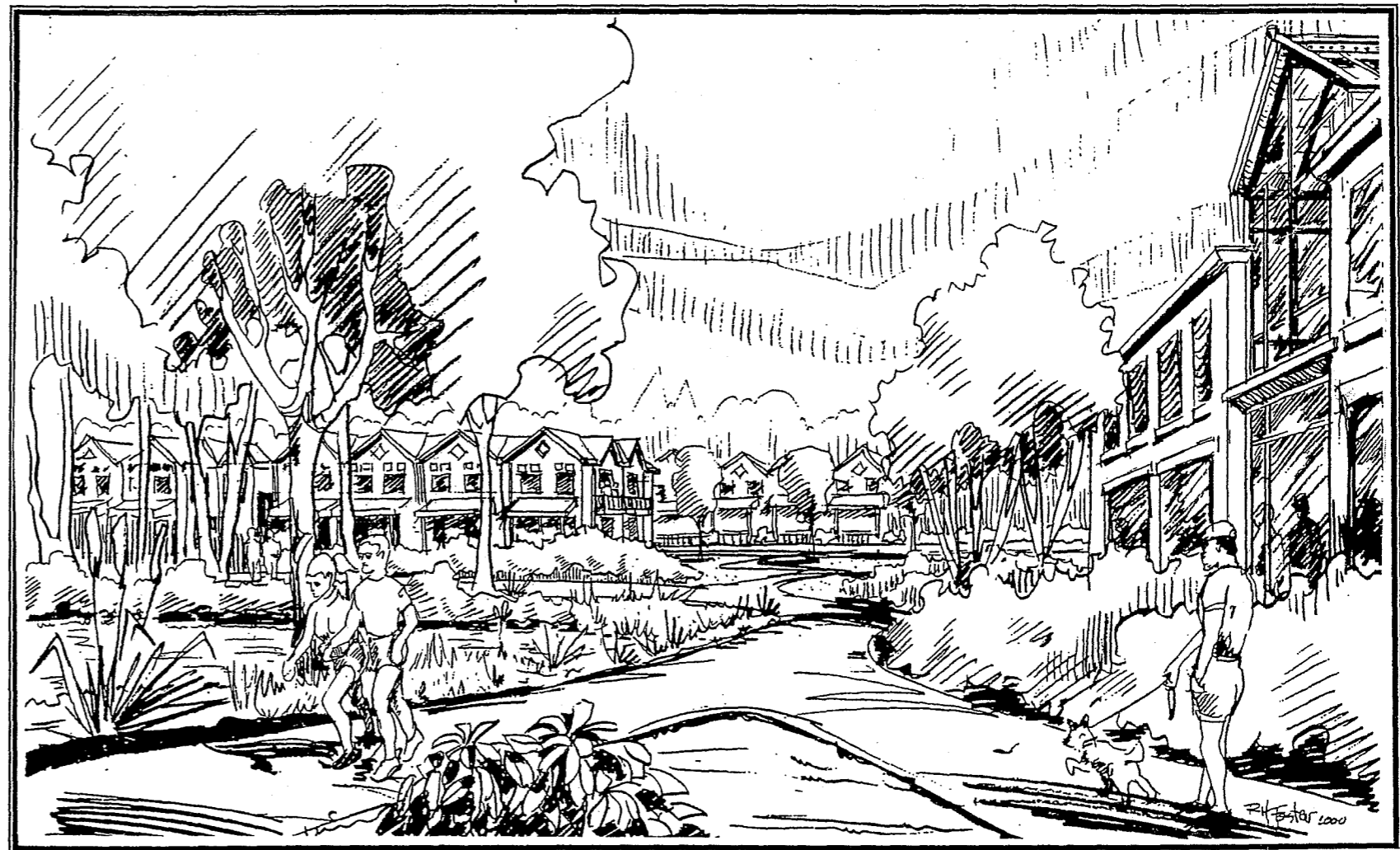


CITY OF SHERWOOD SOUTHERN EXPANSION CONCEPT PLAN



COMMUNITY
DISCUSSION
DRAFT
August 1, 2000

WESTLAKE
CONSULTANTS^{INC}



ACKNOWLEDGMENTS

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PROJECT SPONSORSHIP

*Funding and technical
support for this project has
been provided by METRO
(Metropolitan Service
District) and the City of
Sherwood.*

The City of Sherwood and Metro sponsored and funded this study focusing on land areas immediately south of the City's existing urban growth boundary (UGB), which is also the regional UGB and Metro jurisdictional boundary. The purpose of the project was to develop a vision for future land use, transportation, utilities, and public services in the area.

The Steering Committee offers this Discussion Draft to the community to help citizens, agencies, and decision-makers identify opportunities and issues of concern, and to consider the relative benefits and potential problems associated with future urbanization.

The planning process included an open house and two workshops in which citizens identified issues, discussed the area's potentials, and reviewed conceptual land use/transportation alternatives prepared by the consultant team (Westlake Consultants, DKS Associates, and Leland Consulting Group). Following the workshop series, the Steering Committee and Advisory Committee met in two joint work sessions to identify a preferred alternative land use/transportation scenario.

Resource protection for wetlands and stream corridors within the study area was assumed to be based on Metro's Title 3 inventory method, with a 200-foot-wide protective corridor assumed along streams and around wetlands. Analysis of the City's existing water, sewer, and stormwater management systems indicates that these systems will have adequate capacity to accommodate the expansion area as long as attention is paid to the design of system extensions into the area. (Note, however, that there are two segments of Unified Sewerage Agency (USA) sanitary sewer transmission lines that will need to be upgraded to accommodate the flows predicted in the existing City sewer plan, irrespective of the southern expansion.)

Key Recommendations

- ◆ Several adjustments to the proposed expansion area boundary are recommended. At some locations, urbanization is proposed in order to support efficient urban development; in other areas, the study recommends that land remain ineligible for urbanization, at least until permanent public facilities services are available.
- ◆ An east-west roadway, providing a link between Pacific Highway 99W and Baker Road, and potentially extending east to connect with Interstate 5, is essential. This roadway will be needed for

EXECUTIVE SUMMARY

adequate local circulation in the expansion area; however, this desire may conflict with Metro's Regional Transportation Plan (RTP) designation of a limited-access highway between 99W and I-5 in this vicinity.

- ◆ A mixed-use "village center" in the southwestern part of the expansion area can provide a concentration of employment and retail/service businesses at a scale appropriate to serve the local neighborhood area. The existing rail line, Pacific Highway 99W and the proposed east-west roadway in close proximity create an opportunity for a Park & Ride lot served by rail and potentially transit service in the future.
- ◆ Most of the buildable land in the expansion area would be devoted to single-family housing development, but townhouses, condominiums and apartments at higher densities would be located within walking distance of the Village Center. Within the Village Center itself, urban housing such as apartments and condominiums could be provided above street-level shops and offices, or in residential buildings.
- ◆ For pedestrian and bicycle access, paths should be located alongside protected stream corridors, providing comfortable and scenic routes between residential, commercial, employment, and institutional uses (e.g., schools).
- ◆ The plan anticipates the need for a new school site within the expansion area east of Ladd Hill Road. An illustrative location reflecting the estimated acreage need is shown in the Concept Plan map; however, this is not a literal and specific location requirement. The Sherwood School District should be invited to review and comment on school needs that should be anticipated in conjunction with development according to the proposed Concept Plan.
- ◆ Within the 521 acres in the proposed expansion area, 181 acres (35%) would be reserved for natural resource conservation and storm water management facilities; an additional 38 acres (7%) would be devoted to public parks and open space; 51 acres (10%) would be devoted to Village Center

employment and commercial uses, including a Park & Ride/Intercity Rail station; 12 acres (2%) would be devoted to public service facilities such as police and fire stations and schools; and 241 acres (46%) are allocated to housing in a variety of unit types and densities. (All acreages are approximate.)

Issues of Concern

The Steering Committee wishes to focus attention on the following issues of concern to citizens of Sherwood and the surrounding area. Resolution of these questions is needed prior to taking action to approve the Concept Plan:

- ◆ An adequate long-term source supply of water is needed to accommodate the projected future population.
- ◆ The alignment of the proposed natural gas pipeline as it passes through the expansion area needs to be determined, and the impact of that alignment on aspects of the concept plan needs to be considered.
- ◆ The ability of the future transportation system to accommodate projected development needs to be considered. There appears to be a conflict between the local need for access via the proposed east-west roadway, and the regional need for limited-access highway capacity between Highway 99W and Interstate 5. The timing of specified improvements will also be critical in keeping up with the travel demand that population growth will produce.
- ◆ Implementation efforts related to Statewide Planning Goal 5 (Protection of Natural Resources) and compliance with the Federal Endangered Species Act will affect the amount of land that must be reserved for conservation and preservation of significant features. Conservation requirements will affect the anticipated "yield" of the study area and may increase or lower its future population.
- ◆ Impacts on service providers, such as schools, libraries, police, fire, and other emergency response personnel, need to be considered. The Discussion Draft Concept Plan should be circulated to all affected agencies and service providers to solicit their comments and suggestions.

Next Steps in the Process

Metro is currently in the process of determining whether additions to the regional UGB are necessary to provide an adequate supply of land for residential construction in the region. Based on its findings with respect to the need for land, it will then consider priorities for the inclusion of land currently outside the UGB in light of local needs and community desires. Discussion of the Concept Plan within the Sherwood community will help the Planning Commission and City Council make a recommendation to Metro concerning expansion of the UGB at this location.

Several steps will be necessary before urban development can occur within the proposed expansion area: (1) Metro must annex the area into its jurisdictional boundary and approve a UGB expansion to include the area; (2) the City of Sherwood must prepare and adopt amendments to its Comprehensive Plan, land use regulations, related facility system plans (i.e., transportation, water, sewer, and storm water management), and ordinances establishing Systems Development Charges (SDCs) and other development fees; (3) annexation of the area, or portions of the area, into the City of Sherwood must be approved by popular vote; and (4) proposed developments in annexed areas must obtain all necessary land use permits and other approvals (public works construction plans, building permits, and so forth) and pay all applicable development fees and charges.

Contact Information

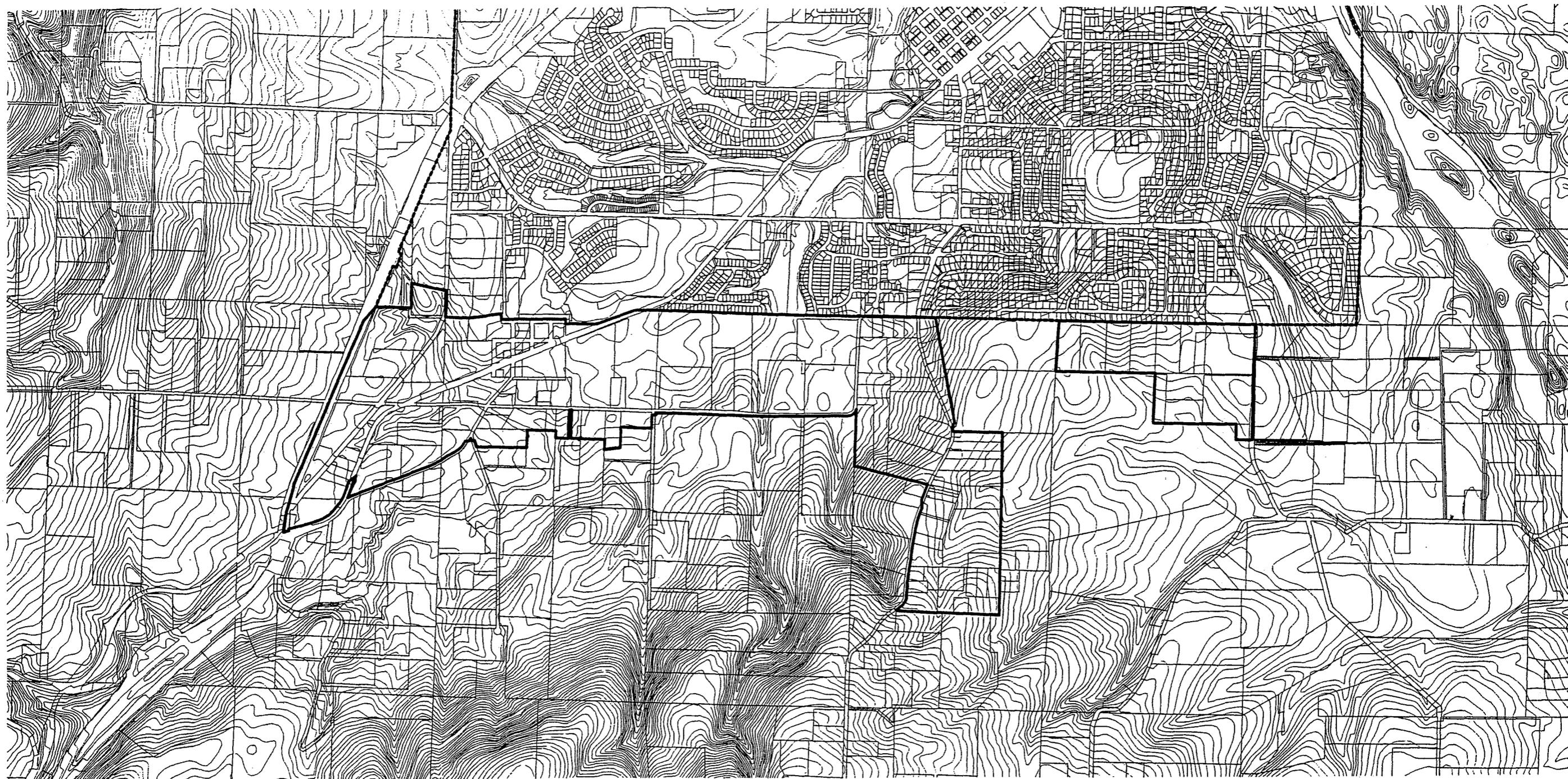
The Steering Committee welcomes your comments on the Discussion Draft of the Sherwood Southern Expansion Concept Plan. Please mail or deliver written comments to:




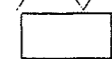
David Wechner, Planning Director
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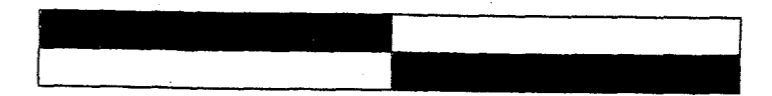
You may also fax comments, Attention: David Wechner, to 503 625-5524; or e-mail them to wechnerd@sherwood.or.us.

The Steering Committee thanks you for your participation in this important community planning effort.

TOPOGRAPHIC MAP



-  Urban Growth Boundary
-  Urban Reserve #45
-  Contours
-  Tax Lots



Miles

**SOUTHERN
EXPANSION
CONCEPT
PLAN**



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Introduction – the Planning Process and the Purpose of this Document

As part of regional and local efforts to address the complex needs of a growing urban population, the City of Sherwood and Metro, the elected regional government of the Portland metropolitan region (formerly the Metropolitan Service District), participated in sponsoring and funding the City of Sherwood's urban reserve planning effort. Because the City of Sherwood's southern Urban Growth Boundary (UGB) is also the Metro UGB at this location, this study is important to both governments in order to identify the future potential of the land area immediately south of the present City limit/UGB line.

The planning effort brought interested parties together with the project consultants and staff of both the City and Metro, to consider opportunities, development constraints, and issues related to urbanizing the new area. Participants included residents of the City and of the study area, property owners, real estate and development professionals, City officials, and other parties with a variety of interests in the area, such as its natural environmental characteristics. In an open house "project kick-off" meeting and two public workshops, participants contributed their knowledge of the area, aired their views, attitudes and expectations, engaged in dialogue with their neighbors, and explored alternative possibilities.

The Urban Reserve Plan Steering Committee, appointed by the Sherwood City Council, reviewed the results of the public workshops and the recommendations of the consulting team, and worked with the Advisory Committee to consider alternative concepts and plans. This document contains the Steering Committee's preliminary recommendation to the community for discussion. Its central vision is the product that emerged from two joint work sessions conducted by the two committees in December 1999.

There are many intriguing and challenging ideas in this draft plan. Examples include:

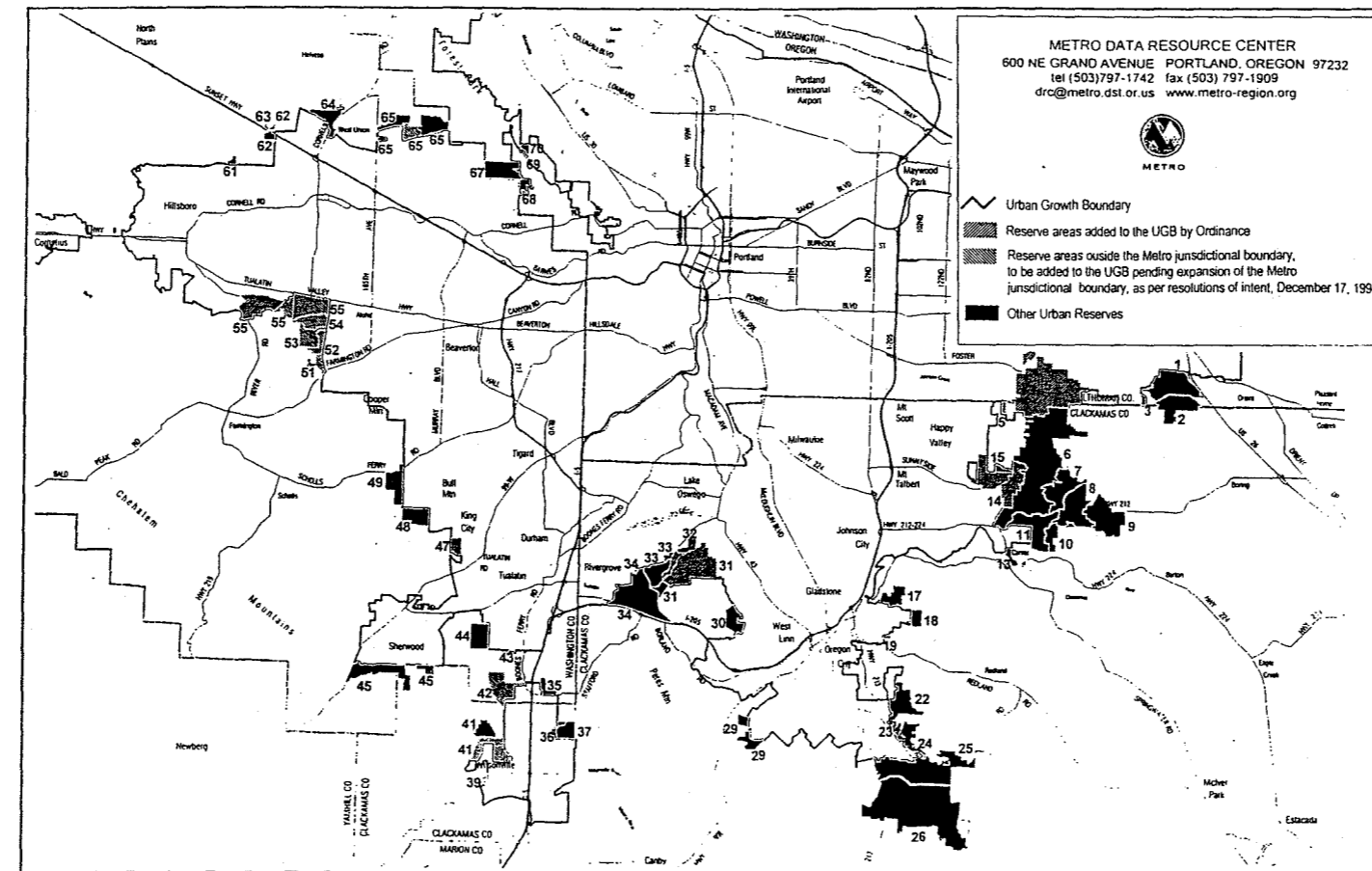


Figure 1. Location Map: Sherwood (45) and Other Metro Urban Reserve Study Areas (Source: Metro)

- ❖ An inter-city rail station, park-and-ride facility, and employment-oriented mixed-use center in the southwestern part of the community;
- ❖ A new east-west roadway capable of supporting a future linkage east to Interstate 5 in north Wilsonville;
- ❖ Wide protective buffers along stream corridors, to protect habitat for fish, animals, and birds in the midst of future urban development.

