Adopted 6/01-95

CITY OF

GLADSTONE

OREGON

TRANSPORTATION SYSTEM PLAN

1995

CITY OF GLADSTONE

TRANSPORTATION SYSTEM PLAN

JUNE 1995

CITY COUNCIL

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BRENT GRAHAM
JOHN HART
RAY JAREN
TOM PAGH
MARK PAGANO

CITY ADMINISTRATOR

RONALD J. PARTCH

PREPARED BY

THOMAS J. PICCO
PLANNING CONSULTANT

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INTRODUCTION

INTRODUCTION

The purpose of the Transportation System Plan (TSP) is to comply with the Transportation Planning Rule, OAR 660 Division 12, adopted by the Department of Land Conservation and Development in 1991 to guide regional and local transportation planning in carrying out statewide Goal 12 - Transportation. This rule requires jurisdictions throughout the state to prepare and adopt local and regional transportation plans that are incorporated into their comprehensive plans.

In Gladstone, the TSP provides the city the opportunity to address transportation issues of local concern within the context of regional transportation systems. Particular issues that have been examined, and proposed actions recommended to address these issues, include the following:

- Increasing traffic congestion on arterials, collectors and local streets;
- Increasing traffic speeds, including on local streets;
- Identifying appropriate locations for the installation of sidewalks;
- Identifying appropriate locations for the installation of intra-urban bicycle and pedestrian routes; and
- Coordinating the interface of local transportation networks and regional transportation systems.

In November 1994 the city received a Transportation and Growth Management grant from the Oregon Department of Transportation (ODOT) to prepare a TSP, which entails an inventory and analysis of the city's transportation systems and needs, including automobile, transit, bicycle and pedestrian facilities. It is not the intention of this Plan to duplicate or supplant the existing Transportation Element of the Gladstone Comprehensive Plan, acknowledged in 1981, nor the Gladstone Bikeway Plan, adopted by reference to the Comprehensive Plan in 1979. All or parts of these Plans, as well as specific actions taken by the City Council in March and May 1993 (Ordinance Nos. 1171 and 1175), meet many of the requirements of the Transportation Planning Rule and have been incorporated by reference into this TSP.

The TSP combines these past efforts with new analysis in coordinating land-use and transportation planning to better accommodate the impacts locally of increasing population and traffic growth in the metropolitan region.

CHAPTER I

GOALS - POLICIES - IMPLEMENTATION STRATEGIES

CHAPTER I

GOALS - POLICIES - IMPLEMENTATION STRATEGIES

Transportation Planning Rule Requirement: ***Findings of compliance with applicable statewide planning goals and acknowledged comprehensive plan policies and land use regulations shall be developed in conjunction with the adoption of the TSP.***

Pertinent state policies include the following:

- Reduce reliance on the single-occupant vehicle;
- Encourage alternatives to the auto, including bicycling, walking and, where feasible, public transit;
- Manage existing transportation facilities and services efficiently;
- Coordinate local transit services with interurban services;
- Coordinate land uses with the transportation facilities and services; and
- Make the transportation system accessible to all potential users, including the transportation disadvantaged.

CONCLUSIONS: The goals and policies enumerated in the acknowledged Gladstone Comprehensive Plan, Transportation Element, already closely reflect these state policies and are included in the TSP by reference, and attached in the appendix.

Transportation Planning Rule: ***The TSP shall establish a coordinated network of transportation facilities adequate to serve state, regional and local transportation needs.***

CONCLUSIONS: The following chapters of the Gladstone Transportation System Plan address each of the primary transportation system facilities in regard to their existing conditions, needs, and proposed actions.

CHAPTER II

STREET PLAN ELEMENT

CHAPTER II

STREET PLAN ELEMENT

OVERVIEW AND MAJOR FINDINGS

- **Gladstone is a largely fully-developed community with an established street network,** in generally overall fair to good condition.

- **Little new major construction is anticipated;** mostly infill, conversion and small subdivisions.

- **Little change in population or employment growth is expected for the foreseeable future,** except for the possible development of the 80 acre Seventh-day Adventist (SDA) property as an Office Park, for which sufficient studies have been conducted as to potential impacts.

- **While local growth is expected to be relatively slow,** Gladstone residents will be impacted by significant regional population and employment growth in North Clackamas County, which is projected to result in a 50% increase in travel demand in the next 20 years.

- **Travel within Gladstone is not greatly congested except on selected street sections and intersections,** particularly 99E and those local arterials that channel traffic onto I-205, including Oatfield Road and 82nd Drive.

- **Maintaining the carrying capacity of the city's arterials is a principal means of minimizing traffic intrusion onto neighborhood streets.**

- **The city recognizes the limited opprtunities for of significant expansion of its pedestrian and bicycle network** occurring as a result of conditions of new development or conditions of land-use approval, and has initiated a long-term program of street improvements intended to achieve more rapid expansion of these facilities.

- **The functional street classifications of city and county roadways are consistent with one another,** and continuity exists between adjacent jurisdictions on common streets.

Transportation Planning Rule Requirement: ***The Street Plan Element shall contain an inventory and general assessment of existing and committed transportation facilities and services by function, type, capacity and condition.***

EXISTING CONDITIONS

Street Network/Urban Form

A distinguishing characteristic of the city of Gladstone in regard to its transportation system, and in particular its street network, is the fact that it is a mature and largely fully developed community, with very little remaining developable vacant land, and little likelihood of additional new street construction or extensions. As such, the existing street network of arterials, collectors, and local streets is largely established for now and the foreseeable future.

Over 40 miles of general purpose roadways traverse the city of Gladstone, serving a range of functions based on established classification standards, from providing direct local access to residential properties, connecting intra-urban activity centers, such as schools, commercial districts, and public service centers, and accommodating interurban access to regional activity centers and general through traffic. Of this total over 36 miles are city-owned and for whom full maintenance responsibility is held. The state of Oregon is responsible for approximately 1.66 miles of major arterials (99-E) and freeway (I-205). The city also has responsibility for an additional 0.98 miles of park roads. Street mileage by classification and selected streets are listed in Table II-1. An assessment of the physical and operational condition of arterials and collector streets in the Gladstone area are compiled in Table II-1A. A complete inventory of the condition and characteristics of <u>every</u> street in the city is available in a supplemental volume, available at City Hall.

Topography and history have largely determined the current form into which the city's street network has evolved. Bordered on the south and west by the Clackamas and Willamette Rivers, and the limited access state highways of I-205 on the east and 99-E on the west, the city's street grid is uniquely truncated in terms of through travel. These constraints have severely restricted east-west through travel. Travel access south to the regional center of Oregon City is also limited to the two state highway bridges. The city does benefit, however, from the east and west side locations of these regional state highways in their capacity to allow north/south regional through traffic to occur with little direct impact on the city's internal local street network.

The steeper and higher elevations of the relatively newer, predominately single-family neighborhoods of north and east Gladstone, combined with the land-use/transportation planning ethos of the 1960's and 1970's when most of these neighborhoods were developed, resulted in more meandering drive-like streets and extensive use of cul-de-sacs, than in the more consistently grid-like patterns employed in the "old town" neighborhoods. **As a result of these topographical constraints and earlier planning concepts, approximately 64% of all general purpose city streets in Gladstone are <u>non-through</u> streets, representing approximately 19% of total street miles, and serving a similar percentage of residential properties.**

TABLE II-1
STREET MILEAGE BY CLASSIFICATION

Classification	No.	Jurisdiction	Street	Mileage	Total
Freeway:	[1]	State of Oregon	I-205	1.02 mi.	1.02 mi.
Major Arterial:	[1]	State of Oregon	McLoughlin Blvd.	0.64 mi.	0.64 mi.
Minor Arterial:	[7]	City	Arlington Street	0.90 mi.	
		City	82nd Drive	1.37 mi.	
		City	Oatfield Road	1.03 mi.	
		City	Webster Road	0.79 mi.	
		City	River Road	0.49 mi.	
		City	Portland Avenue	0.93 mi.	
		City	Jennings Avenue	0.09 mi.	5.60 mi.
Collector:	[6]	City	Abernethy Lane	0.49 mi.	
		City	Cason Road	0.39 mi.	
		City	Glen Echo Avenue	0.92 mi.	
		City	Gloucester Street	1.07 mi.	
		City	Dartmouth Street	0.97 mi.	
		City	Valley View Road/ Los Verdes Drive	0.62 mi.	4.46 mi.
Local:	[129]	City (All remaining public general purpose streets)			26.18 mi.
	[137]	City general purpose & private S.F. resid. streets			26.49 mi.
	[139]	City/Private /Paved Park Roads			27.47 mi.
TOTALS:	**[144]**	**CITY JURISDICTION PUBLIC STREETS IN CITY**			**37.53 mi.**
	[155]	**CITY PUBLIC & PRIVATE STREETS IN CITY**			**39.32 mi.**
	[157]	**TOTAL STREET MILES IN CITY (incl. state hwys)**			**40.98 mi.**
Private Streets:	[8]	0.31 mi. (single-family residential)			
	[3]	1.48 mi. (Mobile Home Parks/Apts. on River Road)			
Non-through Streets:					
Dead-ends:	[40]	2.90 mi.			
Cul-de-Sacs:	[44]	3.31 mi.			
Hammerheads:	[12]	0.86 mi.			
TOTAL	[96]	7.07 mi.*			

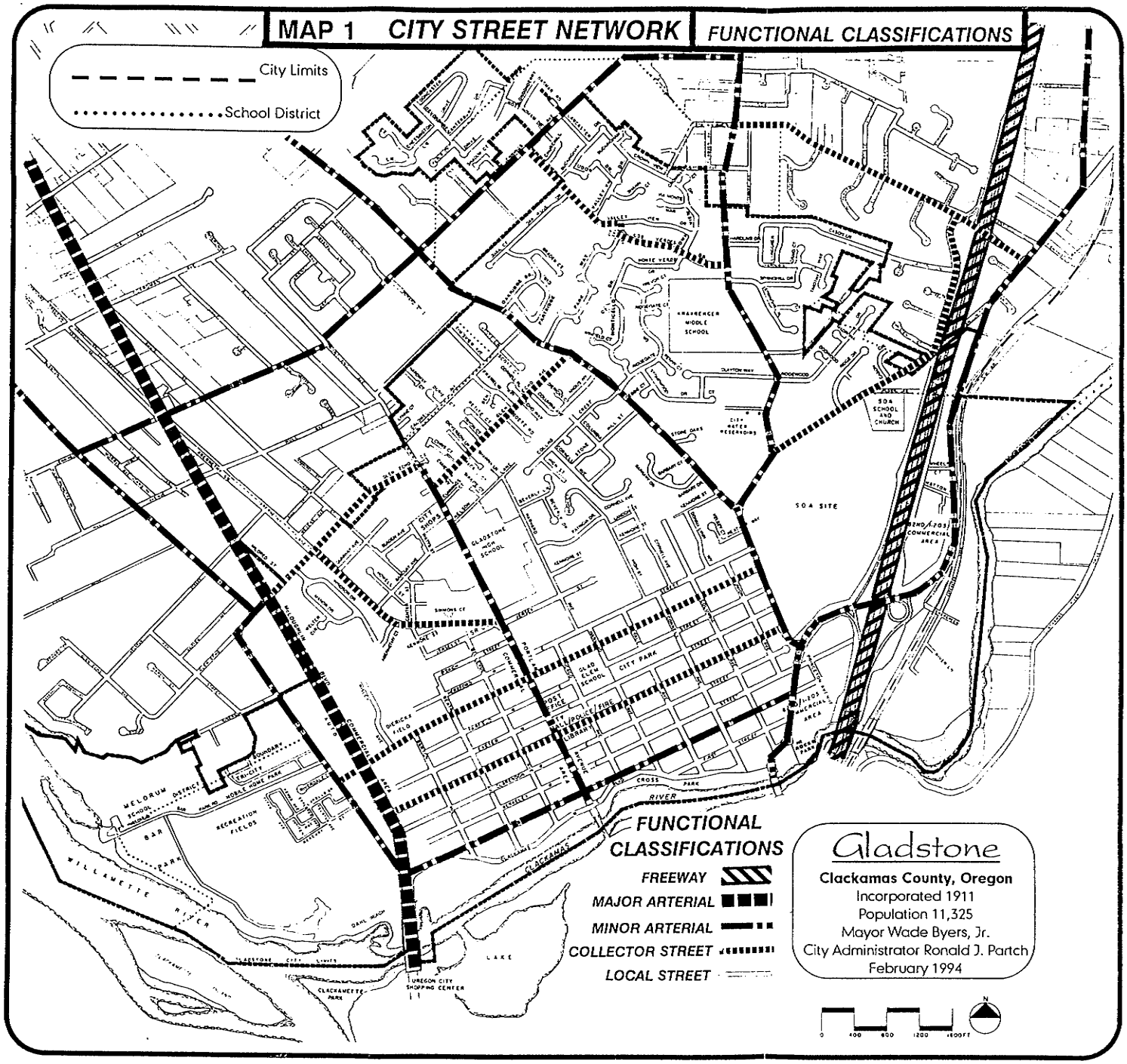
*64% of all general purpose city streets are non-through streets; 19% of total street miles are on non-through streets (excluding park roads, and internal mobile home parks/ Apts.)

TABLE II-1A

EXISTING CONDITIONS - ARTERIALS & COLLECTORS

Classification	Street	Jurisdiction	Physical Condition	Operating* Condition
Freeway:	I-205	State of Oregon	Good	Fair
Major Arterial:	McLoughlin Blvd.	State of Oregon	Good	Fair-Poor
Minor Arterial:				
	Arlington Street	City	Poor	Fair
	@ McLoughlin Blvd.		Fair	Poor
	@ 82nd Drive		Fair	Poor-Very Poor
	82nd Drive	City		
	Arlington St.-I-205		Good	Fair-Poor
	I-205 - city limits		Very Good	Fair-Good
	Oatfield Road	City		
	@ Webster - 82nd		Fair	Poor-Very Poor
	@ Webster - Jennings		Good	Fair-Good
	Webster Road	City	Good	Good
	River Road	City	Very Good	Fair-Good
	Portland Avenue	City	Fair	Fair
	Jennings Avenue	City/County	Fair	Fair
Collector Street:				
	Abernethy Lane	City	Fair	Fair
	Cason Road	City	Fair	Good
	Glen Echo Avenue	City	Fair	Fair
	Gloucester Street	City	Fair	Fair
	Dartmouth Street	City	Fair	Good
	Valley View Rd./ Los Verdes Dr.	City	Good	Good

*Based on assessment of level of traffic volume/congestion, remaining street capacity, and traffic accidents.


MAP 1 CITY STREET NETWORK
FUNCTIONAL CLASSIFICATIONS
City Limits
School District
FUNCTIONAL CLASSIFICATIONS
FREEWAY
MAJOR ARTERIAL
MINOR ARTERIAL
COLLECTOR STREET
LOCAL STREET
Gladstone
Clackamas County, Oregon
Incorporated 1911
Population 11,325
Mayor Wade Byers, Jr.
City Administrator Ronald J. Partch
February 1994
SOA SITE
CITY PARK
GLADSTONE HIGH SCHOOL
MELDRUM SCHOOL
RECREATION FIELDS
BARN PARK
WILLAMETTE RIVER
CLACKAMETTE PARK
OREGON CITY SHOPPING CENTER
LAKE
CROSS PARK
RIVER
CLACKAMAS

While non-local through traffic on residential streets is minimized with this type of street network it also limits more direct access to local activity centers by transportation modes other than automobile. This lack of direct access routes tends to discourage pedestrian or bicycle use, as well as use of public transit. In recognition of the negative consequences of this type of street design/urban form, in March 1993 the City Council adopted Ordinance No. 1171, amending Section 17.50.040 of the Gladstone Municipal Code, limiting the construction of cul-de-sacs to a maximum length of 800', and to serving no more than 18 single-family dwellings.

It is suggested that, except for some arterial traffic capacity improvement needs that have been identified to relieve congestion, facilitate traffic flow, and reduce safety hazards, alternative methods to new construction should be implemented for achieving greater efficiency of the existing street network. *It is suggested* the city's long-standing efforts to reduce primary reliance on the automobile should be aimed at improvements in traffic management controls, bicycle routes and pedestrian accessibility, public transit services, and closer coordination of land use and transportation facilities.

CONCLUSIONS: The Gladstone Comprehensive Plan already addresses issues of street classification functions, types, and design standards, but is somewhat dated and deficient in the current capacity and condition of the existing street network. A complete inventory and assessment of the city's long established transportation facilities was conducted as a part of the TSP, as described in the following sections.

Transportation Planning Rule: ***The TSP shall include a road plan for a network of arterials and collectors. Functional classifications of roads shall provide for continuity between adjacent jurisdictions.***

Functional Classification

Street Functional Classification and associated Street Design Standards for the city of Gladstone are summarized in Table II-2 at the end of the chapter, as adopted in the Gladstone Comprehensive Plan (pp.12-13), and stipulated in the Gladstone Municipal Code, Section 17.50.040. A similar Street Functional Classification Table for Clackamas County is summarized in Table A-1, in Appendix, for comparison. Also enclosed is Metro's Functional Classification System, describing the regional highway network, and serving as the framework for consistency among the comprehensive plans of local jurisdictions.

Specific streets in the city and adjacent streets in unincorporated Clackamas County are identified in Table II-3 by their respective functional classification, as well as their regional designation. These streets are also noted on enclosed Map 1 and Map 2, and

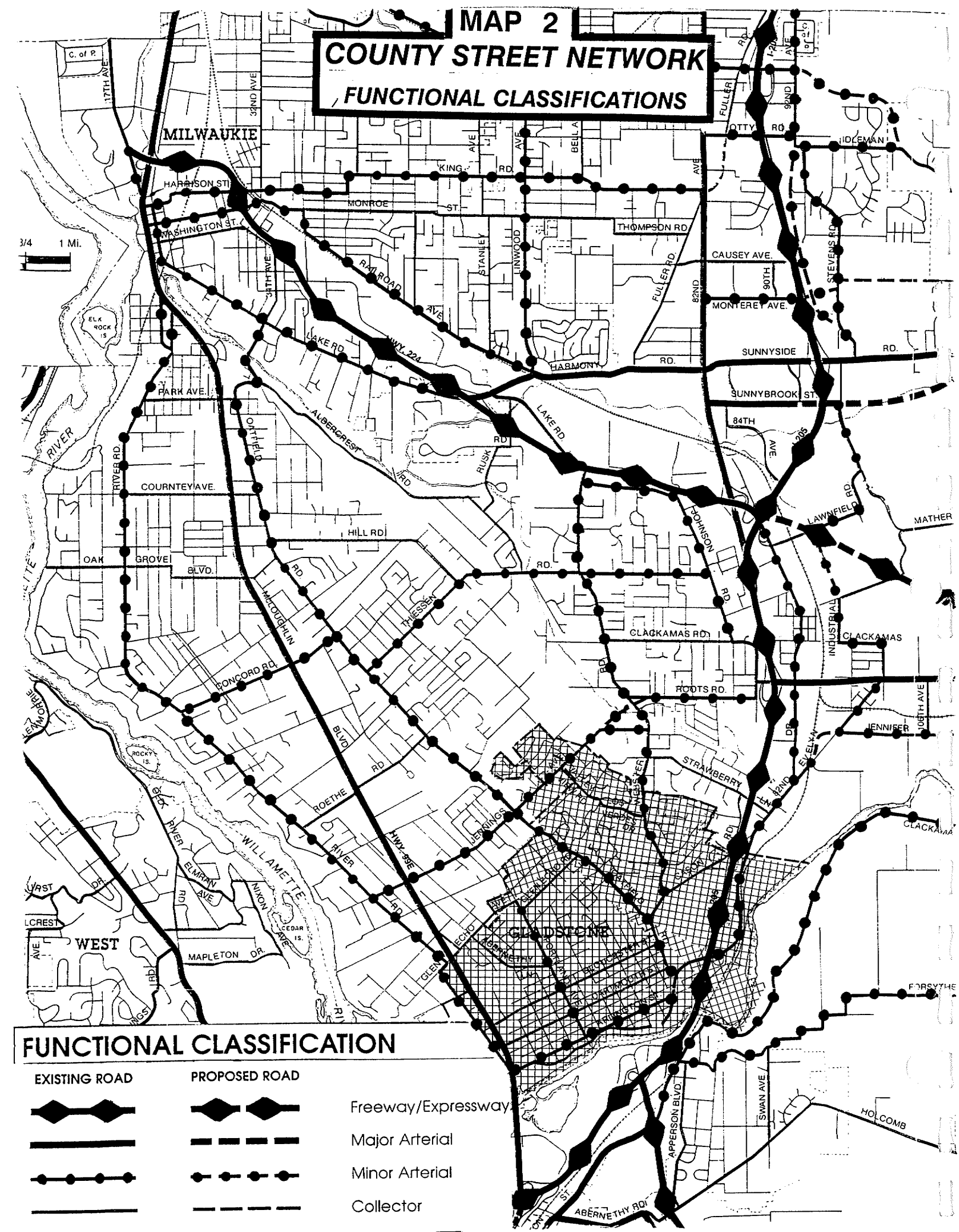
reflect a relatively effective and spatially distributed network of interconnecting arterials and collector streets serving the transportation needs of the city. As noted, the functional street classifications of adjacent jurisdictions are consistent with one another, and provide for continuity of common roads.

The two primary regional traffic carriers in the city, I-205 freeway and state highway 99-E (McLoughlin Blvd.), are situated on the east and west boundaries of the city and fairly effectively channel non-local through traffic away from the local street network and inner neighborhoods. I-205 is designated a Principal Route by Metro, and provides the backbone for the regional roadway network. It is designed to serve through-trips entering and leaving the urban area, as well as the majority of movements bypassing the central city (Portland). McLoughlin Blvd. is designated a Major Arterial by Metro, and serves as the supporting elements of both the principal routes and collector systems. Major Arterials are intended to provide a high level of mobility for travel from one subarea to another.

Four minor arterials in Gladstone have been designated by Metro as Minor Arterials of Regional Significance, intended to support and complement the Principal Routes and Major Arterials, and to facilitate travel within and between adjacent subareas. **These minor arterials include Oatfield Road, Webster Road, Arlington Street, and Jennings Avenue.** All of these arterials serve this designation reasonably well, although Oatfield Road, between Webster Road and 82nd Drive, has been experiencing significant traffic capacity constraints, due primarily to its function as a principal access to and from I-205 via the 82nd Drive interchange. Possible future development of the adjacent 80 acre SDA property as an Office Park will likely create even greater traffic congestion along this arterial and adversely effect its capacity to function effectively. Efforts by the city to manage traffic flow on this street include modification of the traffic signal at Oatfield Road and 82nd Drive in 1994 to better accommodate traffic movements. At its March 14, 1995 meeting the Gladstone City Council authorized submission to Metro of a project proposal for Region 2040 Implementation Funds to make needed capacity improvements to this section of Oatfield Road.

CONCLUSIONS: As a largely fully developed community the city has a long established street network of arterials and collectors, and clearly defined functional street classification, as originally described in the Gladstone Comprehensive Plan. This street network is further described in the TSP. The city's functional street classifications are consistent with those of adjacent jurisdictions, and provide continuity of common streets.

MAP 2
COUNTY STREET NETWORK
FUNCTIONAL CLASSIFICATIONS



FUNCTIONAL CLASSIFICATION

EXISTING ROAD	PROPOSED ROAD	
		Freeway/Expressway
		Major Arterial
		Minor Arterial
		Collector

TABLE II-3
MAJOR STREETS BY FUNCTIONAL CLASSIFICATION

Freeway/Expressway:

Location: City
Jurisdiction: State of Oregon
Street: I-205

Location: County
Jurisdiction: State of Oregon
Street: I-205 & Hwy 224

Major Arterial:

Location: City
Jurisdiction: State of Oregon
Street: McLoughlin Blvd. (99-E)

Location: County
Jurisdiction: State of Oregon
Street: McLoughlin Blvd. (99-E); Hwy 212-224

Minor Arterial:

Location: City
Jurisdiction: City
Street: Arlington Street; 82nd Drive; Oatfield Road; Webster Road; River Road; Portland Avenue (Arlington to Glen Echo Avenue); Jennings Avenue.

Location: County
Jurisdiction: County
Street: 82nd Drive; Oatfield Road; Webster Rd.; Jennings Avenue; Roots Road; Johnson Road; Thiessen Road; Lake Road.

Collector:

Location: City
Jurisdiction: City
Street: Abernethy Lane; Cason Road; Glen Echo Avenue; Gloucester Street; Dartmouth Street; Valley View Road/ Los Verdes Drive.

Location: County
Jurisdiction: County
Street: Strawberry Lane; Glen Echo Avenue (River Road - 99-E); Roethe Road; Hill Road; Clackamas Road; Aldercrest Road.

Local:

Location: City
Jurisdiction: City
Street: all remaining streets

Metro Regional Classification Designations

Principal Routes: I-205; Hwy 224; Hwy 99-E (S. of City); Hwy 213 (S. of City)
Major Arterials: McLoughlin Blvd. (99-E, between I-205 & Hwy 224)
Minor Arterials of Regional Significance: Oatfield Road; Webster Road; Arlington Street; Jennings Avenue.

Transportation Planning Rule: ***The Street Plan Element shall contain a transportation capacity analysis.***

Traffic Volumes/Impacts of Projected Population and Employment Growth

An analysis of population and employment growth in Gladstone and the north Clackamas County subregion provides useful information on the potential impacts of increased travel demand on projected traffic volumes on city streets. Building on historic census data and a 1993 population and employment analysis conducted by Metro as part of the South/North Transit Corridor Study, housing and employment projections to the year 2015 were developed both locally and regionally. Regional data were aggregated to subregions, and then to smaller, discrete Transportation Analysis Zones (TAZ) within subregions and local jurisdictions to better refine the extent of current and projected growth throughout the region. (See Maps 3A & 3B at end of chapter.) [A more comprehensive analysis of growth impacts follows this section.]

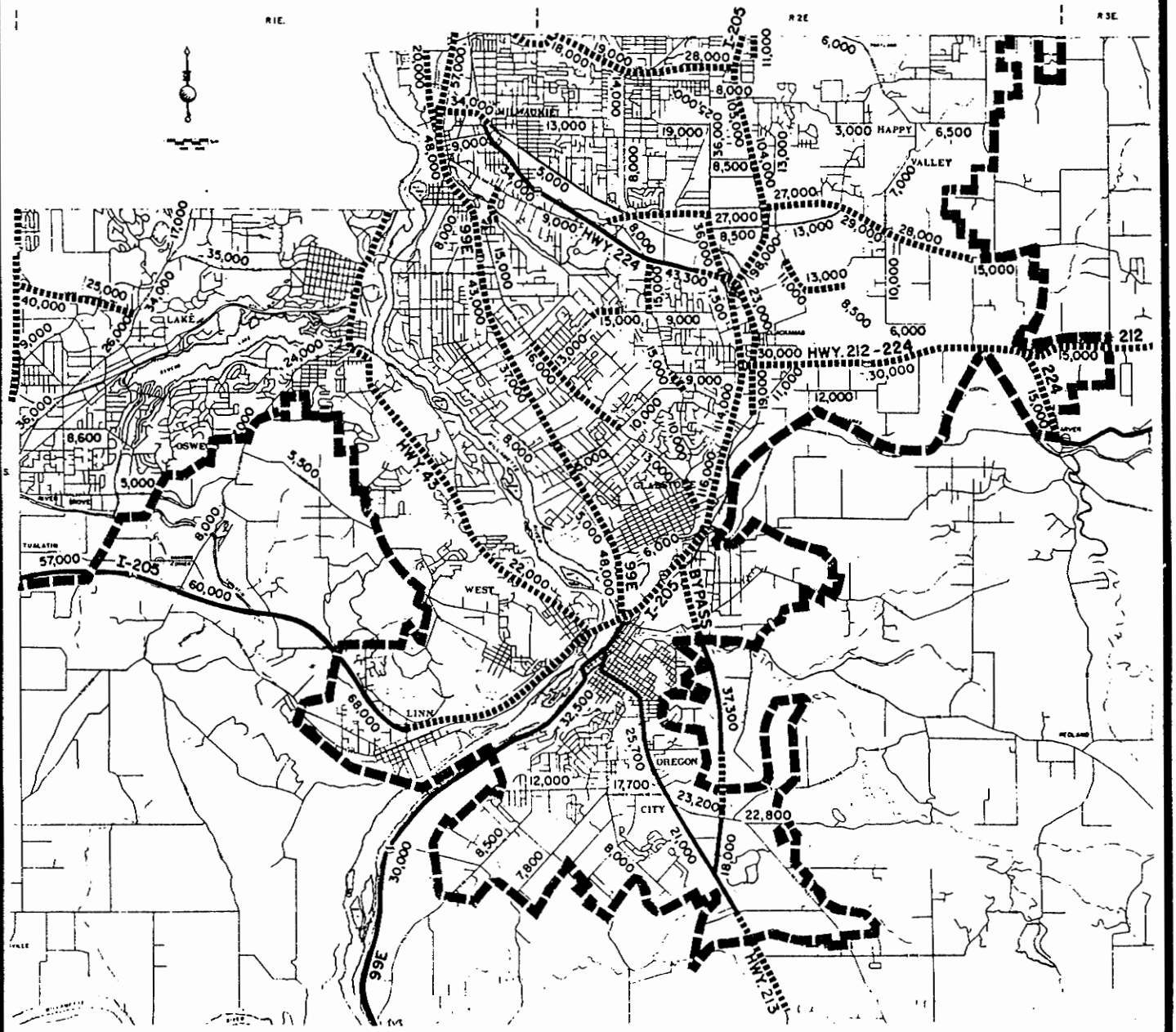
The assessment of regional growth impacts indicate those areas expected to experience most significant increases in housing and employment activity by the year 2015 will be in north Clackamas County in and around the City of Milwaukie, Clackamas Town Center, and Oregon City. **Projected population and employment growth in the north Clackamas County subregions is expected to generate a sizeable 50% increase in travel demand and resulting traffic volumes.** (See Table II-4 at end of chapter.) Arterials in this region expected to experience significant traffic volumes by the year 2009, and related congestion along sections of these arterials, are noted in Figure 3.

Those regional arterials that route traffic into and out of Gladstone that are expected to experience increasing congestion include the following:

- McLoughlin Blvd., along its entire length;
- Oatfield Road, between Concord Road and Jennings Avenue, and between Webster Road and 82nd Drive;
- Webster Road, between Jennings Avenue and Roots Road, and between Thiessen Road and Highway 224; and
- The Oregon City By-Pass (Hwy. 213), between I-205 and Redland Road.

The projected drop off in traffic volumes on Oatfield and Webster Roads south of Jennings Avenue (between Jennings Avenue and the union of Webster Road and Oatfield Road in Gladstone) suggests traffic routing to and from Highway 212-224 and/or I-205 Interchange. The same phenomenon may explain the increasing traffic volumes occurring on Oatfield Road, between Webster Road and 82nd Drive; namely, motorists accessing and exiting I-205 at the Gladstone/82nd Drive Interchange. The congested traffic conditions in this area may also be aggravated by the attraction of

FIGURE 3



2009 URBAN AREA ARTERIAL PROBLEM AND 24 HOURS VOLUMES

CONGESTED LINKS

15,000 AVERAGE DAILY TRAFFIC

U.G.B

Prepared By
CLACKAMAS COUNTY
Department of Transportation And Development
902 Abernethy Road
Oregon City, OR 97045
(503)655-8521

FIG 3

N

a dedicated travel lane (no merging required) on I-205 from the Gladstone Interchange to the Oregon City By-Pass (Park Place/Hwy. 213 Exit), allowing for quick and convenient access to the growing Oregon City area and Clackamas County Community College. Long range policies for specific urban arterials in unincorporated Clackamas County that may impact Gladstone's local street network are noted in Table A-3 in the Appendix.

It is suggested that Oatfield Road, between Webster Road and 82nd Drive, be widened to three lanes to increase existing capacity, and provide a continuous left turn lane to facilitate access onto adjacent cross streets. *It is suggested* that a traffic signal be installed on Oatfield Road at Gloucester Street to provide a safe and convenient point of access onto Oatfield Road, and reinforce Gloucester Street's function as a collector street, and connection route to Portland Avenue and McLoughlin Blvd. *It is suggested* that the city request Clackamas County initiate congestion mitigation measures on county roads that convey traffic onto common city arterials. These measures may include a program to study and implement a coordinated system of traffic signals along the length of Oatfield Road to better manage traffic flows and discourage usage of this minor arterial as a regional through-route.

It is suggested that consideration be given to rezoning properties on the west side of Oatfield Road, between Webster Road and 82nd Drive, from the current R-5, Single Family Residential District, to C-2, Community Commercial District, to reflect the reduced quality of residential use due to the high current and projected traffic volumes along this section of roadway. The future development of the adjacent SDA property would certainly prompt such a rezoning, although consideration of such a proposal at this time is appropriate. The Traffic Safety Commission and Planning Commission may wish to closely study the following issues:

- The merits of one-half block versus full block depth rezoning;
- Traffic circulation patterns; and
- Placement of driveway access on local side streets.

It is further suggested that as a possible mitigation measure to increasing congestion on McLoughlin Blvd. that the city consider requesting Clackamas County to study and implement an increase in the posted speed limit on River Road from its current 35 mph to 40 mph, to increase its efficiency as a minor arterial that parallels Highway 99-E.

Notwithstanding the projected impacts of population and employment growth in the region on specific arterials traversing the city, a significant proportion of this growth would be expected to occur primarily on the region's major freeways and arterials providing the most direct access to major regional activity centers. In this regard, the anticipated impacts of the projected population and employment in the region on the local interior street system of Gladstone is not expected to be as significant as might

be experienced by other local communities in closer proximity to some of the identified major activity centers such as Milwaukie and the Clackamas Town Center. In both instances, principal access to these regional centers would likely be by way of I-205 and McLoughlin Blvd. (99-E), both major north/south highway corridors that largely circumvent the central interior of the Gladstone community and therefore minimize the potential usage of local streets by non-residents.

Also important to assessing the impacts of projected population and employment growth in the region on the local transportation system is the extent and nature of projected growth within the city proper. In this regard, two major factors will influence the future capacity of the city's existing transportation facilities:

- The largely fully developed state of the community, with little remaining vacant and developable land for new construction; and

- The timing and nature of development of the 80 acre Seventh-day Adventist (SDA) campground on the eastern edge of the city.

It should be noted that there are currently (1995) a number of city arterials and collectors that are already exhibiting excessive traffic congestion. Even minimal new growth would likely aggravate the level of congestion. **Maintaining the carrying capacity of the city's arterials is a principal means for preventing traffic intrusions onto local streets.**

Historic census housing data, as well as more recent building permit data, indicate that the city is rapidly reaching full development. (See Table II-4 at end of chapter.) It is anticipated that future residential development will consist primarily of redevelopment, infill, minor partitions, and small subdivisions. Higher density multi-family unit development may also be reasonably anticipated as single-family zoned residential areas are filled in. Between 1990 and 1994, 365 multi-family units were constructed (+50%) compared to 62 single-family units (+2%). The current housing mix in the city is 69% single-family, 25% multi-family, and 5% mobile homes, which is rapidly approaching the Metro 2040 Plan housing mix goal of 62% SF/38% MF.

Current development patterns support goals of the Transportation Planning Rule that promote public transit by encouraging higher density residential development. In Gladstone most higher density multi-family property is located along or nearby minor arterial and collector streets that are designated transit routes (River Road, Abernethy Lane, Webster Road). Current zoning also allows siting of duplexes along arterials and collectors as a use permitted outright in R-7.2 single-family zoning district. Duplexes are also a use permitted outright in all parts of the city's R-5 single-family zoning districts, which is characterized by a street grid system with reasonable access to transit routes.

Of greater significance to the impacts of increasing traffic volumes on the city's street system is the extent and nature of future development of the SDA campground site. As noted in Table II-5 at the end of the chapter, while employment growth in Gladstone from 1990 to 2015 is expected to increase by 1,930, or 44%, 1,124 of that total (58%) is projected to occur in the SDA site, and adjacent High Rocks commercial district (TAZ 494). Within this district the 80 acre SDA property would be the predominate focus of employment growth because of its largely undeveloped state. It has been zoned Office Park, which will generally limit traffic patterns to week days between the hours of 7:00 a.m. to 6:00 p.m. Nonetheless, the potential scale of such a localized Office Park development would generate significant impacts on adjacent arterials, and possibly local streets, if adequate transportation improvements are not made. This is particularly true since a number of adjacent arterials and collectors are already experiencing significant congestion. (See Table II-6, at end of Chapter.)

Streets that will be particularly impacted by future development of the SDA site include:

- Oatfield Road, from 82nd Drive to Webster Road; 82nd Drive, from Oatfield Road to I-205 interchange ramps;
- Arlington Street at 82nd Drive; and
- Gloucester and Dartmouth Streets at Oatfield Road;
- I-205 interchange ramps. (NOTE: ODOT has indicated that due to the increasing demand for limited public resources to construct needed improvements throughout the state highway system, any improvements needed to the I-205/Gladstone interchange to accommodate increased traffic volumes resulting from development of the SDA site may require local government or private developer funding rather than state funding.

Depending on the alignment/extension of streets within the proposed SDA development, Webster Road and Cason Road may also experience significant increases in traffic volumes. *It is suggested* that traffic capacity improvements and traffic control measures be implemented in order to accommodate the projected increases in traffic volumes expected to accompany development of this site as an Office Park. *It is suggested* that public transit improvements, as well as travel demand management measures, be employed to mitigate some of the impacts of this development.

The city has commissioned a number of traffic studies on the potential impacts of development of the SDA site on adjacent streets. One such study, conducted by the Clackamas County Department of Transportation and Development in 1990, indicates clearly that full development of the SDA site would generate significant traffic congestion on adjacent streets above and beyond already high congestion levels. Similar findings were noted in a 1990 report by Ron Partch, City Administrator, on the traffic impacts of such development on the quality of life of local neighborhoods in the

city. This study indicated the city's awareness of the genuine threat that increasing traffic congestion and traffic speeds have on the safety of area residents, their sense of community cohesion, and the need for coordinated planning of land-use and transportation facilities. These studies recognize that maintaining the capacity of the city's arterials is the most effective means of minimizing traffic intrusion onto neighborhood streets.

Traffic Volumes/Street Capacities/Level of Service

While heavy traffic volumes are a good indicator of traffic congestion, and a likely contributor to spillover/diversion traffic onto adjacent local streets, they are not the sole determinant. The capacity of a given street, as well as the nature of traffic management systems in use, such as traffic signals and other control devices, also influence how well traffic flows are accommodated and the associated "Level of Service" (LOS) a street provides. The capacity of a street is defined as the maximum number of vehicles which can pass over a given section of that roadway during a given period of time and still maintain a certain LOS. Table II-6 compares existing remaining street capacity of city arterials and collector streets based on estimated maximum traffic volumes available at LOS "E" for various generic roadway configurations (i.e. 2-lane, 4-lane). Table A-2, in the Appendix, provides additional capacity standards, including peak hour volumes, and one-way streets. Table II-7 lists those streets in the city that have experienced the greatest increase in traffic volumes over this period, and reveal the predominance of points of congestion along Oatfield Road and 82nd Drive. Table II-8 at the end of this section lists traffic count data history on selected streets city-wide for comparison purposes.

The term "Level of Service" refers to a description of the quality of traffic flow. Six levels of service, designated "A" through "F," are identified to describe a set of operating conditions. LOS "A" represents completely free-flowing conditions with no appreciable delay to traffic. LOS "F" represents forced flow conditions wherein motorists would experience significant delays and low travel speeds. LOS "D" is normally considered to be the minimum acceptable level of service in an urban area. LOS "E" is considered to be the maximum realistic roadway capacity.

The LOS of a roadway is based on calculations of the reserve capacity at an unsignalized intersection, the average stopped delay experienced by motorists at a signalized intersection and the volume/capacity ratio (V/C ratio) along an arterial. The LOS descriptions for unsignalized intersections, arterial, and signalized intersections are given in Tables A-3, A-4, A-5, in the Appendix.

As noted in Table II-7A at the end of the chapter, most streets in Gladstone are currently operating at LOS "D" or better, except for certain sections and intersections along Oatfield Road and 82nd Drive that operate at LOS "E" at peak hours. However, many of these same intersections are projected to reach LOS "F" by the year 2009

if the SDA property is developed and no street capacity improvements are completed. Similar deterioration of existing levels of service along these arterials is likely even if the SDA property does not fully develop, as local and regional traffic volumes continue to increase. Metro has projected that the River Road/99-E intersection is also projected to experience significant congestion by the year 2015. Its current LOS of "D" to "E" is projected to border on LOS "F" at that time.

CONCLUSIONS: The traffic capacity analysis conducted herein indicates that most streets in the city are currently operating adequately and under capacity, with the exception of state highway 99E and those city arterials that channel traffic onto I-205, namely Oatfield Road, between Webster Road and 82nd Drive, and 82nd Drive, between E. Arlington Street and the I-205 interchange. The future development of the SDA site is the most significant key to future growth in Gladstone. The city has conducted a number of traffic studies on the impacts of such development, and will direct that additional traffic studies accompany any SDA development proposal to ensure adequate street capacity is maintained, and prevent traffic incursion onto local neighborhood streets. Greater private developer financing of needed street improvements may be required given limited state and local government funding. The city has identified needed street capacity improvements which are listed in the Gladstone Capital Improvement Plan.

Transportation Planning Rule: ***The TSP shall include a plan for transportation system management and demand management.***

Transportation System Management (TSM)

TSM measures are designed to increase the efficiency, safety, capacity or level of service of a transportation facility without increasing its size. As noted earlier, except for some arterial traffic capacity improvement needs that have been identified to relieve congestion, facilitate traffic flow, and reduce safety hazards, alternative methods to new construction will be implemented for achieving greater efficiency of the existing street network. The city has employed various traffic management measures in recent years, including:

- Traffic signal improvements;
- Traffic control devices;
- Large truck parking restrictions;
- Access controls; and
- Development circulation requirements.

Installation of new traffic signals and improvement of existing traffic signals on selective arterials experiencing high traffic volumes and/or high traffic accidents would enhance the quality and life span of certain roadways before capacity limits necessitate expansion. *It is suggested* that improvements be made to the existing signal at the intersection of McLoughlin Blvd., W. Arlington Street, and River Road to better direct and inform motorists of the multiple turn movement conditions resulting from this complex intersection of one major and two minor arterials. *It is suggested* that new traffic signals be installed at E. Arlington Street and 82nd Drive, and Oatfield Road and Gloucester Street to facilitate traffic circulation, reduce congestion, and enhance motorist and pedestrian safety.

The Traffic Safety Commission has been very responsive to neighborhood concerns, including recommendation of traffic control measures such as installation of STOP signs, speed limit signs, pavement markings, speed bumps, reduction in posted speed limits (Arlington Street, Cason Road), access/circulation plans for local schools, etc. The Gladstone Planning Commission is likewise attentive to neighborhood safety and transportation efficiency issues in reviewing access control and circulation issues in its application of Design Review guidelines on new development.

Heretofore, however, most traffic management measures have been taken in reaction to specific issues as they have been raised by staff or citizens. As a result of the inventory and analysis of the city's transportation system and facilities, the Gladstone Transportation System Plan can provide a better understanding of transportation conditions and needs to allow more active, comprehensive approaches to problem areas. *It is suggested* that policies and standards consistent with the Manual On Uniform Traffic Control Devices (MUTCD) be developed for installation of STOP signs and speed bumps on local streets to allow a more effective and systematic process for decision making. *It is suggested* that consideration be given to the development of neighborhood-wide applications of controlled intersection strategies, and traffic calming techniques. (See Section A-11 in the Appendix.)

The city would be supportive of appropriate traffic management initiatives by ODOT along the principal regional corridors through Gladstone for which they have jurisdiction (I-205, 99-E). City cooperation in the mitigation of the adverse local impacts of high traffic volumes, from predominately non-local travel, on certain city arterials feeding into the I-205 and 99-E regional facilities (Oatfield Road, 82nd Drive, and Arlington Street, in particular) would be extended.

Transportation Demand Management (TDM)

Insofar as Gladstone is not a significant employment center, many TDM strategies that involve private/public sector coordination in various rideshare programs designed to manage travel demand patterns are not readily applicable. Such strategies may include the following:

- Actions that reduce peak period single occupant vehicle travel, including park and ride facilities, vanpool, HOV lanes, carpool, express bus, light rail, transit passes, etc.;
- Actions that spread traffic volumes away from the peak period, including truck traffic restrictions, staggered work hours, etc.; and
- Actions that improve traffic flow, including reversible lanes, signalization, one-way streets and bus bypass lanes.

It is suggested that the city continue its support of regional transportation initiatives, including the possible extension of light rail transit (LRT) to Oregon City, expansion of public transportation services (more frequent schedules, express bus routes), etc. *It is suggested* that the city utilize its monthly newsletter distribution to all households in the community to encourage citizen utilization of TDM measures.

CONCLUSIONS: The city utilizes various traffic management measures to relieve congestion, facilitate traffic flow, and reduce identified safety hazards, without the need to increase street capacity. These measures include: traffic signal improvements, traffic control devices, large truck parking restrictions, access controls and development circulation requirements. TDM strategies employed by the city include efforts to expand public transportation services, support regional efforts, and urge private initiatives through public educational materials.

Transportation Planning Rule: ***Local governments shall adopt land use or subdivision ordinance regulations to protect transportation facilities, corridors and sites, for their identified functions, including access control measures.***

Access Management

The Gladstone Municipal Code (Chapter 17.80) currently requires Design Review by the Planning Commission for all new residential development of tri-plexes and larger, all new commercial and industrial development, and to any significant change in the exterior appearance of a structure. The objective of Design Review is to ensure compliance with the goals, objectives and policies of the Gladstone Comprehensive Plan, zoning and subdivision ordinances, and address issues of access, parking and circulation, entrances and exits, and pedestrian circulation, among other concerns. The Gladstone Traffic Safety Commission typically reviews access, circulation and safety issues when requested.

Given the longstanding operation of the existing street network and predominately "bedroom community" nature of Gladstone, it is not surprising that most of the city's minor arterials and collector streets serve as direct access routes to residential housing in neighborhoods, in addition to their prescribed arterial functions. The residential

access needs of these streets are occasionally in conflict with their functional classifications which are designed to better facilitate and channel through traffic, to accommodate relatively high traffic volumes at high speeds, and to provide connections to neighborhood local streets. Many of these higher level streets serve low and medium density residential areas, such as the R-5 and R-7.2 zoning districts.

For example, the full 1.07 mile length of E. and W. Gloucester Street (a collector street) includes 155 points of street access (14 cross streets/141 driveways), for an average of 149 access points per mile. The full 0.97 mile length of E. and W. Dartmouth Street (collector street) includes 122 access points (13 cross streets/109 driveways), for an average of 126 access points per mile.

Among the minor arterials within the city limits, E. and W. Arlington Street includes the highest average access points per mile with 103 (0.90 mile length; 94 access points: 12 cross streets/82 driveways). See Table II-9 at the end of the chapter for a listing of access data of all the major arterials, minor arterials, and collector streets in the city, as well as their extensions into adjacent unincorporated Clackamas County. Indeed, the data indicates that among those same arterials that traverse both the city and county, the number of access points per mile in the county is much higher than within the city proper.

The relatively unlimited and ill-defined driveway accesses along McLoughlin Blvd. (99-E) represents a continuing traffic safety concern on this state major arterial. Access issues, however, are the responsibility of ODOT along state highways. *It is suggested* that the city support and encourage reasonable and appropriate ODOT efforts to require better driveway access delineation and consolidation along 99-E.

Although existing rights-of-way and pavement widths along city arterials and collector streets are sufficient to minimize undue hazards from motorists backing out of their driveways into the abutting thoroughfares, traffic slowing and congestion may occur with such multiple points of access. Current zoning provisions in predominantly residential districts allow for the outright siting of duplexes in R-5 zones, and on arterials and collector streets in R-7.2 zones. Three to eight unit multi-family housing is also permitted as a conditional use in both zones, although subject to Design Review.

Insofar as the likely form of future development in the city will be infill, redevelopment, and conversion to relatively higher (albeit still moderate) densities, such as duplexes, tri-plexes, etc., the need for continuing attention to access issues is particularly warranted. *It is suggested* that the city, through the Planning Commission and Traffic Safety Commission, continue to conduct Design Review of all new multi-unit (3+) residential development, commercial and industrial development. Particular attention should be directed to protecting transportation facilities, corridors and sites on arterials and collector streets, consistent with their identified functions, and the objectives of the Transportation Planning Rule, as adopted by local ordinances.

CONCLUSIONS: The city of Gladstone is a fully developed community, primarily residential in nature, with a long-established street network. As such, there does exist some ongoing conflict between the designated functions of the city's arterials and collectors and their service as providers of access to local residences. The city has utilized its Design Review procedures to address these issues regarding the impacts of new development and believes these procedures effectively allows it to protect the full range of arterial functions without additional regulations. A complete inventory of access points along the city's arterials and collectors was conducted as a part of the TSP. ODOT has primary responsibility for access management of the major arterial in the city (99-E).

Truck Routes/Truck Parking/Hazardous Waste Shipping Routes

In 1993 the city designated I-205 as the east/west "truck route" in the city. Local deliveries are allowed on city streets, however, non-local cross traffic by large delivery trucks between 99-E and I-205 is prohibited.

In February 1995 the City Council adopted Ordinance No. 1207, amending Section 10.04.230 of the Gladstone Municipal Code, prohibiting the parking of large commercial motor vehicles (subject to motor carrier tax) from parking on public streets within or abutting property zoned for residential use (zones R-5, R-7.2, MR). Parking is allowed on residential streets when necessary for deliveries.

The Gladstone Fire Marshal has stated that there are no major hazardous waste generators in the city, with little significant transport of such materials within the city.

No specific hazardous waste shipping routes have been assigned in the city, beyond the designated I-205 truck route.

STREET PLAN ELEMENT

Transportation Planning Rule Requirement: ***The TSP shall identify transportation needs relevant to the planning area and the scale of the transportation network being planned.***

STREET NETWORK NEEDS AND PROPOSED ACTIONS

RECOMMENDATION: Add the following projects to the Gladstone Capital Improvement Plan

A. Transportation Capacity Needs

1. OATFIELD ROAD WIDENING AND SIGNALIZATION (Webster Road to 82nd Drive)

Proposed Actions: Widen this section of Oatfield Road to 3 lanes to include a continuous left-turn lane; Redesign the Oatfield Road/Webster Road intersection/traffic signal to include a southbound left-turn lane; Add a traffic signal at Gloucester Street (a Collector Street); Co-ordinate the traffic signals at Webster, Gloucester and 82nd Drive, and; Install a sidewalk along the west side of Oatfield Road.
Estimated costs = $1,300,000.

Street Conditions: Principal north/south minor arterial and transit route; Primary connection to 82nd Drive and I-205 interchange; Uniform pavement width; No curbs/few sidewalks; 1,760' (0.33 mi.); 60' R/W (85' @ 82nd Dr.); 40' pavement width (45' Hereford to Webster); Part of regional bicycle route with 8' wide designated bike lanes on each side of street; No on-street parking; Traffic signals @ Webster Road and 82nd Drive; STOP signs on all six intersecting cross streets; 15 access points (8 cross streets/7 driveways).

Traffic Volume/Congestion History:
@ Webster Rd.: 8,400 (1973/74) - 14,400 (1993) = +71% increase;
@ Gloucester St.: 15,200 (1992)
@ Dartmouth St.: 12,592 (1986)
@ 82nd Dr.: 7,800 (1973/74) - 15,900 (1992) = +104% increase.
Current Level of Service (LOS):
@ Webster Rd.: NA @ Gloucester Dr.: "E" (1993)
@ Dartmouth St.: "D" (1988) @ 82nd Dr.: "D" (1988)
Projected Traffic Volumes/LOS (in year 2009): @ Webster Rd.:
with no development on SDA site: 18,400 = +34%/LOS "D" sbnd/"E"-"F" nbnd
with development on SDA site: 21,400 = +56% /LOS "E"-"F" both directions
Projected Traffic Volumes/LOS (in year 2009): @ 82nd Dr.
with no development on SDA site: 13,400 = +60%/LOS "E"-"F"
with development on SDA site: 15,600 = +86%/LOS "E"-"F"

(Proposal submitted to ODOT in 4/1993 for consideration in Statewide Transportation Improvement Program, and to Metro in 3/1995 for Region 2040 funding.)

2. E. ARLINGTON STREET SIGNALIZATION (@ 82nd Drive)

Proposed Actions: Install traffic signal at intersection to facilitate safe traffic flow, and coordinate with traffic signal @ Oatfield Road.
Estimated costs = $130,000.

Street Conditions: Intersection of two minor arterials: Arlington Street connects McLoughlin Blvd. (99-E) with 82nd Drive and High Rocks commercial district; 82nd Drive connects with Oatfield Road and I-205 interchange ramps; Both streets are public transit routes; 60' (Arlington) x 75' (82nd Dr.) R/W; 36' (Arlington) x 48' (82nd Dr.) pavement width; Continuous left-turn lane from Arlington St. to Oatfield Road; Sidewalks on both streets, both sides; Bicycle lanes on both sides of 82nd Drive; STOP sign on E. Arlington Street is only traffic control device presently available to assign vehicle priority.
Traffic Volume/Congestion History: 3,200 (1973/74) - 4,350 (1992) = +36% increase
Current Level of Service (LOS): "F" (1988)
Projected Traffic Volumes/LOS (in year 2009):
with no development on SDA site: 9,000 = +107%/LOS "F"
with development on SDA site: 10,000 = +130%/LOS "F"

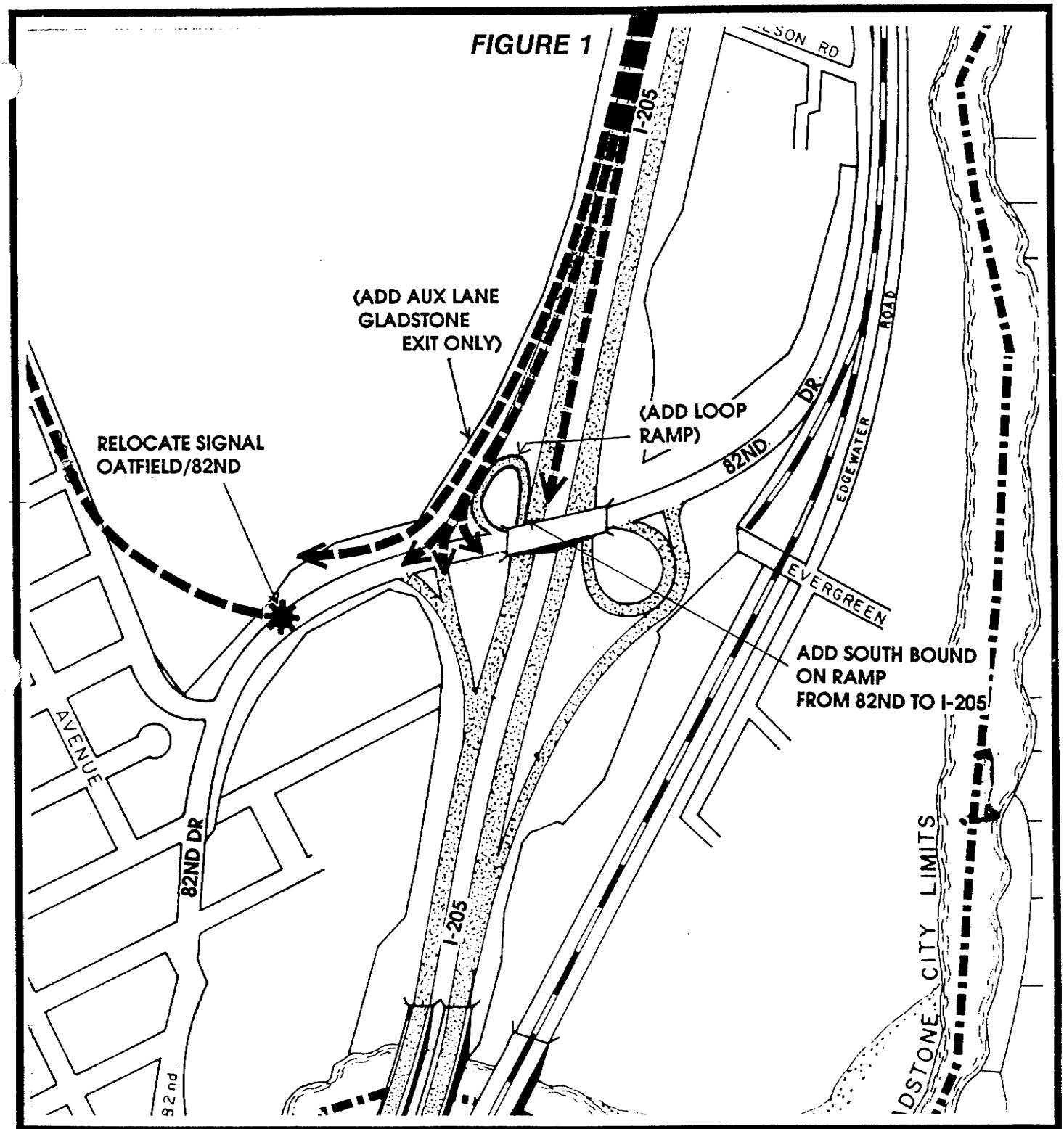
(Proposal submitted to ODOT in 4/1993 for consideration in Statewide Transportation Improvement Plan.)

3. GLADSTONE I-205 INTERCHANGE/82nd DRIVE

Proposed Actions: Improvements to interchange capacity/configuration; Consideration of adding auxiliary lane on southbound Gladstone interchange ramp, and adding loop ramp off of interchange for traffic heading southbound onto I-205. (see Figure 1)
Estimated costs = $12,000,000.

Street Conditions: Increasing freeway traffic volumes, and completion of E. 82nd Drive/Evelyn Street bypass in 1992 has increased traffic use at interchange, particularly southbound truck traffic from Clackamas Industrial Area, which currently must make a left turn at the interchange to go south on I-205. Future development of nearby SDA property would significantly increase traffic volumes at the interchange.
Traffic Volume/Congestion History:
@ I-205 @ Interchange: 114,000
@ Oatfield Rd. to I-205 Ramps: 6,200 (1973/74) - 22,000 (1988/89) = +255%
Current Level of Service (LOS):
@ I-205 Ramps: "C" (1988)
Projected Traffic Volumes/LOS (in year 2009): Oatfield Rd. to I-205 Ramps:
with no development on SDA site: 22,000 = +21%/LOS "D"; ramps LOS "F"
with development on SDA site: 32,800 = +49%/LOS "E"-"F"; ramps LOS "F"

(Proposal submitted to ODOT in 1993 for consideration of preliminary engineering only [$500,000] in Statewide Transportation Improvement Plan)



EAST PORTLAND FREEWAY
GLADSTONE INTERCHANGE

Prepared By
CLACKAMAS
COUNTY
Department of
Transportation
And
Development
902 Abernethy
Road
Oregon City,OR
97045
(503)655-8521

N

4. E. DARTMOUTH STREET (@ Oatfield Road)

Proposed Actions: Widen Oatfield Road, from 82nd Drive to Webster Road, to provide continuous left-turn lane, as part of larger Oatfield Road project (see A.1 above).

Street Conditions: A principal collector street and transit route connects Oatfield Road (minor arterial and transit route) to Portland Avenue (minor arterial and transit route); Site of numerous public sector and commercial activities, including city hall, library and post office; 60' (Oatfield Rd.) x 80' (Dartmouth St.) R/W; 40' (Oatfield Rd.) x 56' (Dartmouth St.) pavement width; Sidewalks on Dartmouth St. (s. side only); STOP sign on Dartmouth St. only traffic control device; Lack of left-turn lane on Oatfield Rd. at intersection contributes to traffic congestion and accidents.
Traffic Volume/Congestion History: 1,700 (1973/74) - 2,950 (1988/89) = +74 increase
Current Level of Service (LOS): "D"
Projected Traffic Volumes/LOS (in year 2009):
with no development on SDA site: 4,500 = +53%/LOS "F"
with development on SDA site: 5,200 = 76%/LOS "F"

5. E. GLOUCESTER STREET SIGNALIZATION (@ Oatfield Road)

Proposed Actions: Widen Oatfield Road, from 82nd Drive to Webster Road, to provide continuous left-turn lane, and install traffic signal, as part of larger Oatfield Road project (see A.1 above).

Street Conditions: A principal collector street that connects McLoughlin Blvd. (major arterial with traffic signal), Portland Avenue (minor arterial with traffic signal) and Oatfield Road (minor arterial); 60' R/W on both streets; 28' (Gloucester St.) x 40' (Oatfield Rd.) pavement width; No sidewalks on either street; Bicycle lanes on Oatfield Rd.; STOP sign on Gloucester St. only traffic control device; Lack of left-turn lane on Oatfield Rd. and traffic signal at intersection contributes to traffic congestion and accidents.
Traffic Volume/Congestion History: 800 (1973/74) - 2,800 (1993) = +250% increase
Current Level of Service (LOS): "E"
Projected Traffic Volumes/LOS (in year 2009):
with no development on SDA site: 3,500 = +56%/LOS "F"
with development on SDA site: 4,300 = +91%/LOS "F"

Other Roadway Needs

B. Safety Needs

1. OATFIELD ROAD WIDENING AND SIGNALIZATION (Webster Road to 82nd Drive)

Proposed Actions: see A.1 above.

Street Conditions: see A.1 above.
Traffic Accident History: 90 accidents on this section of Oatfield Rd., 1986 - 1993, including reported accidents at the following intersections (accident site rank):

@ Webster Rd.: 25 (rank: #4) @ 82nd Dr.: 25 (rank: #4)
@ Gloucester St.: 16 (rank: #8) @ Dartmouth St.: 14 (rank: #9)
Street Section/Intersection: Webster Road to Jennings Avenue
Traffic Accident History: 70 accidents on this section of Oatfield Rd., 1986 - 1993, including reported accidents at the following intersections (accident site rank):
@ Glen Echo Ave.: 24 (rank: #5) @ Caldwell Rd.: 10 (rank: #12)
@ Oakridge Dr.: 9 (rank: #13) @ Kenmore St.: 6 (rank: #16)

2. W. ARLINGTON STREET INTERSECTION IMPROVEMENTS (@ River Road/99E)

Proposed Actions: Preliminary engineering through construction to improve "crown" of 99E and to upgrade traffic signals to better accommodate multiple turn movements (see Figure 2). Estimated costs = $500,000.
Street Conditions: Four leg intersection involving a major arterial (McLoughlin Blvd./99E: 34,000 ADT/1993), minor arterial (Arlington St.: 5,200 ADT/1988/89), and minor arterial (River Road: 3,600/1988/89); R/W: 99E (120'-165'); W. Arlington St.(60'); River Road (60'); Pavement width: 99E (84'); W. Arlington St. (45'); River Road (46'); Multiple vehicle movements; River Road enters 99E at much less than a right angle, making clear vision difficult; Existing "crown" of 99E restricts field of vision from adjoining streets; Traffic signal with sign warning motorists on W. Arlington St. to yield to oncoming traffic from River Road.
Traffic Accident History: 79 accidents, 1986 - 1993 (accident site rank: #1)

(Proposal submitted to ODOT 4/1993 for consideration in Statewide Transportation Improvement Plan.)

3. E. ARLINGTON STREET SIGNALIZATION (@ 82nd Drive)

Proposed Actions: See A.2 above

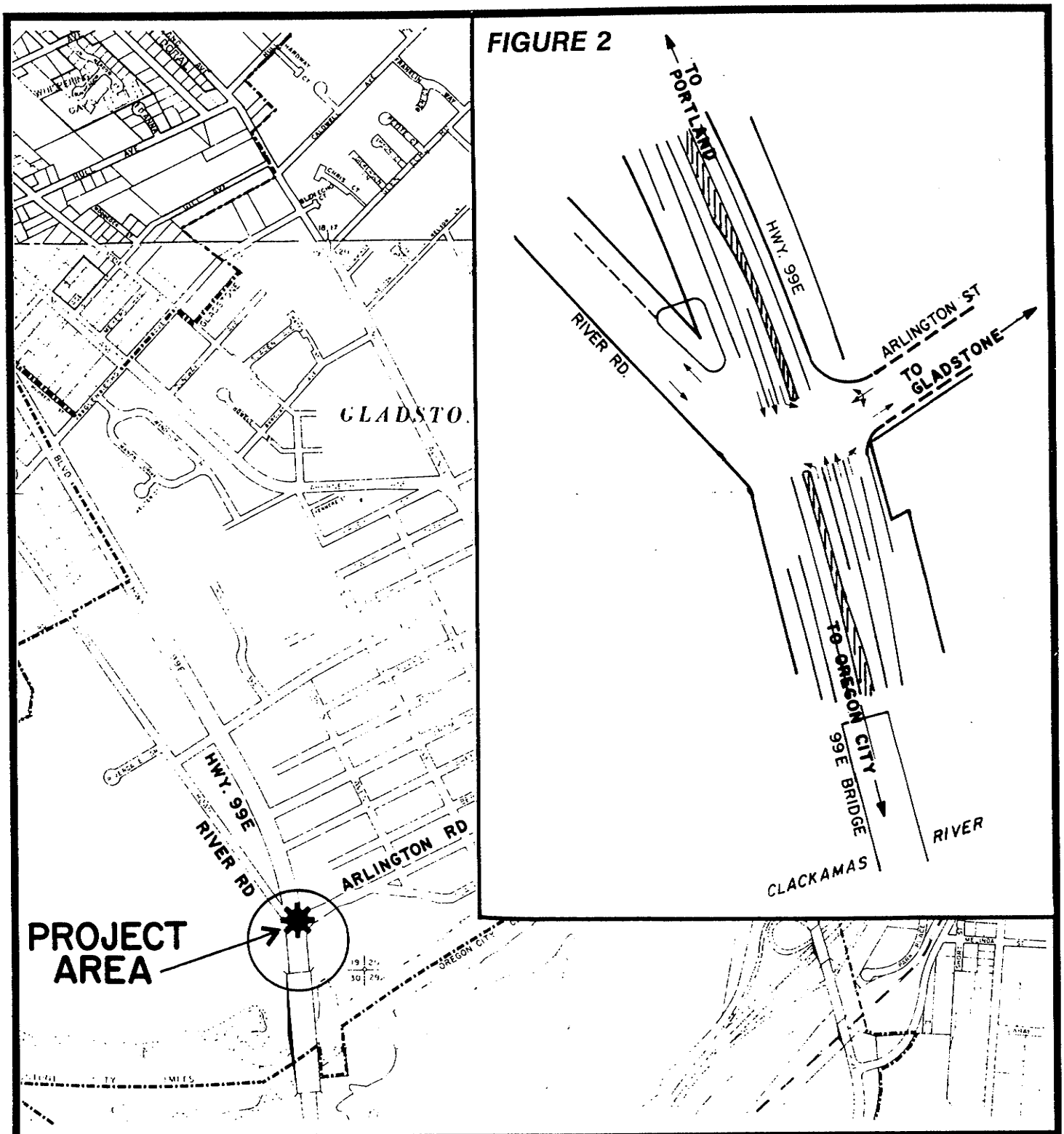
Traffic Accident History: 23 accidents, 1986 - 1993 (rank: #6)

C. Bridge Needs

PARK PLACE BRIDGE REUSE STUDY

Proposed Actions: Conduct feasibility study, in coordination with Tri-Met/Metro, to assess benefits of reconstructing bridge to accommodate LRT or two HOV bus lanes to facilitate high capacity transit service between Oregon City, Gladstone (SDA), and Clackamas Town Center transit center.
Estimated construction costs = $2,000,000.

Location/Connection: Connects 82nd Dr. in Gladstone to Hwy 213 in Oregon City
Current Condition: Pedestrian and bicyclist use only (very good condition)/not authorized for automobile or bus use (weight limitations); 235' span/18' width.



99E ARLINGTON ST. INTERSECTION

Prepared By
CLACKAMAS COUNTY
Department of Transportation And Development
902 Abernethy Road
Oregon City, OR 97045
(503)655-8521

N

D. Reconstruction Needs

1. ABERNETHY LANE WIDENING AND SIDEWALKS (Glen Echo Avenue to Portland Avenue)

Proposed Actions: Widen pavement to uniform collector standard of 36' (8' parking areas/10' travel lanes); Install sidewalk on east side of street/separated bicycle path on west side; Provide hard surface accommodation for transit stops on west side of street. Estimated costs = $300,000.

Street Section: Glen Echo Avenue to Portland Avenue
Street Conditions: North-south collector street and transit route; Non-uniform pavement width; Few curbs/no sidewalks; 2,590'; 70'-75' R/W; Pavement width 22'-33'(near Portland Avenue; Fair condition; Separated pedestrian walkway/bicycle path south and west of roadway/not paved except for short section west of Beatrice Avenue past Abernethy Ct., and along Senior Center; STOP signs @ Glen Echo Avenue (4-way), and Portland Avenue; STOP signs on all four intervening cross streets.
Traffic Conditions: 10 traffic accidents reported along this street, 1986-1993 (rank: #15); traffic volume counts @ Glen Echo: 3,100 ADT (1973/74)/@ Portland Avenue: 3,000 ADT (1988/89); Number of access points along this section: 6 streets/22 driveways (all on east and north sides).

(Storm drainage improvements completed in 1995 in preparation for street work.)

2. E. GLOUCESTER STREET WIDENING, SIDEWALKS, SIGNALIZATION (Portland Avenue to Oatfield Road)

Proposed Actions: Widen pavement to uniform collector standard of 36' (8' parking areas/10' travel lanes); Or to minor arterial standard of 42' (8' parking areas/13' travel lanes); Or to 48' (8' parking areas/10' travel lanes/two 6' bicycle lanes); Uniform curbs and sidewalk along entire length; Traffic signal @ Oatfield Rd.
Estimated costs = $950,000.

Street Conditions: Principal east-west collector street with direct connection to McLoughlin Blvd. (traffic light @ 99E); Non-uniform pavement width/incomplete curbs and sidewalks; 3,070'; 60' R/W; Pavement width 36' west of Harvard/28' east of Harvard; Generally fair pavement condition; No on-street parking east of Harvard; Curbs and sidewalks west of Harvard/mostly none east of Harvard; Grade school abuts Gloucester St. between Chicago and Harvard; School crosswalk @ Harvard; Traffic light @ Portland Ave; STOP sign @ Oatfield Rd.; STOP signs on all six intervening cross streets.
Traffic Conditions: 16 traffic accidents reported @ Oatfield Rd, 1986-1993 (rank: #8)/16 traffic accidents reported @ Portland Ave., 1986-1993,(rank: #8); Traffic volumes have increased @ Portland Ave. 96% from 1973/74 (1,200 ADT) to 1988/89 (2,350 ADT) and @ Oatfield Rd. 263% from 1973/74 (800 ADT) to 1992 (2,900 ADT); Number of access points along this section: 8 cross streets/ 78 driveways (45 N/33 S).

3. W. ARLINGTON STREET RECONSTRUCTION AND CURBING (99E to Portland Avenue)

Proposed Actions: Remove asphalt overlay buildup/restore pavement crown to correct elevation; Install new curbs entire length; Replace poor sidewalks.
Estimated costs: $400,000.

Street Conditions: Principal east-west minor arterial and transit route; With direct connection to McLoughlin Blvd. (traffic light @ 99E); 2,315'; 60' R/W (120' @ 99E); uniform pavement width 36' (not to minor arterial standard)/45' @ 99-E; Fair to poor pavement condition, with very inadequate subsurface/street base that requires annual slurry seal coating; 95% complete curbs and sidewalks on both sides; Curbs poor to very poor: Very shallow to even with pavement, crumbling, or missing; Sidewalks poor to fair; STOP sign @ Portland Avenue; STOP signs on all three intervening cross streets (see B.1 above).
Traffic Conditions: 79 traffic accidents reported @ McLoughlin Blvd., 1986-1993, (rank: #1)/8 over remainder of section; Traffic volume counts @ 99E: 5,200 ADT (1988/89)/ @ Portland Avenue: 4,753 ADT (1987); Number of access points along this section: 5 cross streets/37 driveways (21 N/ 16 S).

E. Operations & Maintenance Needs

1. STREET SLURRY SEAL PROGRAM

The City has undertaken extensive review of the comparative merits and cost effectiveness of utilizing asphalt overlay or slurry seal for maintaining the surface and subsurface integrity of local street facilities, and has determined that a conscientious slurry seal maintenance program is superior to asphalt overlay in most aspects. A slurry seal schedule is proposed to be compiled on all streets in the city to provide an historic summary of the year and street section-slurry sealed to allow for an ongoing overview of maintenance needs and effectiveness.

2. TRAFFIC COUNT AND SPEED MONITORING AWARENESS RADAR TRAILER

The City purchased a multi-function traffic management device in May 1995 to assist city staff in monitoring and analyzing traffic operations, including: Conducting peak hour and Average Daily Traffic (ADT) volume count surveys on selected streets; Promoting speed awareness by area motorists through the visual display of the speeds of oncoming vehicles; Monitoring the range and median speeds traveled by motorists on selected streets; and, Conducting radar speed enforcement by city police officers. This instrument represents both a useful instrument for ongoing assessment of traffic volume/street capacity issues, as well as an effective public relations and police enforcement tool.
Estimated costs = $11,273.

On May 9, 1995 the Gladstone City Council approved the addition of the following street improvements to the city's Capital Improvement Plan (see attached next page).