It is important to understand that this DISCUSSION DRAFT Concept Plan is not the end of the discussion, but rather the beginning of a broad-based public review process. In publishing it, the Steering Committee hopes to broaden public participation in the planning effort and to obtain important community feedback in response to several key ideas and specific proposals in the draft

plan. Service providers and public agencies, including the Sherwood School District, are invited to review the concept plan with an eye to the service needs of the area, and comment on its feasibility from their perspective. Ultimately, the plan can only be adopted by the City following a public hearing before the Sherwood City Council. When adopted, it will form the basis for the City's recommendation to Metro concerning expansion of the UGB in this area.

We hope you will participate in considering the study area's best potentials with an open mind, as well as a discerning eye. With proper planning, a southern community expansion can reinforce and contribute positively to the values that make Sherwood special today. Your critiques will be important in refining the concepts and implementation details, making them fit and complement the present Sherwood community.

Area Characteristics and Natural Features

The land area south of the City of Sherwood contains a complex variety of topographic features, ranging from steep slopes to broad, relatively flat areas separated by numerous stream corridors.

The dominant vertical feature is the north slope of Ladd Hill. Ladd Hill Road makes a southbound climb along the northwest face of the hill immediately after leaving the present City limit line and crossing the Brookman Road intersection. When it reaches the ridgeline, Ladd Hill Road generally follows the ridgeline farther south.

The sub-area northeast of the hill has broad, east- and south-sloping land forms suitable for future redevelopment, which with good design could offer views southeast along the Rock Creek corridor, toward the broad, flat plain of the Coffee Lake Creek corridor. Its drainage flows generally south into a tributary of Rock Creek, which flows east and then north until passing beneath SW Oregon Street immediately west of SW Tonquin Road, in the northern part of the City.

West of Ladd Hill Road, a broad west slope descends to the bed of Cedar Creek, where two short eastern tributaries join the main stem in a densely forested riparian corridor. Farther west, Goose Creek flows from a point on the west side of Pacific Highway 99W, southeast through the study area, to a confluence with Cedar Creek. There are substantial flood plains along Goose Creek and its tributaries, and along the main stem of Cedar Creek. However, most of the land area is not subject to flooding, has moderate slopes, and is generally suitable for urban development.

The pattern created by these land forms and drainageways creates the series of small hills and dips one experiences when traveling east-west along Brookman Road. Although the stream corridors do constrain street connectivity, paths alongside them can provide excellent alternative routes for pedestrians and cyclists, while dividing neighborhood areas into unique enclaves that are both attractive and sequestered by stands of mature trees.

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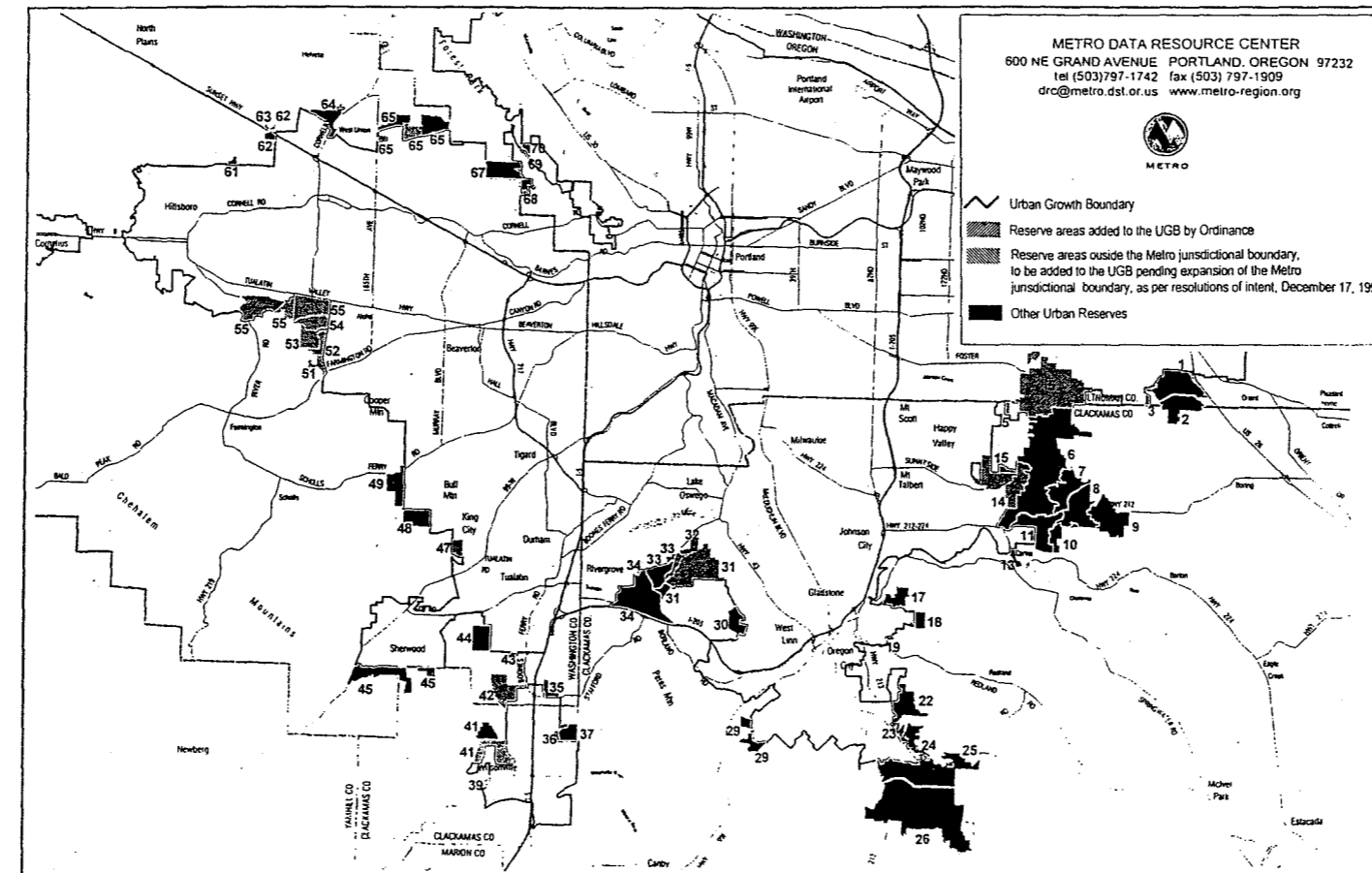


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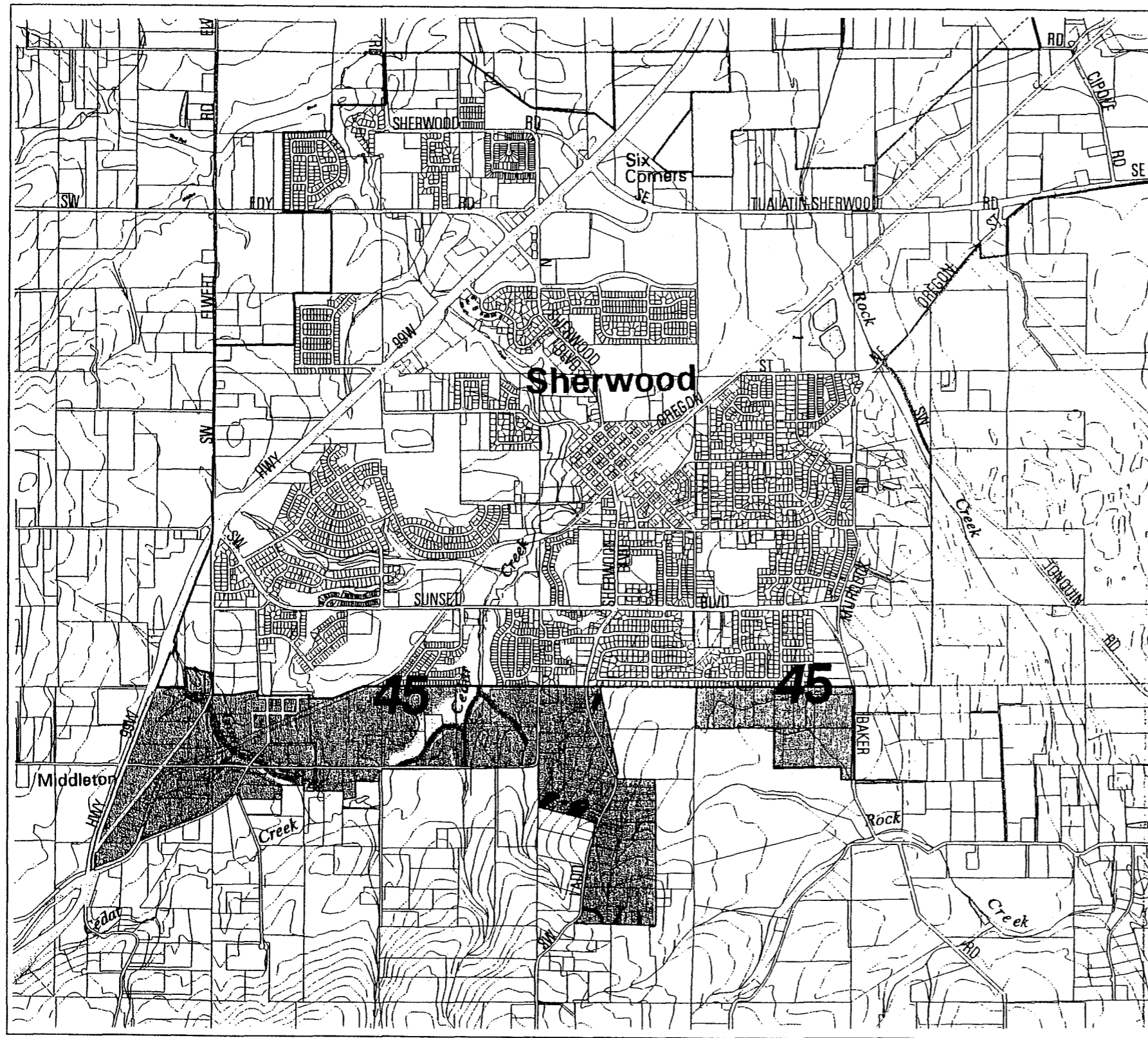


Figure 2. Urban Reserve #45 Study Area in Relation to the City of Sherwood (Source: Metro)

Resource Protection Measures

Even as this plan is being prepared, governments in the Portland Metropolitan Region are working to adopt and implement multiple initiatives aimed at environmental conservation, protection and restoration. Simultaneously, Metro is reconsidering the amount of land that will be needed for addition to the Urban Growth Boundary in light of recent development experience.

For almost a decade now, surface water management within the Tualatin River watershed has included treatment of runoff from urban sites to improve its quality prior to releasing it into natural streams. As a result of coordinated planning and implementation by Metro, the Unified Sewerage Agency of Washington County (USA) and local jurisdictions, ponds, grassy swales, and other types of water quality features are now commonplace in urban areas within the Tualatin River Basin. Similarly, stormwater detention measures are required to limit post-development flows to the flow rates prior to urbanization, reducing damaging erosion and turbidity in natural streams. All of these practices will be required in conjunction with future urban development within the study area.

Perhaps more importantly, the region is also working to address critical habitat needs of several species of anadromous fish (such as salmon and steelhead trout) that have been listed as threatened or endangered by the National Marine Fisheries Service (NMFS). A traditional strategy for protecting natural resource values, such as wetlands, riparian corridors, and other sensitive habitat areas, has been to forbid urban development that encroaches upon such areas. However, the specific strategies to be implemented in this region to conserve critical habitat areas are not known at this time.

Therefore, for planning purposes, we have assumed that a protective corridor will be established along stream channels and wetlands in the study area, which have been identified by Metro. These corridors are assumed to extend 200 feet surrounding a protected resource, creating a 400-foot wide buffer corridor along linear features such as streams. This approach reserves approximately 150 acres within the 521-acre study area, or roughly 28% of the total land area, specifically for environmental protection and restoration efforts.

Of course, the protection standards that ultimately are adopted are likely to differ from this assumption. Our method simply gives us a way to estimate the potential capacity of the study area to support urban development, even while the regional and local policies and programs are being formulated. When a new set of policies and standards becomes effective, it will be appropriate for Metro and the Sherwood community to consider their effect on the yield calculations and other assumptions in this Concept Plan.

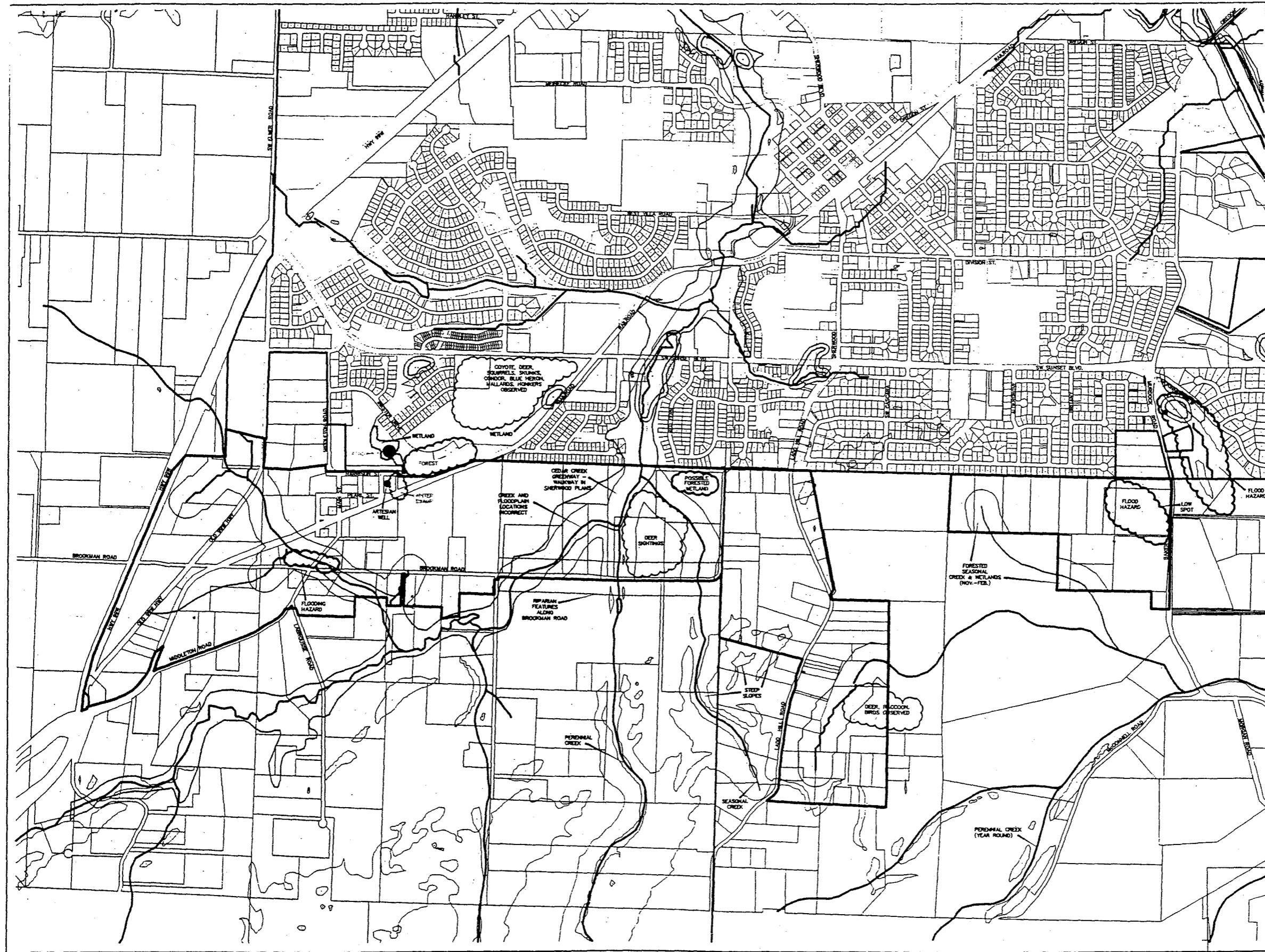


Figure 3.
 Natural Resources,
 Riparian Corridors and
 200-Foot Buffers
 (Sources: Metro, Westlake
 Consultants)