PRELIMINARY STREET IMPROVEMENT PLAN

1995:	
Plant street trees along Abernethy Lane	$10,000
Grind surface & pave sections of Oatfield Rd. south of Webster Rd.	100,000
Install curb and sidewalk near grade school	20,000
Install sidewalk along one-half of 100 block of East Dartmouth Street	6,000
Install sidewalk on west side of Valley View Road	10,000
Construct bikeway on north side of Cason Road	50,000
Subtotal	$196,000
1996:	
Gravel five blocks of road shoulder along East Gloucester Street	30,000
Install curb and sidewalk and asphalt pave Abernethy Lane*	300,000
Install sidewalk along northerly and easterly side of high school	35,000
Subtotal	$265,000
1997:	
Gravel and slurry seal shoulders of East Exeter and Fairfield Streets	50,000
Asphalt pave Webster Road	200,000
Install sidewalk along 200 block of Ipswich Street*	10,000
Install sidewalk along 300 block of West Hereford Street*	7,000
Gravel slurry seal shoulders of Caldwell Road for bikeway	30,000
Subtotal	$267,000
1998:	
Reconstruct West Arlington Street including new curbs*	$400,000
Install sidewalk along Charolais Drive near Webster Road	15,000
Subtotal	$415,000
1999:	
Construct Center Turn Lane on Oatfield south of Webster Rd.	$400,000
Subtotal	$400,000
2000:	
Install curb and sidewalk and pave 5 blocks of East Gloucester	300,000
Install curb and sidewalk on Bellevue, Beatrice and Barton Avenues*	250,000
Subtotal	$550,000
2001:	
Install traffic signal at Oatfield and Gloucester intersection	$130,000
Install left turn lane on Oatfield south bound at Webster Rd.	200,000
Synchronize signals on Oatfield Rd. at Webster, Gloucester and 82nd Dr.	15,000
Subtotal	$345,000
2002:	
Construct sidewalk along west side of Oatfield Rd. south of Webster Rd.	$50,000
Install traffic signal in the 82nd Drive and Arlington intersection	130,000
Construct sidewalk on westerly side of Valley View from Oakridge to Jennings	35,000
Subtotal	$185,000
2003 or after:	
Reconstruct 82nd Drive and I-205 Interchange (local match only)	$350,000
Subtotal	$350,000
ESTIMATED TOTAL	$2,973,000

*Could be partially funded by federal Community Development Block Grants

SAFETY ISSUES

Traffic Accidents

Gladstone streets do not appear to exhibit serious traffic accident problems outside of the high volume, high speed state arterials (I-205 and 99E). Table II-10, in the back of the chapter, provides a summary of the location and frequency of traffic accidents on those streets experiencing the worst history of traffic accidents over the reporting period of 1986 - 1993. The streets are listed in order of number of accidents, and ranked by frequency on three scales:

- Overall rank (including state highways I-205 and 99E);
- "Non-system" rank (city streets only); and,
- Local streets rank.

The traffic volumes along the major state highways are of such a magnitude that corresponding high traffic accidents are not unexpected. In fact, the average accident rate on McLoughlin Blvd. (Highway 99E) of 3.22 accidents per million vehicle miles over the five year period of 1989-1993 is slightly less than the statewide average of 3.57 for urban non-freeways over this same period.*

Among the "non-system"/city streets the primary accident-heavy streets, by rank, include the following:

#1 - Oatfield Road (155: 90 between Webster Road and 82nd Drive);
#2 - Portland Avenue (83);
#3 - Arlington Street (60);
#4 - Webster Road (38);
#5 - 82nd Drive (26).

All of the top five streets in accidents are minor arterials, where higher volumes and speeds are prevalent. The traffic volume/capacity/LOS issues identified earlier in regard to Oatfield Road, between Webster and 82nd Drive, would appear to be contributing factors to the corresponding high accident ranking.

The Gladstone Traffic Safety Commission regularly reviews city-wide traffic accident data. As a result, STOP signs have been installed on local streets with the greatest accident frequency. Such traffic management actions taken by the city to address these and other specific accident sites have shown effective results. The installation of STOP signs on Columbia Avenue at Hereford Street in 1991 has reduced the rate of accidents at this site from six in the preceding six years to one in the succeeding two years. Likewise, installation of STOP signs on Berkeley Street at Cornell and Harvard Avenues in 1992 has reduced the incidence of accidents at these sites from nine in the preceding seven years to zero in the succeeding year of reporting. *It is suggested* that the city consider implementing a "Denver Plan" approach used in some Portland neighborhoods where STOP signs have been installed virtually at every other other intersection of local streets.

*Oregon Department of Transportation, Transportation Data Section, Accident Rate Tables, 1/95.

One other example of successful traffic management/control actions includes the installation of four-way STOP signs at the intersection of Portland Avenue and Dartmouth Street. This intersection of a minor arterial and a collector street is ranked as the #3 accident site in the city with 23 accidents reported from 1986 - 1993. Twenty-two (22) accidents were reported there prior to installation of STOP signs in 1991, and only one (1) accident reported in the two years since. Flashing red lights were installed in 1994, but no data is available as yet to measure the effectiveness.

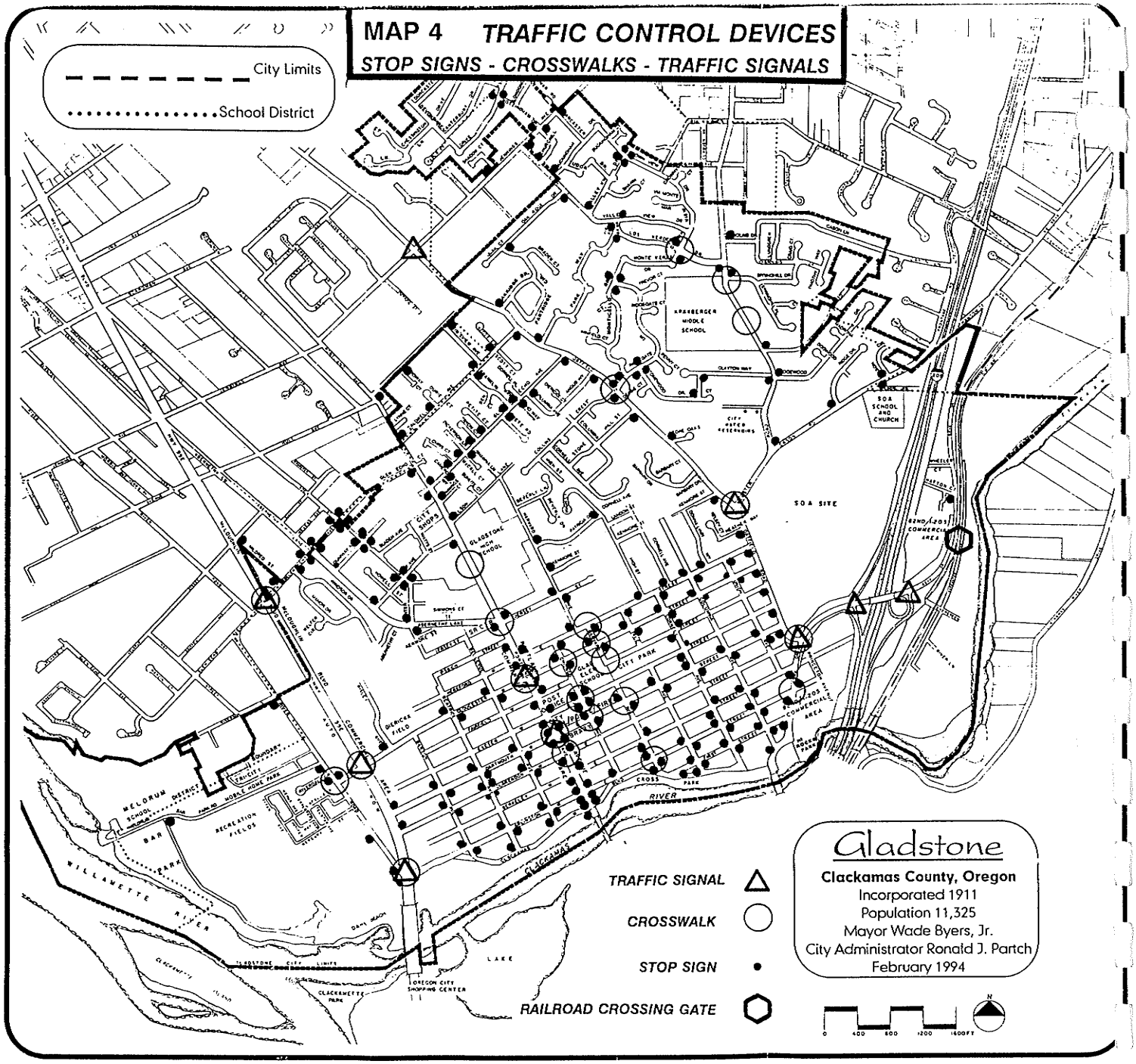
Table II-12, at the end of the chapter, provides further insight on specific high accident intersections along streets and areas experiencing both high traffic accident histories and high traffic volumes and congestion. Of the 90 accidents reported occurring on Oatfield Road, between Webster Road and 82nd Drive, 80 are accounted for at four intersections: Webster Road (25: #1 rank city-wide); 82nd Drive (25: #1 rank city-wide); Gloucester Street (16: #4 rank); Dartmouth Street (14: #5 rank). The high traffic volumes, limited reserve street capacity, and lack of a center turn lane along this section of Oatfield Road significantly contribute to these accidents. Another problem site in this area is the intersection of 82nd Drive and E. Arlington Street (23 accidents: #3 rank). Lack of a traffic signal at this site may contribute to the high accident rates reported.

The Traffic Safety Commission monitors accident rates and locations on an annual basis to determine problem sites that may require further analysis and traffic controls. These efforts should continue. A complete listing of traffic accidents on <u>all</u> streets and street intersections for the period of 1986 - 1993 is compiled in Table A-6, in the Appendix. Street intersection accidents by street classification are listed in Table A-7, in the Appendix. Location of vehicle accidents involving pedestrians and bicyclists is listed in Table IV-1.

Traffic Control Devices

The Gladstone Traffic Safety Commission has been very responsive to neighborhood traffic concerns. Table A-9 lists actions recommended by the Traffic Safety Commission since 1991 in response to concerns and issues raised by citizens. Table A-8, in the Appendix, provides an on-going log of traffic accidents before and after the installation of STOP signs. This ongoing monitoring of traffic conditions, and associated responsiveness by Traffic Safety Commission to neighborhood concerns, should continue.

Principal traffic control devices employed in the city include traffic signals (10 total: 5 state/4 city/1 county); STOP signs (245); crosswalks (24 total); and posted speed limits. Map 4 identifies the location of STOP signs, crosswalks, and traffic signals in the Gladstone area. Table II-13, at the end of the chapter, lists the location of traffic signals and crosswalks. Posted speed limits on specific streets are compiled in Table II-14. The City Council authorized a reduction in the posted speed on Cason Road in 1991 from 35 mph to 30 mph, and on Arlington Street in 1994, from 30 mph to 25 mph.


MAP 4 TRAFFIC CONTROL DEVICES
STOP SIGNS - CROSSWALKS - TRAFFIC SIGNALS
City Limits
School District
TRAFFIC SIGNAL
CROSSWALK
STOP SIGN
RAILROAD CROSSING GATE
Gladstone
Clackamas County, Oregon
Incorporated 1911
Population 11,325
Mayor Wade Byers, Jr.
City Administrator Ronald J. Partch
February 1994
KRAHBERGER MIDDLE SCHOOL
SOA SCHOOL AND CHURCH
SOA SITE
GLADSTONE HIGH SCHOOL
OLD ELEC. SCHOOL
CITY PARK
DIERCKS FIELD
MELORUM SCHOOL
RECREATION FIELDS
MOBILE HOME PARK
BAR PARK
WILLAMETTE RIVER
CLACKAMETTE PARK
OREGON CITY SHOPPING CENTER
LAKE
CROSS PARK
RIVER
COMMERCIAL AREA
0 400 800 1200 1600FT

STREET PLAN ELEMENT

Transportation Planning Rule Requirement: ***The determination of local and regional transportation needs shall be based upon population and employment forecasts and distributions which are consistent with the acknowledged comprehensive plan.***

POPULATION AND EMPLOYMENT PROJECTIONS: IMPACTS ON TRAFFIC VOLUMES

Regional Growth

Projected regional population growth and anticipated increased travel demand is not expected to significantly impact local Gladstone streets. In 1993 a population and employment analysis was conducted by Metro, with the cooperation and participation of all local jurisdictions in the metropolitan area, as part of the South/North Transit Corridor Study. This study provides useful information on the extent and location of projected growth likely to occur in and around the city of Gladstone, which may serve as an indicator of projected traffic volumes on principal arterials that traverse the city. This area is comprised of three subregions that include the Clackamas Town Center, Milwaukie, and Oregon City (see maps 3A and 3B).

In this analysis regional 2015 household and employment projections were aggregated to subregions, and then to smaller, discrete geographical areas (Transportation Analysis Zones) along the study area for assessing ridership potential and cost per rider data to determine the most effective alignment and terminus options for the proposed North/South Light Rail. Historic 1990 household and employment data were also provided to establish a common baseline for the 2015 allocations. Land use designations and the location/extent of vacant developable lands within the study area were principle factors in allocating future growth. Similar allocations/projections were conducted for the city of Gladstone as well. This analysis is useful for projecting the impacts of this growth on future traffic volumes on city streets. Existing and projected growth in the surrounding region is summarized below.

SUBREGION GROWTH*

	Region #6	Region #7	Region #9	Total
1990 Households	26,262	9,603	9,155	45,020
2015 Households	35,223	17,230	15,478	67,931
Growth	8,961	7,627	6,323	22,911
Percentage	34%	79%	40%	51%
1990 Employment	35,030	26,590	15,958	77,578
2015 Employment	43,636	40,681	22,490	106,807
Growth	8,606	14,091	6,532	29,229
Percentage	25%	53%	41%	38%

*Source: 1993 Metro study, in coordination with City of Gladstone and Clackamas County staff, as part of South/North Transit Corridor Study.

A substantial proportion of the expected growth in population and employment in Region #6 (Gladstone to Milwaukie, Willamette River to I-205) is likely to occur in the

Milwaukie area and unincorporated north Clackamas County. Milwaukie has been identified in Metro's 2040 Plan as one of nine Regional Centers in the Portland/Vancouver metropolitan area, indicating its status as a major focus of compact development, redevelopment, transit and highway improvements. It currently is the site of a major transit center, and future light rail transfer station.

A substantial proportion of the expected growth in population and employment in Region #7 (Clackamas River to Multnomah County, I-205 east) is likely to occur in the Clackamas Town Center area, Happy Valley, and surrounding environs. The Clackamas Town Center has also been identified as a metropolitan Regional Center. It currently is the site of a major shopping center, medical center, transit center, and future southern terminus of the proposed South/North LRT.

Growth in Region #9 (Oregon City, south and east of Gladstone) is likely to occur in the Oregon City area, and surrounding environs. Oregon City has also been identified in the Metro 2040 Plan as a Regional Center, providing shopping and employment opportunities to the Clackamas market area south of the Clackamas River. It currently serves in that capacity, as well as the site of county government.

An assessment of projected population and employment growth in the southeast quadrant of the metropolitan area, comprised of the three subregions discussed above (#6, #7, and #9), indicates a significant 50% increase in travel demand and resulting traffic volumes. The increase in projected travel demand associated with the projected increase in households in the three subregions studied can be estimated as a function of the number of trips generated per day by land use category. The increase in daily vehicle trips in the three subregions in 2015 is estimated to be 194,107. Regional trip generation data per subregion is summarized below.

SUBREGION TRAVEL DEMAND INCREASE

	Region #6	Region #7	Region#9
HH Increase: 1990-2015	8,961	7,627	6,323
Assumed 2015 SF/MF Ratio	65%/35%	65%/35%	65%/35%
Estimated Travel Demand Increase 1990-2015	75,921	64,617	53,569

Trip generation rates for Single-Family housing units are 9.55 trips per day, and for Multi-Family housing units are 6.47 trips per day. (Trip Generation, Institute of Transportation Engineers, 1991)

Notwithstanding the projected impacts of population and employment growth in the region on specific arterials traversing the city, a significant proportion would be expected to occur primarily on the region's major freeways and arterials providing the most direct access to major regional activity centers. In this regard, the anticipated impacts of the projected population and employment growth in the

region on the local interior street system of Gladstone is not expected to be as significant as might be experienced by other local communities in closer proximity to some of the identified major activity centers, such as Milwaukie and Clackamas Town Center. In both instances, principal access to these regional centers would likely be by way of I-205 and McLoughlin Blvd.(99E), both major north/south highway corridors that provide the most efficient regional travel routes through the area; largely circumvent the central interior of the Gladstone community; and, therefore, minimize the potential usage of local streets by non-residents. Travel north and south from the Oregon City region would also likely occur primarily on I-205 and 99E.

A 1994 Metro study of the projected impacts of a possible LRT alignment along McLoughlin Blvd. on travel patterns on adjacent, parallel north/south arterials tends to confirm this assessment. This study indicated that increasing congestion on 99E (as might result from LRT installation, or from anticipated traffic volume growth) would not result in the diversion of traffic to either River Road or Oatfield Road. These streets were projected to remain at a Level of Service (LOS) of "D" even if McLoughlin Blvd. would drop to an LOS of "E" or "F".

Local Growth

Perhaps of more significance to assessing the impacts of projected population and employment growth in the region on the local transportation system, is the extent and nature of projected growth within the city proper. In this regard, two major factors will influence the future capacity of the city's existing transportation facilities to provide safe and efficient service to its residents:

1. The largely fully developed state of the community, with little remaining vacant and developable land for new construction; and

2. the timing and nature of development of the 80 acre Seventh-day Adventist (SDA) campground on the eastern edge of the city.

It should be noted that there are currently (1995) a number of city arterials and collectors that are already exhibiting traffic congestion. Even minimal new growth would likely aggravate the level of congestion. **Maintaining the carrying capacity of the city's arterials and collectors is a principal means for preventing traffic intrusions onto local streets.**

The historic growth in the city's population and housing units shows very clearly how this predominately residential community has reached its current state of maturity as a largely fully developed city, with few remaining parcels of sufficient size zoned for additional residential uses.

LOCAL HISTORIC POPULATION GROWTH**

	1960	1970	1980	1990
Population	3,953	6,237	9,500	10,152
Change Over Previous Decade	--	+2,384	+3,263	+652
% Change Over Previous Decade	--	+62.0%	+52.0%	+6.8%
Annual % Change Over Previous Decade	--	+6.2%	+5.2%	+<1.0%

**Source: Census data.

The data indicate that as a predominately residential community the city is rapidly reaching full development. Indeed, 41% of the 652 person increase in population between 1980 and 1990 was attributable to a 270 person/99 unit housing unit (Oakridge Subdivision) annexation that occurred in 1990. Without that annexation the population increase in 1990 would have been only 382 (+4.0% increase over previous decade).

LOCAL HISTORIC HOUSING GROWTH**

	1960	1970	1980	1990
Housing Units	1,955	2,192	3,497	3,745
Change Over Previous Decade	--	+237	+1,305	+248
% Change Over Previous Decade	--	+12.1%	+59.5%	+7.1%
Annual % Change Over Previous Decade	--	+1.2%	+5.9%	+<1.0%

**Source: Census data.

Much like the population data, this data indicate that the community of Gladstone is rapidly reaching full development. The primary reason for this significant slowdown in new residential development during the 1980's is because of the city's increasingly limited remaining supply of vacant buildable land as it reaches full development. With limited opportunity or need for annexing additional property, it is anticipated that future residential development will consist of redevelopment, infill, minor partitions, and small subdivisions. Higher density multi-family unit development may also be reasonably anticipated, as single family zoned residential areas are filled in.

Indeed, the number and rate of multi-family construction increased significantly over the 1980's (+60%), to represent 17% of all housing units in the city. The proportion of single-family units to all residential units declined from 83% in 1980 to 76% in 1990. A review of city building permit data from 1990 through 1994 reinforces these observations indicating a change in the housing mix of the community. Between 1990 and 1994, 365 multi-family units were constructed (+50%) compared to 62 single family units (+2%). The current housing mix in the city is 69% single family, 25% multi-family, and 5% mobile homes, which is rapidly approaching the Metro 2040 Plan housing mix goal of 62% SF/38% MF.

Similar projections on year 2015 household and employment for the city of Gladstone are available from the same 1993 Metro study noted earlier in regard to subregional data. Aggregations of household and employment data were assigned to Transportation Analysis Zones within the city limits, for the years 1990 and 2015, that allow an assessment of growth trends within selected areas of the city, and by extension, projected traffic volumes/congestion on selected streets. These TAZ allocations, and associated map, are attached (see Table II-5 at the end of the chapter). The study projects an increase of 1,296 households from 1990 to 2015. This represents an increase of 35% over a 25 year period, or an annual increase of 1.4%. This rate of increase is similar to the historic 1.6% annual increase noted in the city from 1980 to 1994, and reflects a likely development pattern of a combination of slow infill/redevelopment of scattered parcels, and the addition of selected higher density multi-family residential construction along transit routes.

Projected increases in local travel demand from 1990 to 2015 can be estimated in the same manner as those derived for the subregions, utilizing trip generation methodology. Similar trip generation assumptions are used in projecting an increase of 10,978 vehicle trips per day from local residences in 2015 over that of 1990. City-wide, and over a 25 year period, this increase, of and by itself, should not create unmanageable increases in traffic congestion.

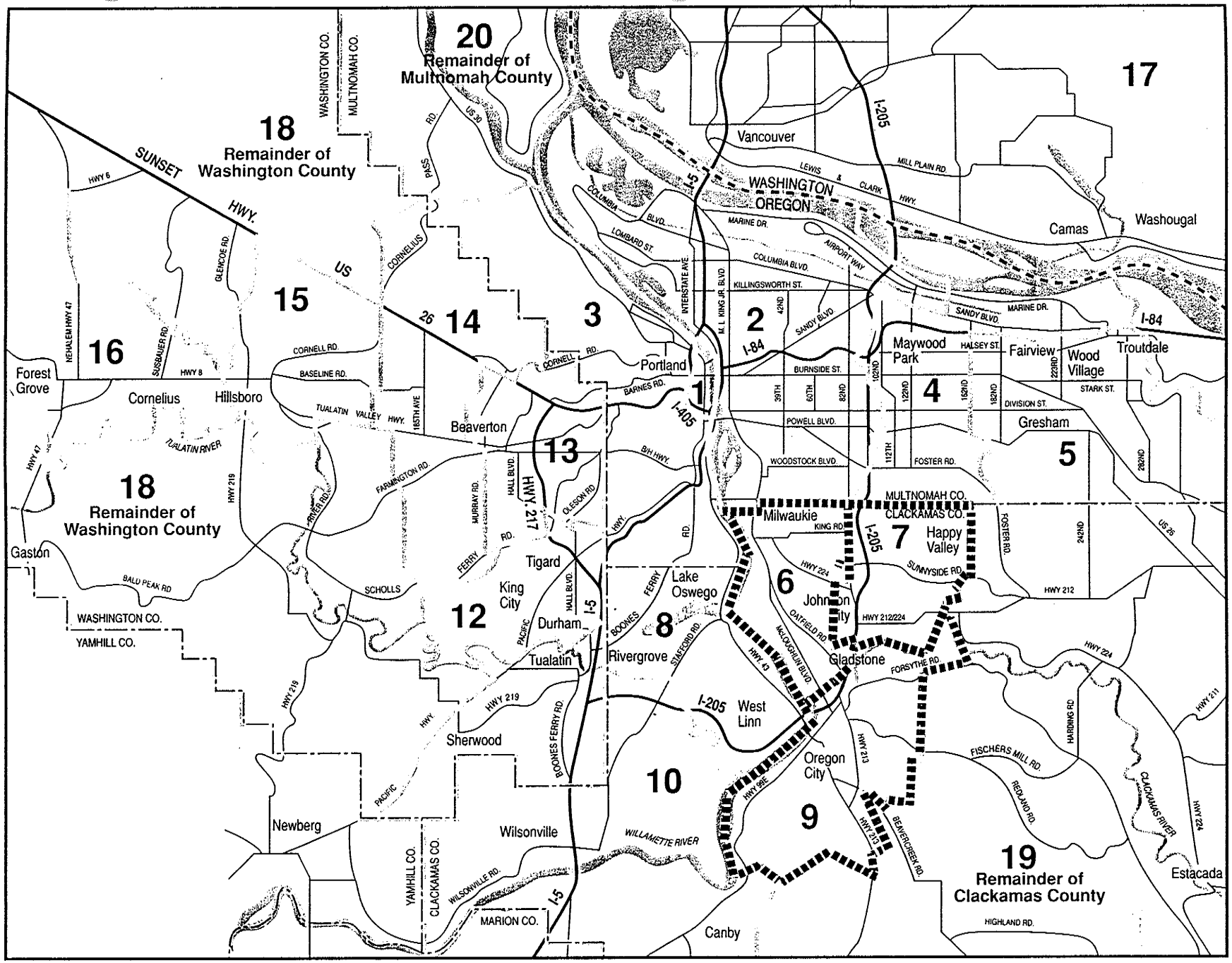
A detailed traffic study of the impacts of development of the SDA site on adjacent streets was conducted by the Clackamas County Department of Transportation and Development in 1990. This study compared recorded 1988/89 traffic volumes and Levels of Service (LOS) on adjacent arterials and collectors with projected traffic volumes/LOS in the year 2009, with no site development and no street improvements, and with full site development and no street improvements. This study indicates clearly that full development of the SDA site would generate significant traffic congestion on adjacent streets, above and beyond already high congestion levels.

Streets that will be particularly impacted by future development of the SDA site include:

* Oatfield Road, from 82nd Drive to Webster Road;
* 82nd Drive, from Oatfield Road to I-205 interchange ramps;
* Arlington Street at 82nd Drive; and,
* Gloucester and Dartmouth Streets at Oatfield Road;
* I-205 Interchange Ramps.

Depending on the alignment/extension of streets within the proposed SDA development, Webster Road and Cason Road may also experience significant increases in traffic congestion. Traffic capacity improvements and traffic control measures will likely need to be implemented in order to accommodate the projected increases in traffic volumes expected to accompany development of this site as an Office Park. Public transit improvements, as well as travel demand management measures, may mitigate some of the impacts of this development.

CONCLUSIONS: The city has determined local transportation needs through a careful review of recent studies: by Metro, on the impacts of regional population and employment growth on the city's street network (2015 projections); and by Clackamas County Department of Transportation and Development, on the local street impacts of growth (2009 projections) likely to result from future development of the last significant developable commercial property in Gladstone (SDA site). The city also conducted an evaluation of historic population and housing data (census and recent building permit data) to identify trends in the housing mix resulting from the near fully developed state of the community. This evaluation confirmed the basic trends noted in the Comprehensive Plan and is consistent with its findings, goals and objectives.



METRO

Regional Transportation Plan: 20 Districts

1992

MAP 3 A

METROPOLITAN AREA SUBREGIONS

MAP 3B
GLADSTONE AND ADJACENT SUBREGIONS
TRANSPORTATION ANALYSIS ZONES (TAZ)

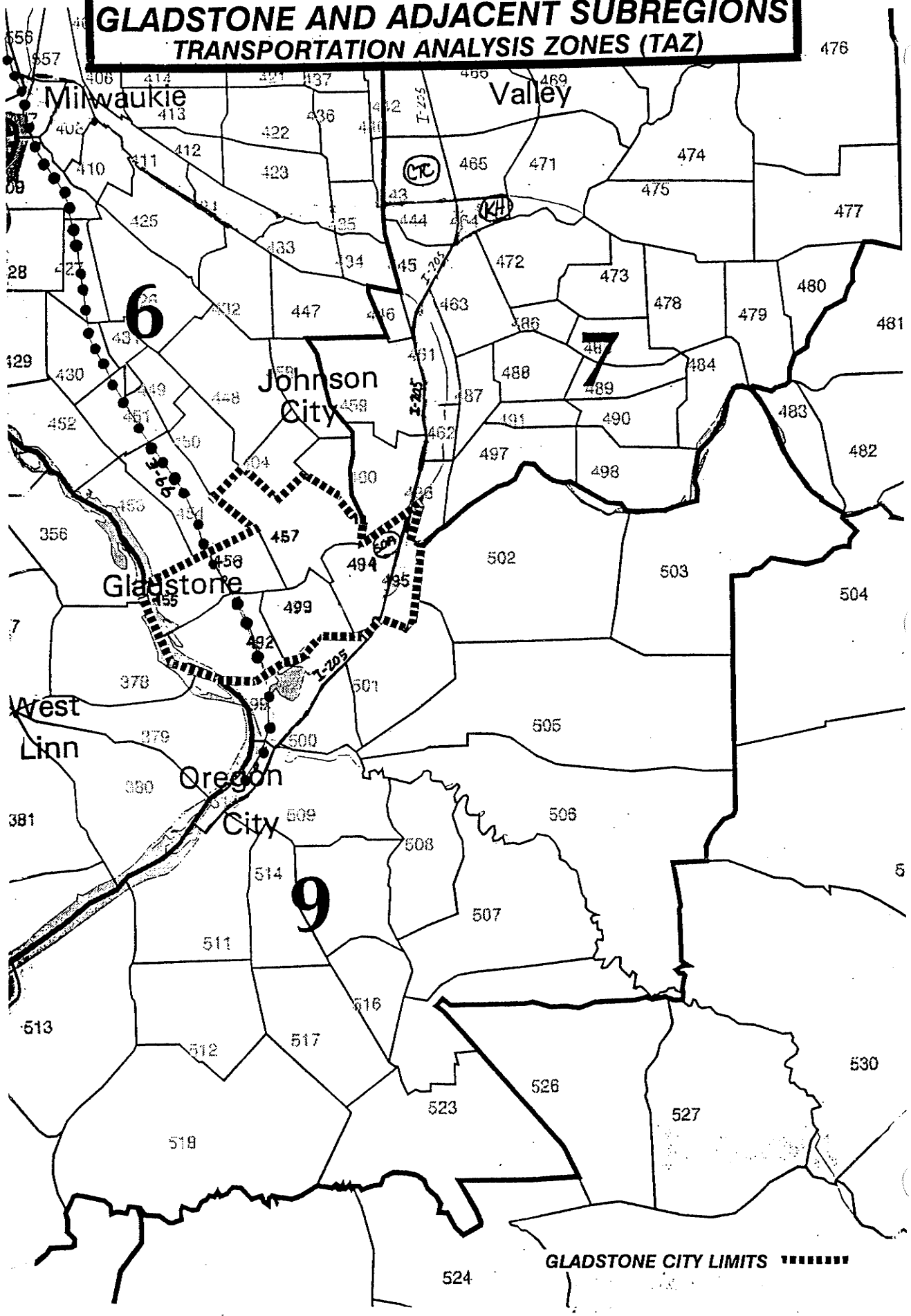


TABLE 11-2

GLADSTONE STREET FUNCTIONAL CLASSIFICATION

FREEWAY:

* Divided highway, 2 or more lanes for exclusive use by traffic in each direction
* Uninterrupted traffic flow
* Full control of access and egress at ramps

Major Arterial:

* Right-of-way - minimum 100 feet
* High volume traffic at relatively high speeds
* Connect to and be accessible only by major traffic generators
* Should not divide homogeneous land uses

Minor Arterial:

* Right-of-way - 60 to 80 feet
* Pavement width - minimum 42 feet
* Relatively high traffic and high speeds
* Connect major traffic generators to collector streets
* Facilitate through traffic and channel it around homogeneous land uses
* Discourage private driveway entrances and parking
* Provide channelization at major intersections

Collector Streets:

* Right-of-way - 50 to 60 feet
* Pavement width - minimum 36 feet
* Provide access between neighborhoods and arterials
* May define neighborhood boundaries
* Discourage through traffic
* Discourage residential driveways

Local Streets:

* Right-of-way - minimum 40 feet
* Pavement width - minimum 32 feet
* Provide access to abutting properties and accommodate minor traffic volumes
* Should not be a route for through traffic, buses or trucks
* Should not connect to arterials

TABLE II-4

LOCAL AND REGIONAL POPULATION AND EMPLOYMENT PROJECTIONS 1990 - 2015

SUBREGION GROWTH*

	Region #6	Region #7	Region #9	Total
1990 Households	26,262	9,603	9,155	45,020
2015 Households	35,223	17,230	15,478	67,931
Growth	8,961	7,627	6,323	22,911
Percentage	34%	79%	40%	51%
1990 Employment	35,030	26,590	15,958	77,578
2015 Employment	43,636	40,681	22,490	106,807
Growth	8,606	14,091	6,532	29,229
Percentage	25%	53%	41%	38%

*Source: 1993 Metro study, in coordination with City of Gladstone and Clackamas County staff, as part of South/North Transit Corridor Study.

SUBREGION TRAVEL DEMAND INCREASE

	Region #6	Region #7	Region#9
HH increase: 1990-2015	8,961	7,627	6,323
Assumed 2015 SF/MF Ratio	65%/35%	65%/35%	65%/35%
Estimated Travel Demand Increase 1990-2015	75,921	64,617	53,569

Trip generation rates for Single-Family housing units are 9.55 trips per day, and for Multi-Family housing units are 6.47 trips per day. (Trip Generation, Institute of Transportation Engineers, 1991)

TABLE II-4 (cont.)

LOCAL AND REGIONAL POPULATION AND EMPLOYMENT PROJECTIONS
1990 - 2015

LOCAL HISTORIC POPULATION GROWTH**

	1960	1970	1980	1990
Population	3,953	6,237	9,500	10,152
Change Over Previous Decade	--	+2,384	+3,263	+652
% Change Over Previous Decade	--	+62.0%	+52.0%	+6.8%
Annual % Change Over Previous Decade	--	+6.2%	+5.2%	+<1.0%

**Source: Census data.

LOCAL HISTORIC HOUSING GROWTH**

	1960	1970	1980	1990
Housing Units	1,955	2,192	3,497	3,745
Change Over Previous Decade	--	+237	+1,305	+248
% Change Over Previous Decade	--	+12.1%	+59.5%	+7.1%
Annual % Change Over Previous Decade	--	+1.2%	+5.9%	+<1.0%

**Source: Census data.

TABLE II-5

HOUSEHOLDS AND EMPLOYMENT PROJECTIONS
CITY OF GLADSTONE
1990 - 2015

TAZ	1990 HH	2015 HH	Change/%	1990 EMP.	2015 EMP.	Change/%
455	499	685	186/37%	190	262	72/38%
456	516	674	158/31%	603	715	112/19%
457	1,244	1,587	343/28%	17	91	74/435%
492	437	638	201/46%	1,637	1,908	271/17%
493	655	911	256/37%	658	853	195/30%
494*	306	442	136/44%	1,311	2,435	1,124/86%
495	70	86	16/23%	242	324	82/34%
	3,727	5,023	1,296/35%	4,658	6,588	1,930/44%

1990 population: 10,152 (3,727 HH @ 2.72 persons per HH)
2015 population (est.): 12,306 (5,023 HH @ 2.45 persons per HH)

*TAZ in which SDA property is located.

Source: 1993 Metro study, in coordination with City of Gladstone and Clackamas County staff, as part of South/North Transit Corridor Study.

TABLE II-6

EXISTING REMAINING STREET CAPACITY - ARTERIALS & COLLECTORS

Street	LOS "E" Maximum Capacity*	No. of Travel Lanes	Current Traffic Volumes**	Over (+) Under (-) Capacity
Freeway:				
I-205	120,000	6	114,000	-
Major Arterial:				
McLoughlin Blvd.	28,900	5	33,000	+
Minor Arterial:				
Arlington Street				
@ 99E	11,300	2	5,200	-
@ 82nd Drive	11,300	2	5,800	-
82nd Drive				
Arlington St.-I-205	16,000	3	16,850	+
I-205 - city limits	16,000	3	8,500	-
Oatfield Road				
Webster - 82nd	11,300	2	15,150	+
Webster - Jennings	11,300	2	10,000	-
Webster Road	11,300	2	5,750	-
River Road	11,300	2	3,600	-
Portland Avenue	16,000	3	5,850	-
Jennings Avenue	11,000	2	6,500	-
Collector Street:				
Abernethy Lane	11,300	2	3,000	-
Cason Road	11,300	2	1,500	-
Glen Echo Avenue	11,300	2	2,957	-
Gloucester Street	11,300	2	2,725	-
Dartmouth Street	11,300	2	2,225	-
Valley View Rd./ Los Verdes Dr.	11,300	2	1,518	-

*Source: Basmaciyan-Darnell, Inc. (Average Daily Traffic [ADT] counts), (See Table A-2)
**Traffic volumes are the average of most current traffic counts taken at selected points along the specific section of roadway indicated. Average Daily Traffic counts are the most current counts available (mostly 1988/89 - 1993) listed on Table II-8.

TABLE II-7

GLADSTONE STREET SYSTEM
STREETS EXPERIENCING MAJOR TRAFFIC VOLUME INCREASES
1973/74 - 1995

Street/Section	Traffic Volume Increase Base Year	End Year	Increase/%	Rank
82nd Drive:				
82nd Drive @ I-205	6,200-1973/74	22,000-1988/89	15,800/255%	1
82nd Drive @ Edgewater Rd.	2,400-1973/74	8,500-1988/89	6,100/244%	3
82nd Drive @ Oatfield Rd.	8,800-1973/74	22,000-1988/89	13,200/150%	5
Oatfield Road:				
Gloucester St. @ Oatfield Rd.	800-1973/74	2,800-1993	2,000/250%	2
Oatfield Road @ 82nd Drive	7,800-1973/74	15,900-1992	8,100/104%	7
E. Hereford St. @ Oatfield Rd.	1,600-1973/74	3,250-1992	1,650/103%	8
Oatfield Rd. @ Webster Rd. (Northbound)	5,200-1973/74	10,000-1993	4,800/92%	10
Dartmouth St. @ Oatfield Rd.	1,700-1973/74	2,950-1988/89	1,250/74%	12
Oatfield Rd. @ Webster Rd. (Southbound)	8,400-1973/74	14,400-1993	6,000/71%	13
Streets with Major Traffic Volume Increases but with Sufficient Remaining Capacity:				
Glen Echo Ave. @ Oatfield Rd.	1,100-1973/74	2,959-1990	1,859/169%	4
Cason Rd. @ Webster Rd.	400-1973/74	1,400-1988/89	1,000/250%	2
Glen Echo Ave. @ Portland Ave.	1,000-1973/74	2,264-1979	1,164/126%	6
Gloucester St. @ Portland Ave.	1,200-1973/74	2,350-1988/89	1,150/ 96%	9

TABLE II-7A

PROJECTED TRAFFIC VOLUMES/LOS CHANGES
IMPACTS OF SDA DEVELOPMENT ON ADJACENT STREETS
1988/89 - 2009

Street	1988/89 ADT[1]	LOS[2]	2009 ADT[1]	Increase/%	LOS[1]
Oatfield Rd.					
@ Webster Rd.	13,800	-			
no development			18,400	4,600/33%	D
full development			21,400	7,600/55%	E-F
@ 82nd Dr.	16,200	D			
no development			21,000	5,100/32%	E-F
full development			25,400	9,200/60%	E-F
@ Dartmouth St.	12,592[3]	D			
no development			-	-	F
full development			-	-	F
@ Gloucester St.	15,200[4]	E			
no development			-	-	F
full development			-	-	F
82nd Dr.					
@ I-205 Ramps	22,000	D			
no development			26,600	4,600/21%	D
full development			32,800	10,800/49%	E-F
@ Arlington St.	11,700	F			
no development			13,400	1,700/15%	F
full development			15,600	3,900/33%	F
Dartmouth St.					
@ Oatfield Rd.	2,950	D			
no development			4,500	1,550/53%	F
full development			5,200	2,250/76%	F
Gloucester St.					
@ Oatfield Rd.	2,250	E			
no development			3,500	1,250/56%	F
full development			4,300	2,050/91%	F

TABLE II-7A (cont.)

PROJECTED TRAFFIC VOLUMES/LOS CHANGES
IMPACTS OF SDA DEVELOPMENT ON ADJACENT STREETS
1988/89 - 2009

Street	1988/89 ADT[1]	LOS[2]	2009 ADT[1]	Increase/%	LOS[1]
Webster Rd.					
Oatfield to Cason	6,000	-			
no development			11,100	5,100/85%	C
full development			14,200	8,200/137%	E-F
Cason Rd.					
@ Webster Rd.	1,400	-			
no development			2,700	1,300/93%	D
full development			6,200	4,800/343%	F

no development: no development occurs on SDA site, and no new improvements to adjacent streets.
full development: SDA site fully developed, and no new improvements to adjacent streets.

LOS: Level of Service

[1]Clackamas County Department of Transportation and Development, Gladstone Traffic Study: SDA Site Development Year 2009, May, 1990.
[2]Kittleson & Associates, Inc., 8/19/93 letter to city.
[3]Clackamas County Department of Transportation and Development, 1986.
[4]Carl Buttke, Inc., A Traffic Impact Study on the Proposed Gladstone Market Center Development (SDA site), 1992.

TABLE II-8

SELECTED AVERAGE DAILY TRAFFIC COUNTS
1973/74 - 1993

FREEWAYS/MAJOR ARTERIALS:

I-205:		
@ Hwy 212/224:	119,000 (N)*/107,000 (S)* - 1993[10]	
@ Gladstone:	114,000 (S) - 1993[10]	
@ Oregon City:	84,000 (bridge) - 1993[10]	
McLoughlin Blvd.(99-E):		
@ W. Arlington St.:	32,000 (S)/29,000 (N) - 1973/74[10]	
	31,100 (S)/27,000 (N) - 1988/89[10]	
	34,000 (S)/33,000 (N) - 1993[10]	**[+14%(S)/+6%(N)]***
@ W. Gloucester St.:	30,000 (S)/31,000 (N) - 1973/74[1]	
@ North City Limits:	33,000 - 1993[10]	

MINOR ARTERIALS:

Arlington Street:		
@ McLoughlin Blvd.:	7,000 - 1973/74[1]; 7,888 - 1986[3]	
	8,022 - 1987[4]; 5,200 - 1988/89[5]	**[-26%]**
@ Portland Ave.:	5,000 (W)/3,600 (E) - 1973/74[1]	
	5,238 (W)/4,060 (E) - 1979[5]	
	5,472 (W)/4,514 (E) - 1986[3]	
	4,753 (W)/5,061 (E) - 1987[4]	**[-5%(W)/+41%(E)]**
@ 82nd Ave.:	3,200 - 1973/74[1]; 4,206 - 1979[2]	
	5,575 - 1986[3]; 5,770 - 1987[4]	
	5,800 - 1988/89[2]; 4,350 - 1992[6]	**[+36%]**
River Road:		
@ McLoughlin Blvd.:	5,000 - 1973/74[1]; 3,600 - 1988/89[2]	**[-28%]**
@ Rinearson Rd.:	3,200 - 1973/74[1]	
Portland Avenue:		
@ Arlington St.:	5,200 - 1973/74[1]; 4,388 - 1986[3]	
	5,200 - 1988/89[2]	**[no change]**
@ Dartmouth St.:	5,600 - 1973/74[1]	
@ Gloucester St.:	6,200 - 1973/74[1]; 6,500 - 1988/89[2]	**[+5%]**
@ Abernethy Ln.:	4,000 - 1973/74[1]	
@ Glen Echo Ave.:	1,600 (N)/1,800 (S) - 1973/74[1]	**[-8%(N)/+52%(S)]**
	1,477 (N)/2,738 (S) - 1979[5]; 1,350 - 1988/89[2]	

82nd Drive:		
@ E. Arlington St.:	8,800 - 1973/74[1]; 11,700 - 1988/89[2]	[+**33%**]
@ Oatfield Rd:	8,800 - 1973/74[1]; 22,000 - 1988/89[2]	[+**150%**]
@ I-205:	6,200 - 1973/74[1]; 22,000 - 1988/89[2]	[+**255%**]
@ Edgewater Rd.:	2,400 - 1973/74[1]; 8,500 - 1988/89[2]	[+**244%**]
Oatfield Road:		
@ 82nd Dr.:	7,800 - 1973/74[1]; 14,857 - 1979[5]	
	13,194 - 1986[3]; 13,300 - 1987[7]	
	16,200 - 1988/89[2]; 15,900 - (1992)[6]	[+**104%**]
@ Webster Rd.:	8,400 (S)/5,200 (N) - 1973/74[1]	
	10,453 (S) - 1979[5]; 13,800 (S)/9,900 (N) - 1988/89[2]	
	13,750 (S)/8,900 (N) - 1992[6];	
	14,400 (S)/10,000 (N) - 1993[11]	[+**71% (S)/+92% (N)**]
@ Caldwell Rd.:	5,800 - 1973/74[1]	
@ Dartmouth St.:	12,592 - 1986[3]	
@ Gloucester St.:	15,200 - 1992[6]	
Webster Road:		
@ Oatfield Rd.:	4,200 - 1973/74[1]; 4,651 - 1979[5]	
	6,000 - 1988/89[2]; 6,500 - 1992[6]	[+**55%**]
@ Cason Rd.:	3,800 - 1973/74[1]; 3,848 - 1979[5]	
	6,000 - 1988/89[2]; 5,300 - 1992[6]	[+**39%**]
@ Clayton Way:	5,000 - 1988/89[2]	
@ Los Verdes Dr.:	3,400 - 1973/74[1]	
Jennings Avenue:		
@ Valley View Rd.:	3,600 - 1973/74[1]; 6,500 - 1988/89[2]	[+**81%**]
COLLECTORS:		
Abernethy Lane:		
@ Portland Ave.:	3,000 - 1973/74[1]; 3,434 - 1979[5]; 3,000 - 1988/89[2]	
@ Glen Echo Ave.:	3,100 - 1973/74[1]	**[no change]**
Glen Echo Avenue:		
@ McLoughlin Blvd.:	3,500 - 1973/74[1]	
@ Abernethy Lane:	3,400 - 1979[5]; 3,650 - 1988/89[2]	[+**7%**]
@ Portland Ave.:	1,000 (E) - 1973/74[1];	
	2,264 (E)/1,284 (W) - 1979[2]	[+**126%(E)**]
@ Oatfield Rd.:	1,100 - 1973/74[1]; 2,959 - 1990[5]	[+**169%**]
Dartmouth Street:		
@ McLoughlin Blvd.:	1,000 - 1973/74[1]; 1,500 - 1988/89[2]	[+**50%**]
@ Portland Ave.:	1,400 (E)/1,800 (W) - 1973/74[1]	
@ Oatfield Rd.:	1,700 - 1973/74[1]; 2,550 - 1987[4];	
	2,950 - 1988/89[1]	[+**74%**]

Gloucester Street:		
@ McLoughlin Blvd.:	2,000 - 1973/74[1]; 2,650 - 1988/89[2]	[+**33**%]
@ Portland Ave.:	1,200 (E)/1,800 (W) - 1973/74[1]; 2,350 (E) - 1988/89[2]	[+**96**%(E)]
@ Oatfield Rd.:	800 - 1973/74[1]; 2,250 - 1988/89[2]; 2,900 - 1992[6]; 2,800 - 1993[11]	[+**250**%]
Cason Road:		
@ Webster Rd.:	400 - 1973/74[1]; 1,400 - 1988/89[2]	[+**250**%]
@ Strawberry Ln.:	1,500 - 1988/89[2]	
Valley View Rd./Dr./Los Verdes Dr.:		
@ Jennings Ave.:	600 - 1973/74[1]; 1,735 - 1982[8]; 1,005 - 1984[9]	[+**68**%]
@ VV Dr. & Los Verdes:	600 - 1973/74[1]	
@ Crownview Dr.:	905 - 1982[8]	
@ Webster Rd.:	2,800 - 1973/74[1]; 2,032 - 1982[8]	[-**27**%]
Strawberry Lane:		
@ Cason Rd.:	2,650 - 1988/89[1]	
LOCAL STREETS:		
E. Berkeley Street:		
along entire length	722 - 1987[4]	
E. Hereford Street:		
@ Portland Ave.:	1,500 - 1973/74[1]	
@ Oatfield Rd.:	1,600 - 1973/74[1]; 2,850 - 1988/89[2]; 3,250 - 1992[6]	[+**103**%]
Oakridge Drive:		
@ Valley View Rd.:	711 - 1984[9]	
@ Oatfield Rd.:	1,009 - 1982[8]; 1,571 - 1984[9]	[+**57**%]
Ridgegate Drive:		
@ Stonewood Dr.:	622 - 1982[8]	
@ Oatfield Rd.:	1,511 - 1982[8]	
Stonewood Drive:		
@ Ridgegate Dr.:	518 - 1982[8]	
Clayton Way:		
@ Webster Rd.:	601 - 1982[8]	
Crownview Drive:		
@ Los Verdes Dr.:	512 - 1982[8]	

Parkway Drive:
@ Oatfield Rd.: 822 - 1982[9]

Monticello Drive:
@ Ridgegate Dr.: 476 - 1982[8]

Nottingham Drive:
@ Jennings Ave.: 1,100 - 1973/74[1]; 1,449 - 1982[8] [+32%]

Lancaster Drive:
@ Jennings Ave.: 426 - 1982[8]

Dagmar Avenue:
@ Jennings Ave.: 287 - 1982[8]

Franklin Way:
@ Caldwell Rd.: 450 - 1990[5]

Angus Way:
@ Oatfield Rd: 200 - 1982[8]

*(S) = south, traffic count taken at southern side of intersection.
*(N) = north, traffic count taken at northern side of intersection
*(E) = east,
*(W) = west,

***[% increase or decrease from earliest year data to most recent year data shown]**

[1] CH2M-Hill, Traffic Safety Operations Improvement Program, 8/74. (24 hr. counts)
[2] Clackamas County Dept. of Transportation and Development, Gladstone Traffic Study, SDA Site Development Year 2009, 1979. (p.m. peak hour counts converted to 24 hr. counts)
[3] Clackamas County Dept. of Transportation and Development, 1986. (24 hr. counts)
[4] Ibid., 1987.
[5] Ibid., 1990.
[6] Carl Buttke, Inc., A traffic impact study on the proposed Gladstone Market Center development (SDA site), 1992. (p.m. peak hour counts converted to 24 hr. counts)
[7] Kittleson & Associates, Traffic Operational and Safety Analysis, 3/87. (P.M. peak hour counts converted to 24 hr. counts)
[8] Clackamas County Dept. of Transportation and Development, 1982. (24 hr. counts)
[9] Ibid., 1984.
[10] Oregon Department of Transportation, 1995.
[11] Kittleson & Associates, Oatfield at Gloucester Street, 8/93.

TABLE II-9
ACCESS MANAGEMENT
ACCESS POINTS ALONG ARTERIALS AND COLLECTOR STREETS

Street/Section	Access Points	Length	Access Points/Mile
Major Arterials:			
McLoughlin Blvd./ in city limits	50: 5 streets/ 45 driveways	0.64 mi.	78
McLoughlin Blvd./ city limits-Jennings	55: 5 streets/ 50 driveways	0.70 mi.	79
Minor Arterials:			
Arlington Street/ in city limits	94: 12 streets/ 82 driveways	0.90 mi.	103
82nd Drive/ in city limits	47: 9 streets/ 38 driveways	1.37 mi.	34
82nd Drive/ (County) city limits-Evelyn	32: 9 streets/ 23 driveways	0.40 mi.	80
Oatfield Road/ 82nd - Jennings Ave.	81: 20 streets/ 61 driveways	1.03 mi.	79
Webster Road/ in city limits	43: 7 streets/ 36 driveways	0.79 mi.	54
Webster Road/ (County) city limits-Jennings	36: 5 streets/ 31 driveways	0.35 mi.	103
River Road/ in city limits	34: 5 streets/ 29 driveways	0.49 mi.	69
River Road/ (County) Rinearson-Glen Echo	18: 2 streets 16 driveways	0.16 mi.	113
Portland Avenue/ Clack.Blvd.-Glen Echo	65: 19 streets 46 driveways	0.93 mi.	70
Jennings Avenue/ in city limits	6: 4 streets/ 2 driveways	0.09 mi.	66
Jennings Ave/ (County) Oatfield-Webster	67: 7 streets/ 60 driveways	0.79 mi.	85
Total (City):	**370: 76 streets/ 294 driveways**	**5.60 mi.**	**64**
Total (County):	**153: 23 streets/ 139 driveways**	**1.70 mi.**	**90**
Total (City/County):	**523: 99 streets/ 433 driveways**	**7.30 mi.**	**72**

TABLE II-9
ACCESS MANAGEMENT
ACCESS POINTS ALONG ARTERIALS AND COLLECTOR STREETS

Street/Section	Access Points	Length	Access Points/Mile
Collector Streets:			
Abernethy Lane/ in city limits	28: 6 streets/ 22 driveways	0.49 mi.	57
Cason Road/ in city limits	23: 4 streets/ 19 driveways	0.39 mi.	59
Cason Road/ (County) city limits-Strawberry	23: 5 streets/ 18 driveways	0.39 mi.	59
Glen Echo Avenue/ 99-E - Oatfield Rd.	79: 17 streets/ 62 driveways	0.92 mi.	86
Glen Echo Ave./(County) River Rd.-99-E	8: 3 streets/ 5 driveways	0.11 mi.	73
Gloucester Street/ in city limits	155: 14 streets/ 141 driveways	1.07 mi.	149
Dartmouth Street/ in city limits	122: 13 streets/ 109 driveways	0.97 mi.	126
Valley View Road/Los Verdes Drive	56: 8 streets/ 48 driveways	0.62 mi.	90
Strawberry Ln./(County) Webster - Cason Rd.	56: 10 streets/ 46 driveways	0.54 mi.	104
Total (City):	**463: 82 streets/ 381 driveways**	**4.46 mi.**	**104**
Total (County):	**87: 18 streets/ 69 driveways**	**1.04 mi.**	**84**
Total (City/County):	**550: 100 streets/ 450 driveways**	**5.50 mi.**	**100**

TABLE II-10

LOCATION AND FREQUENCY OF TRAFFIC ACCIDENTS
1986 - 1993

Street Name	Street Class.	No. of Accidents	Overall Rank	Non-System Rank (1)	Local St. Rank
McLoughlin	Maj.Art.	249	1	-	-
I-205	Freeway	170	2	-	-
Oatfield Rd.	Min.Art.	155	3	1	-
Portland Ave.	Min.Art.	83	4	2	-
Arlington St.	Min.Art.	60	5	3	-
Webster Rd.	Min.Art.	38	6	4	-
82nd Dr.	Min.Art.	26	7	5	-
Columbia Ave.	Local	24	8	6	1
Gloucester St.	Collector	20	9	7	-
Berkeley St.	Local	19	10	8	2
River Rd.	Min.Art.	19	10	8	-
Dartmouth St.	Collector	16	11	9	-
Clarendon St.	Local	13	12	10	3
Exeter St.	Local	12	13	11	4
Hereford St.	Local	11	14	12	5
Bellevue Ave.	Local	11	14	12	5
Glen Echo Ave.	Collector	10	15	13	-
Abernethy Ln.	Collector	10	15	13	-
Valley View/ Los Verdes Dr.	Collector	8	16	14	-
Cornell Ave.	Local	7	17	15	6
Jennings Ave.	Min.Art.	6	18	16	-
Ridgegate Dr.	Local	5	19	17	7

(1) "Non-system" streets refers to accidents that occur on all streets in the city except the state highways (I-205, 99E), referred to as "system" streets.

TABLE II-11

STREET INTERSECTIONS WITH HIGHEST ACCIDENT RATES
1986 - 1993

Street Intersection	Street Classif.	No. of Accidents	Overall Rank	Non-System Rank (1)	Local St. Rank
McLoughlin/ Arlington/ River Rd.	Maj.Art./ Min.Art./ Min.Art.	79	1	-	-
McLoughlin/ Gloucester	Maj.Art./ Collector	43	2	-	-
McLoughlin/ Dartmouth	Maj.Art./ Collector	27	3	-	-
Oatfield Rd./ Webster Rd.	Min.Art./ Min.Art.	25	4	1	-
Oatfield Rd./ 82nd Dr.	Min.Art./ Min.Art.	25	4	1	-
Oatfield Rd./ Glen Echo Rd.	Min.Art./ Collector	24	5	2	-
Portland Ave./ Dartmouth St.	Min.Art./ Collector	23	6	3	-
Arlington St./ 82nd Dr.	Min.Art./ Min.Art.	23	6	3	-
McLoughlin/ Clarendon St.	Maj.Art./ Local	21	7	-	-
Oatfield Rd./ Gloucester St.	Min.Art./ Collector	16	8	4	-
Portland Ave./ Gloucester St.	Min.Art./ Local St.	16	8	4	-
Oatfield Rd./ Dartmouth St.	Min.Art./ Collector	14	9	5	-
Oatfield Rd./ Caldwell Rd.	Min.Art./ Collector	10	12	7	-
Oatfield Rd./ Oakridge Rd.	Min.Art./ Local	9	13	8	-
Portland Ave./ Barclay St.	Min.Art./ Local	9	13	8	-
82nd Dr./ I-205	Min.Art./ Freeway	12	10	-	-
River Rd./ Meldrum Bar	Min.Art./ Local	11	11	6	-

Street Intersection	Street Classif.	No. of Accidents	Overall Rank	Non-System Rank	Local St. Rank
Columbia Ave./ First St.	Local/ Local	11	11	6	1
Webster Rd./ Los Verdes	Min.Art./ Collector	10	12	7	-
Portland Ave./ Arlington St.	Min.Art./ Min.Art.	10	12	7	-
Oatfield Rd./ Hereford St.	Min.Art./ Local	8	14	9	-
Portland Ave./ Clarendon St.	Min.Art./ Local	8	14	9	-
Portland Ave./ Exeter St.	Min.Art./ Local	8	14	9	-
Portland Ave./ Hereford St.	Min.Art./ Local	8	14	9	-
Webster Rd./ Kirkwood Dr.	Min.Art./ Local	8	14	9	-
Columbia Ave./ Hereford St.	Local/ Local	7	15	10	2
Arlington St./ Yale Ave.	Min.Art./ Local	7	15	10	-
Webster Rd./ Cason Rd.	Min.Art./ Collector	7	15	10	-
Oatfield Rd./ Kenmore St.	Min.Art./ Local	6	16	11	-
Oatfield Rd./ Ridgegate Dr.	Min.Art./ Local	6	16	11	-
Webster Rd./ Clayton Way	Min.Art./ Local	6	16	11	-
Abernethy Lane/ Glen Echo Ave.	Collector/ Collector	5	17	12	-
Berkeley St./ Cornell Ave.	Local/ Local	5	17	13	3
Berkeley St./ Yale Ave.	Local/ Local	5	17	13	3
Cornell Ave./ Exeter St.	Local/ Local	5	17	13	3
Oatfield Rd./ Collins Ct.	Min.Art./ Local	5	17	13	-

(1) "Non-system" streets refers to accidents that occur on all streets in the city except the state highways (I-205, 99E), referred to as "system" streets.

TABLE II-12

HIGH ACCIDENT/HIGH TRAFFIC VOLUME STREETS

OATFIELD ROAD

Street Section/Intersection: Webster Road to 82nd Avenue
Traffic Accident History: 90 accidents on this section of Oatfield Rd., 1986 - 1993, including reported accidents at the following intersections (accident site rank):

@ Webster Rd.: 25 (rank: #4) @ 82nd Dr.: 25 (rank: #4)
@ Gloucester Rd.: 16 (rank: #8) @ Dartmouth St.: 14 (rank: #9)

Street Section/Intersection: Webster Road to Jennings Avenue
Traffic Accident History: 70 accidents on this section of Oatfield Rd., 1986 - 1993, including reported accidents at the following intersections (accident site rank):

@ Glen Echo Ave.: 24 (rank: #5) @ Caldwell Rd.: 10 (rank: #12)
@ Oakridge Dr.: 9 (rank: #13) @ Kenmore St.: 6 (rank: #16)

W. ARLINGTON STREET

Street Section/Intersection: McLoughlin Blvd./Arlington St./River Rd. intersection
Traffic Accident History: 79 accidents, 1986 - 1993 (accident site rank: #1)

E. ARLINGTON STREET

Street Section/Intersection: @ 82nd Drive
Traffic Accident History: 23 accidents, 1986 - 1993 (rank: #6)

GLEN ECHO AVENUE

Street Section/Intersection: @ Oatfield Road
Traffic Accident History: 24 accidents, 1986 - 1993 (rank: #5)

TABLE II-13

TRAFFIC CONTROL DEVICES 1994
CROSSWALKS

Location	Number
McLoughlin Blvd. @ Glen Echo Ave.	4
McLoughlin Blvd. @ Gloucester St.	4
McLoughlin Blvd. @ W. Arlington St.	3
River Rd. @ Gloucester St.	1
Gloucester St. @ Portland Ave.	4
Gloucester St. @ Harvard Ave.	2
Portland Ave. @ Clarendon St.	4
Portland Ave. @ Dartmouth St.	4
Portland Ave. @ Abernethy Ln.	1
Portland Ave. @ mid-block high school	1
Chicago Ave. @ Exeter St.	2
Chicago Ave. @ Gloucester St.	1
Dartmouth St. @ Chicago Ave.	1
Dartmouth St. @ Harvard Ave.	1
Hereford St. @ Harvard Ave.	1
Arlington St. @ Harvard Ave.	1
Harvard Ave. @ Fairfield St.	1
Oatfield Rd. @ Collins Crest/Ridgegate Dr.	1
Oatfield Rd. @ Webster Rd.	2
Webster Rd. @ Springhill Dr. (N. end Kraxberger School)	1
Webster Rd. @ entrance to Kraxberger School	1
Los Verdes Dr. @ Crownview Dr.	3
82nd Drive @ Arlington St.	1
82nd Drive @ Oatfield Rd.	3

TRAFFIC SIGNALS

Location	Jurisdiction
McLoughlin Blvd./W. Arlington Street/River Road	State of Oregon
McLoughlin Blvd./Gloucester Street	State of Oregon
McLoughlin Blvd./Glen Echo Avenue	State of Oregon
Portland Avenue/Gloucester Street	City of Gladstone
Portland Avenue/Dartmouth Street (flashing red lights)	City of Gladstone
82nd Drive/I-205 Freeway Ramps (2)	State of Oregon
Oatfield Road/82nd Drive	City of Gladstone
Oatfield Road/Webster Road	City of Gladstone
Oatfield Road/Jennings Avenue	Clackamas County

January, 1995

TABLE II-14

POSTED STREET SPEED LIMITS

I-205 (Freeway): **55**

McLoughlin Blvd./99-E (Major Arterial): **40**

82nd Drive (Minor Arterial): **35**

Oatfield Road (Minor Arterial): **35**

Webster Road (Minor Arterial): **35**

River Road (Minor Arterial): **30**

Jennings Avenue (Minor Arterial): **30**

Cason Road (Collector): **30**

Arlington Street (Minor Arterial): **25**

Abernethy Lane (Collector): **25**

Dartmouth Street (Collector): **25**

Gloucester Street (Collector): **25**

Valley View Rd./Valley View Dr./Los Verdes Dr. (collector): **25**

Clackamas Blvd. (local): **25 / 15** (east in Cross Park)

All other local streets: 25

Portland Avenue (Minor Arterial): **20 / 25** (north of Nelson Lane)

CHAPTER III

BIKEWAY PLAN ELEMENT

CHAPTER III

BIKEWAY PLAN ELEMENT

OVERVIEW AND MAJOR FINDINGS

* The city has completed those portions of the regional bikeway network within its jurisdiction. Over four miles of streets within the city contain designated bicycle routes for exclusive use by bicyclists and pedestrians.

* Sections of five (5) regional bike routes traverse the city along the following arterials: Oatfield Road, Webster Road, River Road, 82nd Drive, and I-205.

* While these predominately north/south regional bicycle routes form the backbone of the city bicycle network, the lack of corresponding east/west bicycle routes limits their cross connection, prevents loop routes in the network, and restricts safe and convenient access to many of the principal activity centers located in the central corridor of the city.

* To reinforce the public awareness of the city bicycle network and expand its interconnections it is suggested to designate planned and committed bicycle routes with signage only, indicating certain streets as identified bicycle routes and providing direction to specific activity centers and other important bicycle routes. These designated bicycle routes will not be striped to prohibit vehicle parking.

Transportation Planning Rule Requirement: ***The TSP shall develop a bicycle and pedestrian plan for a network of bicycle and pedestrian routes throughout the planning area.***

EXISTING CONDITIONS

The city has succeeded, in many regards, in implementing significant elements of the Bikeway Plan, particularly in its commitment to completing those portions of the regional bikeway network within its jurisdiction. Sections of five regional bike routes that traverse the City of Gladstone have been completed. These bike routes are designated by signage and pavement markings for bicycle use only, and provide connections to a regional network throughout the metropolitan area. A description of the different types of bicycle facilities in use in the city, with suggested design practices and construction standards is provided in Table III-1.

The city currently provides a good system of north/south, designated bikeways on four minor arterials in the eastern and western portions of the city, as well as access

to a separated bikeway along I-205. All of these facilities are a part of a regional network of bikeways that continue into adjoining jurisdictions, and connect to regional activity centers. Similar designated bikeways providing east/west connections, however, are lacking on east/west city arterials and collectors, as well as a north/south route connecting the many activity centers located along the central corridor of the city (Portland Avenue). Shared roadway bikeways do provide such links, albeit on less direct routes. Additional bicycle routes are planned to provide better network interconnections among existing designated bicycle routes, and the various activity centers throughout the community (see Map 5).

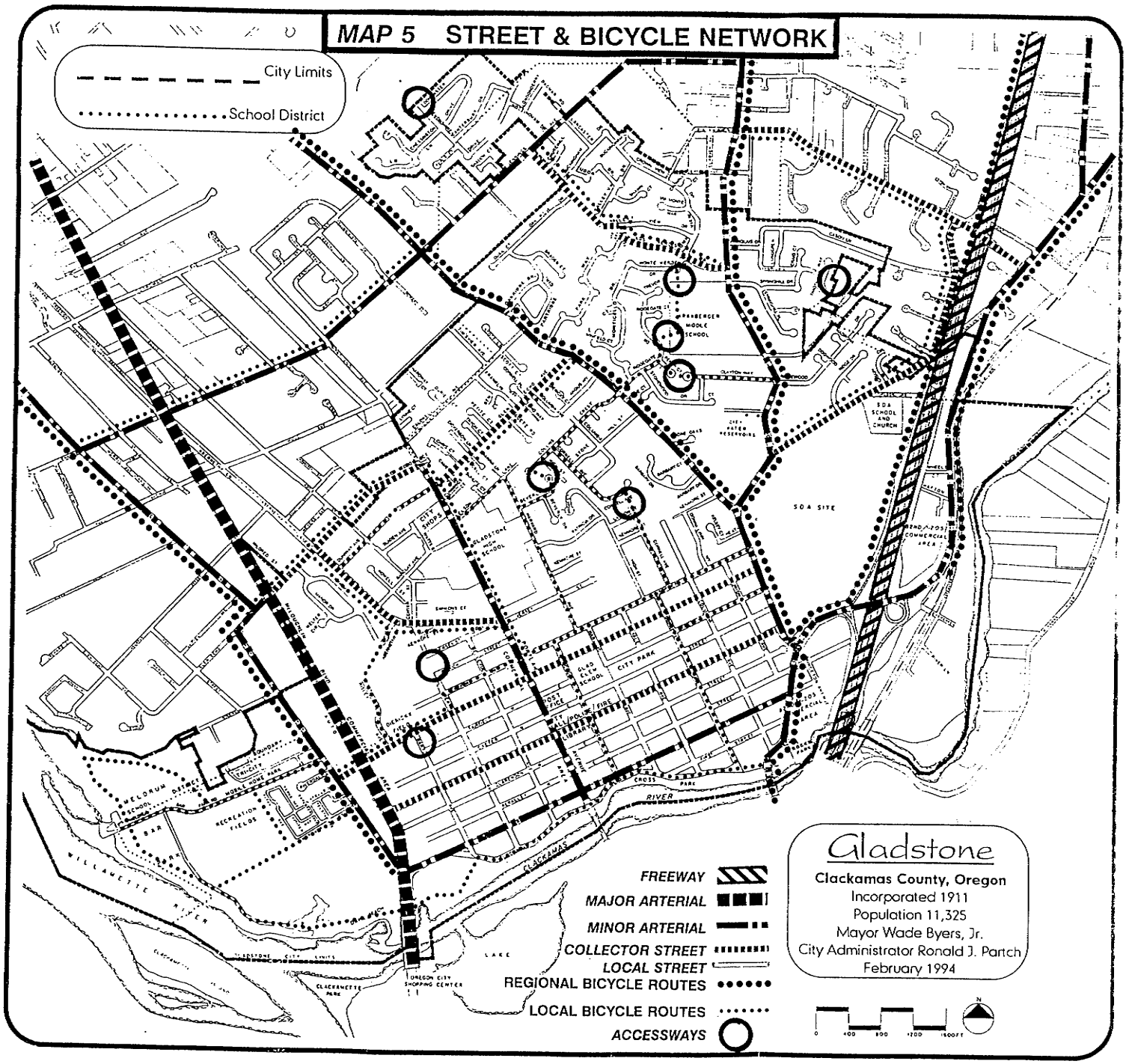
Extent of Existing Bikeway System by Type and Location

All existing bicycle routes in the city within the paved right-of-way and designated as a "bike route" by use of signage and pavement markings are classified as bike lanes and are part of the regional bikeway system. The I-205 bike route is also a part of the regional system but is classified as a separated bike path. The bike path located along Abernethy Lane, between Portland Avenue and Glen Echo Avenue, is separated from vehicle traffic but not designated as a bike route by signage or pavement markings (only partially paved). The Abernethy Lane bike path may be included in a future regional bikeway being considered by Metro to travel along the entire length of the existing Portland Traction Company (PTC) right-of-way. Metro and Clackamas County are exploring acquisition of portions of the PTC line for use as a bicycle/pedestrian way. Likewise, McLoughlin Blvd. (99E) has been identified in Metro's draft Regional Transportation Plan as a possible regional bike route.

Most of these routes run in a north/south direction. Almost all local streets are suitable for shared travel by bicycles and automobiles but are not designated as "bike routes" by signage or pavement markings, and are classified as shared roadway facilities. A number of recreational bike paths are located within Meldrum Bar Park, but are not included in this plan, except in those instances where they provide a connection with other identified bikeways in the city.

A description of existing designated bikeways in the city follows:

Bikeway Type	Location: Street/Section	Extent: Distance in City
Bike Lane	River Road/ McLoughlin - Rinearson Rd.	0.49 mi.(0.98 mi.: both sides) continues N. in County
Bike Lane	Oatfield Road/ 82nd Dr. - Jennings Rd.	1.14 mi.(2.28 mi.: 2 sides) continues N. in County
Bike Lane	Webster Road/ Oatfield Rd. - city limits	0.79 mi.(1.58 mi.: both sides) continues N. in County
Bike Lane/ Shared Roadway	82nd Drive/ Clackamas R. - city limits	0.45 mi.(0.90 mi.: both sides) 0.42 mi.
Total Bike Lanes in City		2.87 mi.(5.74 mi.: both sides)


MAP 5 STREET & BICYCLE NETWORK
City Limits
School District
FREEWAY
MAJOR ARTERIAL
MINOR ARTERIAL
COLLECTOR STREET
LOCAL STREET
REGIONAL BICYCLE ROUTES
LOCAL BICYCLE ROUTES
ACCESSWAYS
Gladstone
Clackamas County, Oregon
Incorporated 1911
Population 11,325
Mayor Wade Byers, Jr.
City Administrator Ronald J. Partch
February 1994
SOA SITE
CITY PARK
RIVER
LAKE

Bikeway Type	Location: Street/Section	Extent: Distance in City
Bike Path	I-205 Freeway/(west side) N. city limits - 82nd Dr.	0.74 mi. continues N. to Columbia River
Bike Path	Abernethy Lane/(S.& W. side) Portland Ave. - Glen Echo Ave.	0.49 mi.
Total Bike Paths in City		1.23 mi.
Total Designated and/or Separated Bikeways		4.10 mi.(6.97 mi.: 2 sides)

CONCLUSIONS: The Gladstone Bikeway Plan was adopted by reference to the Transportation Element of the Gladstone Comprehensive Plan in 1979. The objectives of this plan remain viable today in the guidance they provide to current transportation planning issues, and are consistent with the objectives of the Transportation Planning Rule. Those objectives include efforts to encourage bicycle travel as a viable, practical alternative to the automobile by providing a continuous, safe, and interconnected system of facilities within the community and region. Map 5 indicates the extent of the city's bicycle network, both designated regional bike lane/path routes, and local bike routes.

Transportation Planning Rule: ***Facilities providing safe and convenient pedestrian and bicycle access shall be provided within and from new subdivisions, planned developments, shopping centers and industrial parks to nearby residential areas, transit stops and neighborhood activity centers, such as schools, parks and shopping. This shall include:***

- ***Sidewalks along arterials and collectors in urban areas;***
- ***Bikeways along arterials and major collectors;***
- ***Where appropriate, separate bike or pedestrian ways to minimize travel distances within and between the areas and developments listed above.***

Connection to Activity Centers

In May 1993 the City Council adopted Ordinance No. 1175, amending Sections 17.50.020 and 17.50.040 of the Gladstone Municipal Code, requiring facilities to be provided for safe and convenient bicycle access within and from new subdivision, commercial and industrial developments, to nearby residential areas, transit stops, and neighborhood activity centers, such as schools, parks, and shopping. Included in this ordinance is the requirement for the provision of bicycle facilities as a part of any new construction or reconstruction of arterials and collector streets. Both the volume and speed of automobile traffic on these street classifications is such that a designated

space is necessary for bicyclists. For most local streets, the traffic volume and speeds are low enough that bicycles and automobiles can safely share the same roadway.