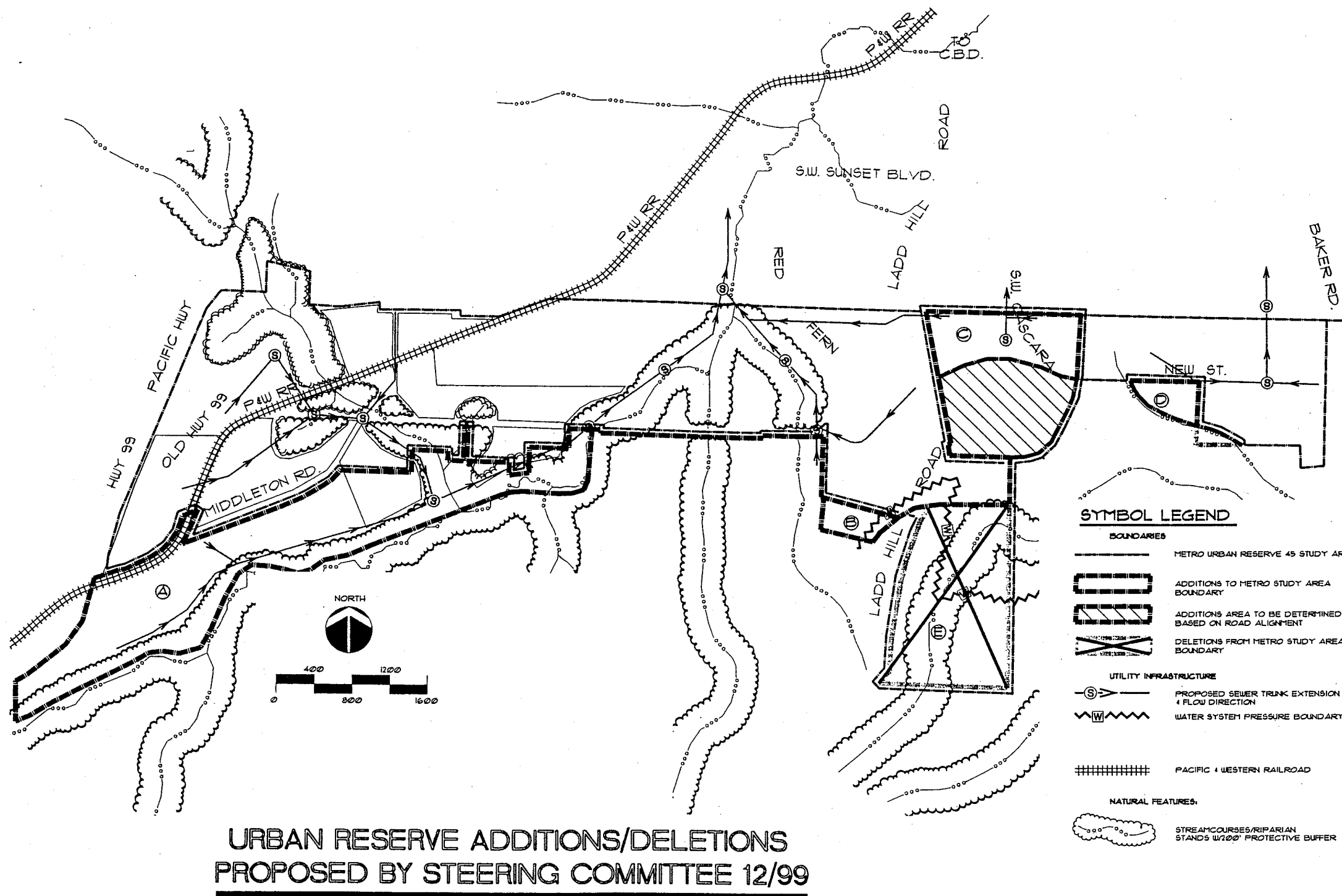


Table 1. Estimated Acreages for Urban Reserve Additions/Deletions
(Source: Westlake Consultants)

Gross Acreage Estimate	Natural Resource (Acres)	Buildable Area (Acres)
A = 76	39	37
B = 5	-	5
C = 21	-	21
D = 5	3	2
E = (50)	(27)	(23)
$\Delta = 57$	15	42

SYMBOL LEGEND

- BOUNDARIES**
- METRO URBAN RESERVE 45 STUDY AREA
 - ADDITIONS TO METRO STUDY AREA BOUNDARY
 - ADDITIONS AREA TO BE DETERMINED BASED ON ROAD ALIGNMENT
 - DELETIONS FROM METRO STUDY AREA BOUNDARY
- UTILITY INFRASTRUCTURE**
- PROPOSED SEWER TRUNK EXTENSION & FLOW DIRECTION
 - WATER SYSTEM PRESSURE BOUNDARY
 - PACIFIC & WESTERN RAILROAD
- NATURAL FEATURES:**
- STREAMCOURSES/RIPARIAN STANDS W/100' PROTECTIVE BUFFER

Figure 4. Proposed Changes from Urban Reserve Study Area Boundaries (Source: Westlake Consultants)

Recommended Urban Expansion Boundary

Several changes are proposed in the boundaries of the Sherwood southern expansion area, as compared to the urban reserve study area originally identified by Metro. The changes are designed to create a logical southern boundary of the community and to accommodate efficient public facilities within the future UGB, such as roads, water system, sanitary sewer trunk lines, and stormwater management facilities. The proposed changes are identified by letter in Figure 4 and Table 1 and discussed below.

Proposed additions to Urban Reserve area

- ❖ Southwest, between Middleton Road and the west fork of Cedar Creek (Area A)

Realigning the UGB along the north edge of Cedar Creek's west fork will allow a new, relatively high-capacity east-west road to be extended across the southern urban expansion area, reaching an intersection point at Pacific Highway 99W without requiring a grade crossing of the Pacific & Western Railroad tracks. In addition, this alignment will allow sanitary sewer lines to be run alongside the riparian corridor, at the lowest elevations subject to urban development, in order to accommodate gravity sewer lines (avoiding the expense and maintenance issues associated with pump stations). This change adds approximately 76 acres, of which roughly 39 acres are assumed to be devoted to riparian corridors and buffers, adding an estimated 37 buildable acres.

- ❖ West of Ladd Hill Road (Area B)

This small (approximately 5-acre) area is situated on a relatively steep, but buildable slope on the west side of Ladd Hill Road. Note that the eastern portion of the property (with frontage on Ladd Hill Road) is above the highest elevation that can be served by the existing City water system. As a result, that portion should either not be brought into the UGB or specifically exempted from water system hook-up requirements, and required to maintain its own water well until a new pressure level is constructed. (Note that City-County coordination and possibly zoning code amendments will be required in order to

approve subdivision and development of parcels divided by the UGB.)

- ❖ East of Ladd Hill Road (Area C)

To accommodate an urban east-west public road across the southern expansion area, some of the land in Exclusive Farm Use (EFU) zoning between the two separate parts of the urban reserve study area will need to be included. The size of this proposed addition is estimated at 20 acres, with no natural resource areas. However, because the UGB would follow the southern edge of the public roadway, the size of the area will depend on the specific alignment of the new east-west road.

- ❖ East, adjacent to riparian corridor (Area D)

This area contains approximately 5 acres, of which 3 would likely be devoted to the riparian corridor and buffer areas along it. The proposed alignment will allow the east-west roadway to be aligned adjacent to the riparian corridor buffer, and will accommodate efficient public facilities alignments.

Land areas proposed to be left out of Urban Reserve area

- ❖ High on Ladd Hill Road (Area E)

This approximately 50-acre area is situated above the City's water pressure level boundary, and so cannot be served by City water unless a new reservoir and supporting pump station are constructed at a higher elevation or a pressure-boosting system is added to present facilities. With roughly 27 acres of land in resource corridors and protective buffers, and high-value residential development on much of the remaining 23 acres, redevelopment productivity would be low and costs high.

Effect of proposed changes on the Urban Reserve land area

The combined effect of these changes is a net addition of roughly 57 acres to the urbanization area, of which 15 acres are within the anticipated riparian corridor buffer widths.

Land Use Recommendations

Key Concepts and Design Principles

Several priorities emerged from the series of public meetings and Advisory/Steering Committee discussions.

- ❖ An east-west through road connection between Pacific Highway 99W at the west and Baker Road at the east will be needed.
- ❖ The amount of land in Exclusive Farm Use (EFU) zoning to be converted to urban use to accommodate the proposed east-west roadway should be minimized (to the extent practicable and consistent with a workable alignment).
- ❖ The Pacific Highway 99W corridor should be visually enhanced by dense landscape plantings, and protected from visual clutter by strict controls on signs and building/site orientation.

- ❖ The majority of the land area to be urbanized should be devoted to single-family residential neighborhood use, with lots ranging from 5,500 to 10,000 square feet in size.
- ❖ Protect and preserve natural streams and riparian corridors, wetlands, and other wildlife habitat areas.
- ❖ Incorporate bicycle/pedestrian paths alongside riparian corridor buffers, to provide alternative routes for travel as well as scenic and recreational opportunities.
- ❖ Establish a well-defined southern City boundary by running the principal east-west road alongside the Cedar Creek Corridor. The riparian corridor will create a parkway character for the road, and its protected status will preclude sprawling development on the south side of the new roadway.

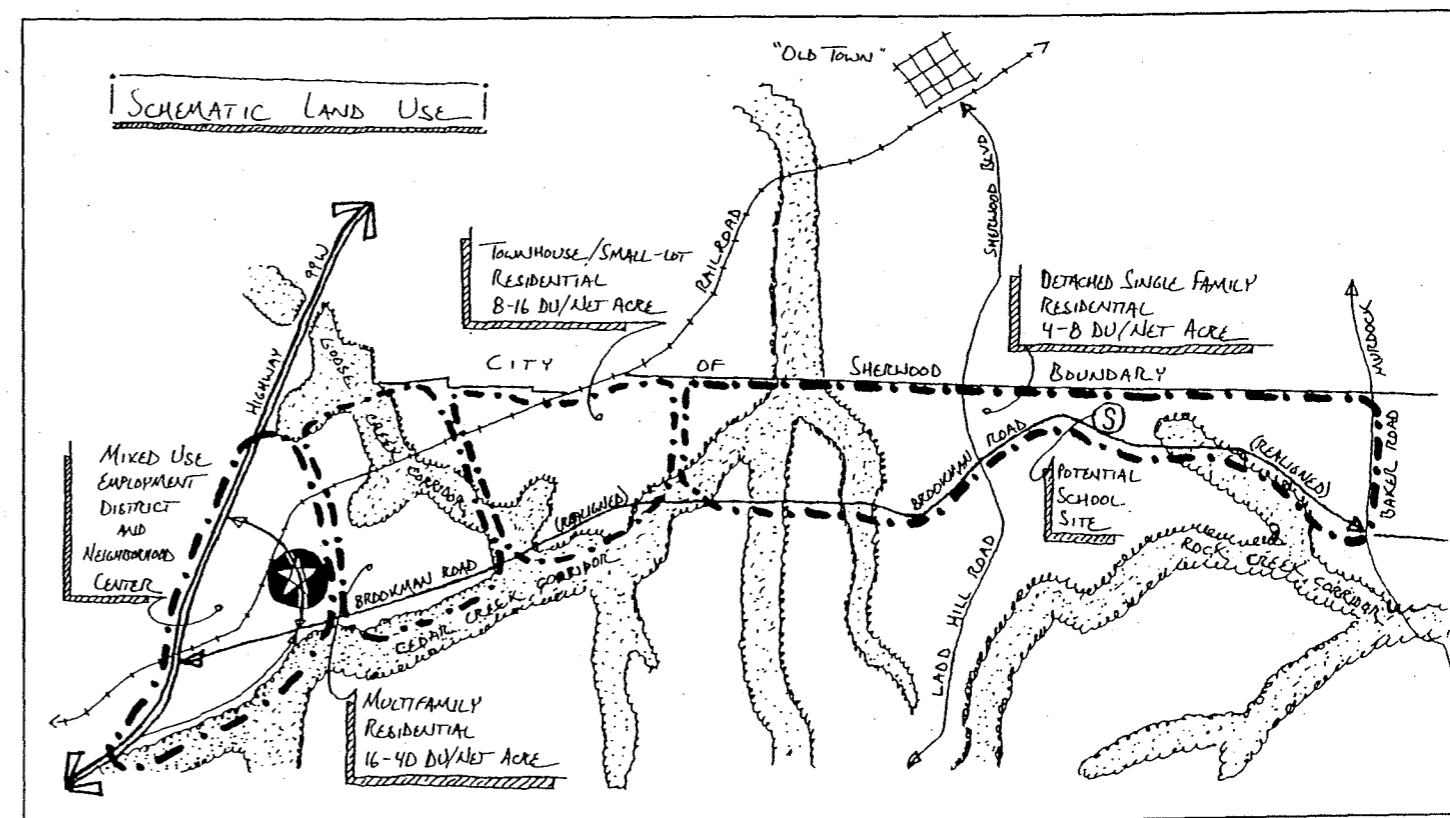


Figure 5. Schematic Land Use Diagram (Source: Westlake Consultants)

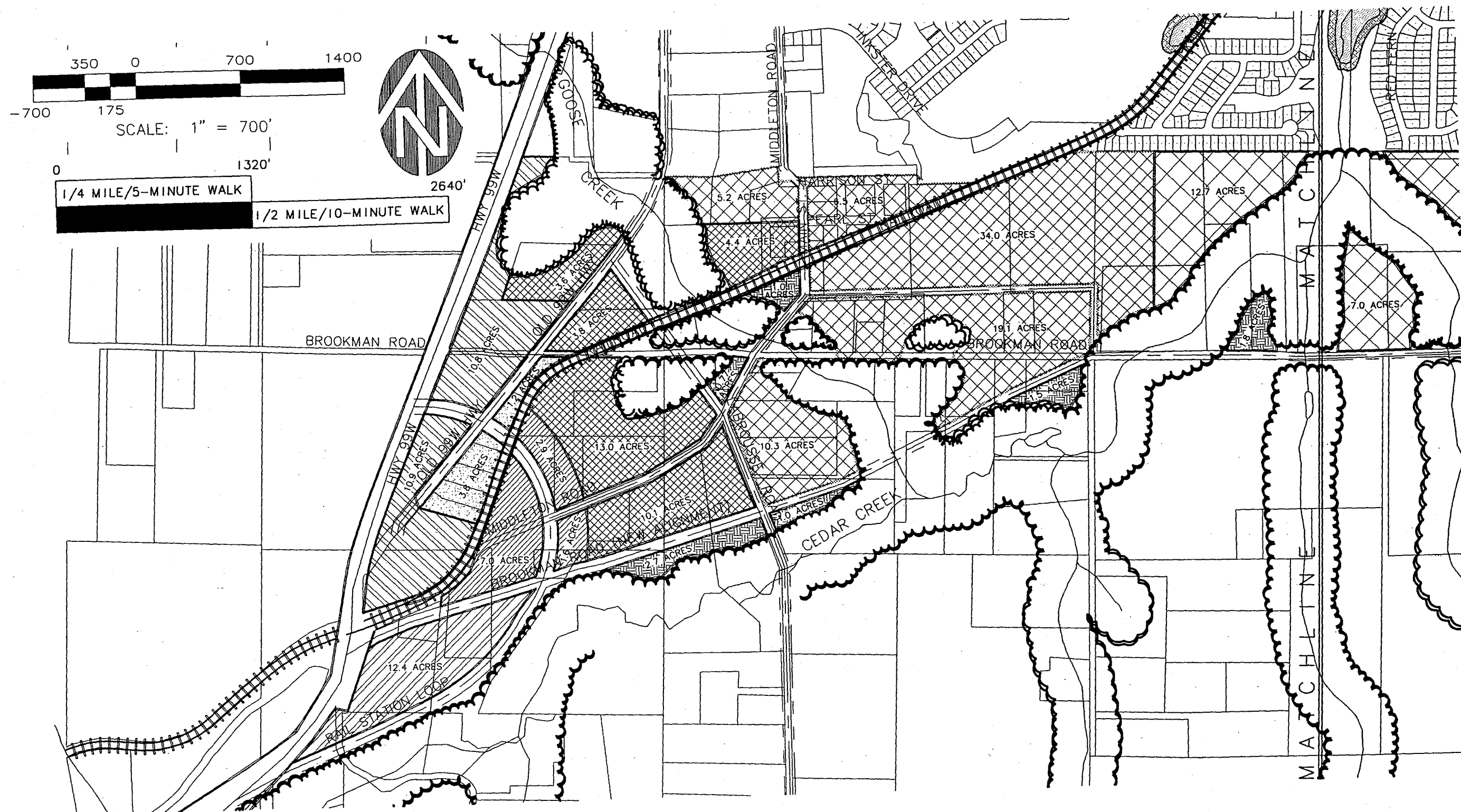


Figure 6. Land Use Designations, West Sub-Area (Source: Westlake Consultants)

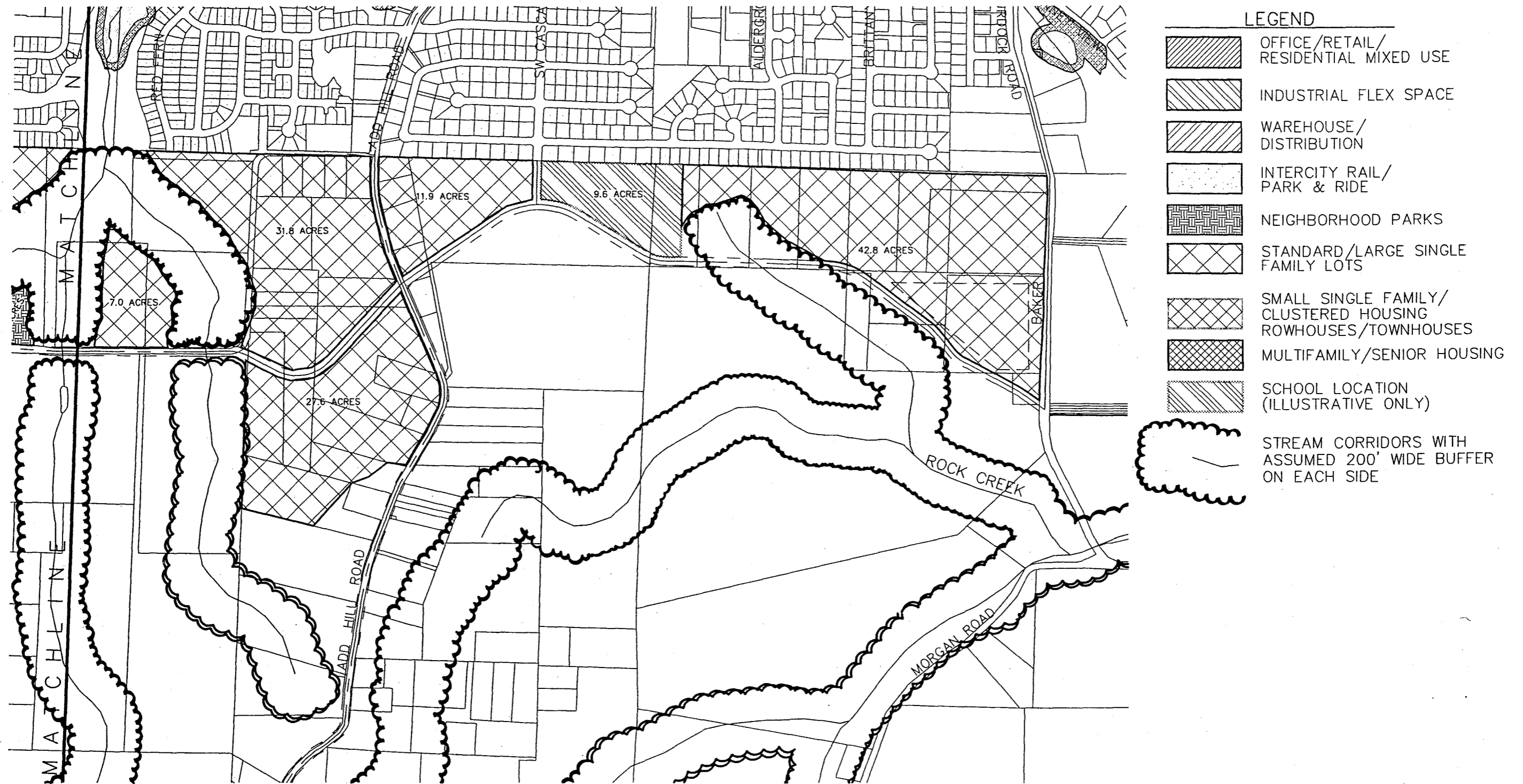


Figure 7. Land Use Designations, East Sub-Area (Source: Westlake Consultants)

Opportunities

- ❖ The proposed east-west roadway could potentially extend eastward to intersect Day Road in north Wilsonville, making a connection to Interstate 5 at the North Wilsonville/Elligsen Road interchange.
- ❖ In the southwestern part of the study area, the convergence of Pacific Highway 99W, the Pacific & Western Railroad line, and the

proposed east-west roadway alignment creates an opportunity for an employment-oriented mixed-use district, providing significant local employment, transit and other uses at a new "village center."