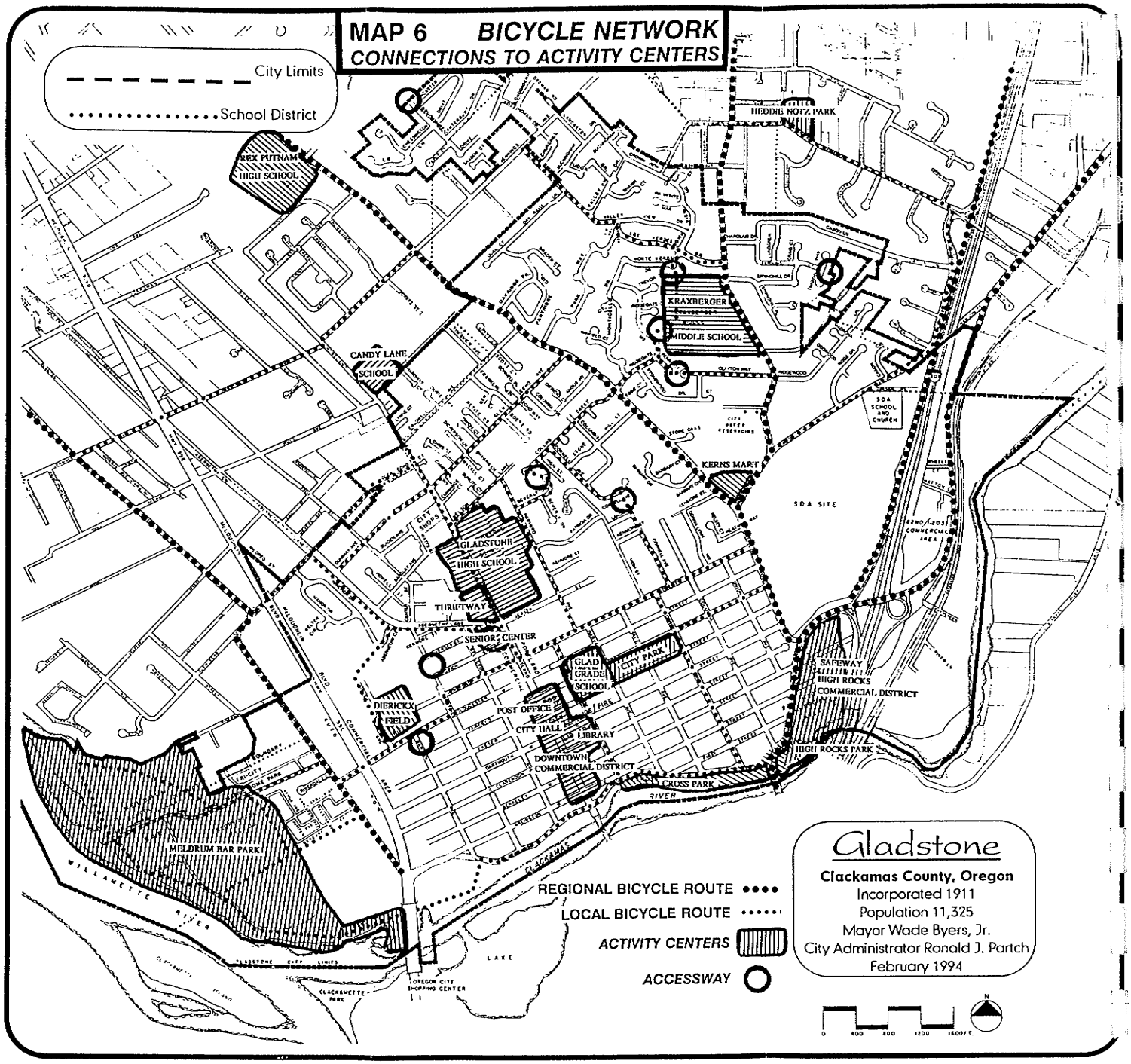
Principal activity centers in the city are noted in Map 6, with existing and planned bicycle route connections. Most of the identified activity centers tend to cluster in nodes in the east, central and west portions of the city, primarily along north/south arterials. As such, connections in the east and west, along the designated north/south regional bike paths are quite good. However, few of the city's principal public service activities, including city hall, library, post office, grade school, high school, city park, and senior center, are served directly by any of these regional facilities. Designated east/west connections among these existing north/south bicycle routes, and city-wide in general, are notably absent.

On the western edge of the city, the regional bike lanes on River Road provide connections with the recreational bicycle trails in Meldrum Bar Park, as well as activities further north in unincorporated Clackamas County along River Road. Connections to the central and eastern portions of the city, however, are difficult, requiring passage over the heavy traffic and five lanes of McLoughlin Blvd. Such passage is limited, for all practical purposes, to the only signalized cross streets accessing 99E, namely, Glen Echo Avenue, Gloucester Street, and Arlington Street. A proposed regional bike route along 99E would provide more direct connections to Oregon City and Milwaukie.

A proposed separated bike path connecting an existing bike route on Dahl Beach Road in Meldrum Bar Park, under the McLoughlin Blvd. bridge, to Clackamas Blvd., would be a significant improvement, particularly if such a bike route would continue along Clackamas Blvd. (as a shared roadway, likely) to connect with Cross Park, High Rocks commercial district, 82nd Drive bike lanes, and the Park Place Bridge. Bike monies from the State Highway Fund, however, are not eligible for the construction of recreational/park bikeways. The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 does includes federal funds which may be used for such purposes as well as city general funds, and as conditions of development.

The developer of the Rivergreens Apartments Phase II has contributed $12,500 toward construction of this bikeway, and the city has initiated construction of certain sections. It is suggested that the city require dedication of easements as future conditions of development of the Jack Parker properties (Lots #600, #7200, and #7300), and/or bowling alley/Tri-City Development property (Lot #700), and then pursue completion of the connection to Dahl Beach Road along an appropriate alignment.

On the eastern edge of the city, residents enjoy access to four regional bike lane or bike path facilities, although the lack of adequate east/west routes limit their internal value for local connection to activity centers elsewhere within the city. The Webster Road and Oatfield Road bike routes connect with the 82nd Drive bike route and provide connections to the High Rocks commercial district (Safeway, pub/tavern,


MAP 6 BICYCLE NETWORK
CONNECTIONS TO ACTIVITY CENTERS
City Limits
School District
REX PUTNAM HIGH SCHOOL
HIDDEN NOTZ PARK
KRAXBERGER MIDDLE SCHOOL
CANDY LANE SCHOOL
SDA SCHOOL AND CHURCH
KERNS MART
SDA SITE
GLADSTONE HIGH SCHOOL
TIRIFTWAY
SENIOR CENTER
GLAD GRADE SCHOOL
CITY PARK
SAFEWAY
HIGH ROCKS COMMERCIAL DISTRICT
DIERICKX FIELD
POST OFFICE
CITY HALL
LIBRARY
DOWNTOWN COMMERCIAL DISTRICT
HIGH ROCKS PARK
CROSS PARK
MELDRUM BAR PARK
WILLAMETTE RIVER
CLACKAMETTE PARK
OREGON CITY SHOPPING CENTER
REGIONAL BICYCLE ROUTE
LOCAL BICYCLE ROUTE
ACTIVITY CENTERS
ACCESSWAY
Gladstone
Clackamas County, Oregon
Incorporated 1911
Population 11,325
Mayor Wade Byers, Jr.
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February 1994

offices, etc.); High Rocks Park/Cross Park and passage over the Clackamas River on the Park Place Bridge (bicycle/pedestrian use permitted only); Kearns Market; and, Kraxberger Middle School. The 82nd Drive bike lane provides access to Edgewater Road, Clackamas River Racquet Club, and industrial activities along Evelyn and Jennifer Streets in Clackamas County. The I-205 bike path provides connection from the 82nd Drive bike lanes to bike lanes on Hwy. #212-#224, and continuing on north to Clark County, Washington.

Connections to, through, and around Kraxberger Middle School could be improved by taking greater advantage of existing accessways on Ridgegate Drive, Monte Verde Drive, and Penny Court/Clayton Way. *It is suggested* that the Gladstone School District consider connecting the accessways on Ridgegate Drive and Monte Verde Drive with a paved bicycle/pedestrian path on the Kraxberger school grounds/playing fields, to provide safe and convenient access to and around this major activity center. It is recommended that the route connecting Ridgegate Drive and Webster Road, along Penny Court and Clayton Way (via connecting accessway) be designated a bikeway on the Comprehensive Plan Map 5, and appropriate signage be installed indicating this route as a connection to the Webster Road regional bikeway.

In the central portion of the city, along the central axis lines of Portland Avenue and Dartmouth Street that traverse the city's central core and comprise its "main streets," both north/south and east/west designated bicycle connections are lacking. Existing roadways are generally wide enough and carry sufficiently moderate traffic volumes at low to moderate speeds that most of the adjacent streets are suitable for shared roadway bicycle facilities, and are so utilized by residents. However, the lack of specific, designated bicycle routes (designated by "Bike Route" signage, not necessarily parking-prohibited bike lanes) may discourage an environment of safe bicycle usage as a convenient alternative transportation mode.

A number of activity center clusters in relatively close proximity to one another within this central core district currently lack clear north/south connections as well as east/west connections to residents in other neighborhoods in the city, and other existing bicycle routes. These activity clusters include the following: Multiple public service institutions and commercial businesses along Portland Avenue and Dartmouth Street, including city hall, post office, library, and police and fire departments; Gladstone Grade School and adjacent Max Patterson Memorial Park. A little further north on Portland Avenue, between Jersey Street and Nelson Lane, is another cluster of public and commercial activities, including Gladstone High School and athletic fields, Senior Center, and Thriftway grocery store. The interconnections among all of these activity clusters are currently ill-defined and underutilized. Designation of Chicago Avenue as a "bike route," with signage only, will provide this central corridor a needed north/south connection, and enhance the vitality of the community's historic "downtown."

Accessways

Accessways are short, separate bicycle and pedestrian connections, off the public roadways, designed to minimize travel distances between these areas and developments. In 1993 amendments to the Gladstone Municipal Code requiring facilities to be provided for bicycle access within and from new residential areas and neighborhood activity centers included the provision of accessways where appropriate.

Although the city is largely fully developed with future large subdivisions unlikely, a significant number of accessways (9) between residential areas have already been constructed, providing convenient access routes between neighborhoods and activity centers. Bicycle routes have been planned to take maximum advantage of these accessways. Most such accessways in Gladstone connect residential cul-de-sacs, or public streets along platted but undeveloped public streets. A complete list of bicycle and pedestrian accessways is provided in Table III-1, as well as on Map 5.

CONCLUSIONS: In May 1993 the City Council adopted Ordinance No. 1175, amending Sections 17.50.020 and 17.50.040 of the Gladstone Municipal Code, requiring facilities to be provided for safe and convenient bicycle access within and from new subdivision, commercial and industrial developments, to nearby residential areas, transit stops, and neighborhood activity centers, such as schools, parks, and shopping. Included in this ordinance is the requirement for the provision of bicycle facilities as a part of any new construction or reconstruction of arterials and collector streets (see Section A-10, in Appendix).

Transportation Planning Rule: ***Bicycle parking facilities shall be provided as part of new multi-family residential developments of four units or more, new retail, office and institutional developments, and all transit transfer stations and park and ride lots.***

Bicycle Parking Facilities

In May 1993 the City Council adopted Ordinance No. 1175, amending Section 17.48.050 of the Gladstone Municipal Code to establish standards for bicycle parking that applies to full site Design Review of new construction for multi-family residential (tri-plexes and larger), and new commercial/industrial development. These standards describe the location, dimensions, number and type of such facilities, and are described in Section A-10, in the Appendix. It is suggested that like accommodations be provided for new public facilities.

CONCLUSIONS: Action has been taken by the city regarding establishing standards for bicycle standards through amending the Gladstone Municipal Code, as noted above (see Section A-10, in Appendix).

Modal Split

The 1990 census data on journey-to-work modes of transportation indicate that approximately 0.4% of all such work commutes by residents/workers of Gladstone were made by bicycle. This modal split figure compares favorably to bicycle journey-to-work travel modes in Milwaukie (0.4%), Oregon City (0.2%), and Clackamas County (0.3%). The city of Portland shows the highest participation rate in the metropolitan area of 1.1%, consistent with its higher population density and employment centers.

Most bicycle trips, however, are taken for social, recreational, or short errand purposes, which are difficult to calculate, vis-a-vis other modes of transportation. The city's efforts to ensure the availability of safe and convenient facilities that provide direct connections to activity centers, and to better identify and reinforce, through "Bike Route" signage, the rights of bicyclists to city streets, is expected to encourage the usage of this transportation mode.

TABLE III-1

TYPES OF BICYCLE FACILITIES

The 1992 Oregon Bicycle Plan identifies four basic types of bicycle facilities with suggested design practices and construction standards:

- **Shared Roadway:** Where bicycles and vehicles share a common roadway with no signing or striping for bicycles. A travel lane width of 14' is recommended. Shared roadway bicycle facilities are common on city street systems, particularly local streets, where traffic volumes and speeds are relatively low. As such, almost all local streets in Gladstone would qualify as shared roadway bike facilities.

- **Shoulder Bikeway:** More common on rural highways, a 4" wide painted stripe delineates the separate travel portions of vehicular and bicycle traffic on a given street. A travel lane width of 12' is recommended, as well as a shoulder bikeway width of 4'- 6'. Where bicycle travel is significant, shoulder bikeways may be signed as bicycle routes. Meldrum Bar Road includes a shoulder bikeway facility along its length.

- **Bike Lane:** Where bicycle travel and demand is substantial, a portion of the roadway may be designated for preferential use by bicyclists. Vehicle parking in Bike Lanes is prohibited. Bicycle travel is one way in the direction of vehicle travel. Bike Lanes are 4'- 6' wide and are separated from automobile traffic lanes by an 8" wide stripe and signed with either "Bike Only" stencils and a diamond shape on the pavement (old standards), or a bicycle stencil and directional arrow only (new standards, effective 10/93). Free standing "Bike Only" signs may also be placed at the start of designated bike lanes. Bike lanes are most commonly used on arterials and collector streets. Bike lanes currently are in place on River Road, Oatfield Road, Webster Road and 82nd Drive.

- **Bike Path:** A bicycle path is a designated, restricted route for bicycles that is physically separated from vehicle traffic on a highway or street by an open space or barrier. Bike paths are designed for two way bicycle travel, and should be 10' in width. The I-205 corridor includes a separated bike path. A partially unpaved separated bike/pedestrian path parallels Abernethy Lane on its south and west.

TABLE III-2

EXISTING PEDESTRIAN AND BICYCLE ACCESSWAYS

Connection	Length x Width
Kraxberger Middle School - Monte Verde Drive	257' x 8' (4' pave. width)
Kraxberger Middle School - Ridgegate Drive	215' x 8'
Collins Crest Ct. - Beverly Lane	230' x 8'
Cornell Place - Cornell Avenue (Salty Acres Subdivision)	100' x 8'
Timothy Way - Kirkwood Road	92' x 6'
Clayton Way - Penny Court	183' x 10'
Barton Avenue: W.Fairfield Street - W.Gloucester Street	200' x 8'
Beatrice Avenue: W.Ipswich Street - W.Jersey Street (unpaved)	200' x 6'
Devonshire Drive - Brewster Place (Sherwood Forest Subdivision)	85' x 6'
TOTAL ACCESSWAYS	**1,562' (0.30 mi.)**

BIKEWAY PLAN ELEMENT

Transportation Planning Rule Requirement: ***The TSP shall identify transportation needs relevant to the planning area and the scale of the transportation network being planned.***

BIKEWAY NETWORK NEEDS AND PROPOSED ACTIONS

RECOMMENDATION: Amend Comprehensive Plan Map 5 as indicated. Add to Gladstone Capital Improvement Plan as indicated.

Proposed Actions: Designate by signage only ("Bike Route" and/or "Bike Route to XXX") the following streets as bicycle routes (see Map 5), to encourage bicycle usage, provide interconnections among activity centers, and create system loops.

A. East/West Interconnection Needs

Existing Network Conditions: No existing designated bike routes provide east/west connections through community, access central corridor (Portland Avenue), allow for system loops, or connect existing regional north/south bicycle routes.

1. **Clackamas Blvd., from Dahl Beach Road to 82nd Drive**. [As already noted on Map 5.] Proposed route connects existing bicycle routes in Meldrum Bar Park along Dahl Beach Road and Meldrum Bar Park Road with 82nd Drive regional bike route, and creates system loops. Proposed route also provides connection to Portland Avenue corridor, Cross Park and High Rocks Park, the High Rocks commercial district, and Park Place Bridge over the Clackamas River. The proposed route would be designed as a separated bike path from Dahl Beach Road, under the 99E bridge to an as yet undetermined point on Clackamas Blvd. where it would continue as a shared roadway to the 82nd Drive bike lanes.

$12,500 has been received by the city for construction of the separated bike path portion of the proposed route by a private developer as a condition of developing the Rivergreens Apartments Phase II project. Completion of this section of the bike path, from Dahl Beach Road to a point under the 99E bridge should follow the dedication of easements, as conditions of development, of the future development of the Jack Parker and/or bowling alley (Tri-City Development) properties.

2. **Bicycle Routes in Meldrum Bar Park**. [Amend Map 5 to reflect proposed additions and deletions.] Delete extensions noted on Map 5 from River Road to Dahl Beach, due to access loss following construction of Rivergreens Apartments. Add existing shoulder bikeway along Meldrum Bar Park Road, from River Road to end. Add section of shared roadway bicycle route along Dahl Beach Road from

point where separated park bikepaths cross roadway, to start of proposed Dahl Beach Road/Clackamas Blvd. bicycle route.

3. Gloucester/Hereford Streets, from River Road to Oatfield Road. [Amend existing route noted on Map 5 by eliminating Risley Avenue/Dierickx Field/Hereford Street connection, due to ball field development, but retain Risley Avenue/Abernethy Court connection; extend route east of Harvard Avenue to Oatfield Road.] Proposed shared roadway route connects existing River Road and Oatfield Road regional bicycle routes. Proposed route also provides connection to activity centers clustered along the Portland Avenue central corridor, and creates system loops.

The proposed route is split between Gloucester and Hereford Streets in order to take advantage of the only traffic signal permitting safe crossing of McLoughlin Blvd. (Gloucester Street) between Glen Echo Avenue and Arlington Street, as well as providing the most direct connection to River Road and Meldrum Bar Park. From Beatrice Avenue east to Oatfield Road this bicycle route is proposed to travel along Hereford Street because of this street's more uniform pavement width and extensive curb and sidewalk network. If E. Gloucester Street is reconstructed in the future (pavement widened to 36', uniform curbs and sidewalks) and bicycle activity is sufficient, designated bike lanes could be included, and routing along Hereford Street discontinued.

4. Beverly Lane/Collins Crest, from Harvard Avenue to Oatfield Road. [Largely as noted on Map 5, except connection from existing bicycle routes on Beverly Lane and Collins Crest to be via accessway between cul-de-sacs on these two streets, instead of via connection to High Street bicycle route (to be deleted as High St. not constructed.)]

5. Penny Court/Clayton Way, from Ridgegate Drive to Webster Road. [New addition to Map 5.] Proposed shared roadway route connects existing bicycle route on Webster Road to proposed bicycle route on Ridgegate Drive, and creates system loops. Accessway between Penny Court and Clayton Way provides direct connection along this route.

6. Strawberry Lane, from Webster Road to Cason Road (Clackamas County). [As already noted on Map 5.] Planned bike lane route connects existing regional bicycle route on Webster Road to proposed bicycle route along Cason Road (shared roadway initially, but intended for bike lanes, as Cason Road is widened to full collector street standards). Clackamas County funding has been committed for construction in 1997. Proposed bicycle route along Cason Road would create system loop.

7. Duniway Avenue Accessway, connecting two dead-ends of Duniway. [Add to Map 5.] This proposed route will provide connection between the separated bikepath/pedestrian way on Abernethy Lane with the proposed route on Portland

Avenue and Gladstone High School, and create system loops. There are currently no sidewalks along Duniway Avenue. This section is designed to connect the two dead-ends of Duniway Avenue with a 12' wide serviceway that would also be suitable for fire and police emergency vehicle use. The accessway would include either removable gates, bollards, or barriers to discourage non-official vehicle access, but allow pedestrian, bicycle, and emergency use (see Figure 4). Construction of this accessway may occur as a condition of land use approval of development of abutting properties or in lieu of street frontage improvements.

Distance: Approximately 125'
Existing completion (Portland Avenue to Abernethy Lane): 0'
Estimated costs: $7,500

B. North/South Interconnection Needs

Existing Network Conditions: Five regional, designated bicycle routes are located in the western and eastern portions of the city; Few system loops in place among existing routes; and No interior north/south routes along city's central corridor to provide connections among its many public sector and small business activity center clusters.

8. Cornell Avenue, from Clackamas Blvd. to Collins Crest Street. [Amend Map 5 to delete bicycle routes on Yale Avenue and High Street, and replace with Cornell Avenue route.] Proposed shared roadway bicycle route connects Cross Park on the Clackamas River, bicycle routes on Clackamas Blvd. and Hereford Street. This connection is made possible by an existing accessway between Cornell Avenue (dead-end) and Cornell Avenue (cul-se-sac) in the Salty Acres subdivision. System loops are created via Collins Crest/Oatfield Road regional bikeway, and proposed Collins Crest/Beverly Lane accessway/Harvard Avenue.

9. Abernethy Lane, from Beatrice Avenue to Portland Avenue. [New addition to Map 5.] Designation of this section of the existing separated bike path along Abernethy Lane, from Glen Echo Avenue to Portland Avenue, merely recognizes its existing usage by bicyclists.

10. Harvard Avenue/Nelson Lane, from Beverly Lane to Portland Avenue. [Amend Map 5 to extend existing bicycle route along Harvard Avenue.] Proposed shared roadway bicycle route would extend existing route around the Gladstone High School to complete a system loop, and connect to Portland Avenue route.

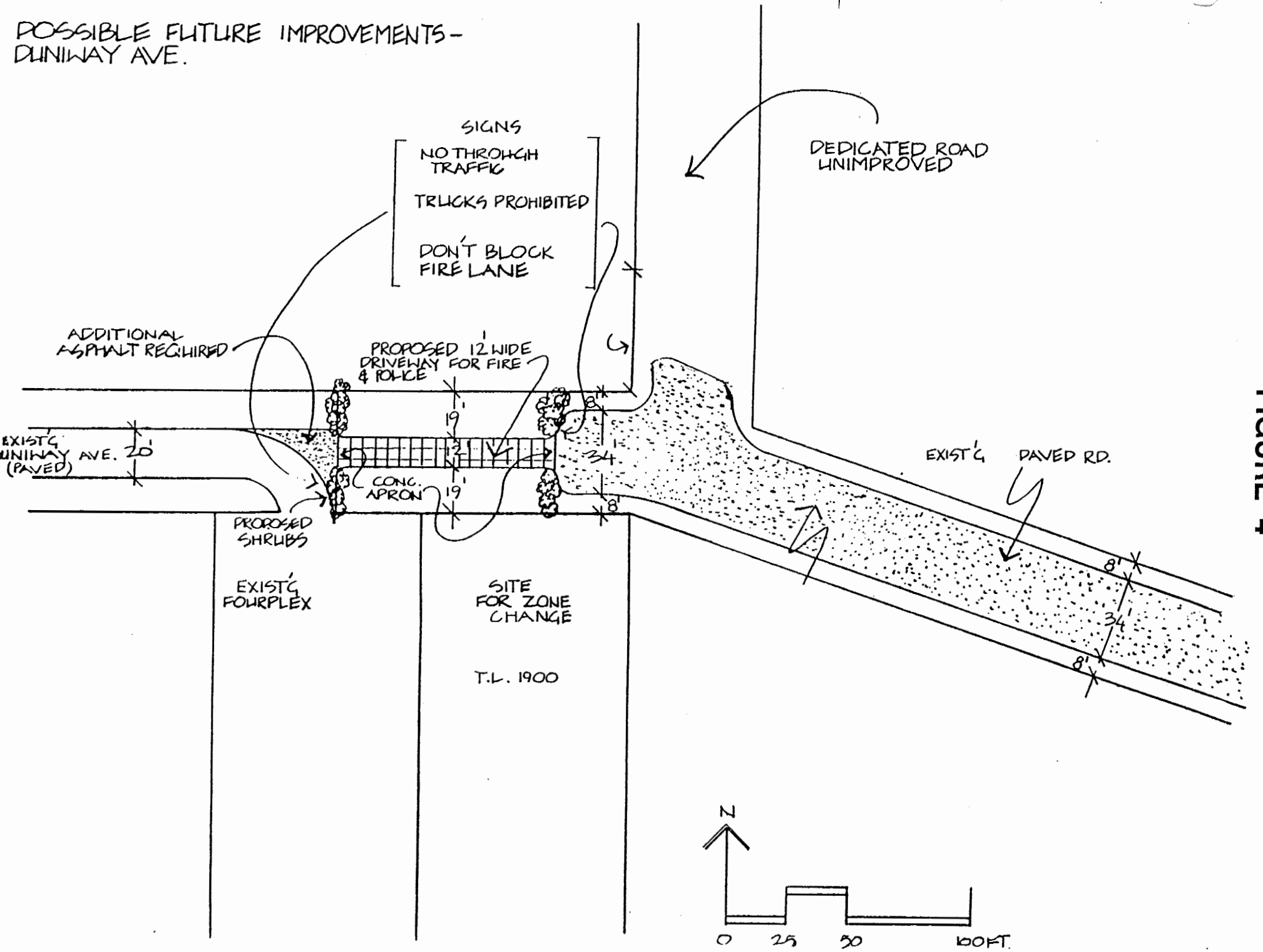

POSSIBLE FUTURE IMPROVEMENTS -
DUNIWAY AVE.
SIGNS
NO THROUGH TRAFFIC
TRUCKS PROHIBITED
DON'T BLOCK FIRE LANE
DEDICATED ROAD UNIMPROVED
ADDITIONAL ASPHALT REQUIRED
PROPOSED 12' WIDE DRIVEWAY FOR FIRE & POLICE
19'
8'
34'
EXIST'G DUNIWAY AVE. (PAVED)
20'
CONC. APRON
19'
8'
EXIST'G PAVED RD.
PROPOSED SHRUBS
EXIST'G FOURPLEX
SITE FOR ZONE CHANGE
T.L. 1900
8'
34'
8'
N
0
25
50
100 FT.

FIGURE 4

CHAPTER IV

PEDESTRIAN PLAN ELEMENT

CHAPTER IV

PEDESTRIAN PLAN ELEMENT

OVERVIEW AND MAJOR FINDINGS

- The existing sidewalk network varies considerably from neighborhood to neighborhood, as noted on enclosed maps. Inconsistent, incomplete network provides limited system loops. Limited opportunities exist for significant expansion of the sidewalk network as conditions of new development.

- The City Council at its May 9, 1995 meeting, adopted a long-term street improvement plan that outlined an initiative for the public installation of sidewalks as a means to achieve more rapid expansion of the city's pedestrian network.

- Inclusion for pedestrian use of the more than five (5) miles of designated bike lanes on four minor arterials of the city's street network, as well as an additional one mile of combination bikeways/pedestrian ways on two collector streets, provides for fairly extensive coverage along these higher volume/higher speed street classifications. **[Note: minor arterials = 92% coverage/collector streets = 52% coverage.]**

- It is along the lower volume/lower speed local streets that coverage is least extensive and most unevenly distributed. **[Estimated 40% coverage.]**

Transportation Planning Rule Requirement: ***The TSP shall develop a bicycle and pedestrian plan for a network of bicycle and pedestrian routes throughout the planning area.***

EXISTING CONDITIONS

The provision of adequate pedestrian facilities city-wide serves important safety functions for area residents in addition to connecting activity centers. An extensive sidewalk network provides for the safe separation of pedestrians and motorists, who do not need to compete for space with motorists on the city's roadways. While this competition is less hazardous on local streets where traffic volumes and traffic speeds are relatively low, the lack of such separated facilities on arterials and collector streets with their higher traffic volumes and speeds present very real safety concerns. Six out of thirteen traffic accidents involving pedestrians (1987 - 1993) occurred in or near intersections in which one or both of the connecting streets did not have sidewalks. In all cases at least one, and often both, of the two streets defining the location of the accidents was an arterial or collector (see Table IV-1 at end of Chapter IV).

Extent of Completion of Pedestrian Network

City-wide Overview

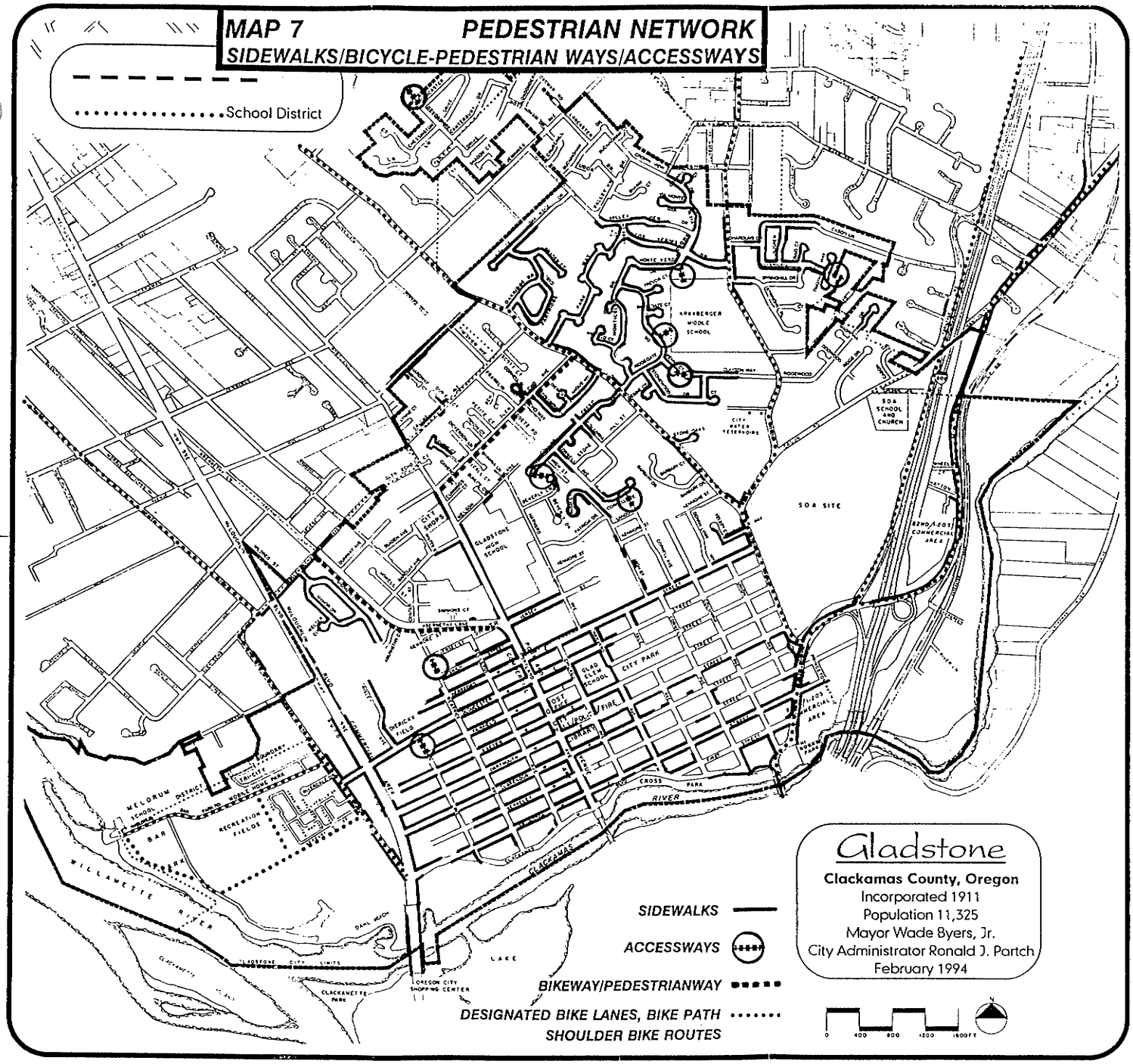
The extent of coverage of the city's pedestrian network varies considerably from neighborhood to neighborhood, based on the building/planning requirements at time of development, and the interconnectiveness of the street system in different areas (see Map 7). An assessment of the extent of completion of the pedestrian network also will vary on the adequacy of utilizing existing designated bicycle lanes, located on a number of minor arterials, for pedestrian use. While it is recognized that sidewalks provide greater safety to pedestrians by their very design, in providing important physical separation from vehicle traffic, the five (5) miles of existing bike lanes on city arterials affords a reasonable, if only interim, service to pedestrian access. Sidewalks have typically been required as a condition of new development on arterials and collector streets where bike lanes are present.

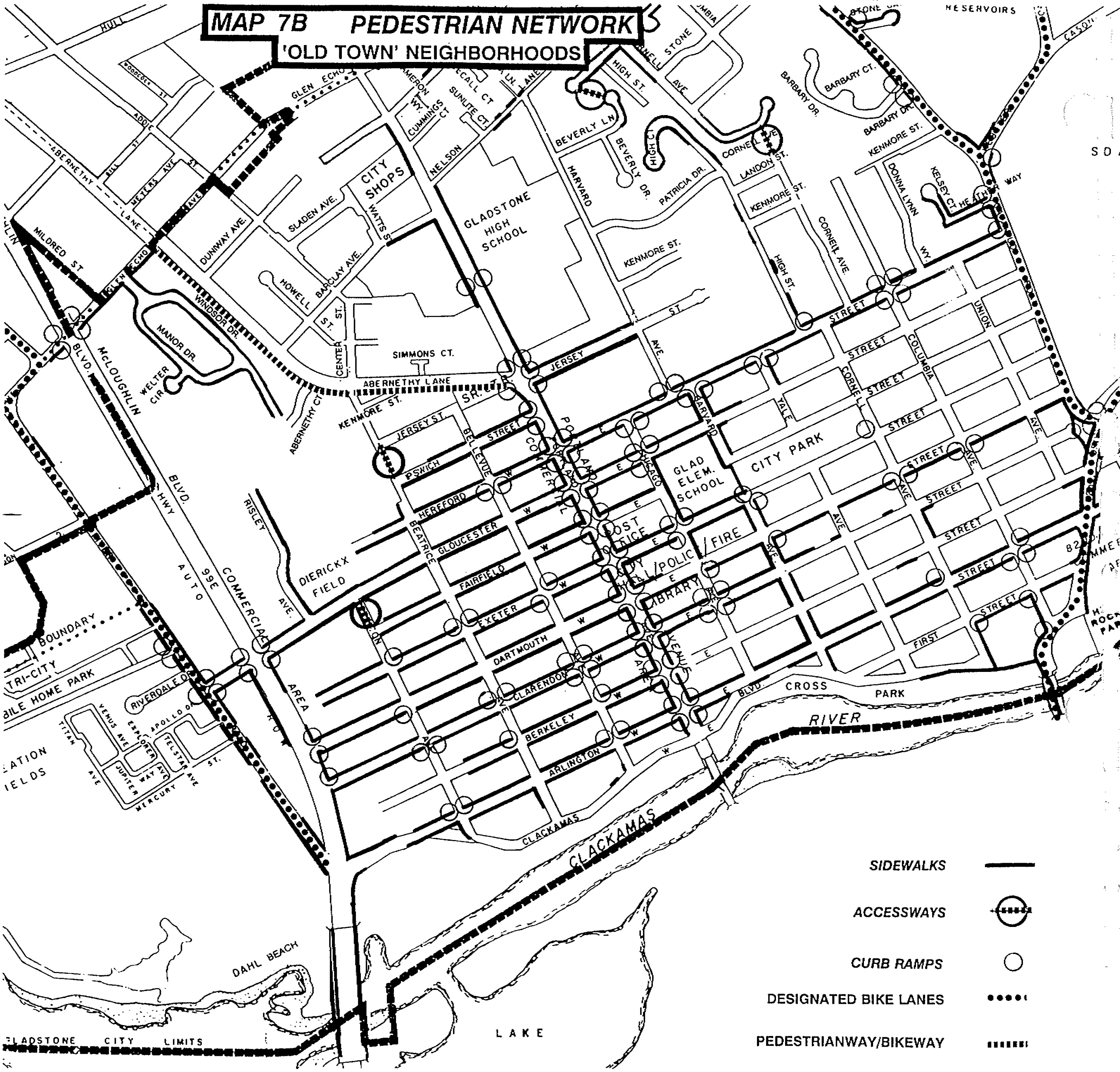
As noted in the following summary overview, by street classification, pedestrian facilities along minor arterials vary from fair to excellent (53% sidewalks only/92% sidewalks and bike lanes); along collectors fair (41% sidewalks only/52% sidewalks and bike lanes); and along local streets poor to fair (40% est.). (See Table IV-2 at the end of the chapter for a more detailed assessment by specific arterial and collector.)

Street Classification	Extent of Coverage
Total Minor Arterial Roadways	5.71 mi./11.42 mi. (2 sides)
Total Minor Arterial Completion (sidewalks)	**6.09 mi./53%**
Total Minor Arterial Completion (+bike lns)	**9.46 mi./92%**
Total Collector Street Roadways	9.46 mi./8.92 mi. (2 sides)
Total Collectors Completion (sidewalks)	**3.69 mi./41%**
Total Collectors Completion (+ bike paths)	**4.64 mi./52%**
Total Arterial & Collector Street Roadways	10.17 mi./20.34 mi. (2 sides)
Total Art. & Collector Completion (side.)	**9.78 mi./48%**
Total Art. & Collector Completion (+ bike)	**14.10 mi./69%**
Total Local Street Roadways	26.49 mi./52.98 mi. (2 sides)
Total Local Street Completion (sidewalks)	**21.90 mi./40%** (2 sides) [est.]

Neighborhood Overview

In the **"old town"** neighborhoods, located between McLoughlin Blvd. and Oatfield Road, and Clackamas Blvd. and Hereford Street, the more uniform 200' x 400'- 600' street block grid system provides optimal potential for very direct connections to activity centers. However, incomplete installation of sidewalks over time has left a


MAP 7
PEDESTRIAN NETWORK
SIDEWALKS/BICYCLE-PEDESTRIAN WAYS/ACCESSWAYS
School District
Gladstone
Clackamas County, Oregon
Incorporated 1911
Population 11,325
Mayor Wade Byers, Jr.
City Administrator Ronald J. Partch
February 1994
SIDEWALKS
ACCESSWAYS
BIKEWAY/PEDESTRIANWAY
DESIGNATED BIKE LANES, BIKE PATH
SHOULDER BIKE ROUTES
SOA SITE
CROSS PARK
RIVER
LAKE
WILLAMETTE RIVER
0 400 800 1200 1600FT


MAP 7B PEDESTRIAN NETWORK
'OLD TOWN' NEIGHBORHOODS
SIDEWALKS
ACCESSWAYS
CURB RAMPS
DESIGNATED BIKE LANES
PEDESTRIANWAY/BIKEWAY
GLADSTONE HIGH SCHOOL
CITY SHOPS
CITY PARK
GLAD ELEM. SCHOOL
POST OFFICE
CITY HALL/POLICE/FIRE
LIBRARY
DIERICKX FIELD
CLACKAMAS RIVER
CROSS PARK
DAHL BEACH
GLADSTONE CITY LIMITS
LAKE
McLOUGHLIN BLVD.
99E AUTO HWY
COMMERCIAL AREA
ABERNETHY LANE
KENMORE ST.
JERSEY ST.
PORTLAND AVE.
SIMMONS CT.
MANOR DR.
WINDSOR DR.
RESERVOIRS
TRI-CITY
BOUNDARY

number of deficiencies in the area's pedestrian network (see Map 7B). The network of east/west sidewalk connections is very comprehensive and complete between McLoughlin Blvd. and Harvard Avenue, however largely absent east of Harvard Avenue except for the primary arterials and collector streets of Arlington, and Dartmouth (one side of street only). Hereford Street, a local street, has complete sidewalks along both sides of the roadway along its entire length, from Beatrice Avenue to Oatfield Road. Furthermore, only five of the eight east/west streets in this area connect to McLoughlin Blvd.

The network of **north/south** sidewalk connections in the "old town" neighborhoods, however, are almost completely lacking, except for Portland Avenue (minor arterial), and Harvard Avenue (local street). Both of these north/south streets provide primary connections to area activities, and are primary elements of the city's pedestrian network, but represent only two (2) out of the twelve (12) north/south streets in these neighborhoods (17%) that have complete sidewalks. The designated bike lanes on Oatfield Road serve as suitable pedestrian ways along this minor arterial. Completion of sidewalks along McLoughlin Blvd. would provide greater safety and access along this commercial corridor.

In the **neighborhoods north of the "old town"** area, located between McLoughlin Blvd. and Oatfield Road, and Hereford Street and Hull Avenue, very few elements of a pedestrian network exist (see Map 7C). A continuation of the sidewalk network along Portland Avenue north to Nelson Lane provides good pedestrian connections from downtown to the senior center, Thriftway store, and high school. A separated, and largely unpaved bicycle path/pedestrian way along Abernethy Lane provides connection between Glen Echo Avenue and Portland Avenue. The bicycle lanes on Oatfield Road provide continuous north/south pedestrian connections along the east/central corridor.

The Welter Park neighborhood is complete unto itself, but has little connection to other activity centers in the city. A grade elevation obstacle at the south end of Windsor Drive presently precludes pedestrian access to Abernethy Court and Abernethy Lane pedestrian way. The city is pursuing efforts to provide an accessway at this point in conjunction with nearby roadway. A planned bicycle route connecting Risley Avenue and Abernethy Court/Lane would provide additional alternative access for area residents, but its passage over an intervening wetlands makes installation of this pedestrian/bicycle route uncertain at this time.

It is suggested that the 125' unimproved section of Duniway Avenue, between the dead-end east of Addie Street and the dead-end west of Portland Avenue, be developed as a pedestrian way, to provide a safe and convenient means of access from the Abernethy Lane neighborhood to the high school and other activity centers along Portland Avenue.

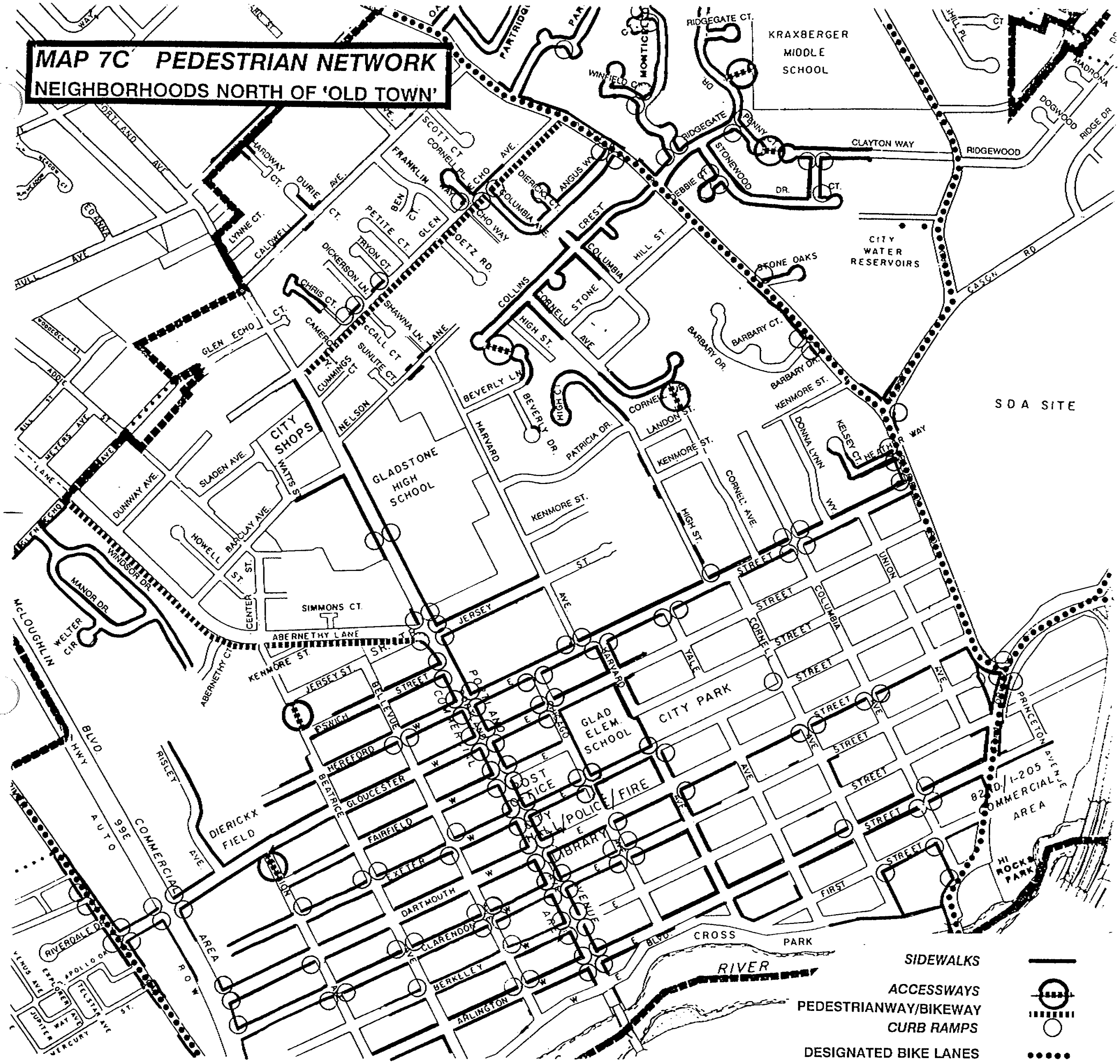
The pedestrian network between Portland Avenue and Oatfield Road is minimal in its coverage, largely as a result of an existing street network that has very limited through

connections, and a number of cul-de-sacs and dead ends. Collins Crest Avenue provides the longest section of sidewalk completion, although it, too, ends in a cul-de-sac. An accessway between Collins Crest Court cul-de-sac and Beverly Lane cul-de-sac provides a connection to Harvard Avenue, a primary pedestrian route in "old town" and a logical section for extension of sidewalks. Glen Echo Avenue, in this area, was widened in 1994 to provide a paved pedestrian/bicycle way connection between the two minor arterials. A pathway along the south side only was possible due to inability to acquire additional right-of-way. An accessway between two sections of Cornell Avenue (dead-end in the Kevin Terrace subdivision/cul-de-sac in the Salty Acres subdivision) provide another opportunity for coordinating extensions of the pedestrian network in these neighborhoods with the "old town" neighborhoods to the south.

In the neighborhoods located in the triangle formed by Oatfield Road, Webster Road, and Jennings Avenue, east/west elements of a pedestrian network are largely complete, particularly along Ridgegate, Park Way, and Los Verdes Drive (see Map 7D). However, the street network in this area is characterized by relatively long and meandering roadways, with a number of cul-de-sacs. A number of streets are completely lacking sidewalks, or have incomplete installation (Oakridge Drive, Clayton Way).

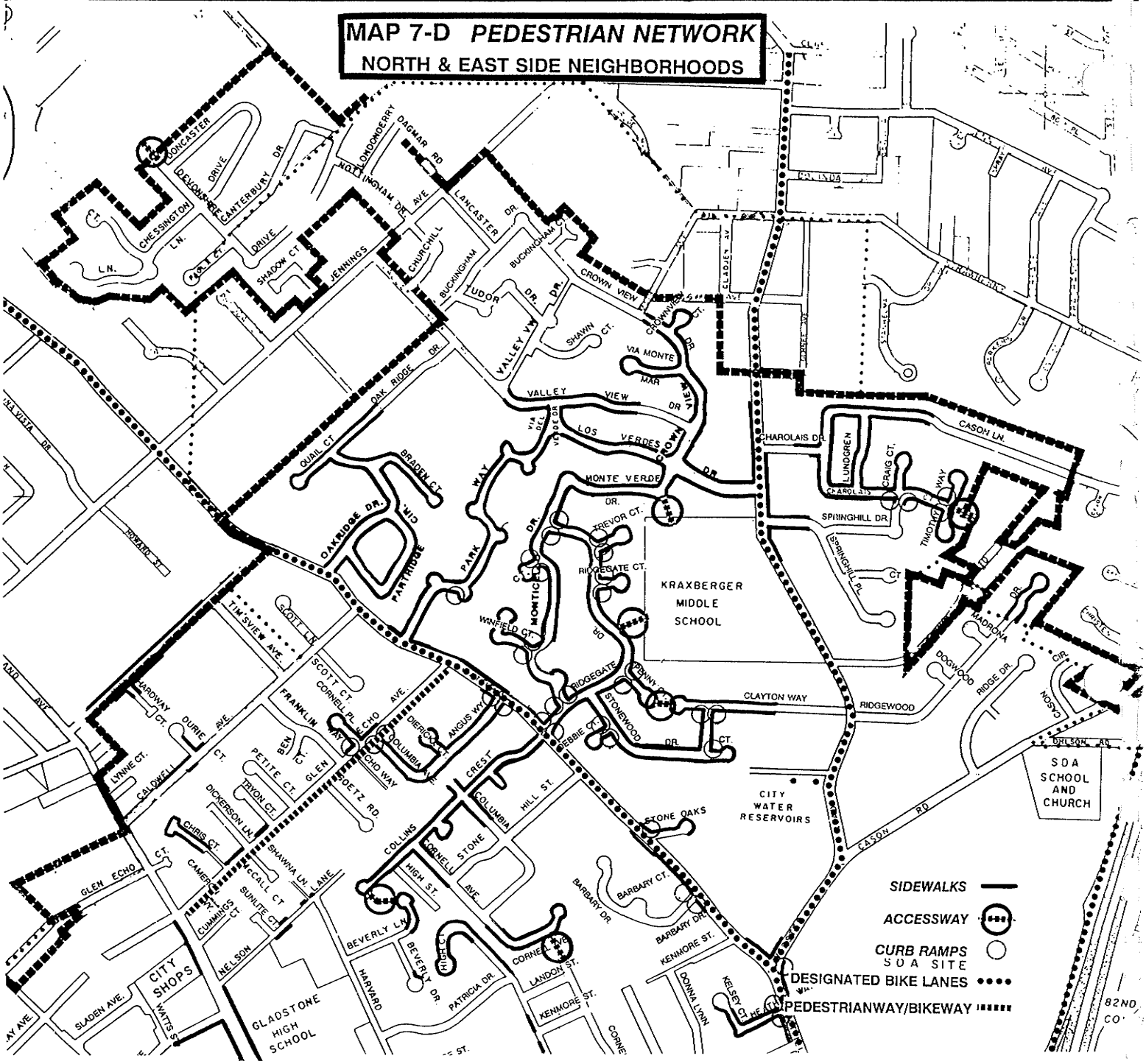
North/south elements of a pedestrian network in these neighborhoods are limited, except for the bicycle lanes on Oatfield Road and Webster Road, which serve as pedestrian access routes. The lack of sidewalks along Jennings Avenue (primarily Clackamas County jurisdiction), and from Jennings Avenue along Valley View Road to existing sidewalks on Los Verdes Drive significantly limits pedestrian access from these neighborhoods and the nearby Sherwood Forest neighborhood, to Kraxberger Middle School and other activity centers in the remainder of the city. An accessway completed in 1995 connecting the Sherwood Forest neighborhood with the Brewster Park neighborhood (Clackamas County), via Devonshire Drive to Brewster Place and McNary Road, provides a convenient alternative access route to and from this area.

In the neighborhoods located in the triangle formed by Webster Road, Cason Road, and Strawberry Lane, very limited elements of a pedestrian network exist. (See Map 7D) The existing street system is comprised of a number of non-through roadways, and multiple cul-de-sacs. Webster Road bicycle lanes provide pedestrian access along this minor arterial. Certain street sections in the Charolais Heights neighborhood have sidewalks, but do not extend to either Webster or Cason Roads, or to the nearby Springhill neighborhood. An accessway located between Timothy Way and Kirkwood Road provides a direct and convenient point of connection between these two areas.


MAP 7C PEDESTRIAN NETWORK
NEIGHBORHOODS NORTH OF 'OLD TOWN'
KRAXBERGER MIDDLE SCHOOL
CITY WATER RESERVOIRS
SDA SITE
GLADSTONE HIGH SCHOOL
CITY SHOPS
GLAD ELEM. SCHOOL
CITY PARK
POST OFFICE
CITY HALL/POLICE/FIRE
LIBRARY
DIERICKX FIELD
82ND/I-205 COMMERCIAL AREA
HI ROCKS PARK
RIVER
CROSS PARK
McLOUGHLIN BLVD
HWY 99E AUTO COMMERCIAL AREA
RIDGEGATE CT.
CLAYTON WAY
RIDGEWOOD
STONEWOOD DR.
STONE OAKS
BARBARY CT.
BARBARY DR.
KENMORE ST.
HEATHER WAY
KELSEY CT.
DONNA LYNN WY.
CORNELL AVE.
HIGH ST.
LANDON ST.
PATRICIA DR.
BEVERLY LN.
BEVERLY DR.
HARVARD
COLLINS
COLUMBIA
HILL ST.
CREST
ECHO AVE.
FRANKLIN
SCOTT CT.
DURIE AVE.
LYNNE CT.
CALDWELL
PORTLAND AVE.
GLEN ECHO
DUNWAY AVE.
SLADEN AVE.
WATTS ST.
BARCLAY AVE.
HOWELL
CENTER ST.
SIMMONS CT.
ABERNETHY LANE
KENMORE ST.
JERSEY ST.
BELLEVUE
IPSWICH
HEREFORD
GLOUCESTER
FAIRFIELD
EXETER
DARTMOUTH
CLARENDON
BERKELEY
ARLINGTON
BEATRICE
RISLEY AVE.
WINDSOR DR.
MANOR DR.
WELTER CIR
RIVERDALE DR.
PORTLAND AVENUE
UNION
YALE
PRINCETON AVENUE
FIRST STREET
NELSON
CUMMINGS CT
SUNLITE CT
SHAWNA LN.
DICKERSON LN.
CHRIS CT.
TRYON CT.
PETITE CT.
GLEN
GOETZ RD.
COLUMBIA AVE.
ANGUS WY.
CASON RD
DOGWOOD
MADRONA
RIDGE DR
SIDEWALKS
ACCESSWAYS
PEDESTRIANWAY/BIKEWAY
CURB RAMPS
DESIGNATED BIKE LANES

MAP 7-D *PEDESTRIAN NETWORK*

NORTH & EAST SIDE NEIGHBORHOODS



CONCLUSIONS: The objectives of the Gladstone Comprehensive Plan closely parallel those of the Transportation Planning Rule in encouraging pedestrian travel as a practical alternative to the automobile by providing a continuous, safe, and interconnected network of facilities (sidewalks, shared bicycle lanes, accessways) within the community. Such a network is designed to provide relatively short and direct connections between activity centers. Maps 7, 7B, 7C, and 7D indicate the extent of the existing pedestrian network. The Gladstone City Council, recognizing limited opportunities for expanding the pedestrian network through conditions of land use approval, adopted a long term street improvement program that includes some public financing for the installation of sidewalks as a means to achieve more rapid coverage.

Transportation Planning Rule: ***Facilities providing safe and convenient pedestrian and bicycle access shall be provided within and from new subdivisions, planned developments, shopping centers and industrial parks to nearby residential areas, transit stops and neighborhood activity centers, such as schools, parks and shopping. This shall include:***

- ***Sidewalks along arterials and collectors in urban areas;***
- ***Bikeways along arterials and major collectors;***
- ***Where appropriate, separate bike or pedestrian ways to minimize travel distances within and between the areas and developments listed above.***

Connections to Activity Centers

In May, 1993 the City Council adopted Ordinance No. 1175, amending Section 17.50.040 of the Gladstone Municipal Code, requiring facilities to be provided for safe and convenient pedestrian access within and from new subdivision, commercial and industrial developments, to nearby residential areas, transit stops, and neighborhood activity centers, such as schools, parks, and shopping. Included in this ordinance is the requirement for the provision of pedestrian facilities as a part of any new development along arterials and collector streets (see Maps 7A, 7B1, 7C1, and 7D1).

Portland Avenue traverses the geographic and historic center of the city. Clusters of activity centers are located along this central corridor, including most of the city's public service institutions (city hall, post office, library, senior center, grade school and high school), and numerous professional, service, and retail shopping establishments. However, although this corridor traverses an area with a predominately grid street system, sidewalks along this central core are almost exclusively limited to Portland Avenue itself, with little adjacent, parallel sidewalk sections in the pedestrian network, except Harvard Avenue. This situation, therefore, provides little opportunity for system loops.

East/west pedestrian connections to Portland Avenue and its many activity clusters are somewhat limited on many local streets, although largely in place on the principal connecting arterials and collectors (Arlington, Dartmouth, and W. Gloucester/E. Hereford Streets). These streets provide direct connections to McLoughlin Blvd., River Road, and Meldrum Bar Park in the west, and Oatfield Road and the High Rocks commercial center on 82nd Drive on the east.

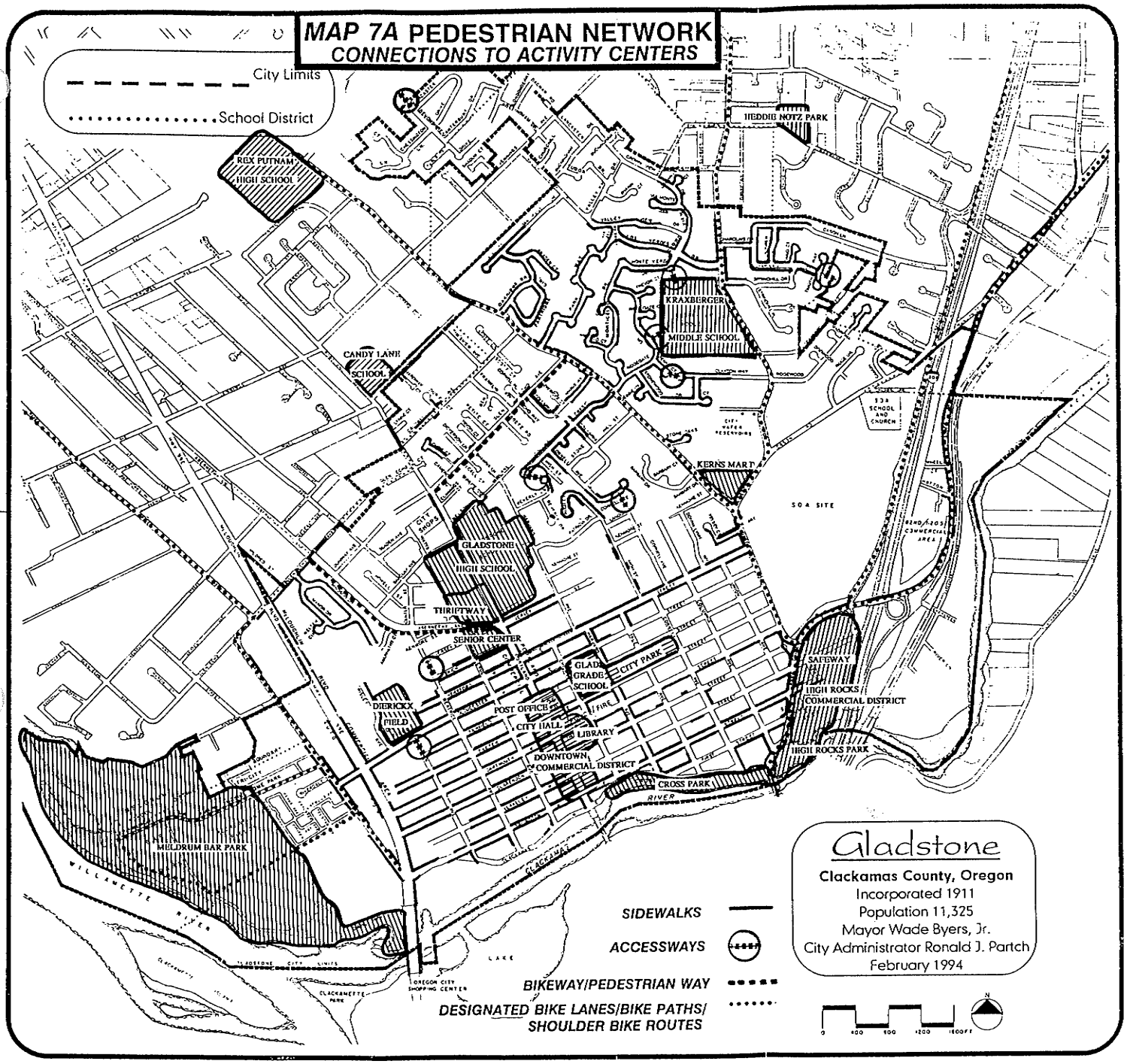
The existing north/south bicycle lanes on Oatfield, Webster, and River Roads serve as effective elements of the city's pedestrian network along these principal minor arterials, and connect to the east/west sidewalk networks located on Arlington, Dartmouth, and Gloucester/Hereford Streets for cross connections and access to the central corridor activities. The non-through nature of much of the street network in the neighborhoods north and east of the central corridor and "old town" portions of the city, and their incomplete sidewalk network, however, limit more frequent resident usage of the pedestrian network connections found on these major streets.

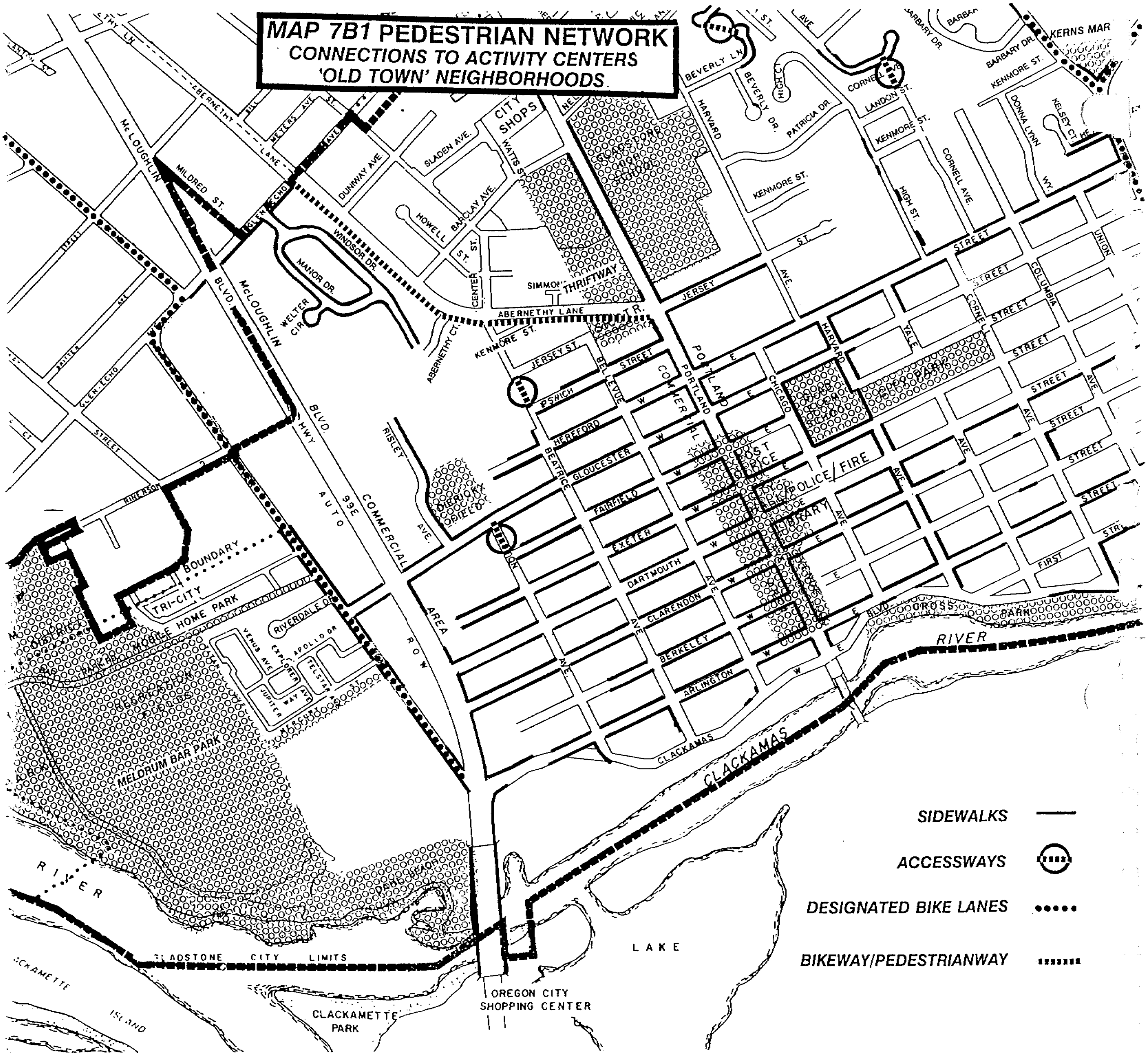
Accessways

Accessways are short, separate bicycle and pedestrian connections, off the public roadways, designed to minimize travel distances between these areas and developments. In 1993 amendments to the Gladstone Municipal Code requiring facilities to be provided for pedestrian access within and from new residential areas and neighborhood activity centers, included the provision of accessways where appropriate.

Although the city is largely fully developed, with future large subdivisions unlikely, a significant number of accessways (9) between residential areas have already been constructed, providing convenient access routes between neighborhoods and activity centers. Pedestrian/bicycle routes have been planned to take maximum advantage of these accessways. Most such accessways in Gladstone connect residential cul-de-sacs, or public streets along platted but undeveloped public streets. A complete list of bicycle and pedestrian accessways is provided in Table III-1, as well as on Map 7.

CONCLUSIONS: In May 1993 the City Council adopted Ordinance No. 1175, amending Section 17.50.040 of the Gladstone Municipal Code, requiring sidewalks to be installed along arterials and collector streets, as conditions of new development. As a means to provide for the incremental extension of the sidewalk network city-wide, including along local streets, it is recommended to amend Section 17.50.040 (15) of the Gladstone Municipal Code to provide additional guidance and authority to the Planning Commission to determine where and under what conditions sidewalks shall be installed on local streets, in association with new development or redevelopment of property (see Section A-10 in Appendix.)


MAP 7A PEDESTRIAN NETWORK
CONNECTIONS TO ACTIVITY CENTERS
City Limits
School District
REX PUTNAM HIGH SCHOOL
HEDDIE NOTZ PARK
KRAXBERGER MIDDLE SCHOOL
CANDY LANE SCHOOL
KERN'S MART
SOA SITE
GLADSTONE HIGH SCHOOL
THRIFTWAY
SENIOR CENTER
GLAD-GRADE SCHOOL
CITY PARK
SAFEWAY
HIGH ROCKS/ COMMERCIAL DISTRICT
DIERICKX FIELD
POST OFFICE
CITY HALL
LIBRARY
DOWNTOWN COMMERCIAL DISTRICT
HIGH ROCKS PARK
CROSS PARK
MELDRUM BAR PARK
WILLAMETTE RIVER
OREGON CITY SHOPPING CENTER
SIDEWALKS
ACCESSWAYS
BIKEWAY/PEDESTRIAN WAY
DESIGNATED BIKE LANES/BIKE PATHS/ SHOULDER BIKE ROUTES
Gladstone
Clackamas County, Oregon
Incorporated 1911
Population 11,325
Mayor Wade Byers, Jr.
City Administrator Ronald J. Partch
February 1994


MAP 7B1 PEDESTRIAN NETWORK
CONNECTIONS TO ACTIVITY CENTERS
'OLD TOWN' NEIGHBORHOODS
SIDEWALKS
ACCESSWAYS
DESIGNATED BIKE LANES
BIKEWAY/PEDESTRIANWAY
McLOUGHLIN BLVD.
CITY SHOPS
THRIFTWAY
ABERNETHY LANE
PORTLAND
COMMERCIAL
POST OFFICE
POLICE/FIRE
LIBRARY
TRI-CITY
MOBILE HOME PARK
MELDRUM BAR PARK
GLADSTONE CITY LIMITS
OREGON CITY SHOPPING CENTER
CLACKAMETTE PARK
CLACKAMAS
RIVER
LAKE

In recognition of the city-wide public benefits provided by extensive curb and street network, and as a means to achieve a more rapid completion of the city's pedestrian network the city initiated a publicly-funded long-term capital improvement program in May 1995 designed to increase the extent of sidewalk network coverage. Funding is to be derived from Road and Street Funds, and available grants where appropriate (e.g., Community Development Block Grant funds for eligible neighborhoods). A preliminary list of proposed improvements is included in the section on pedestrian network needs.

In March 1990 the City Council adopted Ordinance No. 1131, amending Chapters 17.18 and 17.38 of the Gladstone Municipal Code, to encourage more creative and flexible approaches in land development, including mixed-use developments. Such code allowances would enhance the practicality of pedestrian activity by mitigating the current separation of land uses that often necessitates automobile usage for access. Section 17.18.070 eases usual off-street parking standards in the C-2 zoning district along Portland Avenue when residential dwellings are converted to mixed uses. Chapter 17.38 provides for mixed-use developments in any zoning district under the standards of a Planned Unit Development. (See Section A-10, in the Appendix.)

Transportation Planning Rule: ***The TSP shall identify and accommodate the transportation needs of the transportation disadvantaged.***

ADA Accommodation/Corner Wheelchair Ramps

Given the largely fully developed, mature state of the city, the long term existence of an established street network, and, the relatively limited sidewalk network in place, city-wide, the number and location of corner curb wheelchair ramps is somewhat limited. Installation of such accommodations for the physically disabled has occurred primarily along Portland Avenue in relation to many of the public and commercial activity centers located along this central corridor. Similar installation has occurred near commercial establishments along 82nd Drive and McLoughlin Blvd., most minor arterials and collectors that have sidewalks along their routes, and any new street or sidewalk construction that has occurred since adoption of the Americans with Disabilities Act (ADA) in 1990. See Maps 7B, 7C, 7D, for the location of existing curb ramps.

Additional curb ramps will be constructed as the pedestrian network is extended. The city installed 18 corner curb ramps along Portland Avenue in 1995, with Community Development Block Grant funds, achieving complete coverage along this heavily pedestrian-oriented corridor, from Clackamas Blvd. to Ipswich Street.

CONCLUSIONS: The Gladstone Comprehensive Plan states its objective to "promote the elimination of architectural barriers on public and semi-public lands and transportation facilities." The limited extent of new development that has occurred in the city since passage of the ADA act in 1990 accounts for the related limited number of corner curb ramps. However, corner curb ramps are typically required on new development subject to Design Review where the need for sidewalks has been identified.

Transportation Planning Rule: ***Internal pedestrian circulation shall be provided in new office parks and commercial developments through the clustering of buildings, construction of pedestrian ways, skywalks, where appropriate, and similar techniques.***

Internal Pedestrian Circulation

In May 1993 the City Council adopted Ordinance No. 1175, amending Section 17.50.020 of the Gladstone Municipal Code to ensure that pedestrian access from one part of a development to another is convenient and safe. This policy applies to new non-residential development (i.e. office parks, commercial development), and is to be achieved through the provision of walkways from abutting streets or sidewalks, minimization of driveway crossings, raised or separated walkways from auto travel lanes, etc. (See Section A-10, in the Appendix.)

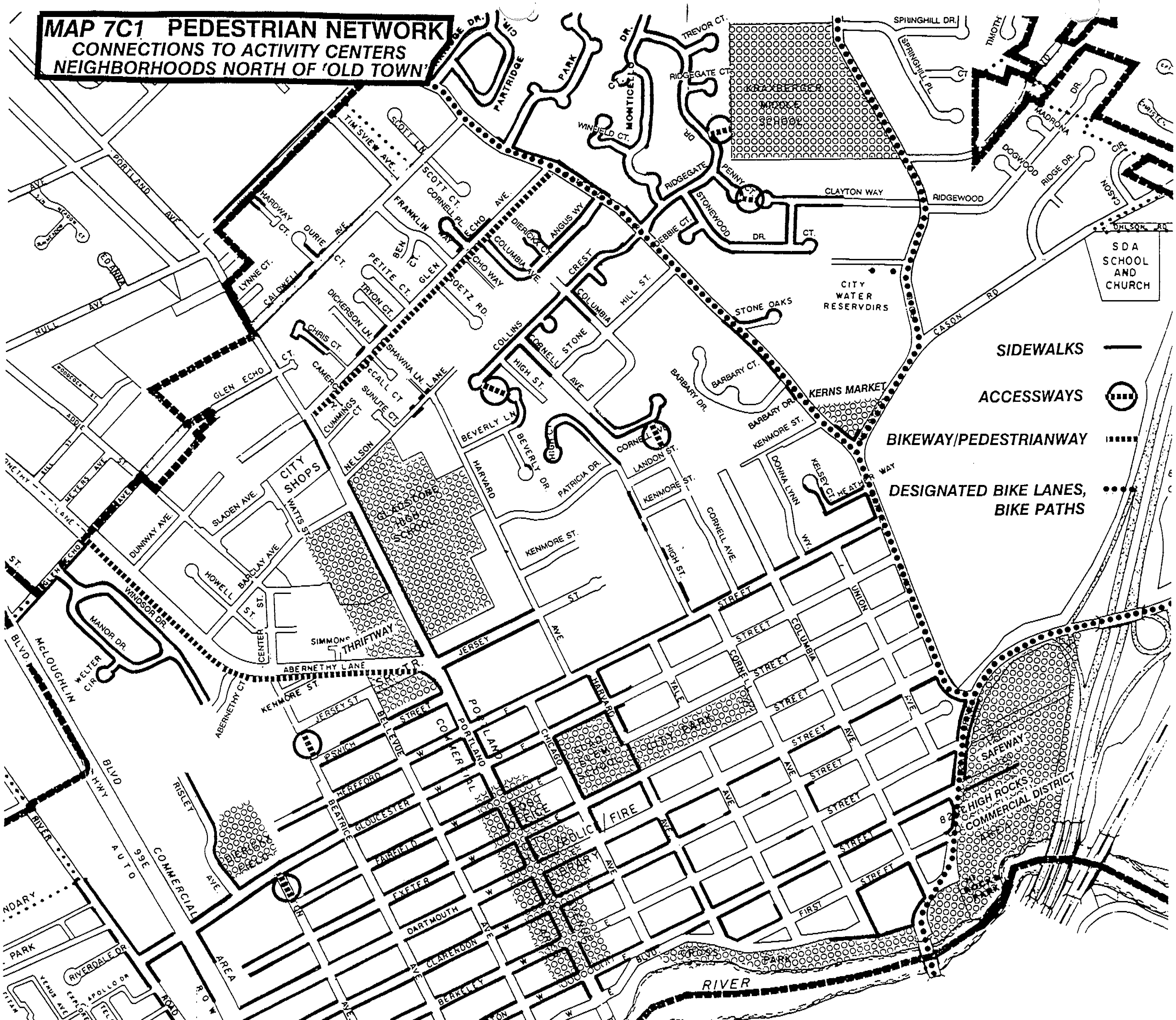
CONCLUSIONS: Action has been taken by the city establishing standards and regulations regarding building orientation and internal pedestrian circulation, through amending the Gladstone Municipal Code, as noted above. (See Section A-10, in the appendix.)