- ❖ The existing Pacific & Western Railroad line could support inter-city commuter rail service in the future, with potential stations in the Old Town area and at the mixed-use village center.

	Acres
UR 45 Study Area per Metro	464
Proposed Boundary Adjustments	57
Total Planning Area	521
Less: Natural Resource/Unbuildable	-151
Estimated Buildable Land Area	371

	Acres	Less: Streets & Water Quality Facilities	Net Acres
Office/Retail/Res'l Mixed Use	12	5%	10.9
Industrial Flex Space	22	10%	19.5
Warehouse/Distribution	12	10%	11.2
Intercity Rail/Park & Ride	5	5%	4.8
Parks and Open Space	38	0%	38.0
Schools	10	0%	9.6
Public Services (Police, Fire, etc.)	2	0%	2.0
Public Stormwater Facilities	30	0%	30.0
Residential Areas (Combined)	241	25%	180.4

	Net Acres	DU/Net Acre	Dwelling Units *
Large Single Family Lots	40	4	159
Standard Single Family Lots	36	6	217
Small Single Family Lots	32	10	325
Clustered Housing	18	8	144
Rowhouses/Townhouses	9	12	108
Condominiums/Stacked Housing	9	16	144
Multifamily	27	18	487
Senior Housing	9	30	271
Mixed Use Center Housing	11	5	55
Residential Total	191	10	1,910

* Minor multiplication discrepancies are due to rounding of the Net Acres figures as presented in Table 4.

Land Allocations by Type of Use

Tables 2 and 3 show how the amount of "developable" land is calculated and distributed among different land use categories. In Table 2, adjustments in the gross acreage of Urban Reserve Study Area 45 are made, first to reflect the revised expansion area boundary and then to subtract the amount of land reserved for protection of natural stream corridors. These figures have been derived from maps prepared using Metro's geographic information system (GIS) and Westlake's computer-aided drafting (CAD) system.

In Table 3, the estimated buildable land area of 371 acres is allocated among a variety of land use categories, and adjustments are made for the amounts of land that will need to be devoted to public infrastructure elements such as streets, schools, and water quality treatment facilities. The highest percentage reduction appears in the residential category because the typical pattern of local streets and block sizes requires more public right-of-way dedications than in commercial and industrial areas.

Density Calculations

Table 4 presents a detailed projection of land allocations for a range of housing types, the corresponding development "density" assumptions (expressed in "Dwelling Units per Net Acre" or DU/Net Acre), and an estimate of the number of housing units that will be produced based on those assumptions.

Metro 2040 Design Type Designation

The Metro Region 2040 Growth Concept and Regional Growth Goals and Objectives (RUGGOs) are based on an urban place-making typology known as the Metro 2040 Design Types. In essence, these design types provide a way to understand different kinds of urban settings, and assemble them into a functional whole at the city and regional level.

In Sherwood, the area surrounding the Highway 99W/Tualatin-Sherwood Road intersection is designated as a Town Center, the Old Town district

is designated as a Main Street, and Employment and Industrial Areas are designated generally along segments of both Highway 99W and Tualatin-Sherwood Road. Also, Highway 99W is designated as a Green Corridor south of the Sunset Boulevard intersection, calling for special landscaping treatment to create a parkway-like character.

In the context of the 2040 Design Types, the Sherwood Expansion Area may be best categorized as an Outer Neighborhood in the eastern part, an Inner Neighborhood in its central section, and a combined Main Street and Employment Area in the western section, where the neighborhood center will be located.

Issues

Urban development creates complex relationships among elements – such as housing, roads, and open spaces – and functions – such as industrial, commercial, residential, institutional, and recreational land uses and transportation. While all of these relationships are interdependent and interrelated, some prove to be complementary while others generate conflict and tension.

There is no one recipe or easy answer for managing the conflicts that arise in the urban land use and transportation planning context. Rather, communities benefit from broad-based discussion and problem-solving efforts that try to optimize beneficial relationships and mitigate conflicts. In that spirit, the following issues list is designed to help frame community dialogue about what functions are needed or desirable, and how to address their associated impacts through good planning.

- ❖ Proposed east-west roadway (Brookman Road)

Two different needs, at the local and regional levels, influence the design and functioning of the proposed new alignment/extension of SW Brookman Road. The Concept Plan Steering Committee found that a good east-west connection between Highway 99W and SW Baker Road would be essential in conjunction with southern urban expansion of the UGB. At the regional level, a new "Sherwood Southern Bypass Highway" is anticipated in the Draft Regional Transportation Plan (RTP) prepared by Metro, running approximately in the

same corridor. In Metro's RTP modeling work, it is conceived as a limited-access highway, possibly even a toll facility, whose primary purpose is to connect between Highway 99W and Interstate 5 in the north Wilsonville area, without intersecting the local street network except at grade-separated, controlled tollway intersections.

This raises some difficult design questions related to the form of the roadway and access to it. How can east-west connectivity be achieved? If the roadway is to serve local as well as regional traffic, will it be capable of accommodating predicted traffic demands? How wide will it need to be, and what kinds of intersection designs and controls will be necessary? What kinds of edge treatments (e.g., noise walls, landscaping, or other strategies) will be needed to reduce detrimental impacts on residential areas adjacent to Brookman Road? What specific alignment will be needed to negotiate the slopes associated with the north slope of Ladd Hill and the Ladd Hill Road intersection (or overcrossing)?

These questions are highly technical in nature and cannot be addressed without further, more detailed study, including significant public participation. A Major Investment Study (MIS) or similar effort is recommended for the region and Sherwood-area residents to evaluate design options and impacts, and to reach conclusions about the best local and regional solution alternatives.

❖ Mixed-use employment district

Introducing any new urban activity area brings with it numerous advantages and disadvantages. The confluence of two – possibly three, considering inter-city rail potential – important transportation facilities in the western part of the urban expansion area suggests an opportunity to accommodate employment.

In that context, the proposed scale of the mixed-use employment district, and the land use allocations surrounding it, have been tailored to provide a functional "village center" core. The village center is expected to serve a localized market of employees and residents without negatively affecting the vitality of Sherwood's Old Town district. The two areas

will be distinctly different in character, and will have different opportunities due to their relative locations and other factors. With employment and residential uses surrounding it, potential for a regional Park & Ride facility, high volumes of traffic anticipated on Highway 99W and the east-west road (the proposed new alignment of Brookman Road), and the opportunity for an inter-city rail station, the village center can become a significant hub of activity that may complement, rather than detract from, the Old Town district.

The Sherwood community should engage in dialogue about the desired roles of both these areas, their economic and social niches and opportunities, and come to a policy decision about the relationship between the Old Town district and the southern urban expansion area.

❖ Transit Service

One of the objectives of the village center concept is to provide the kind of activity concentration, or "density," that makes transit service feasible. The presence of employment sites and residential housing units close to a transit station site will make it attractive as a transit link. By contrast, low-density residential areas do not generate good ridership levels, and therefore tend to be deferred for transit service in favor of areas where higher demand for transit can be demonstrated.

The employment district offers significant benefits from a transit efficiency standpoint. At the same time residents are taking morning trips into the metropolitan area, employees from other parts of the region will be able to ride to their jobs in and around the village center, concentrated within a 5- to 10-minute walk. The complementary pattern is then repeated in the evening rush hour, so buses are carrying more riders in both directions.

Even in a residential-only context, there will be a significant opportunity to locate a Park & Ride station in the western part of the expansion area. At this location, such a station would be expected to intercept commuters who live in and south of Sherwood along the Highway 99W corridor, offering them transit service from Sherwood to



Figure 8. Perspective: Paths in the Mixed-Use District (Drawing: Robert Foster)

points within the greater Portland urban area. This service could be achieved with buses, or a combination of bus and inter-city rail services. However, citizens interested in the study area should consider whether such a Park & Ride function, and its traffic patterns, would be able to integrate with a residential-only character.

The Village Center Concept

A primary objective of the concept plan is to create livable neighborhoods that extend and complement present-day Sherwood's character and quality of life. However, residential development in the expansion area without any supporting uses would require residents to travel to locations outside the neighborhood for all their employment, shopping, entertainment, and other needs. This contributes to

local and regional congestion and is widely considered to degrade quality of life.

The Steering Committee evaluated the highest and best use of the western part of the study area, which is bounded on the west by Highway 99W and on the south by the regional east-west roadway, and has the Pacific & Western Railroad running through it. That context seemed particularly harsh for residential development, with such formidable roadways as boundaries.

The Committee considered the alternative of having an employment-oriented mixed-use district in the western part of the expansion area. Several factors make this an attractive option:

- ❖ Access to both Highway 99W and the proposed east-west road would be excellent.
- ❖ The railroad line could be converted to inter-city rail use in the future.

- ❖ An inter-city rail station could support a park-and-ride facility, helping to reduce the number of single-occupant vehicles on principal routes, thereby reducing congestion.
- ❖ Light industry located in the employment district could provide office, manufacturing, distribution, and other jobs, some of which would be attractive to local residents – who could easily commute by walking or bicycling. Commuters could use bus and inter-city rail service, reducing vehicle miles traveled (VMT).
- ❖ A retail area with local commerce, such as a grocery store, restaurants, and other retail goods and services at the neighborhood scale, would be able to serve a clientele made up of both local residents and workers in the employment district.

Figure 8 is a perspective sketch, drawn from a point along Pacific Highway 99W, that illustrates how the pedestrian/bicycle path network and landscape corridor create an attractive environment linking an employment area (right) with neighboring attached residential dwellings (background). The pedestrian/bicycle paths provide functional transportation as well as encouraging recreational use.

Landscape design and plantings in the stream protection buffers – assumed to extend 200 feet on both sides of projected waterways in this concept plan – contribute to important water quality needs: reducing turbidity, lowering temperature, maintaining pre-development flow characteristics, and providing habitat values for natural species.

The result is a place that integrates rather than dominates the area's natural features, using them as the backdrop for a wide range of human activities: living, working, recreation, and daily commerce.

At the heart of the village center is a business district in the form of a traditional "Main Street." It is immediately adjacent to a proposed inter-city rail station and Park & Ride facility, within a comfortable walking distance of the firms in the employment district, and conveniently located for nearby residents as well.

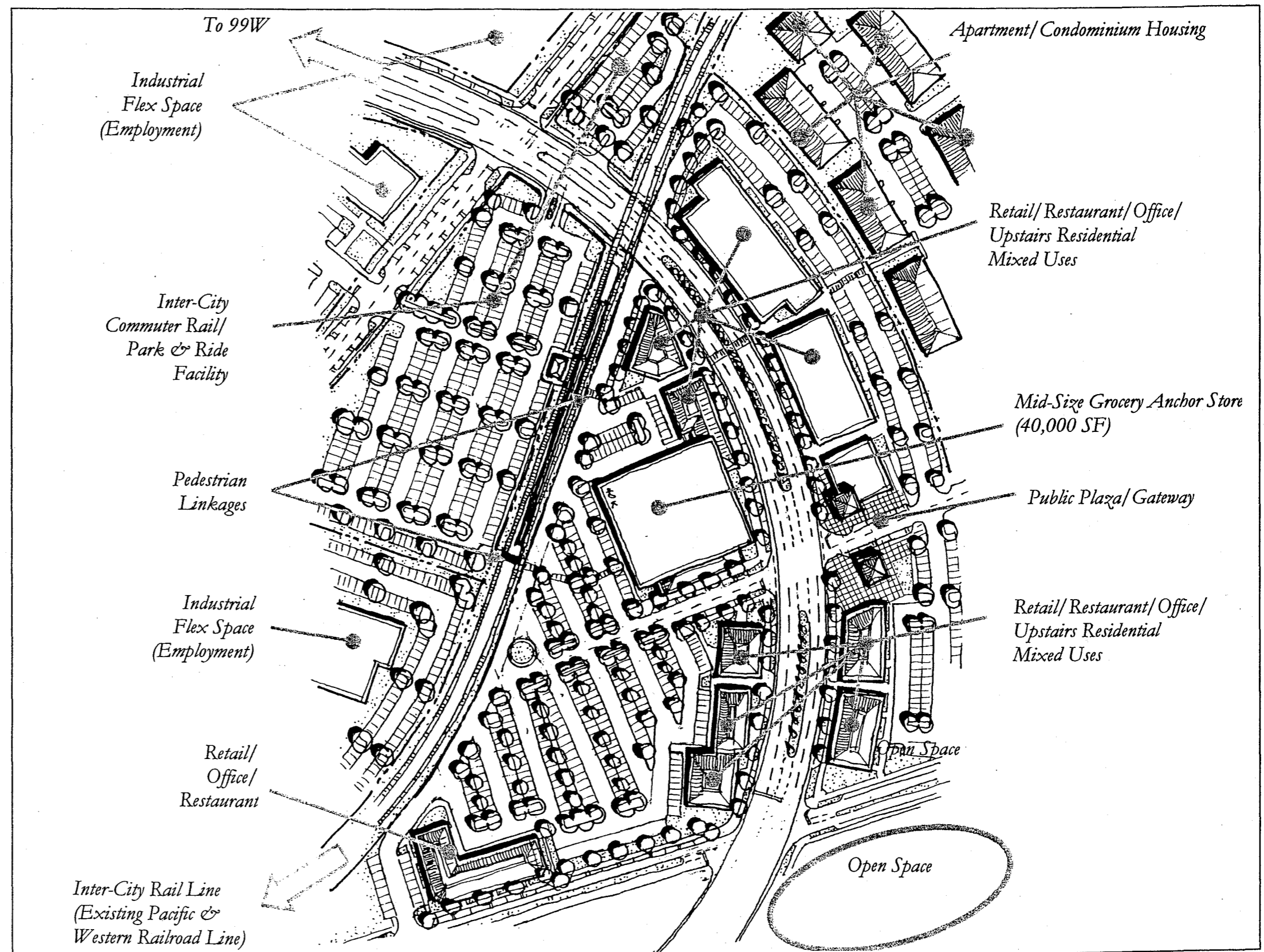


Figure 9. Mixed-Use Village Center Plan (Drawing: Robert Foster)

The plan view in Figure 9 illustrates how land uses will be organized around the rail station and village center. The employment areas to the north, west, and south will provide a healthy daytime population that patronizes restaurants and specialty stores. In the evenings, residents of the village and neighborhood areas to the east – as well as the larger community – will generate activity at restaurants, pubs, shops, and other intimate gathering places whose scale fits the neighborhood population.

Off-street parking, located behind the buildings that face Rail Station Loop, is augmented by the availability of the Park & Ride facility during evenings and weekends. This concept, known as "shared parking," reduces the amount of land that must be devoted to parking lots by taking advantage of the fact that different kinds of land use activities demand parking at different times of day and on different days of the week.

Figure 10, a perspective sketch drawn from the north end of Rail Station Loop ("Main Street"), illustrates how the curving alignment will create a visually interesting area while accommodating expected traffic volumes. Ground-floor display windows, entrances, awnings and upstairs balconies enliven sidewalks, and on-street parallel parking and landscape islands separate pedestrians and moving vehicles.

Because of the village center's mixture of retail, office, and residential uses, people will be present on a 24-hour basis. This fact, together with the casual surveillance provided by upstairs windows with views over the main street and parking areas, contributes to people's safety at all hours.



Figure 10. Perspective: North End of Village Center Shopping Street. (Drawing: Robert Foster)

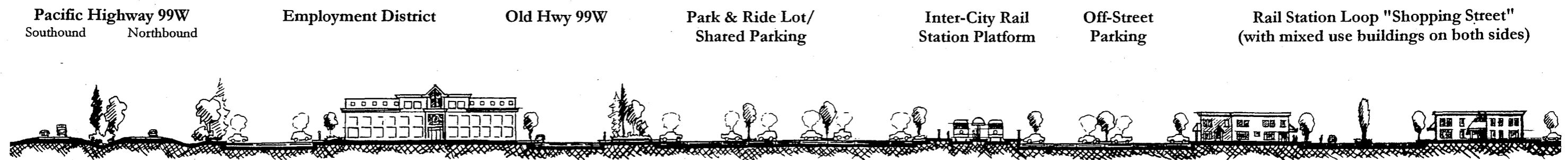


Figure 11. Section: From Highway 99W to Shopping Street. (Drawing: Robert Foster)

Public Infrastructure Systems

A preliminary assessment was made to determine existing capacities of the critical infrastructure and to evaluate the potential of each system to serve and support this urban growth expansion. The following sections indicate the analysis results and conceptual design recommendations for each of four systems: transportation, water, surface water, and sanitary sewerage.

Transportation System

One of the difficulties confronting urbanization of the study area is the limited number of potential north-south street access points in the existing City area. This is partly due to topographic features, but low connectivity has been exacerbated by developments that have not provided street stubs to the UGB and the future growth area beyond.

An important exception is the Cedar Creek corridor, in which the City has planned a major pedestrian trail. Extension of this trail into the study area, and along some of Cedar Creek's tributaries (i.e., Goose Creek and several unnamed drainageways), will provide a system of paths. These paths will enable pedestrians and bicyclists to travel between the proposed village center, employment district, and neighborhood areas without adding to congestion on area streets.

Principal Streets

The principal north-south roads that will serve the study area are Pacific Highway 99W, Old Pacific Highway, Middleton Road, Ladd Hill Road, and Baker Road. A northern extension of Labrousse Road to reach Old Pacific Highway is recommended. There are a few points where new local streets could be connected with existing ones to the north, providing convenient access within neighborhood areas – although care must be taken to avoid encouraging undesirable "cut-through" traffic.

East-west circulation is both a local and a regional problem. This plan proposes to widen and upgrade the present Brookman Road, realigning it to the south in the western part of the study area, extending it eastward to intersect Ladd Hill Road and Baker Road, and potentially providing a link to Interstate 5 in the north Wilsonville area. However, the Metro Regional Transportation Plan (RTP) calls for a "Regional Southern Bypass Highway," a limited-access highway – potentially even a tollway – approximately at this alignment.