Modal Split

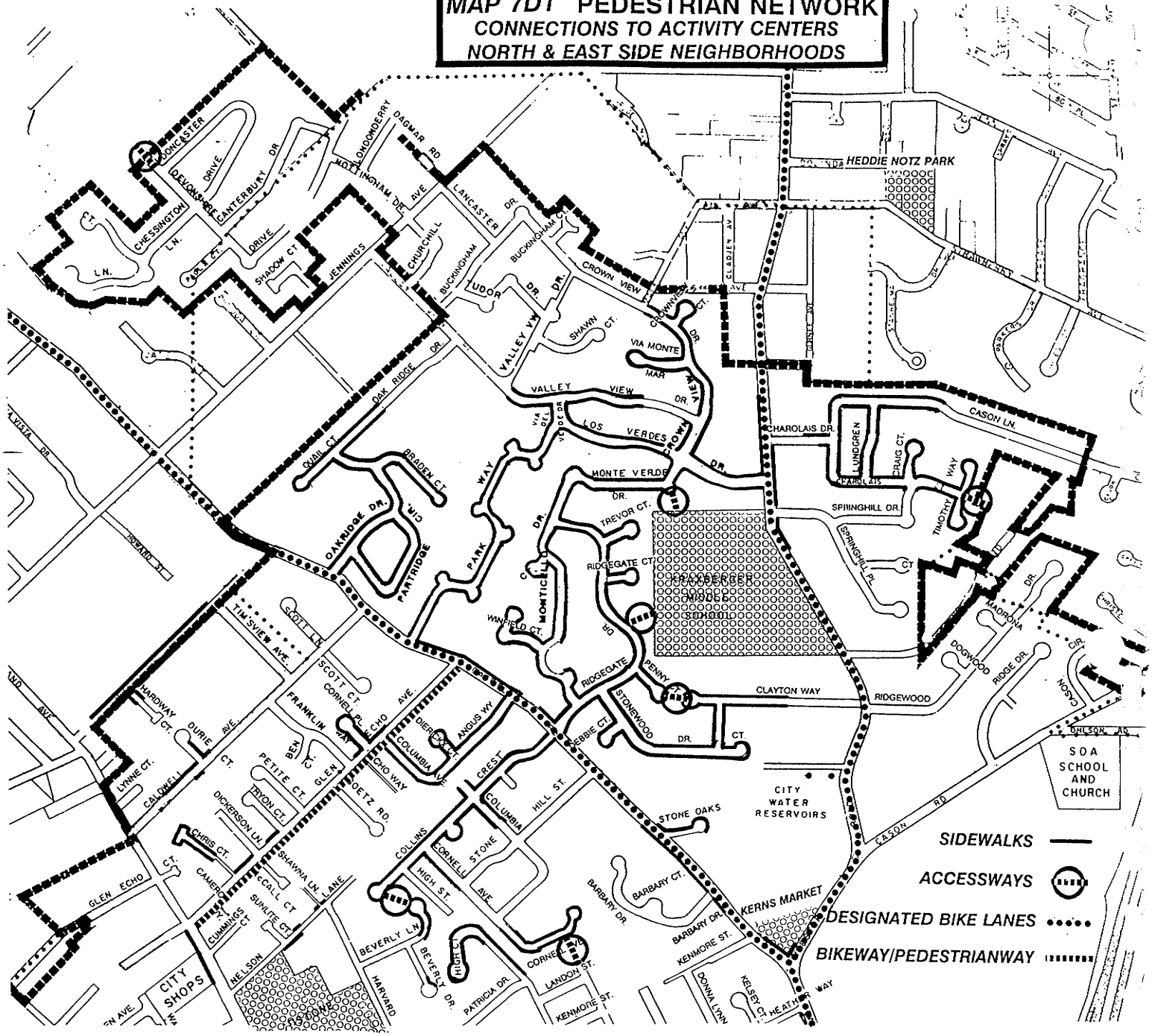
1990 census data on journey-to-work modes of transportation indicate that approximately 7.2% of all such work commutes were made by residents/workers who either work at home or walk to work. This was a 26% increase from a rate of 5.7% in 1980. This modal split compares quite favorably to this same work/travel mode in Milwaukie (4.1% - 1980/5.6% - 1990), Oregon City (5.6% - 1989/5.7% - 1990), and Clackamas County (5.8% - 1980/6.7% - 1990). As might be expected, the City of Portland, with its higher population density and employment centers, shows the highest participation rate in this category (9.4% - 1989/9.0% - 1990).

A significant amount of this increase may actually reflect more home-base employment than walking to a job site in the city. Between 1980 and 1990 home occupancy permits issued by the city increased by 94% (88 permits - 1980/182 permits - 1990). Most walking, of course, is undertaken for social, recreational, or short errand purposes, which are difficult to calculate, vis-a-vis other modes of transportation. The availability of safe and convenient facilities that provide direct connections to activity centers, however, does encourage and facilitate this transportation mode.

MAP 7C1 PEDESTRIAN NETWORK
CONNECTIONS TO ACTIVITY CENTERS
NEIGHBORHOODS NORTH OF 'OLD TOWN'



MAP 7D1 PEDESTRIAN NETWORK
CONNECTIONS TO ACTIVITY CENTERS
NORTH & EAST SIDE NEIGHBORHOODS



PEDESTRIAN PLAN ELEMENT

Transportation Planning Rule Requirement: ***The TSP shall identify transportation needs relevant to the planning area and the scale of the transportation network being planned.***

PEDESTRIAN NETWORK NEEDS AND PROPOSED ACTIONS

A. Incomplete Sidewalk Network

Existing Network Conditions: Incomplete sidewalk network city-wide provides limited safe, convenient, and direct connections throughout the community and among activity centers, although, coverage on most arterials and collector streets is fairly good if designated bicycle lanes are included for pedestrian useage. Sidewalk network varies considerably from neighborhood to neighborhood. Inconsistent, incomplete network provides limited system loops. See Maps 7, 7A, 7B, 7C, 7D and Table IV-2 for a description of the extent of sidewalk coverage.

Proposed Actions: To achieve an incremental infill of the city's sidewalk network it is recommended to amend Section 17.50.040 (15) of the Gladstone Municipal Code, as noted below. This action is designed to provide additional guidance and authority to the Planning Commission to determine where and under what conditions sidewalks should be installed on local streets, in association with new development or redevelopment of property.

RECOMMENDATION: Amend Section 17.50.040 (15) of the Gladstone Municipal Code (new text language in **bold**):

> (15) Sidewalks shall be installed on both sides of public street and at any special pedestrian way within a develop-ment, except that the Planning Commission may approve a development without sidewalks on a local street or on a private street if special site conditions exist, or if alternative pedestrian routes are available, **or if the proposed sidewalk would likely not become part of a completed pedestrian route.**

Explanation: The purpose of this zoning code text amendment is to help clarify city policies regarding requirements for sidewalks. Developments that need land use approval from the Gladstone Planning Commission are required to comply with city standards for streets, water and sewer utilities, drainage, etc. Chapter 17.50 of the Gladstone Municipal Code contains the city's standards pertaining to vehicle and pedestrian circulation, and Section 17.50.040 (15) cited above, contains requirements for sidewalks. In staff's opinion, the text amendment is needed because:

* The city is largely fully developed with an established street and pedestrian network; there are very limited opportunities for extension of the existing sidewalk network as a condition of future land use approval.

* The city's discretion for requiring sidewalks has already been somewhat eroded by the state Transportation Planning Rule, which requires sidewalks on collector and arterial streets for all new developments. The Transportation Planning Rule is silent on requirements for sidewalks on local streets.

* The proposed language addresses the potential that property owners may be required to build sidewalks that go nowhere. Currently, 17.50.040 (15) requires sidewalks as a condition of development approval on local streets except when the Planning Commission can determine either that site conditions prevent sidewalk installation or that alternate pedestrian facilities exist. Whereas the Planning Commission typically has applied a common sense approach to the requirement for sidewalks, including the test that public improvements should be commensurate with the value of private development, a continuing problem arises when a property owner is faced with installing sidewalks along his frontage on a local street when it's questionalbe that the sidewalks will ever connect with other pedestrian facilities.

* The proposed language will not remove the Planning Commission's authority to require sidewalks on local streets as a condition of subdivision development or as a condition of approval for design review or conditional use, such as for multi-family developments, churches, day care centers and businesses.

The Transportation System Plan contains a series of maps on the current extent of the pedestrian network (Maps 7, 7B, 7C, 7D), connections to activity centers (Maps 7A, 7B1, 7C1, 7D1), and connections to transit stops (Map 8), which may assist the city in its considerations.

Proposed Actions: To achieve a more rapid and extensive completion of the city's curb and sidewalk network than private initiated endeavors would likely achieve, the city has taken the initiative for identifying and financing "pedestrian corridors." The following proposed "pedestrian corridors" would establish a spatially distributed network that provides safe and direct connections between activity centers and residential areas, as well as create corridor cross-connections and system loops.

RECOMMENDATION: Add the following projects to the Gladstone Capital Improvement Plan.

a. **Beatrice Avenue, from Clackamas Blvd. to Hereford Street**. This proposed route provides connection to existing completed east/west sections of the sidewalk network from Arlington Street to Hereford Street; provides connection to the

proposed bicycle/pedestrian path from Meldrum Bar Park to Clackamas Blvd., and to Dierickx Field; fills in north/south network gap, roughly equidistant (approx. 1,200') between largely complete sidewalk sections on McLoughlin Blvd. and Portland Avenue; creates system loops; and, provides connection to a transit stop on Arlington Street. Located in low-moderate income neighborhood eligible for Community Development Block Grant funds.

Distance less cross-streets: 1,820' (one side)/3,640' (both sides)
Existing completion: 0' Remaining uncompleted: 1,820' (1)/3,640' (2)
Cross-streets: 9 Handicapped ramps needed: 18 (one side)/36 (both sides)
Estimated costs: $52,600 (one side)/$105,200 (both sides)

b. **Portland Avenue, from Clackamas Blvd. to Glen Echo Avenue.** This largely completed section of the pedestrian network is perhaps the principal pedestrian corridor in the city, traverses its central core and provides connection to clusters of public sector and retail service activity centers along most of its entire length. It also provides access to completed east/west sidewalk sections on Arlington, Dartmouth and Hereford Streets, as well as the pedestrian path on Abernethy Lane. Curbs and sidewalks are proposed to be extended to Glen Echo Avenue to provide connection to the pedestrianway created with the widening of Glen Echo, from Portland Avenue to Oatfield Road, and create system loops.

Distance less cross-streets: 4,130' (one side)/8,260'(both sides)
Existing completion: 3,660' (1)/7,320' (2) Remaining uncompleted: 470' (2)
Cross-streets: 14 Handicapped ramps needed: 16 (1995 CDBG funding allowed completion of curb ramps from Clackamas Blvd. to Ipswich Street)
Estimated costs: $23,800 (both sides plus complete curb ramps entire length)

c. **Harvard Avenue, from Clackamas Blvd. to Beverly Lane/Collins Crest.** This partially completed section of the pedestrian network provides connection to Cross Park, Max Patterson Memorial Park, grade school, and high school; provides connection to existing completed east/west sections of the sidewalk network on Arlington, Dartmouth, Gloucester (west only), and Hereford Streets, as well as needed access to/from the Collins Crest neighborhoods; fills in north/south network gap, roughly equidistant (approx. 900') between the completed sidewalk sections on Portland Avenue and the proposed route on Cornell Avenue; creates system loops; and, provides connection to transit stops on Arlington and Dartmouth Streets.

Distance less cross-streets: 3,035' (one side)/6,070' (both sides)
Existing completion: 1,465' (1)/2,830' (2) Remaining uncompleted: 1,570'(1)/3,140'(2)
Cross-streets: 13 Handicapped ramps needed: 20 (one side)/34 (both sides)
Estimated costs: $49,400 (one side)/$93,400 (both sides)

d. **Cornell Avenue, from Clackamas Blvd. to Collins Crest.** This proposed route provides connection to Cross Park and Max Patterson Memorial Park, as well as access to existing sidewalk sections providing connection to the High Rocks commercial district; provides connection to existing east/west sections on Arlington, Dartmouth and Hereford Streets, as well as needed access to the Collins Crest neighborhoods, via an accessway between Cornell Avenues in the Salty Acres and Kevin Terrace subdivisions; fills in north/south network gap, roughly equidistant (approx. 900'-1,200') between the existing bicycle lanes on Oatfield Road and the proposed route on Harvard Avenue; creates system loops; and, provides connection to transit stops on Arlington and Dartmouth Streets.

Distance less cross-streets: 4,485' (one side)/8,970' (both sides)
Existing completion: 1,560'(1)/2,210'(2) Remaining uncompleted: 2,925' (1)/6,760' (2)
Cross-streets: 16 Handicapped ramps needed: 27 (one side)/44 (both sides)
Estimated costs: $82,800 (one side)/$174,800 (both sides)

e. **Beverly Lane/Collins Crest, from Harvard Avenue to Oatfield Road.** This largely completed section of the proposed pedestrian network provides otherwise limited east/west connection to the high school and other major activity centers along Portland Avenue. It is the closest feasible east/west route in this part of the city within 1,600' (Beverly Lane section) of the east/west route along Hereford Street. It provides connection between the proposed north/south routes on Harvard Avenue and the existing bicycle/pedestrian lanes on Oatfield Road, as well as an east/west continuation along the existing completed sidewalk sections on Ridgegate Drive that provide access to Kraxberger Middle School. This route creates system loops, and provides connection to a transit stop on Oatfield Road.

Distance less cross-streets: 2,265' (one side)/4,530' (both sides)
Existing completion: 1,815' (1)/3,630' (2) Remaining uncompleted: 450' (1)/900' (2)
Cross-streets: 8 Handicapped ramps needed: 5 (one side)/16 (both sides)
Estimated costs: $13,500 (one side)/$32,400 (both sides)

f. **Los Verdes Drive/Valley View Road, from Webster Road to Jennings Avenue.** This partially completed section of the proposed pedestrian network provides otherwise limited north/south connection between the northernmost neighborhoods in the city and access to activity centers in the central and western sections, as well as Kraxberger Middle School on Webster Road. It is the closest feasible parallel route roughly equidistant (approx. 1,800') between existing bicycly/pedestrian routes on Oatfield and Webster Roads. It provides connections to existing east/west sidewalk sections on Park Way, Monticello, Ridgegate, and Crownview Drives; and, creates system loops. A portion of Valley View Road (approx. 600') is within Clackamas County, and would require coordination and cooperation to complete this section of the sidewalk network.

Distance less cross-streets: 2,955' (one side)/5,910' (both sides)
Existing completion: 1,755' (1)/3,510' (2) Remaining uncompleted: 1,200'(1)/2,400'(2)
Cross-streets: 8 Handicapped ramps needed: 9 (one side)/22 (both sides)
Estimated costs: $32,100 (one side)/$67,800 (both sides)

g. **Oakridge Drive, from Oatfield Road to Valley View Road.** This partially completed section of the proposed pedestrian network provides the closest east/west connection to Oatfield Road for residents in the northernmost neighborhoods, roughly equidistant (approx. 800') between Jennings Avenue (Clackamas County, no sidewalks) and the completed sidewalk section on Park Way. It provides connection between the existing bicycle/pedestrian route on Oatfield Road and the proposed route on Valley View Road/Los Verdes Drive. This route creates system loops, and provides connection to a transit stop on Oatfield Road.

Distance less cross-streets: 2,100' (one side)/4,200' (both sides)
Existing completion: 1,400' (1)/2,800' (2) Remaining uncompleted: 600' (1)/1,200' (2)
Cross-streets: 6 Handicapped ramps needs: 1 (one side)/2 (both sides)
Estimated costs: $12,900 (one side)/$25,800 (both sides)

h. **Penny Court/Clayton Way, from Ridgegate Drive to Webster Road.** This partially completed section of the proposed pedestrian network provides otherwise limited east/west connection between the existing sidewalk section on Ridgegate Drive and existing bicycle/pedestrian route on Webster Route, via an accessway between Penny Court and Clayton Way. This proposed route provides access to routes that connect with activity centers in other portions of the city; creates system loops around Kraxberger Middle School; and provides connection to transit stops on Clayton Way at Webster Road, and on Ridgegate Drive at Oatfield Road.

Distance less cross-streets: 1,320'(one side)/2,640' (both sides)
Existing completion: 770' (1)/1,520' (2) Remaining uncompleted: 550' (1)/1,100' (2)
Cross-streets: 3 Handicapped ramps needs: 1 (one side)/2 (both sides)
Estimated costs: $11,900 (one side)/$23,800 (both sides)

i. **Duniway Avenue Accessway, connecting two dead-ends of Duniway.** This proposed route will provide connection between the separated bikepath/pedestrian way on Abernethy Lane with the proposed route on Portland Avenue and Gladstone High School, and create system loops. There are currently no sidewalks along Duniway Avenue. This section is designed to connect the two dead-ends of Duniway Avenue with a 12' wide serviceway that would also be suitable for fire and police emergency vehicle use. The accessway would include either removable gates, bollards, or barriers to discourage non-official vehicle access, but allow pedestrian, bicycle, and emergency use. (See Figure 4)

Distance: approximately 125'
Existing completion (Portland Avenue to Abernethy Lane): 0'
Estimated costs: $7,500

Installation of sidewalks on both sides of this proposed accessway to complete connections to Abernethy Lane and Portland Avenue would provide for a safer and more convenient route for pedestrian travel for area residents.

Distance less cross-streets and accessway: 1,355' (one side)/2,710' (both sides)
Existing completion: 0' Remaining uncompleted: 1,355' (1)/2,710' (2)
Cross-streets: 3 Handicapped ramps needs: 4 (one side)/ 6 (both sides)
Estimated costs: $30,700 (one side)/$59,600 (two sides)

j. **Monticello Drive, east side, between Ridgegate Drive and Winfield Court.** This largely completed section of curb and sidewalk provides reasonably direct connection between Los Verdes Drive and the existing bicycle/pedestrian route on Oatfield Road, and site of a transit stop. This short section of missing sidewalk section presents a safety hazard to pedestrians who must cross on to the street at a point where visibility by pedestrians and motorists is very poor due to a blind curve and tall landscaping. The subject properties are currently undeveloped. (Tax Lots #15700 [owner Clackamas County], and #15800 [owner Gladstone resident])

Distance: approximately 283'
Handicapped ramps needed: 0
Estimated costs: $5,000

k. **City Park perimeter, Exeter St., Fairfield St., Cornell Ave.** This proposed route provides connection to existing completed east/west sections of the sidewalk network on Exeter and on Gloucester Streets, west of Harvard Avenue; provides connection to the proposed north/south route along Cornell Avenue, between Collins Crest Street and Cross Park, and along Harvard Avenue, between the high school and Cross Park; and creates system loops.

Distance: 1.050'
Handicapped ramps needs: 2
Estimated costs: $22,500

l. **Chicago Avenue, between Hereford and Dartmouth Streets, and Fairfield Avenue, between Portland and Chicago Avenues.** This partially completed section of the pedestrian network near Gladstone Grade School is an area of heavy pedestrian activity (mostly young children), bus and automobile traffic. It is a principal pedestrian corridor that provides east/west connection to activity centers along Portland Avenue on Gloucester, Exeter and Dartmouth Avenues. The section along the south side of Fairfield Avenue is included to complete the network coverage in this pedestrian area, and provide direct access to a transit stop on Portland Avenue.

Distance less cross-streets: 1,200' (one side)/2,400' (both sides)
Existing completion: 1,000' Remaining uncompleted: 200'(1 side)/1,400'(2 sides)
Cross-streets: 5 Handicapped ramps needed: 3 (1 side)/6 (2 sides)
Estimated costs: $6,250 (one side)/$32,500 (both sides)

On May 9, 1995 the Gladstone City Council approved the addition of a number of street improvements to the city's Capital Improvement Plan, including extensions to the existing sidewalk network, as noted in Chapter III.

TABLE IV-1

LOCATION OF VEHICLE ACCIDENTS INVOLVING PEDESTRIANS & BICYCLISTS 1987 - 1993

Street/ Nearest Cross St.	Street Classification	Type	Year	Sidewalks	Bikepaths
McLoughlin Blvd./ Gloucester St.	Maj.Arterial/ Collector	Bike, Ped.	1987	Y/Y	N/N
Angus Way/ Oatfield Rd.	Local St./ Min.Arterial	Bike	1987	Y/N	N/Y
Clayton Way/ Webster Rd.	Local St./ Min.Arterial	Bike	1987	N/N	N/Y
Gloucester St./ Oatfield Rd.	Collector St./ Min.Arterial	Bike	1987	N/N	N/Y
Kenmore St./ Oatfield Rd.	Local St./ Min.Arterial	Ped.	1987	N/N	N/Y
Glen Echo Ave./?	Collector St.	Ped.	1987	N	N
Berkeley St./ Union Ave.	Local St./ Local St.	Bike	1988	Y/N	N/N
Gloucester St./ Harvard Ave.	Collector St./ Local St.	Bike	1988	Y/Y	N/N
Hereford St./ Oatfield Rd.	Local St./ Min.Arterial	Bike	1988	Y/N	N/Y
Abernethy Ln./ Portland Ave.	Collector St./ Min.Arterial	Ped.	1989	Y/Y	Y/N
Arlington St./ Portland Ave.	Min.Arterial/ Min.Arterial	Ped.	1989	Y/Y	N/N
Barton Ave./ Dartmouth St.	Local St./ Collector St.	Bike	1989	N/Y	N/N
Portland Ave./ Berkeley St.	Min.Arterial/ Local St.	Ped.	1989	Y/Y	N/N
First St./ Columbia Ave.	Local St./ Local St.	Bike	1989	Y/N	N/N
McLoughlin Blvd./ Gloucester St.	Maj.Arterial/ Collector St.	Ped.	1989	Y/Y	N/N
Cason Rd./ Webster Rd.	Collector St./ Min.Arterial	Bike	1990	N/N	N/Y
Gloucester St./ Portland Ave.	Collector St./ Min.Arterial	Bike	1990	Y/Y	N/N
Oakridge Dr./ Oatfield Rd.	Local St./ Min.Arterial	Bike	1990	Y/N	N/Y

Street/ Nearest Cross St.	Street Classification	Type	Year	Sidewalks	Bikepaths
Webster Rd./ Kirkwood Dr.	Min.Arterial/ Local St.	Ped.	1990	N/N	Y/N
82nd Dr./ Berkeley St.	Min.Arterial/ Local St.	Ped.	1990	Y/Y	Y/N
Beverly Lane/ Harvard Ave.	Local St./ Local St.	Bike	1991	N/N	N/N
Dartmouth St./ Portland Ave.	Collector St./ Min.Arterial	Ped.	1991	Y/Y	N/N
Glen Echo Ave./ Portland Ave.	Collector St./ Min.Arterial	Ped.	1991	N/N	N/N
McLoughlin Blvd./ Gloucester St.	Maj.Arterial/ Collector St.	Bike	1992	Y/Y	N/N
Berkeley St./ Union Ave.	Local St./ Local St.	Bike	1992	Y/N	N/N
Gloucester St./ River Rd.	Collector St./ Min.Arterial	Bike	1992	Y/Y	N/Y
Arlington St./ Yale Ave.	Min.Arterial/ Local St.	Ped.	1993	Y/N	N/N
Hereford St./ Chicago Ave.	Local St./ Local St.	Bike	1993	Y/N	N/N
Portland Ave./ Jersey St.	Min.Arterial/ Local St.	Ped.	1993	Y/N	N/N
River Rd./ Riverdale Dr.	Min.Arterial/ Local St.	Bike	1993	Y/N	Y/N

Accident/Injury Summary:

Total Accidents - 29; Total Injuries - 30 (13 pedestrians/17 bicyclists);
Most frequent streets **on** which bike/pedestrian accidents occur: Gloucester St. (4); McLoughlin Blvd.(3); Portland Ave.(2); Berkeley St.(2); Arlington St.(2); Hereford St.(2).
Most frequent streets **near** which bike/pedestrian accidents occur: Oatfield Rd.(5); Portland Ave.(5); Gloucester St.(3); Webster Rd.(2); Berkeley St.(2); Harvard St.(2).
Number of accidents occurring both **on** and **near** local streets - 5.

TABLE IV-2

EXTENT OF PEDESTRIAN WAY NETWORK COMPLETION BY CLASSIFICATION

Classification	No.	Street (length/both sides)	Length/%Complete*
Major Arterial:	1	Hwy.99-E (0.64 mi./1.28mi.)	0.69 mi./54%
Minor Arterials:	7	Arlington St.(0.90 mi./1.80 mi.)	1.72 mi./96%
		82nd Drive (1.37 mi./2.72 mi.)	1.72 mi./63%
		Oatfield Rd.(1.14 mi./2.28 mi.)	0.38 mi./17%
			Bike Lns: 2.28 mi./100%
		Webster Rd. (0.79 mi./1.58 mi.)	0.24 mi./15%
			Bike Lns: 1.58 mi./100%
		River Road (0.49 mi./0.98 mi.)	0.46 mi./48%
			Bike Lns: 0.98 mi./100%
		Portland Ave.(0.93 mi./1.86 mi.)	1.57 mi./84%
		Jennings Ave.(0.09 mi./0.18 mi.)	0.00 mi./0%
Total Minor Arterial Roadways (5.71 mi./11.42 mi.)			
Total Minor Arterial Completion (sidewalks)			**6.09 mi./53%**
Total Minor Arterial Completion (sidewlks & Bike Lns)			**9.46 mi./92%**
Collector Streets:	6	Abernethy Ln. (0.49 mi./0.96 mi.)	0.00 mi./0%
			Ped.Way: 0.49 mi./50%
		Cason Road (0.39 mi./0.78 mi.)	0.00 mi./0%
		Glen Echo Ave.(0.92 mi./1.84 mi.)	0.14 mi./8%
		(pave.widened ped./bike way)	0.46 mi./25%
		Gloucester St.(1.07 mi./2.14 mi.)	1.38 mi./65%
		Dartmouth St.(0.97 mi./1.94 mi.)	1.41 mi./73%
		Valley View Drive/Valley View Rd. /Los Verdes Dr. (0.62 mi./1.24 mi.)	0.76 mi./61%
Total Collector Street Roadways (4.46 mi./8.92 mi.)			
Total Collector Street Completion (sidewalks)			**3.69 mi./41%**
Total Collector Street Completion (sidewlks & Ped.Way)			**4.64 mi./52%**
Total Arterial & Collector Street Roadways (10.17 mi./20.34 mi.)			
Total Arterial & Collector Street Completion (sidewalks)			**9.78 mi./48%**
Total Arterial & Collector Street Completion (side./bike)			**14.10 mi./69%**
Local Streets:	**137**	**City-wide (26.49 mi./52.98 mi.)**	**21.90mi./40%**

*Areas of parallel sidewalk and bike lane counted only once.

CHAPTER V

PUBLIC

TRANSPORTATION PLAN

ELEMENT

CHAPTER V

PUBLIC TRANSPORTATION PLAN ELEMENT

OVERVIEW AND MAJOR FINDINGS

- The city is served by four (4) separate public transit (bus) routes that traverse the community along three primary north/south corridors (west/central/east), involving eight (8) primary arterials and collector streets.

- Land use zoning standards along these designated transit routes are supportive of transit ridership in their encouragement of higher density development by allowing outright the construction of duplexes in R-5 zoning districts and on minor arterials and collector streets in R-7.2 districts.

- The opportunity for increased public transit ridership is relatively high in Gladstone, in terms of access to bus service, however, utilization of this service is not extensive, as noted by ridership data and modal split ratios between automobile use and bus use. Together these bus routes provide access to approximately 90% of the city's households, residing within one quarter (¼) mile of at least one of the four transit routes.

- Special transit services for the transportation disadvantaged are generally quite good. Services are provided by Tri-Met, Gladstone Senior Center Tram Program, and Clackamas County, and through coordination with the Clackamas County Transportation Consortium.

- Existing transit services are generally in fair condition, although deficient in two areas: 1) frequency of service; and, 2) transit stop shelter protection.

Transportation Planning Rule Requirement: ***The TSP shall develop a public transportation plan that describes the location and condition of facilities, and identifies service needs.***

EXISTING CONDITIONS

The public transit services provided the city are part of a regional transit system, which encompasses the three counties of the Portland metropolitan area, with connections to public transit network in Clark County, Washington, managed by C-Tran. This transit system provides access to most major activity centers in the area, through a radial network centered in downtown Portland, with transfer points at major regional centers, including Clackamas Town Center, Milwaukie, and Oregon City. Locally, the four bus routes that serve Gladstone travel over eight (8) of the city's primary arterials and collector streets. The condition and characteristics of public transportation services in the city are described below.

Transit Ridership

The most recent Tri-Met ridership survey for each of the four bus routes providing service to Gladstone was conducted in 1990. This survey indicated that, on average, 592 Gladstone residents boarded Tri-Met buses within the city limits on a daily basis. This total daily ridership was derived from individual surveys of each of the four bus routes, as detailed by transit stop for each of the routes, as described in Tables V-1, V-2, V-3, and V-4. Summary data follows:

McLoughlin Blvd. #33 = 310	Oatfield Road #32 = 180
Canby - Clackamas Town Center #79 = 91	River Road #34 = 11*

* Does not reflect significant apartment construction that has occurred since 1990 (334 units constructed/64 units planned for summer 1995).

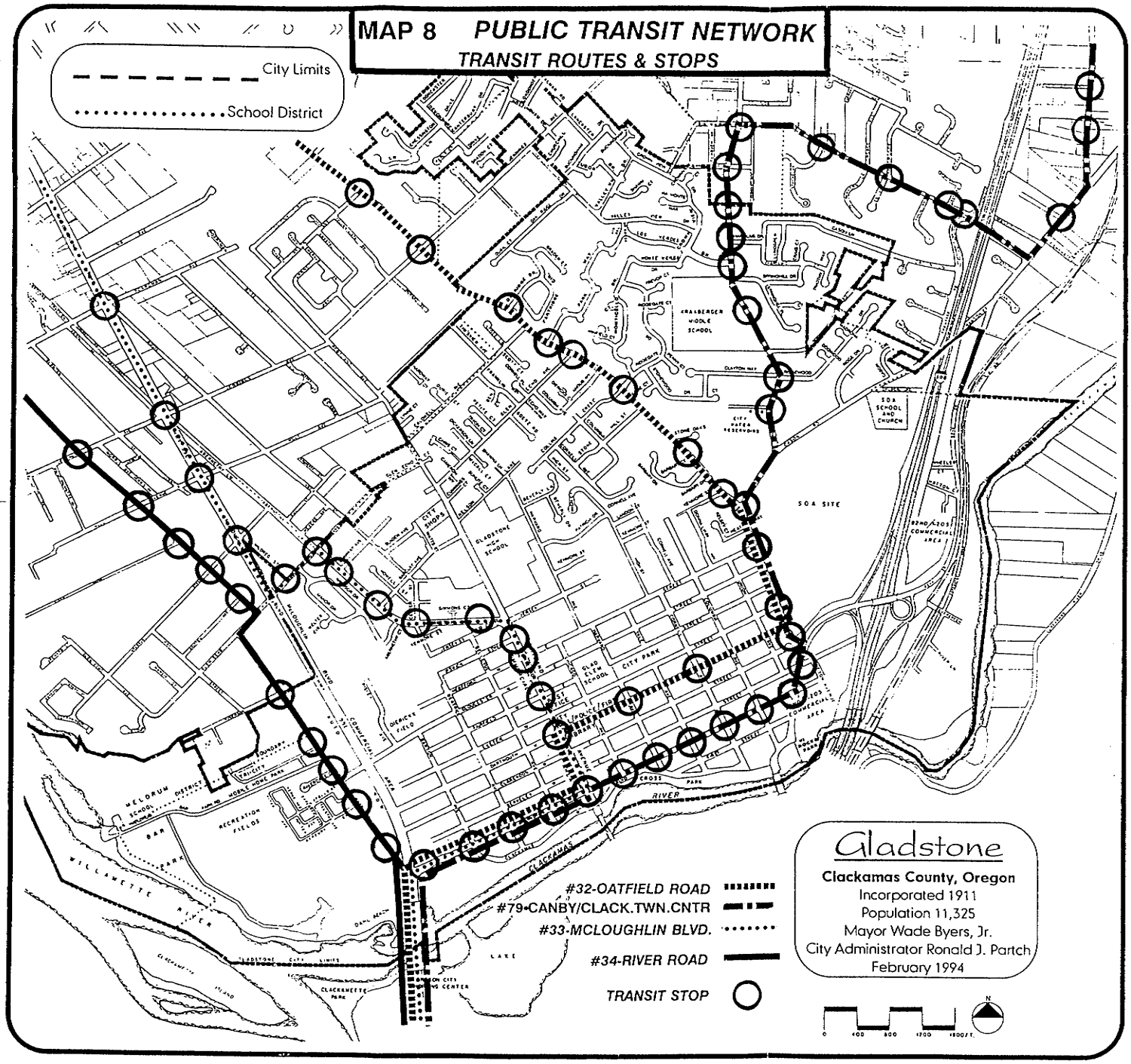
It is suggested that the city request of Tri-Met that a new ridership survey be conducted of the River Road bus route (#34) to ascertain the extent of increased ridership associated with the significant increase in apartment construction along this route since the 1990 survey, and whether more frequent service would be warranted.

Given the number and spacing of transit routes in the city, the potential for increased ridership in the future is significant. Buses run on eight arterials and collector streets that are so situated that approximately 90% of the city's estimated 4,172 households/11,325 residents in 1994, are within a one quarter mile walking distance from a transit stop (see Map 8A). A number of physical constraints, however, constrain the full accessibility such short map distances might suggest. These would include the barriers that confront residents needing to cross the five lanes of McLoughlin Blvd., with no pedestrian island refuges, and signalized pedestrian crossings far and few between.

Another constraint on access to transit stops is the prevalence of cul-de-sacs and other non-through streets within the makeup of the city's street system that prevent the short connections that would encourage walking to these stops.

Transit Routes/Stops/Frequency of Service

The city is served by four (4) separate public transit (bus) routes that traverse the community along three primary north/south corridors (west/central/east), involving eight primary arterials and collector streets (see map 8). Two of these north/south corridors contain east/west components through the south/central portions of the city, but are basically spokes of the regional radial transit design. This transit design orients most routes to the system's central hub in the metropolitan area's highest employment center (Portland CBD), with a series of transit centers and transfer sites located at major regional activity centers, including Clackamas Town Center, Milwaukie, and Oregon City. A brief description of these four routes follows, including: the principal arterials they traverse; frequency of service; activity center destination, and; average travel time.