The two types of roads would have very different effects on adjacent neighborhood areas. In particular, a limited access highway would form a substantial barrier between the present community and future neighborhoods to the south of it, and would demand impact mitigation

strategies – such as landscape buffering and noise walls – if residential development were to be planned adjacent to it. Although it is conceivable that both types of road could be constructed, it is difficult to identify suitable corridor locations for two east-west principal streets within the study area.

To accommodate the anticipated level of activity in the village center area, a special linking street forms a loop on the east side of Pacific Highway 99W. Labeled "Rail Station Loop" in this plan, it intercepts the many roads converging in the village center area, and organizes flows to meet Highway 99W at a limited number of manageable intersections. As the name implies, the street brings people to the inter-city rail station proposed in this plan. This position makes it an excellent location to support local commercial needs, such as a grocery store, restaurants, and a variety of associated businesses suited to local needs. With offices and residential units (typically condominiums and apartments) above the ground level and in some single-use buildings within the village center area, Rail Station Loop will take on the form and several functions of traditional "Main Street" areas.

Also within the village center area, and immediately west of the rail station, a Park & Ride facility with approximately 500 vehicles capacity can be accommodated. The village center circulation plan is designed to handle the traffic demands it would generate in the morning and evening peak travel demand periods (of course, such traffic represents commuters who are not driving into the central Portland area, but instead riding transit). The Park & Ride facility could be served by bus transit, inter-city rail, or both. There is also potential for its use as "shared parking" during evening and weekend times, when Park & Ride ridership is low but parking demand for businesses and activities in the village center may be significant. By obtaining "double duty" from an existing parking lot, this strategy reduces the amount of land that must be devoted to parking on a site-by-site basis in the village center area, contributing to more efficient use of land.

The memorandum from DKS Associates (Technical Supplement) provides detailed information about predicted trip volumes and road

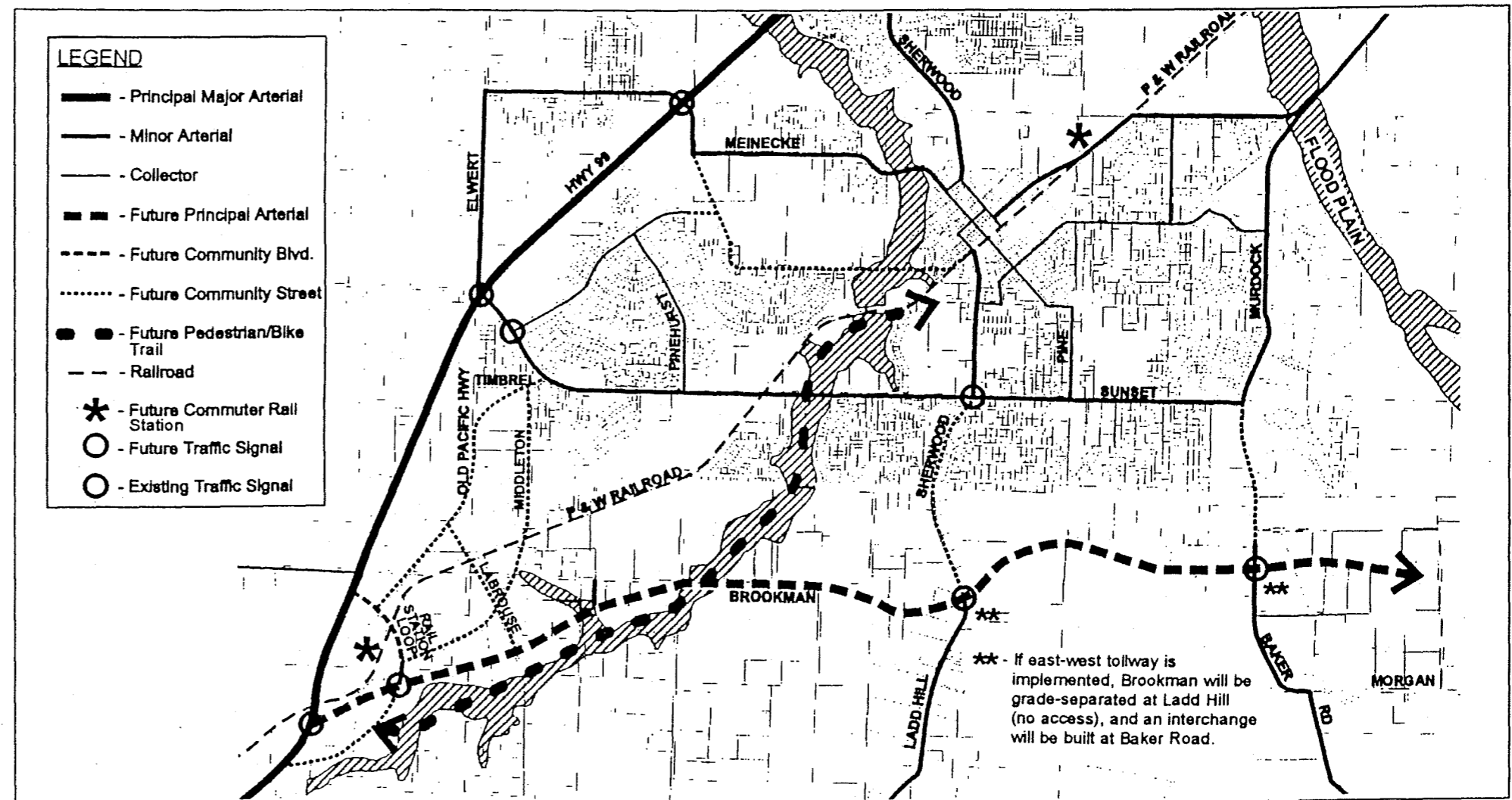


Figure 12. Street Functional Classification (Source: DKS Associates)

capacity needs, functional classifications, design widths, and estimated construction costs (at the concept level).

Water System

The City's water system and future plans were evaluated to identify potential capacity limitations, and the structure of the existing and planned network of water lines was used as the basis for identifying points of connection for future water line extensions and loops in the expansion area.

One of the principal recommendations of this plan concerns the urban expansion area boundary in the vicinity of Ladd Hill Road, where the topography climbs above the highest elevation that can be served by the City's water system pressure zones. Urban growth above that point will require development of a new water pressure zone as part of the City system, with one or more new reservoir and pump station locations. Alternatively, currently proposed or existing pump stations could be enhanced to serve this area, but the cost to benefit ratio doesn't appear to warrant such an endeavor at this time. This plan recommends that consideration of such a move be deferred until the need for urban expansion at that location is pressing, and when the scale of the planned urban expansion may be better able to cover the associated system development costs.

System Capacity

The City of Sherwood's most recent Water System Master Plan Update (Bookman-Edmonston Engineering, Inc.) included the assumption that all of the 2,067 housing units predicted (at that time) by Metro for the 460-acre Metro urban reserve area would be constructed within the water system planning period (i.e., by year 2017). Using an assumed average household size of 2.65, the update calculated that the urban reserve area's additional population would be 5,480. This number was added to the projected population for the City's present area within the UGB, and the resulting projection (24,050 in 2017) was used in the update's calculations of water system capacity needs.

The water system update's assumptions for the build-out of the expansion area are expected to be sufficient to accommodate the land uses anticipated by this plan. This plan proposes an urban expansion area that differs from the Metro urban reserve boundaries in important respects, as explained in previous sections. It contains a different land use mix, including employment and commercial use areas and a variety of housing types, and the average household size assumption (2.3 persons per unit) is lower. The combined effect

of these differences is that this plan projects a lower resident population (4,253) but higher employment.

With the exception of a few industries that use substantial amounts of water for industrial processes, water system demand from commercial and industrial uses can generally be expected to be lower than from residential use of the same amount of land. Therefore, this plan's water demand characteristics can

be thought of as fitting within the assumptions used in the update, and water system capacity expansions by the City of Sherwood based on the update will meet the needs of the expansion area. However, if the employment district were to attract one or more firms requiring high volumes of domestic water, this assumption would have to be reconsidered in light of their specific water needs.

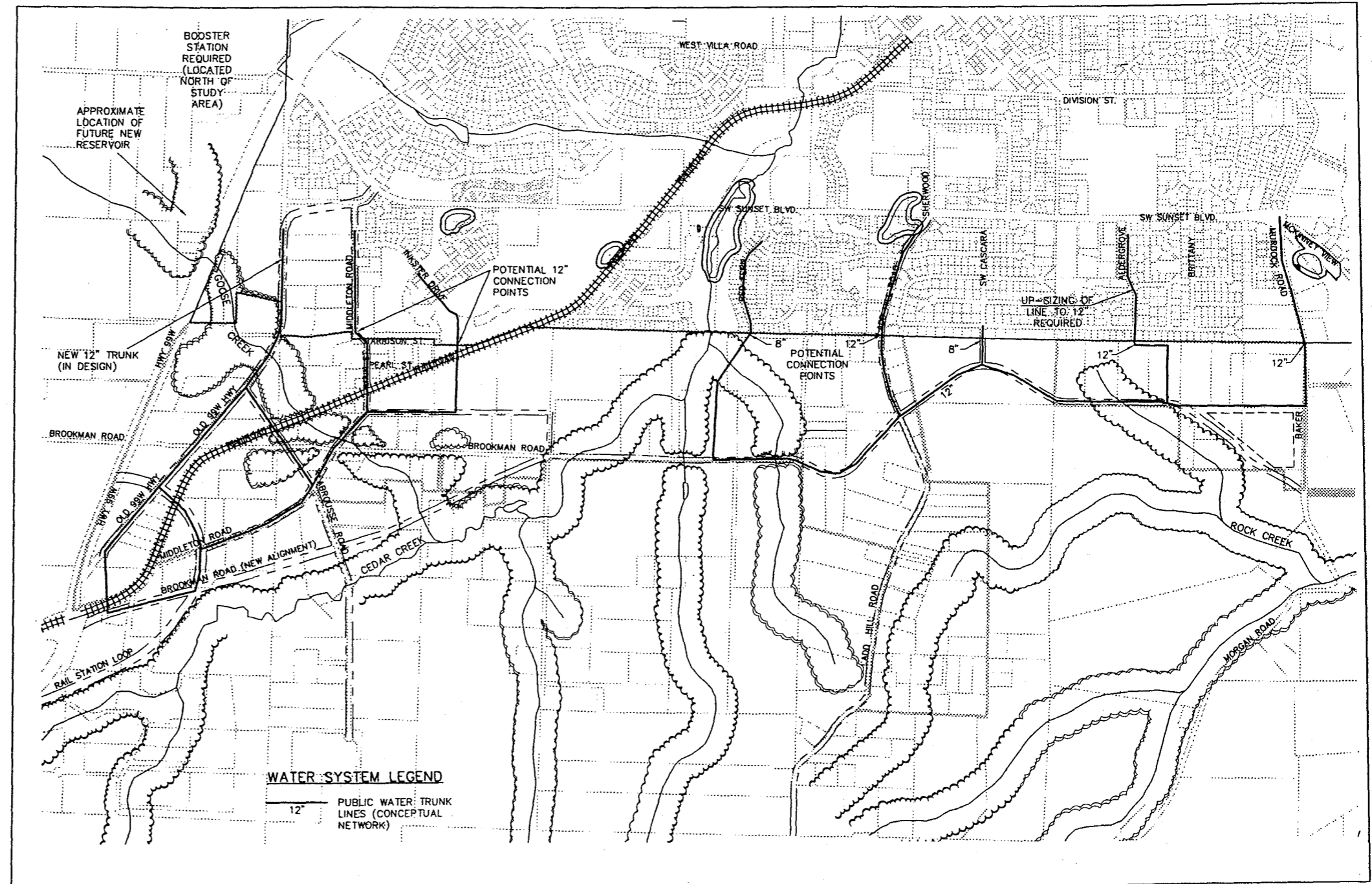


Figure 13. Water System Plan (Source: Westlake Consultants)

Water System Structure

Figure 13 provides a diagrammatic representation of potential points of connection to the existing water system, and the looping of water system connections that would be typical in conjunction with build-out of the southern urban expansion area.

Detailed design and specification of the sizes of water line segments that will be necessary in the future is beyond the scope of this conceptual planning process. Such a refinement plan would be appropriate as part of the City's implementation steps in the urbanization of the southern expansion area. With the benefit of such planning, the City's review process and approval requirements for future development will ensure that interconnected water lines of sufficient size are constructed as development occurs.

Surface Water Management (Storm Drainage)

The Cedar Creek drainage corridor is centrally located within the present City of Sherwood and flows north through it. Because most of the urban expansion area is located west of the Ladd Hill ridgeline, most of the area's natural drainage flows into tributaries of Cedar Creek, including Goose Creek at the west, and then joins Cedar Creek to flow north through the City of Sherwood. On the east side of the Ladd Hill ridgeline, storm water drains into tributaries of Rock Creek southeast away from the urban area. The main stem of Rock Creek then flows north-northwest back into the urban area.

Key Values and Management Objectives

Increasing attention has been focused on the protection and enhancement of streams in the northwest region over the past decade. Efforts to conserve the habitat of threatened and endangered anadromous fish species, such as salmon and steelhead trout protected under the Federal Endangered Species Act (ESA), require attention to the pronounced effects urbanization can have on natural streams. Some of the objectives of impact management and mitigation strategies are to:

- ❖ Reduce erosion and turbidity in surface water runoff entering natural streams,
- ❖ Reduce the temperature of natural streams,
- ❖ Reduce the amount of chemical contaminants entering streams,
- ❖ Maintain pre-development stream flow patterns, avoiding sharp runoff peak volumes during rain storm events due to paving and building construction,

- ❖ Provide stream characteristics that accommodate the life cycle needs of protected fish, such as resting and spawning areas, and
- ❖ Reduce losses of protected fish due to competition, predation, and human activities.

Urbanization in the southern urban expansion area will occur only following its

inclusion in the City of Sherwood's planning area (UGB). Development will be subject to all applicable regulations concerning stream protection and treatment of surface water runoff from urban sites. At this time, however, regional planning to meet Federal ESA and State of Oregon natural resource protection (Statewide Planning Goal 5) requirements is under way, and the specific requirements that will apply to future development cannot be reliably predicted.

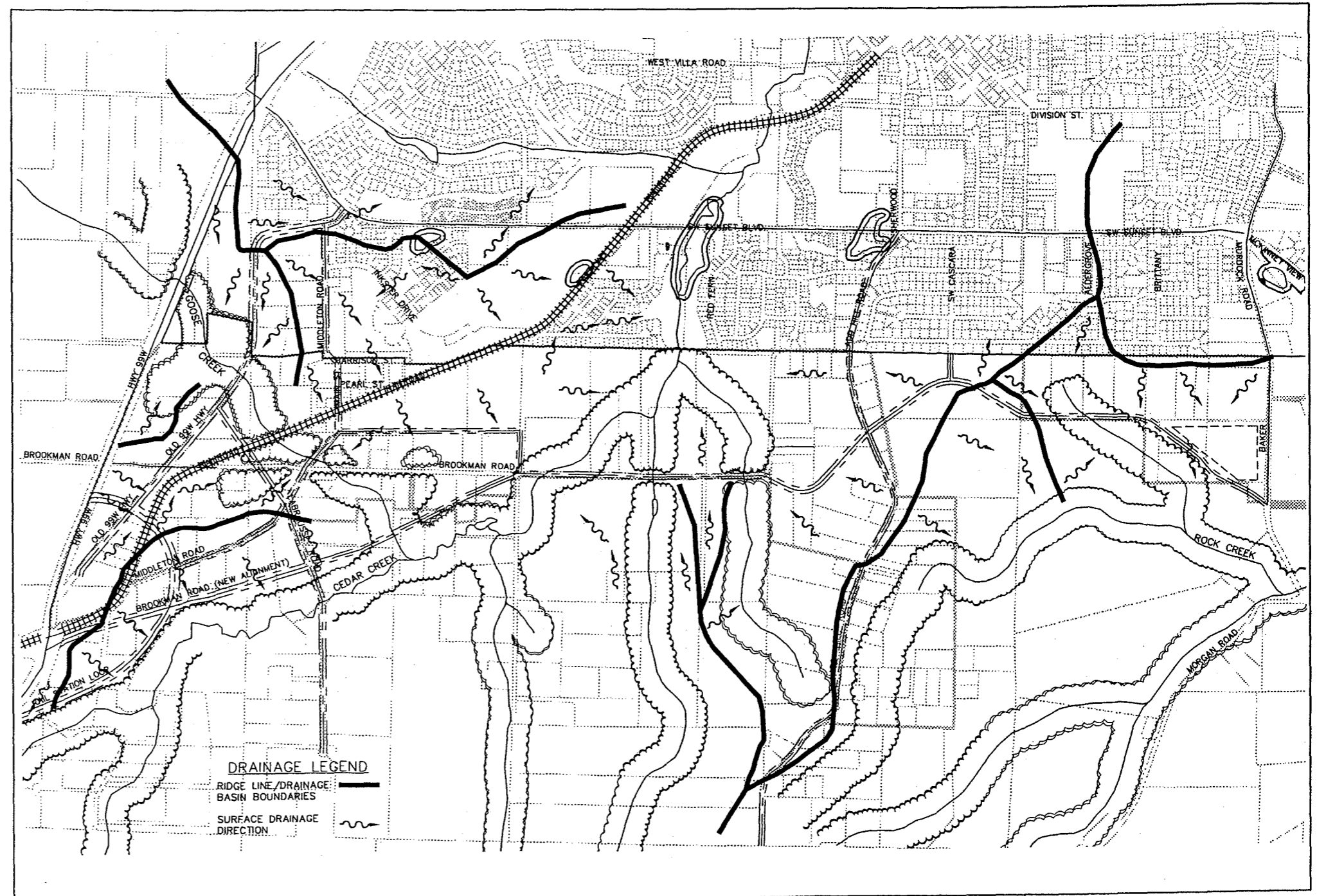


Figure 14. Conceptual Surface Water Management Plan (Source: Westlake Consultants)

As a planning assumption, this plan anticipates 200 foot wide buffer corridors alongside natural streams, and around identified wetlands. Such setbacks for urban development are considered to perform several functions consistent with the objectives listed above, by providing shade, groundwater infiltration, and biological processes that remove phosphorus and other contaminants from surface water runoff before it reaches flowing stream channels.

Conceptually, therefore, this plan's surface water management approach is to implement the kinds of treatments currently required within the urban area. Specifically, each development project is required to construct systems that capture all runoff from roofs and paved surfaces, and direct it to facilities that provide the following functions:

- ❖ Quality treatment – removing oil and grease, phosphorus, and other chemicals that degrade stream water quality prior to discharging water to natural streams;
- ❖ Quantity management – detaining surface runoff during storm events and controlling the rate of its release to match the pre-development flow rate. Alternatively, where soil conditions allow, storm water can be retained within a site and allowed to percolate locally rather than flow out of the site.

Such facilities are typically constructed by developers in conjunction with development projects. At commercial, industrial and multifamily residential development sites, the facilities are usually located within the property, and are privately owned and maintained by the property owner. In residential subdivisions, it is more common for such facilities to be constructed and then dedicated to the City, but they may be retained by the developer or a homeowners' association if adequate safeguards are in place to assure their regular maintenance in the future.

Detailed evaluation of the downstream capacity of Cedar Creek is beyond the scope of this conceptual planning study. Preliminary review at the conceptual level has not indicated that large-scale public storm control facilities will be required within or downstream from the urban expansion area, if surface water quality and quantity management requirements are consistently implemented in conjunction with public construction of principal roadways and private development projects. The resulting surface water management system will be comprised of the natural storm drainage corridors (streams) within the expansion area and a large number of small-scale private and public facilities that treat and control the release of urban runoff into natural drainageways.

An exception to the site-by-site strategy will be needed in the Village Center area, with its dense urban pattern with buildings in close proximity. Since drainage from that area generally flows to the south, surface water management should be accommodated within the public systems that will

be created to treat runoff from the proposed new alignment of Brookman Road. These facilities can be located on the south side of the roadway, outside the stream buffer width, and scaled to handle runoff from both the road and the dense urban village center area to the north.

Sanitary Sewer System

Structure

The City's primary sanitary sewer trunk line, which serves most of the present community, is located generally along the Cedar Creek corridor (discussed above).

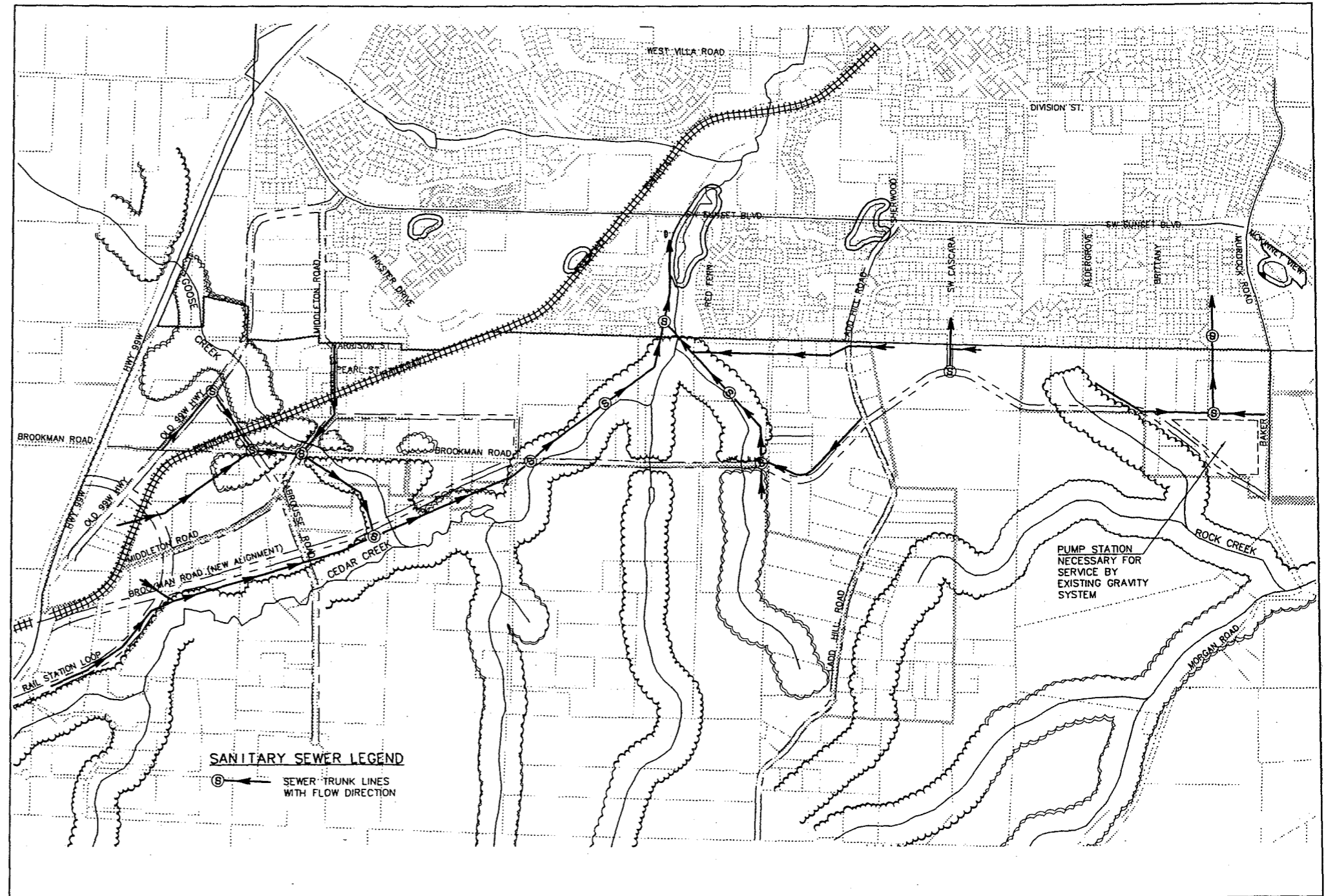


Figure 15. Conceptual Sanitary Sewer Plan (Source: Westlake Consultants)

Public Services

In addition to transportation and public facilities infrastructure (i.e., water, sanitary sewer and surface/stormwater management systems), urbanization creates demand for services provided by local governments, schools and other agencies and special service districts. This Discussion Draft is the first document in which the proposed land uses and supporting systems in the expansion area have been set out at this level of detail. The information in this document is intended to enable service providers to assess impacts and to anticipate service demands and new revenues that will accompany development.

The City of Sherwood will circulate this Discussion Draft to all of the service providers and agencies with interests in the proposed urban expansion area. They are invited to provide comments on the needs that can be predicted based on the proposed mix of land uses, numbers of housing units, and other factors provided in this draft plan. Service providers and agencies are also asked to consider their revenue sources, which may include user fees, property tax assessments, and governmental transfers on a per-capita or other basis, to estimate the ability of development of the expansion area to cover the incremental costs of providing services. When developed, the values of properties within the study area will provide a substantial addition of value subject to property tax levies, which can be used as the basis for a variety of capital financing mechanisms available to local jurisdictions and service providers.

Next Steps

The City of Sherwood's urban expansion planning takes place within the context of Metro's regional planning and management of the regional UGB. While this plan incorporates many of the Metro planning requirements, it also provides some innovations developed by the Steering and Advisory Committees in Sherwood.

It is up to the City of Sherwood and its residents to advise Metro of their preferences with respect to urban expansion. This document is intended to promote dialogue and, to some extent, challenge residents to visualize the potential of the land area south of the City. Many of the issues it raises are regional in scope, with both local and large-scale impacts on transportation and land use in the Portland metropolitan region. The relationships among issues and potential solutions are complex.

Because the City Council is made up of the City's political representatives, it is the decision-making body that will forward a recommendation to Metro concerning adding the southern expansion area to the UGB. Prior to doing so, the community may have one or more public meetings or preliminary hearings, such as before the Planning Commission. For information about the local review and approval process, please contact Mr. David Wechner, Planning Director, City of Sherwood, 503-625-5522.

The Steering Committee wishes to thank the members of the Advisory Committee and all the citizens, property owners, and other interested people who contributed to this Concept Plan.

- ❖ Because most of the urban expansion area's natural drainage flows toward Cedar Creek, that trunk line is the logical facility to serve all of the expansion area west of the Ladd Hill ridgeline.
- ❖ In the eastern part of the City, the Rock Creek sanitary sewer trunk provides service that extends to the southern edge of the present City/UGB. Almost all of the proposed urban area east of the Ladd Hill ridgeline can probably be served by gravity flows into the existing system, i.e., without the need for pump stations.
- ❖ There is a small area in the far southeast corner of the expansion area that may require a pump station to connect to the existing system. In the future, this area could be served by a gravity line following the Rock Creek corridor, which flows southeast outside the current urban area in this vicinity, but then curves and flows northwest back inside the City limits (see Figure 15).

System Capacity

Both trunk lines were evaluated to determine their capacity to accommodate the sanitary sewer flows predicted as a result of urbanizing the southern expansion area. Information in the City's Sanitary Sewer System Plan about the structure of the two system trunks and pipe line sizes was used to test the effect of the predicted additional flows. The analysis indicates that no segment of sanitary sewer line within the City's system would reach an over-capacity condition.

Notably, however, the City's plan – which was not designed to provide service in most of the southern expansion area – observes that there are Unified Sewerage Agency (USA) trunk lines downstream from the City where flows are predicted to exceed capacity as further development within the present UGB occurs. These segments will need to be upgraded, such as by replacement or augmentation of the existing lines, when development within the City approaches their capacity limits. This need is a function of how rapidly development activity continues within the present UGB, and is not related to whether, or when, the southern urban expansion area may be added to the City's UGB. On the other hand, when the needed USA upgrades are planned, they should take into account the future service needs of the expanded urban area, including this plan. Arguably, some assumptions with respect to the potential for long-term future expansions farther to the south and east, such as along Ladd Hill Road and Baker Street, could be included to identify potential extended planning and service needs.

TECHNICAL SUPPLEMENT



DEMOGRAPHICS AND RESIDENTIAL DEVELOPMENT PROGRAM

Sherwood Urban Reserve Concept Plan

Presented to:

CITY OF SHERWOOD

April, 2000

Prepared by:

LELAND CONSULTING GROUP
 325 Northwest 22nd
 Portland, OR 97210

SHERWOOD URA PLAN



SHERWOOD URA DEMOGRAPHIC PROFILE

As part of the process for understanding housing requirements for future development of the Sherwood Urban Reserve Area (URA) Concept Plan, it is necessary to delineate the household size, age and income of future residents of the URA. This demographic analysis is necessary in order to set project goals for development.

The probable number of households supported in the Concept Plan is approximately 1,880. The minimum acceptable number under the Metro criterion of achieving 80 percent of zoning is approximately 1,500. For the purposes of this study an assumption has been established by the project team, that approximately 1,880 households will be located in the Sherwood URA.

The projected population in the URA at 1,800 households is approximately 4,250 persons, yielding an average household size of approximately 2.3 persons per household. The breakdown of household size, age and income is derived from recent preliminary forecasting by Metro.

THE BASE CASE

The base case for planning is shown in Table 1 shown with relative breakdowns by household size, age and income (intended primarily for transportation and land-use planning purposes). Income is shown in 1990 constant dollars in Table 2.

Table 1
All Household Types by Age and Income

	Income				Totals
	>\$17,500	\$17,500 to \$29,000	\$29,000 to \$40,500	\$40,500 and Up	
<25	49	24	11	-	84
25 to 54	144	210	240	362	955
55 to 64	22	66	80	234	402
65 plus	266	109	44	21	440
Totals	481	409	376	617	1,882

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Table 2
Household Types by Age and Income
Metro 2020 Base Case Forecast for URA
Income in Constant Dollars

	Age	Income				Totals
		>\$17,500	\$17,500 to \$28,999	\$29,000 to \$40,499	\$40,500 and Up	
1 Person	<25	20	8	7	-	35
	25 to 54	44	65	66	70	244
	55 to 64	9	23	22	60	115
	65 plus	107	33	14	6	160
	Totals	180	128	109	136	554
2 Person	<25	10	8	3	-	21
	25 to 54	47	61	72	117	298
	55 to 64	9	24	24	78	135
	65 plus	80	38	15	9	141
	Totals	146	132	114	204	595
3 Person	<25	13	4	1	-	18
	25 to 54	32	45	54	90	221
	55 to 64	3	13	18	47	81
	65 plus	75	22	5	3	105
	Totals	124	84	77	140	425
4 Person	<25	6	4	1	-	10
	25 to 54	20	39	49	85	193
	55 to 64	1	6	16	48	71
	65 plus	5	16	10	3	33
	Totals	31	65	75	137	308
All Ages						
1 Person		180	128	109	136	554
2 Person		146	132	114	204	595
3 Person		124	84	77	140	425
4 Person		31	65	75	137	308
Totals		481	409	376	617	1,882

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In the base case, household sizes are:

- 29 percent single
- 32 percent two persons
- 23 percent 3 persons
- 16 percent four persons

In 1990 dollars:

- 26 percent of households have incomes at or below \$17,500
- 22 percent have incomes from \$17,500 to \$29,000
- 20 percent are at incomes from \$29,000 to \$40,500
- 33 percent are at income levels above \$40,500.

By age:

- 5 percent of households are expected to be 25 or under
- 51 percent are expected to be between 25 and 54
- 21 percent are expected to be between 55 and 64
- 23 percent are expected to be 65 or over

Housing Impact

Goal 10 of the Regional Urban Growth Goals and Objectives calls for a mix and range of housing to respond to the needs of future residents and employees within each jurisdiction. The demographic profile for the Sherwood Urban Reserve Area was analyzed to yield a mix of units by bedrooms and income. This mix of units is shown in Table 3, broken out by age and income. The recommended mix of housing types (apartments, row houses, etc.) has been delineated in the development program.

To respond to the mix and range of housing indicated in Table 3, each of the areas and zones within the Concept Plan has a range of densities and allowable housing types. Need for one and two bedroom units can be satisfied with a mix of multifamily rental units and attached housing such as plexes and row-houses.

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**Table 3
Potential Mix of Units by Age and Income**

	Income Range				Totals
	>\$17,500	\$17,500 to \$28,999	\$29,000 to \$40,499	\$40,500 and Up	
1 Bedroom					
<25	30	8	4	-	41
25 to 54	91	65	33	23	212
55 to 64	18	23	11	20	72
65 plus	187	33	7	2	229
Totals	326	128	55	45	554
2 Bedroom					
<25	13	13	6	-	33
25 to 54	32	106	132	85	356
55 to 64	3	37	44	66	151
65 plus	75	60	25	7	166
Totals	124	216	207	158	705
3 Bedroom					
<25	6	4	1	-	10
25 to 54	20	39	59	108	226
55 to 64	1	6	19	68	95
65 plus	5	16	9	7	36
Totals	31	65	89	183	367
4+ Bedroom					
<25	-	-	0	-	0
25 to 54	-	-	16	145	161
55 to 64	-	-	5	80	85
65 plus	-	-	3	6	9
Totals	-	-	25	230	255

Three and four bedroom units will most likely be predominantly single family units, either attached, but mainly detached, with a small minority of larger multifamily units. Within each neighborhood is a range of housing densities that will assure that neighborhoods are not "mono-cultures," (i.e., areas of identical household income, housing and demographic characteristics).

AFFORDABILITY

Metro planning guidelines state a desire for units to meet affordability goals. Of all households in the current projection, fewer than 30 percent are expected

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to fall within a range requiring affordable housing (at 60 to 80 percent of median income). The expected need for affordable units in the very low-income category is not known.

The development program provides for a range of housing densities within each neighborhood. Affordability is most constrained by land cost and lot size and the Concept Plan for this reason includes a range of densities within the single family and multi-family zones to allow for affordable ownership and rental opportunities.

The greatest need for affordable housing will be for one and two-bedroom units for households of two or fewer persons. This need can be satisfied by row housing or plex ownership opportunities in the lower density areas, and by multi-family rentals in the higher density zones. In addition, the presence of services will allow residents, and especially seniors, to live with fewer cars per person.

Data on consumer spending shows typical annual spending per household of more than \$5,000 for automobile services. Site planning, which reduces dependency on cars, will allow households to have more income available for housing and amenities. The Concept Plan has been designed to allow this opportunity so affordable units can be integrated within the fabric of the entire community.

Market Affordability

Housing pricing is a function of construction cost, land cost, efficiency of land use and the demand for units. Land cost in the Metro area tends to follow the standard center city urban land model that posits that land is more expensive in the center of the metropolitan area and lowers with distance from the center. Metro data have shown that, in general, land cost lowers from the center to the urban growth boundary, with land outside the urban growth boundary dropping sharply in price due to its unavailability for uses other than agricultural.

Construction cost tends to be constant across the Metro area – a given quality of construction costs the same amount irrespective of location. Where land cost is high, however, and the land is limited by zoning to single density development, the units tend to grow in size proportional to land cost in order to capture as much return from land cost as possible.



Efficiency in site planning results in more net usable land and therefore lower land cost per dwelling unit. Net usable land is the area remaining after the deduction of land needed for infrastructure, open space, storm drainage and other easements and set-asides as well as land considered unbuildable or environmentally unsuitable for construction.

Demand for units is a function of units available for sale or rent versus the number of households competing for units. If unit supply drops while demand remains constant, unit prices will tend to rise. If demand remains constant but unit supply increases faster than demand, unit prices will tend to lower.

Goal 10 of the Regional Urban Growth Goals and Objectives calls for a mix and range of housing for residents and workers within a jurisdiction in the Metro area. The Sherwood Urban Reserve Plan has addressed this goal by creating a wide mix of densities and housing types within each of the general zoning areas created by the plan. In planning the urban reserve area the factors of cost cited above were taken into account, allowing opportunities for both affordable rental and ownership within the developments. The reasons for this are as follows:

- Raw land cost for the urban reserves, as demonstrated by Metro data, is significantly lower than nearby areas within the urban growth boundary. Land cost is typically 20 to 25 percent of the cost of a finished unit; as land cost goes down unit prices can drop proportionally.
- Unit size and, therefore, construction cost per unit would normally be determined by a combination of land cost and zoning. Because the zoning proposed by the concept plan proposes a range of sizes and types, unit construction cost and selling price can be targeted to provide opportunities for lower cost units by altering the density/land-cost-per-unit relationship.
- Efficiency of use within the concept plan is higher than most existing development. This efficiency of use means that the cost of raw land is allocated to more units than is typical currently, allowing the opportunity for more affordable units. In addition, the density is held to a minimum of ten units per acre, higher than the current Metro area average, while land cost is lower than Metro average within the urban growth boundary. Even if average density were lowered, land cost would still allow more affordable development than in surrounding urbanized areas.



INTRODUCTION TO THE RESIDENTIAL PROGRAM

A development program is a narrative description of how a property or area should be developed. The program serves as a guide to the physical planners (land planners, architects, landscape architects and others) who are responsible for translating the narrative program into a physical land use, transportation and infrastructure plan. The development program describes the overall identity for the project including theme, image, and attributes to be merchandised with the overall objective being to respond to target markets, maintain economically viable development and create a positive, long term identity for the community while responding to the principles of the Region 2040 Framework Plan.

In close cooperation with the project team, programming includes identifying and formulating concepts for the project, including:

- Land uses by type
- Product mix—and distribution
- Number and type of products
- Recommended residential products
- Non-residential components
- Commercial and industrial uses and activities
- Educational and research uses
- Alternative forms for non-residential elements (i.e.: neighborhood center)
- Recommended amenities
- Other development recommendations

Preparing a development program for the Sherwood URA is unusually challenging. In addition to the traditional factors of market conditions, site conditions, city policies, access, infrastructure and other related factors, programming for the Sherwood URA is further impacted by a wide, and sometimes conflicting, array of expectations, policies, hopes and ideals. Region 2040 is a pioneering planning concept—urban reserves policy is even more pioneering.

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STAKEHOLDERS

The stakeholders or participants in this process who have expressed interest in the outcome of the Sherwood URA Plan include, but are not limited to:

- City of Sherwood
- Property owners
- Neighbors
- Metro
- School District
- Washington County
- Oregon Department of Transportation
- Oregon Department of Land Conservation and Development
- Citizen groups
- Other special interest groups

MORE ABOUT PROGRAMMING

The consultant team is charged with the responsibility of preparing a plan that will result in successful implementation while addressing, to the extent reasonably possible, the goals of Region 2040. The additional and equally rigorous layer of considerations that impact the program consists of:

- Market willingness to live, work and shop in the physical environment to be developed;
- Market capacity to pay (either through rents, home ownership, or retail and office rents);
- Ability to establish private sector construction and long-term debt for development on the property;
- Lending and loan underwriting policy and criteria;
- Achieving reasonable levels of profitability commensurate with risk to attract private development capital to the area; and
- Establishing an arrangement of land uses which can be successfully introduced into the marketplace with sufficient velocity (rate of sales) to return the revenues necessary to provide infrastructure both on-site and off-site.

Hence, all development strategies must thoughtfully consider the needs of the potential residents, employees and shoppers who will come to this area. These

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considerations include price, size, quality levels, image, quality of life and other factors. The Sherwood URA Plan must successfully establish a sense of place and, in doing so, build value, diversity and character. An important part of the strategy is to establish a community with a range of housing products and prices.

ADOPTED POLICY DIRECTIVES

In addition to the many other variables that define the programming process for the Sherwood URA Plan, Metro has adopted specific code language relating to urban reserve areas. This language is contained in section 3.01.012 of the Region 2040 Framework Plan. Some of the key elements of that language are summarized as follows:

- 1 The conceptual land use plan and concept map is required to be in compliance with the RUGGO and 2040 growth concept design types and any applicable functional plan provisions.
- 2 The reserve property must be either annexed to the city and/or any necessary service districts at the time of approval of the urban growth boundary.
- 3 The plan should provide for residential densities of at least 10 dwelling units per net developable residential acre.
- 4 The plan must demonstrate measures that will provide a diversity of housing stock that will fulfill needed housing requirements to include and not be limited to implementation of recommendations in Title Seven of the Urban Growth Management Functional Plan.
- 5 The plan must demonstrate how residential development will include (without public subsidy) housing affordable for households with incomes at or below area medium incomes.
- 6 The plan must provide for sufficient commercial and industrial development.
- 7 The plan must provide a conceptual transportation plan consistent with the regional transportation plan.

- 8 The plan must establish a funding strategy for protecting areas from development due to wildlife habitation, water quality enhancement and natural hazards.
- 9 A public facilities and services plan must be provided.
- 10 A conceptual school plan is needed.

DEVELOPMENT THEME AND CHARACTER

The recommended program is for a *residential mixed-use community* with a town center near a major arterial that accommodates a concentration of shops, services, employment facilities, civic uses, amenities, housing and other public and private activities. This theme of a predominantly residential community is recommended for a number of important reasons:

- A residential community is the only primary land use category that can reasonably "take down" (or sell) this large 1,605-acre concentration of holdings in a reasonable time frame—necessary in order to repay capital, cost of capital and generate a profit.
- A residential mixed-use community meets most of the goals addressed in Region 2040.
- Density allocations by Metro and growth forecasts prepared by the City of Sherwood support a predominantly residential project.
- A mixed residential community permits a range of different kinds of housing to be developed simultaneously. Therefore, a number of different housing markets can be addressed in terms of household size, age of the head of household, incomes and lifestyles.
- Developing a town center supports the public objectives of reduced transportation demand while providing convenient access to day-to-day needs and services.
- Employment opportunities within the town center further supports the public objective of reduced transportation demand.

The character of the Sherwood URA Plan is recommended as a diversity of housing choices in terms of image, price, density, and quality (commensurate

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with price). This building diversity (form, color, materials, density, etc.) should be executed within a more homogeneous physical context of planned streetscape, landscaping, street lighting, signing, street furniture and other common elements. In other words, consistency of character will be in the streetscape and landscape while diversity can be expressed in the structures.

A variation on the predominantly residential theme is an intensification of the employment portion of the project. In the recommended concept, the project is essentially a residential project with a relatively limited amount of supporting retail and employment uses and activities.

LAND AVAILABLE FOR DEVELOPMENT

The Sherwood URA area totals 464 acres. However, part of this land is not available for development. Some of this area accommodates existing development; and other areas are not suitable for development because of wetlands or floodplain designations and other factors. Still other parcels are not available for development due to open space expectations, easements, and related factors.

Table 4 shows the Sherwood URA *land take analysis*. This analysis will be refined and modified as the process continues. Table 4 shows the total planning area of 464 acres and the different kinds of existing land uses that adjust the area available for development.

Approximately 43 percent is available for net development, and approximately 35 percent is devoted to residential development. Net development refers to land without streets, wetlands, storm drainage, etc. By contrast, a gross acre includes streets, wetlands and all other required easements and drainage ways.

As shown in Table 4, approximately 464 acres in the URA and 83 acres from a boundary adjustment (547 acres total) are available for development before deducting existing street rights-of-way, utility easements, flood plain and wetlands. It is necessary to further deduct acres to be used for on-site collectors and arterial streets that include both new roads and expansion of existing roads.

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Further, before determining the land available for residential development, come the non-residential components. These include schools, parks, and additional greenways to serve as storm drainage easements and as buffers between land uses for the more intensely developed portions of the projects.

Table 5 shows the various types of housing products to be arrayed across the 190 net developable acres. This analysis shows the distribution of housing products that will provide a variety in the market place and respond to the overall project theme of housing choice, diversity and sense of place.

Table 4
Development Program
Land Take Analysis

Areas	Estimated Acres
Total Planning Area	547
Less Street Rights-Of-Way	(101)
General Employment	(45)
Community Service / Schools	(8)
Parks and Greenspace	(38)
Title 3 w / Bike & Ped Corridors	(135)
Stormwater / Greenways	(30)
Equals Residential Area	190

Table 5
Residential Program
Housing Products & Distribution

Residential Components	Acres	Percent
Large Single Family Lots	42	22%
Standard Single Family Lots	38	20%
Small Single Family Lots	34	18%
Clustered Housing / Plexes	19	10%
Rowhouses / Plexes	10	5%
Condominiums / Stacked Housing	10	5%
Apartments	29	15%
Senior Housing	10	5%
Total	190	100%

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Choice and diversity are essential themes to this recommended program. The glue that holds together the combination of choice and diversity is in good planning, quality street standards and streetscapes, design standards, community facilities, the quality and type of non-residential products and the thoughtfulness with which home owner association, and other community decision making organisms are formed.

Table 6 further refines the product mix and shows the approximate units that would be produced on a net acre basis. The overall target is a net residential density at slightly over 10 units per net acre which yields approximately 1,953 dwelling units on 194 net acres. This target uses average densities that respect the economics of the Portland metropolitan market place while achieving the density goals for housing as outlined in the Region 2040 urban reserve requirements.

Table 6
Development Program
Residential Program, Housing Products & Distribution

Residential Components	Estimated Acres	Units Per Net Acre	No. Of Housing Units
Large Single Family Lots	42	4	167
Standard Single Family Lots	38	6	228
Small Single Family Lots	34	10	343
Clustered Housing	19	8	152
Rowhouses / Plexes	10	12	114
Condominiums / Stacked Housing	10	16	152
Apartments	29	18	514
Senior Housing	10	30	285
Mixed Use Center Housing			50
Total	190		2,006

Table 7 shows a distribution of the target housing units between ownership and rental units. As shown, approximately 59 percent of the units would be targeted to owner occupied households and approximately 41 percent would be targeted to renter occupied households. Approximately 50 percent of the residential housing products are in medium and higher density offerings. By contrast, 44 percent are in single family lots or in large lots.

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Table 7
Development Program
Residential Program, Units & Ownership

Residential Components	No. of Housing Units	Owner Units	Renter Units
Large Single Family Lots	167	167	-
Standard Single Family Lots	228	228	-
Small Single Family Lots	343	343	-
Clustered Housing / Plexes	152	91	61
Rowhouses / Plexes	114	91	23
Condominiums / Stacked Housing	152	122	30
Apartments	514	-	514
Senior Housing	285	114	171
Mixed Use Center Housing	50	20	30
Total / Average	1,953	1,138	815
Percentage	100%	59%	41%

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Memorandum

DRAFT

Date: March 29, 2000
To: Lee Leighton, Westlake Consultants
From: Carl D. Springer, P.E.
RE: Sherwood Urban Reserve 45: Transportation Analysis and Recommendations

Background

This memorandum builds upon our initial technical analysis that outlined the transportation opportunities and constraints for the Urban Reserve 45 area (memo dated October 12, 1999). During the intervening months, several public workshops have been held and further refined analysis has been made to produce a conceptual land use plan. We based our transportation analysis on the plan we received from Westlake Consultants as summarized in the table below.

Table 1: Urban Reserve Area Concept Land Use Plan

Use Code	Gross Acres	Net Use	Units
Warehouse	12.4	340,000	gross sq. ft.
Industrial Flex	21.7	340,000	gross sq. ft.
Mixed Use Retail	11.5	250	gross sq. ft.
Park & Ride Lot	5	475	parking stalls
Residential High Density	34.9	628	dwelling units
Residential Low Density	133.7	739	dwelling units
Residential Medium Density	75.1	594	dwelling units
Elementary School	9.6	550	students
Park	8	8	acres

The purpose of this memorandum is to discuss the transportation network and related issues of functional classes, street design, and preliminary cost estimates that would support the concept land use plan.

Travel Demand Forecasts

The land use concept plan was analyzed to estimate the local traffic added by urban development. Daily traffic volumes were estimated using standard generation rates published by the *Institute of Transportation Engineers*. The calculation determined the proportion of vehicle trips that will start and end within the UR (internal trips), and those that have origins or destinations within the existing city boundaries or other areas in the region (external trips). The trip calculations are attached in Appendix A and summarized below.

Table 2: Trip Generation Estimate (Daily Vehicle Trips)

Total Trips	Net Acres	Net Use	Units	Internal Daily Trips	External Daily Trips	Total Daily Trips
Employment	30.7	681	GSF	260	3,823	4,083
Retail	11.5	250	GSF	1,472	4,790	6,262
Residential	208.9	1961	DU	1,293	12,724	14,017
Other	22.4			1,082	1,624	2,706
Total				4,107	22,961	27,069
Percent of Total				15%	85%	100%

GSF = gross square feet building area
 DU = dwelling unit

The vehicle trip generation to and from UR 45 (external trips) is approximately 23,000 daily or 2,000 to 2,300 during peak hours. This is about double the expected added travel demand from UR 45 as represented in the Metro travel model forecasts. The net change between 1994 and 2020 showed a growth of 1,079 peak hour trips for the traffic analysis zones that overlay UR 45. These zones lie outside the existing city limits, and the growth is limited to development in UR 45 and other permitted low-density development on unincorporated lands¹. The higher trip activity is attributed to the added retail space and the special activity at the park and ride lot.

Internal vs. External Trips – Trips associated with retail, parks and the school uses had a high proportion of internal trips, while the residential uses primarily traveled off-site for work and shopping needs. The overall internal trip capture is 15 percent of all trips. The retail uses on-site capture a significant portion of their total trips from on-site uses (24%), such as office, residential and the park & ride. The reverse is not true: most of the new residents will travel off-site to fulfill their retail shopping needs because they need a larger range of services than can be provided on-site. Approximately three-quarters of the shopping trips by future residents of UR 45 will travel to other retail uses within the City of Sherwood or other destinations. Refer to the calculation worksheets for details of the internal trip analysis.

¹ Metro Traffic Analysis Zones 398 and 399 have a net growth of 2,129 housing units, 1,234 non-retail employees outside of the southern city limits between 1994 and 2020.

Planned Regional Facilities Affecting Plan Area

The City of Sherwood Draft Transportation System Plan (1999) does not provide a street network that extends into the Urban Reserve (UR). None of the planned or programmed city improvement projects that have been identified services this area. The only pending transportation projects that will affect the UR are described in the Draft Regional Transportation Plan list dated February 2000. Five projects from the draft list relevant to the UR are summarized in the table below.

Sherwood Southern Bypass Highway – The most dramatic potential influence is the new four-lane principal arterial between Interstate 5 and Highway 99W, a distance of roughly five miles. The roadway conceptual alignment parallels Brookman Road with full grade-separated interchange connections at Highway 99 and Baker Road. Long-range 2020 traffic forecasts between 30,000 and 40,000 vehicle daily, similar to Tualatin-Sherwood Road or Highway 99W today. This new facility would alleviate the need for major expansion of Tualatin-Sherwood Road (beyond five lanes) and serve the southwestern part of the Metro area including UR 45. The roadway is the most costly project on the selected list with \$250 million allocated for construction. This is a very significant investment, similar in magnitude to the planned widening of Highway 217 from four-lanes to six-lanes (\$280 million). The latest funding policy being considered would make this new highway a toll facility. If implemented, it would be the first of its kind in the State of Oregon. It is likely that the tollway would be the last of the five local projects to be constructed as indicated by the current RTP program schedule and the extra large investment required.

Aside from funding decisions, the roadway alignment and feasibility are still in the preliminary stages of environmental and design reviews. The hilly terrain and particularly the slope around Ladd Hill make a difficult context to design a high speed, principal arterial facility. It is unclear whether this roadway would be exclusive for through traffic with grade-separated access only at Baker Road and Highway 99W, or if it would have a dual function of local access and a regional through facility². The right-of-way for a four-lane principal arterial might be from 110 to 150 feet wide (per Metro guidelines) depending on terrain while a community boulevard is 80 feet wide. If the two facilities were built in parallel, a band approximately 230 feet wide would be assigned to roadway functions only across UR 45. This would most likely alter the concept land use plan proposed to date. The trip generation presented previously would be lower if more land was set aside for regional transportation circulation.

For the purpose of this concept study, the implications of the I-5 to Highway 99W connection were included in the impact analysis based on the latest RTP project list (Round 3) and 2020 travel forecasts. The forecast with bypass along the northern alignment, closer to Tualatin-Sherwood Road was included from the previous round of RTP projects (Round 2) for contrast. However, the Functional Street Classifications were determined with the assumption that the southern connection is implemented.

² A tollway facility requires controlled access that cannot be provided with a conventional at-grade roadway facility. One possible alternative would have a dedicated inside lane in each travel direction with a barrier dividing them from other general purpose lanes. Access to the inside toll lane would be limited to grade-separated crossings with toll facilities. The general purpose lanes would function like frontage roads to provide land access and circulation to local streets.

Table 3: Regional Transportation Plan Project List near UR 45

RTP No.	Project Name	Project Location	Project Description	Est. Project Cost in 1998 dollars	Program Years
6005	Tualatin-Sherwood Highway	I-5 to Hwy. 99W	Construct four-lane tollway with access control on Hwy. 99W in Sherwood area	\$250,000,000	2011-20
6111	Beef Bend/Elsner Road Extension	Scholls Ferry Road to Hwy. 99W	Complete street realignment from Scholls Ferry Road to Hwy. 99W	\$24,000,000	2000-05
6113	Oregon Street Improvements	Tualatin-Sherwood to Murdock	Widen to 3 lanes with a signal at Tualatin-Sherwood Road	\$5,500,000	2000-05
6071	Tualatin-Sherwood Road Improvements	Hwy. 99W to Teton Avenue	Widen to five lanes with bike lanes and sidewalks; intertie signals at Oregon and Cipole streets	\$25,000,000	2006-10
6003	Tualatin-Portland Commuter Rail Extension Study	Tualatin to Union Station via Lake Oswego and Milwaukie	Peak-hour service only on existing tracks	n/a	2011-20

Source: Metro Draft Regional Transportation Plan Project List, Round 3, February 2000.

The other RTP projects expand the other arterial roadways in and around Sherwood and they will be constructed within the first half of the 20-year planning horizon. These will more likely be incorporated into the regional street system at the time UR 45 begins to develop. The tollway project requires substantial refinement to fully understand issues related to environmental, design and funding. The last item in the table is an initial study of a commuter rail extension between Tualatin and downtown Portland via the rail line that runs through UR 45. The proposed concept plan includes a local commuter rail station near the retail/office hub next to Highway 99. This location will be an attractive alternative for commuters traveling into downtown or destinations along the rail corridor. Rail travelers potentially could transfer to another commuter rail line currently being studied between Wilsonville and Beaverton with connections to MAX at the central Beaverton station.

Urban Reserve Travel Patterns

The foregoing planned RTP improvements were assumed to be in place by the full build-out of UR 45. Travel patterns to and from UR 45 were derived from the 2020 Metro travel demand model that considers the proximity and relative size of sub-regional employment, retail and other services not included within Urban Reserve 45.

We found the trip distribution for off-site travel to be balanced to and from the north via Highway 99W, Sherwood Boulevard and Baker Road/Murdock Road. Each of these facilities is classified in the City's Draft Transportation System Plan as an arterial. Travel between UR 45 and destinations to the north, either into the City of Sherwood or beyond, represents the majority of off-site travel (73%). Approximately 20% were to and from the east via the new highway connection to Wilsonville, and the remaining 7% were to and from the south. If the east-west

tollway facility is not constructed more UR 45 trips will use arterial streets within Sherwood to reach their ultimate destinations. The off-site distribution for UR 45 is listed in Table 4 below for the two cases: with or without the tollway. Further analysis showed that approximately 40% of the off-site traffic had destinations within the City of Sherwood while the other 60% traveled through the city to other regional destinations.

Table 4: Travel Distribution for UR 45 Vehicle Trips (Percent of Peak Hour Travel Off-Site)

Roadway	With East-West Tollway	No East-West Tollway
Baker Road/Murdock Road	23%	32%
Highway 99W north of Brookman Road	22%	24%
Highway 99W south of UR 45	5%	8%
Highway 99W to Interstate 5 via East-West Connector Highway	20%	0%
Sherwood Boulevard north into Sherwood	20%	26%
Ladd Hill Road south of UR 45	2%	2%
Local Streets north into Sherwood	8%	8%
Total	100%	100%

Source: Select-zone traffic assignment for Traffic Analysis Zones 399 and 399 in the 2020 travel demand models. Street network Rounds 2 and 3, respectively. Peak-hour off-site travel represents approximately 85 percent of the total UR 45 activity. Refer to Table 2 earlier in this report for the internal and external trip totals.

Long-Range Daily Travel Volumes

The traffic added by development within UR 45 was determined based on the foregoing trip generation and distribution findings. As noted previously, the estimated trip generation for UR 45 is higher than the level included in the latest 2020 forecasts. The additional traffic estimated in this study was overlaid onto the model assignments based on the above findings.

The resulting 2020 daily volumes shown in Figure 1 were used in conjunction with the land use plan to determine the appropriate street functional class as described in the next section. Daily volumes at buildout of UR 45 are expected to range from 32,000 to 43,000 on Brookman Road. To local residents within UR 45 this may seem to be extremely high, especially since they are similar to forecasted volumes on Highway 99W. The majority of traffic using this facility would not have origins or destinations within UR 45, but they would be composed of regional "through" traffic from the northern half of Sherwood, or from origins further to the west. The traffic volumes on Brookman Road would decrease by roughly 10,000 to 15,000 if the tollway facility were not implemented. The junction of Brookman Road at Highway 99W would likely be a grade-separated interchange with these high volumes.

Highway 99W volumes will be similar to daily traffic volumes on Brookman Road assuming that all of the planned improvements are implemented. The planned six-lane principal arterial cross-section can adequately serve this level of traffic.

Murdoch Road and Sherwood Boulevard will carry up to 15,000 vehicles daily. This is compatible with the designation as major arterials in the Draft Transportation System Plan.

The Rail Station Loop that forms a semi-circle onto Highway 99W at the west end of UR 45 will carry from 4,000 to 12,000 vehicles daily. Access control will be implemented at the two intersections with Highway 99W. Both intersections will be limited to right-turn movements only. There will be no provision for left-turning traffic at either location. The southern intersection will be limited to right-turn ingress only. The segment between the commuter rail line and Brookman Road will serve the highest volumes.

Other streets within UR 45 will carry less than 5,000 vehicles daily. This includes Middleton Road, Labrouse Road and Ladd Hill Road south of Brookman Road. Each of these facilities can operate with two travel lanes as designated in the next section.

Street Functional Classification

Roadway function can be best defined by connectivity. Without connectivity, neither mobility nor access can be achieved. Roadways that provide the greatest reach of connectivity are the highest level facilities. Arterials can be defined by regional level connectivity. These routes go beyond the city limits in providing connectivity and can be defined into two groups: principal arterials (typically state routes) and arterials. The movement of persons, goods and services depends on an efficient arterial system. Collectors can be defined by citywide or district wide connectivity. These routes span large areas of the city but typically do not extend significantly into adjacent jurisdictions. They are important to city circulation. The lowest functional classification is local streets, providing the highest level of access to adjoining land uses. These routes do not connect at any significant regional, citywide or district level.

We have reviewed the long-range daily traffic volumes and the adjoining land development patterns shown in the UR 45 Concept Land Use Plan. The resulting street facility designation is based on a composite of criteria as summarized in Table 5 from Metro, ODOT and city street design standards. The traffic volume ranges are typical for these types of facilities, and are not explicitly indicated in the design standards.

Table 5: Street Functional Class Criteria

Metro Functional Class (1) (General Features)	Equivalent City Functional Class (2)	Primary Functional Services	Typical Daily Traffic Volume Range	Access Spacing (ODOT or City Minimum)
Principal Arterial (4-lane highway)	Major Arterial	Regional throughway and freight movement	20,000 to 50,000	Limited. (½-mile or more)
Community Boulevard (2-lanes with median or left-turn pockets, on-street parking, wide sidewalks)	Major Collector	Inter-city travel and town center or "main street" activity centers	7,500 to 15,000	Moderate. (530 feet)

Metro Functional Class (1) (General Features)	Equivalent City Functional Class (2)	Primary Functional Services	Typical Daily Traffic Volume Range	Access Spacing (ODOT or City Minimum)
Community Street (2-lane with left-turn pockets)	Collector	Neighborhood Access	3,000 to 10,000	High. (330 feet)
Local (2-lane)	Local	Land Access	less than 3,000	Very high. (N/A)

Sources:

1. *Creating Livable Streets: Street Design Guidelines for 2040*, Metro, 1997.
2. Draft Sherwood Transportation System Plan, 1998, Table 5.1: Street Design Standards.
3. *Oregon Highway Plan*, ODOT, 1999.

Recommended Street Functional Classifications

The street functional classes recommended for UR 45 are shown in Figure 2 and summarized in the table below for the arterial and collector level facilities. Local street access patterns will be identified at the time of development application consistent with the minimum cross-street spacing³ noted in Metro's Title 6 requirements of the Functional Plan.

Brookman Road and the Sherwood Southern Bypass – Our original recommendation for Brookman Road was for a major collector, three-lane facility based on the moderate intensity of the UR 45 land uses. Since our previous memorandum in October 1999, the southern Sherwood Bypass is now favored by Metro along the southern alignment through UR 45. A major issue with the recommendation on Brookman Road is the ultimate alignment of the bypass, and whether it would coincide with Brookman Road. As a tollway facility, the required right-of-way would be approximately 110 to 150 feet through UR 45 corridor and have very little opportunity for local circulation access. If the regional east-west connection is not made along this alignment, then the facility could be substantially downgraded to a Community Boulevard with about half the required right-of-way (typically 80 feet per Metro standards).

Rail Station Loop – This street is the spine for the mixed-use and employment areas along the western end of UR 45. The fronting retail space and higher intensity uses suggests that a Community Boulevard designation be applied to provide more complete pedestrian facilities. The segments north of Brookman Road would have a three-lane cross section that allows for a center left-turn lane or a raised median while the southern segment would be adequately served with two travel lanes only.

³ Metro Functional Plan Title 6 calls for pedestrian/bicycle connectivity every 330 feet and motor vehicle connectivity every 530 feet. These local street spacing thresholds have been incorporated into the Draft Transportation System Plan for the City of Sherwood. We have assumed these standards would apply throughout local access sub-areas within the Concept Plan area.

All other primary streets can adequately serve forecasted volumes with a lesser designation of Community Street. This includes Old Highway 99, Middleton Road, Labrouse Road, and Ladd Hill Road north of Brookman Road. The prototypical street cross-section is 70-feet wide with two travel lanes, bike lanes, landscape strips, and wide sidewalks. This is similar to the City's minor arterial designation because no on-street parking is allowed.

Table 6: Urban Reserve 45 Street Classifications

Street Name	Segment	Functional Class	Travel Lanes
Brookman Road (1)	Highway 99 to Ladd Hill Road	Principal Arterial (Highway)	5
	Ladd Hill Road to Baker Road	Principal Arterial (Highway)	5
Old Highway 99W	Southern Terminus to Middleton Road	Community Street	2
Rail Station Loop	Highway 99W (north) to Old Hwy. 99W	Community Boulevard	3
	Old Hwy. 99W to Brookman Road	Community Boulevard	3
	Brookman Road to Hwy. 99W (south)	Community Boulevard	2
Middleton Road	Rail Station Loop to Old Hwy. 99W	Community Street	2
Labrouse Road (extension)	Brookman Road to Old Hwy. 99W	Community Street	3
Ladd Hill Road	Brookman Road to city limit	Community Street	2

Notes:

- (1) If the east-west connection from I-5 to Highway 99W is not implemented, this roadway can be downgraded to a Community Boulevard with 3 to 4 travel lanes.

Pedestrian/Bicycle Circulation

The protected streams and creekway that pass through UR 45 would be excellent candidates for off-street pedestrian and bicycle trails. The City's Draft Transportation System Plan shows a bicycle/pedestrian pathway connecting to downtown that ends at the northern edge of UR 45 (see Figure 2). This pathway should be extended along the stream channel across Brookman Road to the office/employment areas in the southwest corner of the plan area. This alignment is shown on Figure 2. All new collector and arterial streets on-site would be constructed with sidewalks and bike lane systems as required by Transportation Planning Rule, Section 660-012-0045.

Preliminary Cost Estimates

The conceptual functional street plan was reviewed based on Metro Street Design standards to determine the preliminary costs for construction. The cost analysis assumed standard road features as described in the following sections, and it does not include local streets, road right-of-way or special construction features such as bridges or culverts. These are intended for initial planning purposes only.

Street Design Standards

Metro guidelines for street functional class design standards were taken from the "Creating Livable Streets: Street Design Guidelines for 2040" (Metro, 1997). The unit costs that were applied for this study included all street elements within the street right-of-way, but excluded the cost of the right-of-way itself. The unit costs by street classification were as summarized in Table 7 below.

Table 7: Street Element Unit Costs

Functional Class	Description	Preliminary Cost Per Mile (1)
Principal Arterial	Five-lane highway, 110 to 150 feet right-of-way, bike lanes, sidewalks, center median, landscape strips	\$3,000,000
Community Boulevard	Three-lane major collector, 80 feet right-of-way, on-street parking, bike lanes, extra wide sidealks, center median, landscape strips	\$2,300,000
Community Street	Two-lane minor collector, 70 feet right-of-way, no on-street parking, bike lanes, sidewalks, landscape strips.	\$2,000,000

Source: Street design elements from "Creating Livable Street", Metro 1997. Cost estimates in 1999 dollars from DKS Associates.

(1) Cost estimate does not include road right-of-way or costs to remove existing roadways or utilities.

Preliminary Cost Estimates

The preliminary cost estimates for the primary street system in UR 45 was developed for the principal arterial, community boulevard and community streets as summarized in Table 8. Local street improvement costs would be in addition to these estimates. The cost calculations considered the street elements including paved travel way, curbs, gutters, sidewalks and any raised medians. The cost of road right-of-way was not included. In addition to the street costs, up to four traffic signals would be required at \$250,000 each which adds another \$1 million. The grand total for primary streets is \$15.4 million.

Table 8: Urban Reserve 45 Street Cost Estimates

Street Name	Segment	Functional Class	Segment Length	Total Cost (Millions)
Brookman Road (1)	Highway 99 to Ladd Hill Road	Principal Arterial	9,200	\$5.23
	Ladd Hill Road to Baker Road	Principal Arterial	4,700	2.67
Old Highway 99W	Southern Terminus to Middleton Road	Community Street	4,800	1.82
Rail Station Loop	Highway 99W (north) to Old Hwy. 99W	Community Boulevard	450	0.20
	Old Hwy. 99W to Brookman Road	Community Boulevard	1,250	0.54
	Brookman Road to Hwy. 99W (south)	Community Boulevard	2,600	1.13
Middleton Road	Rail Station Loop to Old Hwy. 99W	Community Street	4,600	1.74
Labrouse Road (extension)	Brookman Road to Old Hwy. 99W	Community Street	1,950	0.74
Ladd Hill Road	Brookman Road to city limit	Minor Arterial	900	0.34
Total				\$ 14.41

Notes:

(1) If the east-west connection between Hwy 99W and Interstate 5 is not along the southern alignment, this can be downgraded to a major arterial with 3 to 4 travel lanes along its length.

Areas for Further Study

During the transportation review, several issues are unresolved that will require further study as the concept plan is refined. The areas for further study include the following:

- Brookman Road designation as a tollway facility through the urban reserve area and its impacts on development potential and local circulation.
- Brookman Road and Rail Station Loop intersections with Highway 99W and compliance with access spacing standards on ODOT facilities.
- Need for special truck climbing lanes on sustained upgrades along Brookman Road to service regional truck travel.

Urban Reserve 45

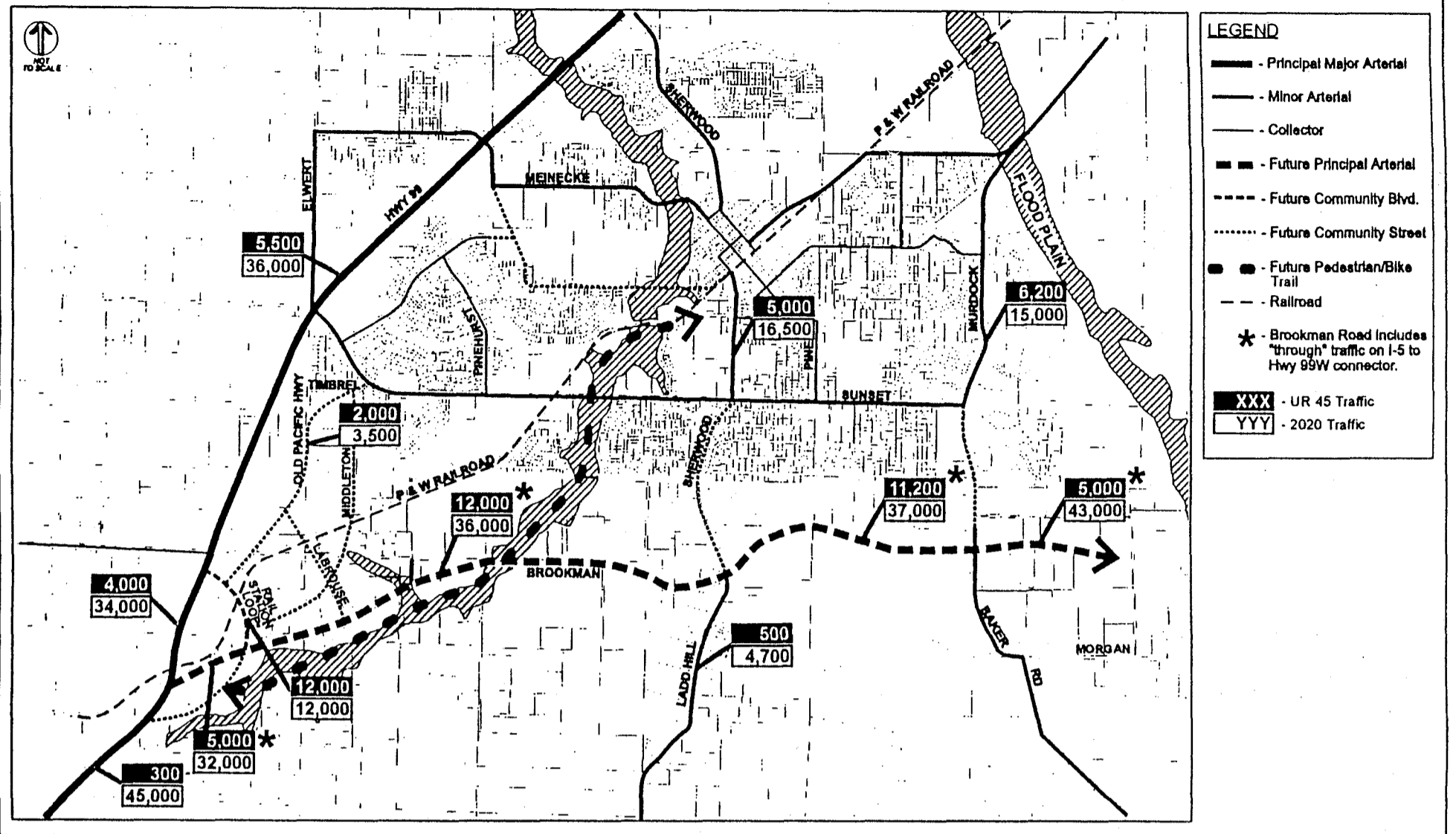


Figure 1
2020 DAILY TRAFFIC VOLUMES

Urban Reserve 45

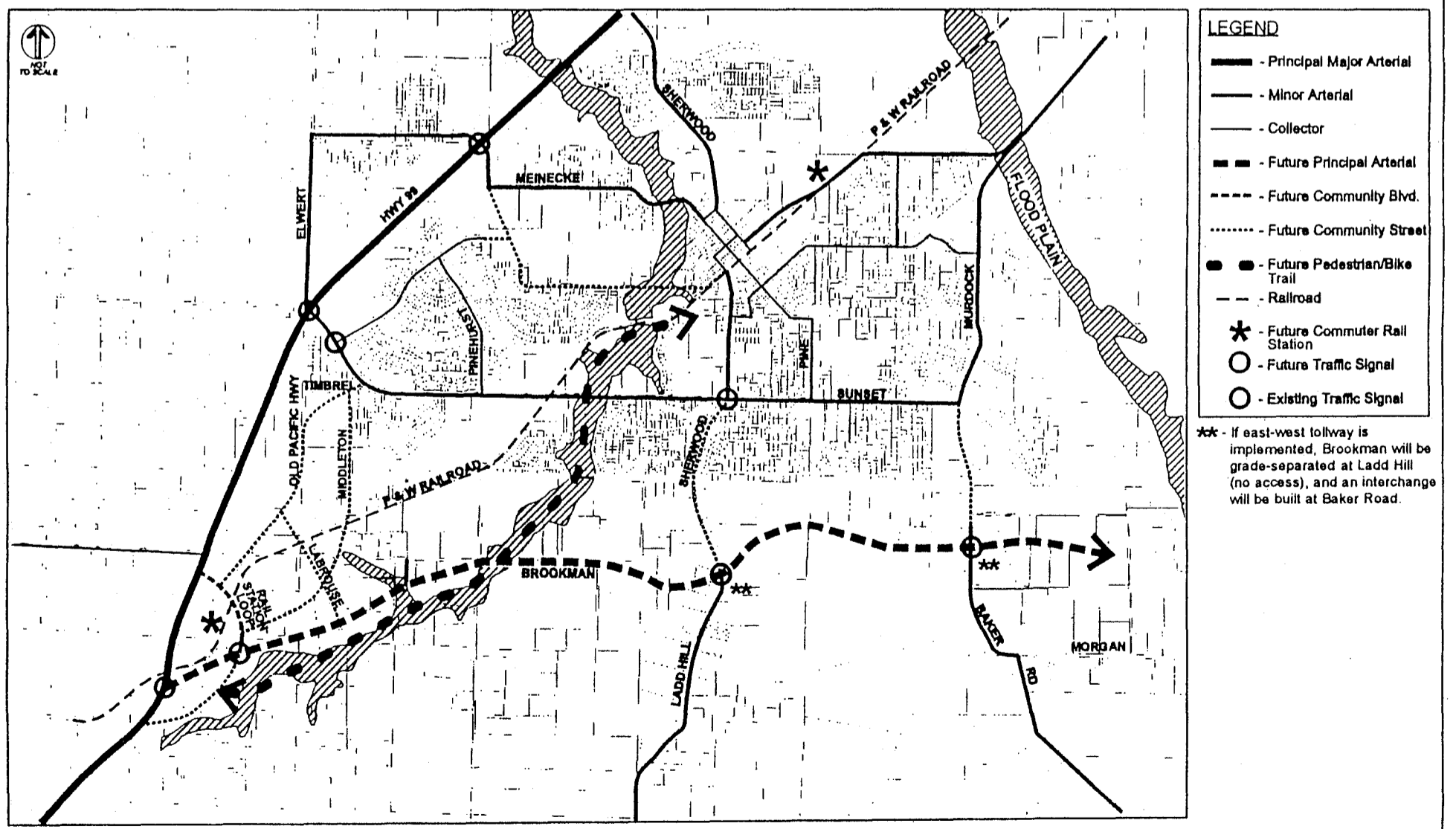


Figure 2
STREET FUNCTIONAL CLASSIFICATION

The Steering Committee welcomes your comments
on this Discussion Draft of the
Sherwood Southern Expansion Concept Plan.

Please mail or deliver written comments to:

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You may also fax comments to

Attention: David Wechner 503 625-5524

or e-mail them to

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**The Steering Committee thanks you
for your participation in this important
community planning effort.**