MAP 8 PUBLIC TRANSIT NETWORK
TRANSIT ROUTES & STOPS
City Limits
School District
#32-OATFIELD ROAD
#79-CANBY/CLACK.TWN.CNTR
#33-MCLOUGHLIN BLVD.
#34-RIVER ROAD
TRANSIT STOP
Gladstone
Clackamas County, Oregon
Incorporated 1911
Population 11,325
Mayor Wade Byers, Jr.
City Administrator Ronald J. Partch
February 1994
SOA SITE
CLADSTONE HIGH SCHOOL
KRALBERGER MIDDLE SCHOOL
CITY SHOPS
OLD ELEM SCHOOL
CITY PARK
MELDRUM SCHOOL
RECREATION FIELDS
WILLAMETTE RIVER
CLACKAMAS RIVER
RIVER

Transit Route	Transit Streets	Frequency	Travel Time
#32 Oatfield Rd.	McLoughlin Blvd., Arlington St., 82nd Dr., Oatfield	14-30 min. peak commute hours	Milwaukie TC 20 min.*/ Portland Mall 42 min.*
#33 McLoughlin Blvd.	McLoughlin Blvd., Arlington St., Portland Ave., Abernethy Ln., Glen Echo Ave., McLoughlin Blvd.	9-15 min. peak commute hours	Milwaukie TC 24 min.*/ Portland Mall 42 min.*
#34 River Road	McLoughlin Blvd., River Road	30-35 min. peak commute hours	Milwaukie TC 24 min.*
#79 Canby-Clackamas Town Center	McLoughlin Blvd., Arlington St., Portland Ave., Dartmouth St., Oatfield Rd., Webster Rd., Strawberry Ln.	52-60 min. peak commute hours	Clackamas Town Center 22 min.*

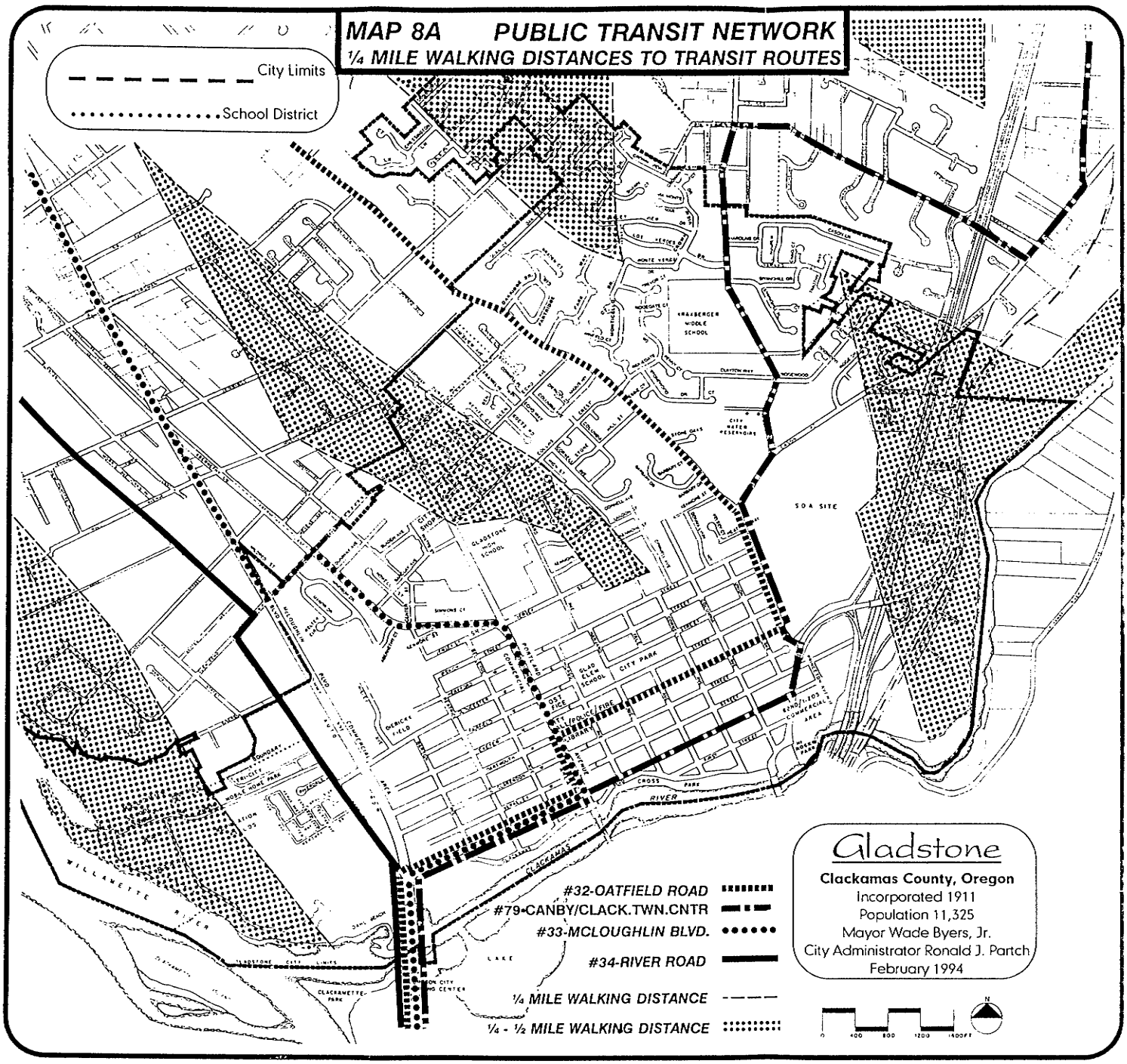
*Travel time from Oregon City Transit Center

See Map 9 for a depiction of the complete regional routes of each of the four bus routes serving the City of Gladstone.

Transit stops are located frequently at or near cross streets, as noted on Map 8. 1990 ridership data for each transit stop of each bus route is noted in Tables V-1, V-2, V-3, V-4. While the multiple transit routes/transit stops provide most city residents wide access to public transportation services, the incomplete sidewalk network in the city limits the safety and convenience of these services to many potential riders (see Map 10).

Transportation Modal Split

The most consistent ridership group for public transit services is commuters going to and from work during the standard work week. In this regard, the potential exhibited by the number and accessibility of public transportation routes in Gladstone, is far from being realized at this time. Census data from 1980 and 1990 on work trip statistics indicates a decline in usage of transit from 1980 to 1990. In 1980, 6.2%


MAP 8A PUBLIC TRANSIT NETWORK
¼ MILE WALKING DISTANCES TO TRANSIT ROUTES
City Limits
School District
#32-OATFIELD ROAD
#79-CANBY/CLACK.TWN.CNTR
#33-MCLOUGHLIN BLVD.
#34-RIVER ROAD
¼ MILE WALKING DISTANCE
¼ - ½ MILE WALKING DISTANCE
Gladstone
Clackamas County, Oregon
Incorporated 1911
Population 11,325
Mayor Wade Byers, Jr.
City Administrator Ronald J. Partch
February 1994
SOA SITE
CLACKAMAS RIVER
WILLAMETTE RIVER

of all work trips were by public transit (71.8% by single occupancy vehicle). In 1990, only 3.4% of all work trips were by public transit (77.4% by single occupancy vehicle). These 1990 modal split findings are similar to that of Milwaukie (3.7%), and better than that of Oregon City (2.6%), both cities the site of transit centers.

As would be expected, however, they fall far short of the level achieved by Portland (11.0% transit/65.0% single occupancy vehicle). The higher densities found in the Portland area, overall shorter commutes, and concentrated employment center found in the downtown area (which is also the center spoke of the regional transit system) significantly contribute to higher transit ridership and more balanced modal split figures. These participation levels are not likely to be readily duplicated in the near future in Gladstone, due to its lower population and employment densities, and longer commute times to place of work.

Future development of the 80 acre SDA property as an Office Park employment center, however, holds significant potential for public transit ridership, either by enhanced bus service or light rail transit. Over 1,100 jobs are projected to be concentrated at this site by the year 2015 at full development. Such a high density employment center would lend itself to public transit service, and such service would be strongly integrated into the design of the development. High public transit ridership would be an important element to the success of this development, and to the minimization of undue and expensive traffic capacity improvements to adjacent streets, and associated traffic intrusions onto local streets and neighborhoods.

Transit Centers and Park & Ride Lots

There are no transit centers located in Gladstone. The nearest transit center is located in Oregon City, between Main St. and McLoughlin Blvd., and 11th St. and Moss St. (see map 9). The Milwaukie Transit Center is located on Jackson St. between Main St. and 21st Ave. (see map 9). The Clackamas Town Center Transit Center is located northside of Town Center near theaters.

There are no park and ride lots in Gladstone. The nearest such facility is located at the Southgate Theater north of downtown Milwaukie near Milport Road.

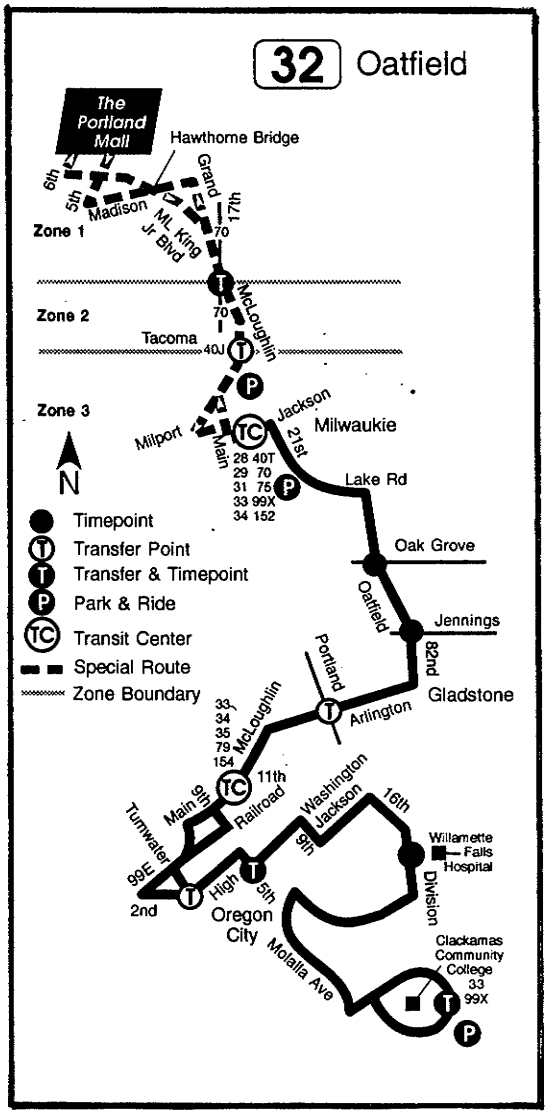
Capacity and Condition of Transit Vehicles

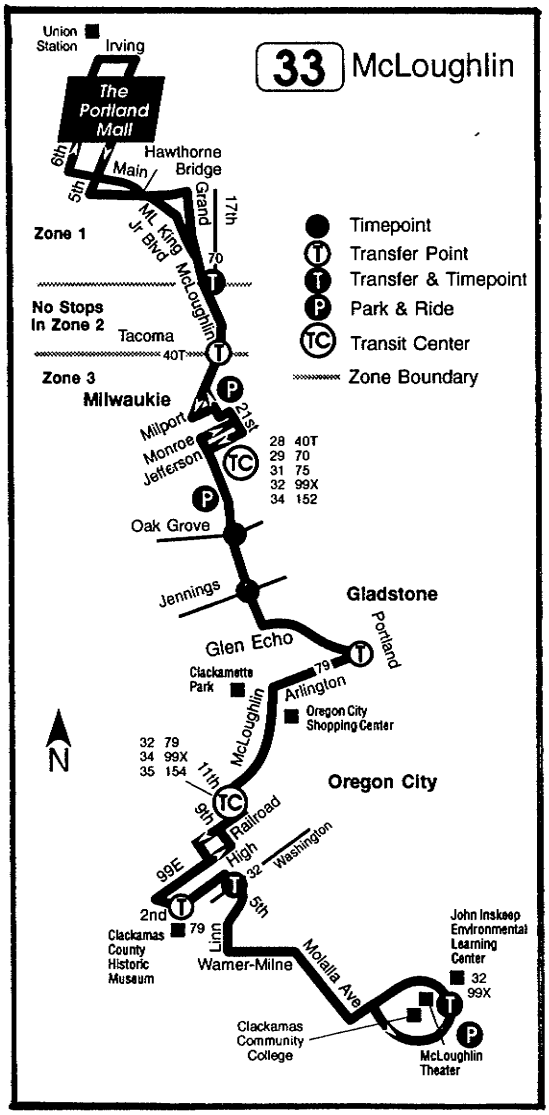
Condition of transit vehicles in use in the Gladstone area is generally very good. The capacity of the vehicles operating in Gladstone are described as follows:

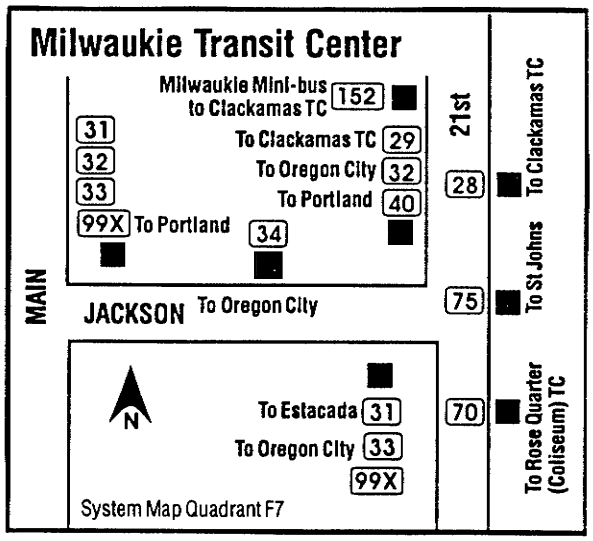
Vehicle Type	Seated Capacity	Standing Capacity	Total Capacity
30' Standard Bus	28	12	40
40' Standard Bus	45	20	65

MAP 9

TRANSIT ROUTES SERVING CITY

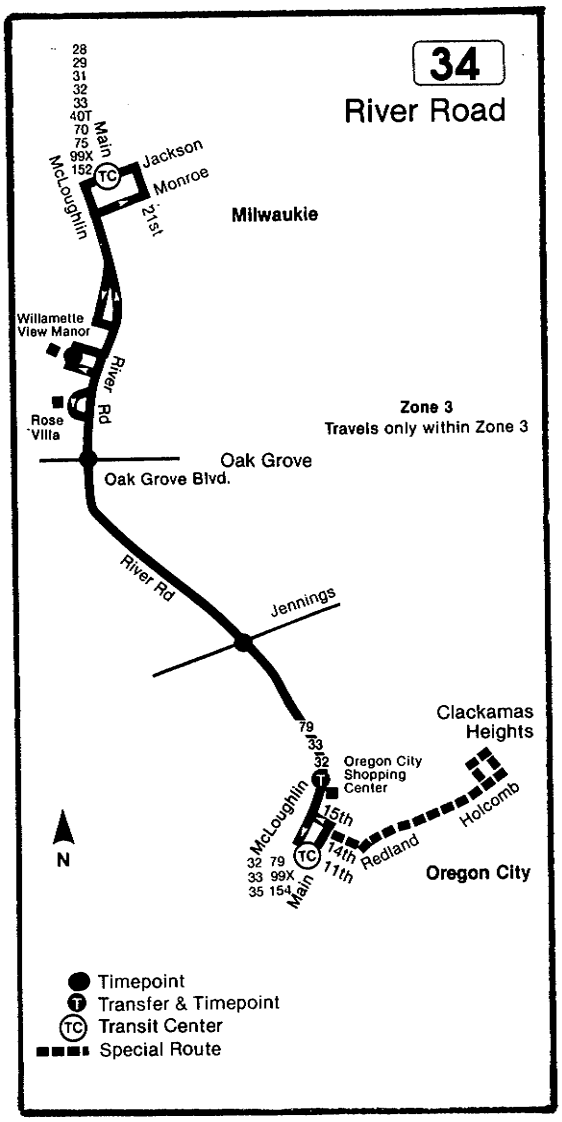


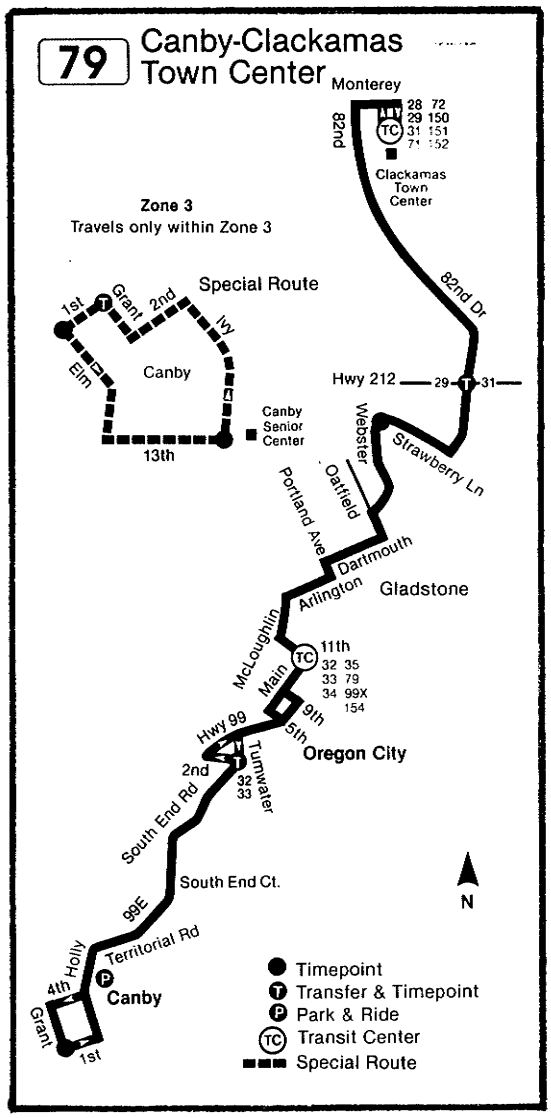


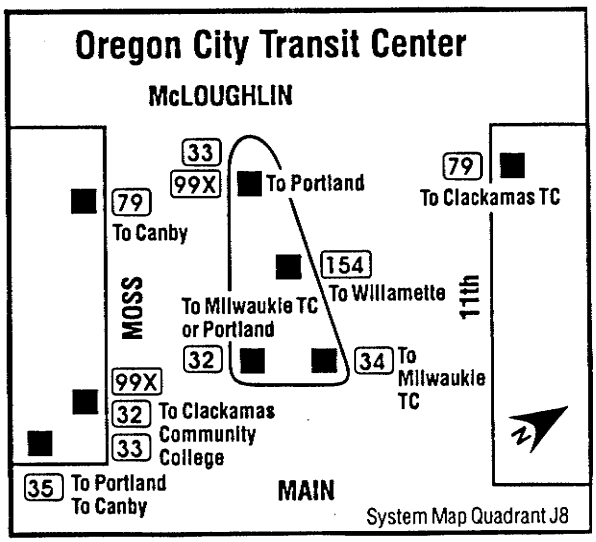


MAP 9

TRANSIT ROUTES SERVING CITY







CONCLUSIONS: The objectives of the Gladstone Comprehensive Plan are consistent with those of the Transportation Planning Rule in its commitment to coordinating land use with transportation facilities. This coordination is evident in the protection afforded designated transit routes in the city by current zoning codes that encourage higher density development along transit routes by allowing outright the construction of duplexes in R-5 zoning districts and on minor arterials and collector streets in R-7.2 districts. The construction of three to eight unit multi-family housing is allowed as a conditional use in these same districts, with standard conditions.

In March, 1990 the City Council adopted Ordinance No. 1131, amending Chapters 17.18 and 17.38 of the Gladstone Municipal Code, to encourage more creative and flexible approaches in land development, including mixed-use developments. Such code allowances would enhance the practicality of public transit usage by increasing the density of development along transit routes. Section 17.18.070 eases usual off-street parking standards in the C-2 zoning district along Portland Avenue, a principal transit route in the city, to facilitate the conversion of residential dwellings to mixed uses. Chapter 17.38 provides for mixed-use developments in any zoning district under the standards of a Planned Unit Development. (See section A-10 in the Appendix.)

Existing transit services are generally in fair condition, although deficient in two areas: 1) frequency of service; and, 2) transit stop shelter protection. *It is suggested* that the city request Tri-Met, the regional service provider, if financially feasible, to improve the frequency of service to the regional trunk commuter peak hour minimum of 10 minutes on the primary bus routes serving the city, as noted in following sections. *It is suggested* that the city request Tri-Met to install appropriate bus stop shelters at selected high passenger bus stops, if financially feasible, as noted in following sections.

Transportation Planning Rule: ***The TSP shall describe public transportation services for the transportation disadvantaged and identify service inadequacies.***

Special Transit Services

Special services are provided for the transportation disadvantaged by the regional service provider (Tri-Met) as well as the City of Gladstone (Senior Center Tram). Tri-

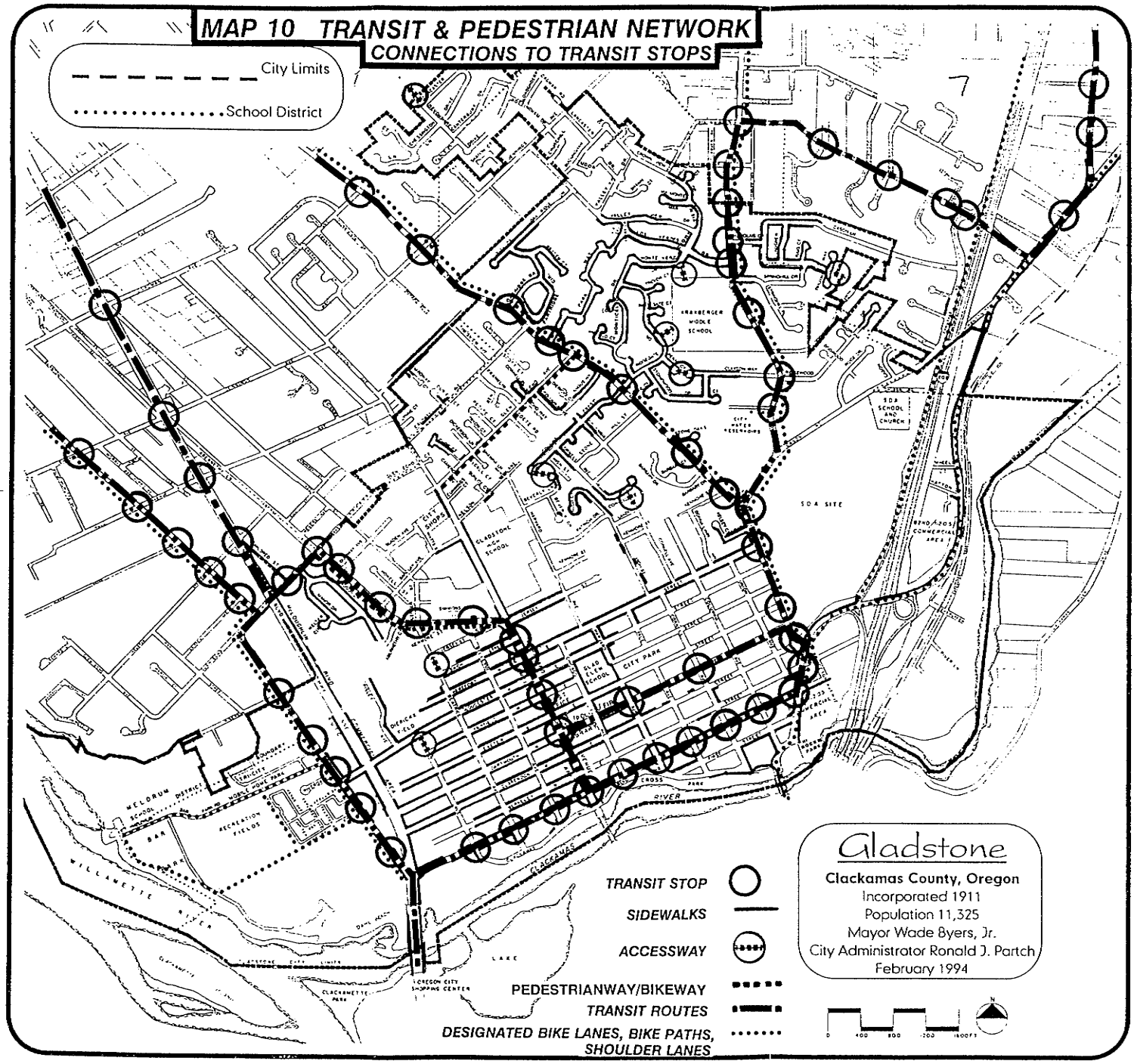
Met accommodates disabled customers through two programs: (1) Accessible Fixed Route Service; and, (2) Tri-County LIFT Program. The first service provides access to all wheelchair or scooter customers on all usual Tri-met routes except a few trips during weekday rush hours (e.g. express routes). Each vehicle is equipped with a lift mechanism that allows a wheelchair or scooter customer to roll onto the device and be lifted into the vehicle. The second program provides on-demand door-to-door service to disabled customers. The service is subcontracted and operates with lift-equipped mini-buses and vans from 4:30 a.m. to 2:30 a.m., seven days a week. However, rides must be requested before noon two working days in advance of the trip. Nearly one-half million one-way trips were provided last year.

The City of Gladstone supplements these Tri-Met services for the transportation disadvantaged with special tram services provided through the Gladstone Senior Center. Gladstone Senior Center transportation services combine a fixed-route and demand/dial-a-ride program that provides door-to-door service to and from the Center for lunch, programs, local grocery shopping, local medical appointments, and other errands. Special recreational outings are also available. Rides must be requested 24 hours in advance of the trip. A fare donation of $.50 each way is requested. The Gladstone Tram is equipped with a lift mechanism and space to accommodate two (2) wheelchair or scooter customers, as well as seating for twelve (12) passengers. The Senior Center also operates an older tram as backup and for larger outings.

In fiscal year 1993-1994, the Gladstone Tram provided service to 2,590 passengers, for a total of 5,921 passenger trips. Over 7,080 miles were driven on the Tram during this period in assisting eligible local citizens with mobility limitations to meet their special transportation needs.

The Center further coordinates through the Clackamas County Social Services Division additional services for the transportation disadvantaged through a volunteer driver program in Clackamas County called Transportation Reaching People (TRP). This program is designed to assist people obtain rides to medical appointments and other important destinations in the Tri-County area. In 1994 TRP provided an average of 60 roundtrip rides per month to Gladstone citizens.

The Gladstone Senior Center is an active member of the Clackamas County Transportation Consortium, a network of 11 service providers dedicated to the provision of coordinated transportation services to seniors and ADA-eligible persons. The Consortium has been successful in increasing access to transportation services for area residents, as well as stabilizing and enhancing service efficiency, funding, and diversity of ride delivery. Members have benefited from better coordination, and sharing of regional resources and information. The Consortium has also been supported in its efforts by Tri-Met, Oregon Department of Transportation, Loaves and Fishes, Inc., and Volunteer Transportation, Inc.


MAP 10 TRANSIT & PEDESTRIAN NETWORK
CONNECTIONS TO TRANSIT STOPS
City Limits
School District
TRANSIT STOP
SIDEWALKS
ACCESSWAY
PEDESTRIANWAY/BIKEWAY
TRANSIT ROUTES
DESIGNATED BIKE LANES, BIKE PATHS, SHOULDER LANES
Gladstone
Clackamas County, Oregon
Incorporated 1911
Population 11,325
Mayor Wade Byers, Jr.
City Administrator Ronald J. Partch
February 1994

CONCLUSIONS: The city has developed a comprehensive program of special transit services for the transportation disadvantaged, involving the following elements: participation with those services provided by the regional transit provider (Tri-Met); coordination of resources with the Clackamas County Transportation Consortium; and, development of local initiatives through operation of its own transit service, the Gladstone Senior Center Tram Program.

Transportation Planning Rule: ***The TSP shall describe intercity bus and passenger rail service and identify the location of terminals.***

Intercity Bus and Passenger Rail Service

There are no bus or rail service facilities in the city. The nearest such facilities are located in the City of Portland.

Transportation Planning Rule: ***Transit routes and transit facilities shall be designed to support transit use through provision of bus stops, pull-outs and shelter, optimum road geometrics, on-road parking restrictions and similar facilities as appropriate.***

In MPO areas (Metropolitan Planning Areas) major industrial, institutional, retail and office developments shall provide either a transit stop on-site or connection to a transit stop along a transit trunk route when the transit operator requires such an improvement.

In May 1993 the City Council adopted Ordinance No. 1175, amending Sections 17.94.020 and 17.50.020 of the Gladstone Municipal Code, to identify transit-related needs in the review of major development proposals, and to allow the regional transit provider (Tri-Met) the opportunity to review proposals for "major" non-residential developments that would generate an average daily traffic of 1,000 trips or greater.

CONCLUSIONS: Action has been taken by the city regarding consideration of transit related facilities in the land-use approval process of major new developments, and the notification of the regional transit service provider for comment on major development projects, through amending the Gladstone Municipal Code, as noted above. (See Section A-10 in Appendix.)

TABLE V-1

TRANSIT ROUTE # 32 OATFIELD ROAD: RIDERSHIP DATA

Transit Route OATFIELD #32

Transit Stops	**Daily Ridership** (1990)
Arlington @ McLoughlin (I/O)*	7
Arlington @ Barton (I/O)	5
Arlington @ Beatrice (I/O)	5
Arlington @ Bellevue (I/O)	4
Arlington @ Portland (I/O)	28
Arlington @ Chicago (I/O)	4
Arlington @ Harvard (I)	2
Arlington @ Cornell (I)	5
Arlington @ Columbia (O)	2
Arlington @ 82nd Dr. (I)	5
82nd Dr. @ Berkeley (O)	4
Oatfield @ 82nd Dr.(O)	1
Oatfield @ SDA Camp (I)	8
Oatfield @ Fairfield (I)	2
Oatfield @ Hereford (O)	7
Oatfield @ Webster (I)	9
Oatfield @ Kenmore (O)	8
Oatfield @ 18309 (O)	4
Oatfield @ Childrens Center (I)	3
Oatfield @ Collins Crest (O)	9
Oatfield @ Ridgegate (I)	14
Oatfield @ Glen Echo Ave (O)	8
Oatfield @ Park Way (I)	11
Oatfield @ Oakridge (I/O)	20
TOTAL	180

*I = Inbound to Portland; O = Outbound from Portland

TABLE V-2

TRANSIT ROUTE #33 MCLOUGHLIN BLVD.: RIDERSHIP DATA

Transit Route MCLOUGHLIN BLVD. #33

Transit Stops	**Daily Ridership** (1990)
Arlington @ McLoughlin (I/O)*	15
Arlington @ Barton (I/O)	12
Arlington @ Beatrice (I/O)	11
Arlington @ Bellevue (I/O)	8
Arlington @ Portland (I/O)	27
Portland @ Dartmouth (I/O)	34
Portland @ Fairfield (I/O)	23
Portland @ Hereford (I)	11
Portland @ Ipswich (O)	38
Abernethy @ Portland (I)	31
Abernethy @ Thriftway (O)	11
Abernethy @ Center (I)	10
Abernethy @ Beatrice (O)	8
Abernethy @ Barclay (I/O)	4
Abernethy @ Duniway (O)	1
Abernethy @ Glen Echo (I/O)	6
Glen Echo @ Mildred (I/O)	38
McLoughlin @ Meldrum (I/O)	22
TOTAL	310

*I = Inbound to Portland; O = Outbound from Portland

TABLE V-3

TRANSIT ROUTE #34 RIVER ROAD: RIDERSHIP DATA

Transit Route RIVER ROAD #34

Transit Stops	**Daily Ridership** (1990)
River Road @ McLoughlin Blvd. (I)*	2
River Road @ Dahl Park ((O)	1
River Road @ 19721 (I)	1
River Road @ Gladstone Park (O)	2
River Road @ Riverdale Dr. (I)	1
River Road @ Tri-City Park (O)	3
River Road @ Rinearson Rd. (I)	1
TOTAL	11

*I = Inbound to Portland; O = Outbound from Portland

TABLE V-4

TRANSIT ROUTE #79 CANBY-CTC: RIDERSHIP DATA

Transit Route CANBY-CLACKAMAS TOWN CENTER #79

Transit Stops	**Daily Ridership** (1990)
Arlington @ McLoughlin (N/S)*	5
Arlington @ "Buick"(S)	1
Arlington @ Barton (N/S)	3
Arlington @ Beatrice (N/S)	3
Arlington @ Bellevue (N/S)	3
Arlington @ Portland (N/S)	12
Portland @ Dartmouth (N/S)	27
Dartmouth @ Harvard (N)	4
Oatfield @ SDA Camp (N)	1
Oatfield @ Exeter (S)	2
Oatfield @ Fairfield (S)	1
Oatfield @ Hereford (S)	1
Oatfield @ Webster (N/S)	10
Webster @ Baptist Youth (S)	1
Webster @ Ridgewood (N)	4
Webster @ Clayton Way (S)	2
Webster @ Kraxberger (N)	3
Webster @ Los Verdes (S)	3
Webster @ Charolais (N)	5
TOTAL	91

*N = Northbound; S = Southbound

PUBLIC TRANSPORTATION PLAN ELEMENT

Transportation Planning Rule Requirement: ***The TSP shall identify transportation needs relevant to the planning area and the scale of the transportation network being planned.***

PUBLIC TRANSPORTATION NEEDS AND PROPOSED ACTIONS

A. Frequency of Service

Existing Conditions: Frequency of service varies by route, but in most instances is far less frequent than the minimum peak commute period service frequency of 10 minutes associated with regional trunk routes. See specific route service frequency below.

Proposed Actions: Request Tri-Met improve frequency of service to regional trunk minimum service frequency of 10 minutes during peak commute hours, as appropriate, and as noted below:

* **Transit Route:** #32 Oatfield Road
  Current peak commute period frequency of 14 - 30 minutes is insufficient to encourage optimal ridership. Endeavor to improve frequency of service to regional trunk minimum service frequency of 10 minutes during peak commute hours.

* **Transit Route:** #33 McLoughlin Blvd.
  Current peak commute period frequency of 9 - 15 minutes is good, however, improvement to uniform, consistent regional trunk minimum service frequency of 10 minutes would encourage optimal ridership.

* **Transit Route:** #34 River Road
  Current peak commute period frequency of 30 -35 minutes is insufficient to encourage optimal ridership, given the recent construction of 334 units of multi-family housing (Rivergreens Apartments) on River Road since the last Tri-Met bus ridership survey in 1990. An additional 64 unit multi-family housing complex is scheduled for construction in 1995 just north of the Tri-City Mobile Home Park. Endeavor to improve frequency of service to regional trunk minimum day base rate of 15 minutes.

* **Transit Route:** #79 Canby-Clackamas Town Center
  Current peak commute period frequency of 52 - 60 minutes is insufficient to encourage optimal ridership. Endeavor to improve frequency to a minimum 15 - 30 minutes.

B. Transit Stops

Existing Conditions: While the number and spacing of transit stops is satisfactory on all of the four bus routes that service the community, passenger protection from adverse weather conditions, through provision of bus stop shelters, is largely absent from all stops. This lack of bus shelters discourages ridership. Selected high ridership transit stops with high daily ridership and without bus shelter protection are prioritized below, by transit route and total daily ridership (1990 Tri-Met survey).

Transit Stop	#32 Oat.	#33 99-E	#79 Canby-CTC	Total
Arlington @ Portland Ave.	28	27	12	67
Portland @ Ipswich St.	--	38	--	38
Glen Echo @ Mildred	--	38	--	38
Abernethy @ Portland	--	31	--	31
Arlington @ McLoughlin	7	15	5	27
Portland @ Fairfield St.	23	--	--	23
Arlington @ Barton Ave.	5	12	3	20
Oatfield @ Oakridge Dr.	20	--	--	20
Arlington @ Beatrice Ave.	5	11	3	19
Oatfield @ Webster Rd.	--	9	10	19
Arlington @ Bellevue Ave.	4	8	3	15
Oatfield @ Ridgegate Dr.	14	--	--	14
Abernethy @ Thriftway	11	--	--	11
Abernethy @ Center St.	--	10	--	10
Oatfield @ Collins Crest	9	--	--	9
Oatfield @ SDA Camp	8	--	1	9

Transit Route: #34 River Road
High density residential housing complexes, recently constructed and planned, near McLoughlin Blvd. and the Tri-City Mobile Home Park, might generate greater transit ridership along this route if bus shelters were installed near the current stops at McLoughlin Blvd., Dahl Park Road, and the Tri-City Mobile Home Park.

Proposed Actions: request Tri-Met install appropriate bus stop shelters at selected high passenger bus stops, as prioritized in table above, as well as on #34 River Road bus route to reflect recent high density residential development along this route.

CHAPTER VI

AIR, FREIGHT, RAIL, WATER AND PIPELINE ELEMENT

CHAPTER VI

AIR, FREIGHT, RAIL, WATER AND PIPELINE ELEMENT

Transportation Planning Rule Requirement: ***The TSP shall develop an air, rail, water and pipeline transportation plan which identifies the location of airports, railroads and railroad facilities, and major regional pipelines and terminals with the planning area.***

Rail Line Facilities

A Southern Pacific Railroad (SPRR) main line passes through the easternmost edge of the city, between the Clackamas River and I-205/82nd Drive, for approximately 4,750' (0.90 mi.) (see Map 11). The SPRR tracks parallel Edgewater Road along its entire 2,900' length. There is only one point of contact between the rail line and a city street, at the short access road connecting 82nd Drive to Edgewater Road. This site is controlled by signage, crossing gates, and flashing warning lights. There are approximately 25 residences and little traffic in this area.

On average eight (8) SPRR freight trains travel this route each way each day, for a total of 16 SPRR freight trains daily. On average two (2) local freight trains travel this route each way each day for a total of four (4) local freight trains daily. The freight trains average approximately 100 cars each. Also, three (3) Amtrack passenger trains travel this route each way each day for a total of six (6) trains. There are approximately 6 - 8 cars per Amtrack train. There are no terminals in Gladstone.

Freight Routes/Facilities

I-205 is the designated "truck route" in the city. Local deliveries are allowed in the city along the principal arterials, most commonly 82nd Drive, Arlington Street, and McLoughlin Blvd. Non-local cross travel by large delivery trucks between 99-E and I-205 is prohibited.

Water Transport Facilities/Activities

Gladstone is bordered on two sides by rivers: Clackamas River on the south/southeast, and Willamette River on the west. However, no commercial water transport activities or facilities operate in the city. Barge and tug operations operate on the Willamette River, transporting sand and gravel, pulp and paper, and agricultural products. The U.S. Army Corps of Engineers report that more than one million tons of products have passed through the Oregon City navigation locks in 1991, 1992, and 1993. Commercial sand and gravel barge operations on the Oregon City side of the Clackamas River, at the current Lone Star NW operation, have largely ceased in the 1990's, with only infrequent tug traffic reported.

Recreational boating activities, however, has continued to expand over the years, as noted by Oregon Marine Board license data, and Clackamas County Sheriffs Department citations issued. Major boat launching facilities in the area are located in

the city's Meldrum Bar Park, on the Willamette River, and Oregon City's Clackamette Park at the confluence of the Clackamas and Willamette Rivers.

Pipeline Facilities and Services

Water: Three major municipal water transmission lines are routed through the city. (See Map 11) The City of Gladstone 27" main water line delivers water from the Clackamas River (Clackamas Water District), north and east of the city, along Cason Road to the city reservoirs off Webster Road. While smaller diameter lines provide water to higher elevations in the city, the main water transmission line continues down to the lower/main part of the city along Webster Road (18")to Oatfield Road, Oatfield Road (18") to Hereford Street, Hereford Street (24") to Union Avenue, Union Avenue (24") to Clarendon Street, Clarendon Street (24") to McLoughlin Blvd., and McLoughlin Blvd. (24") to Clackamas River.

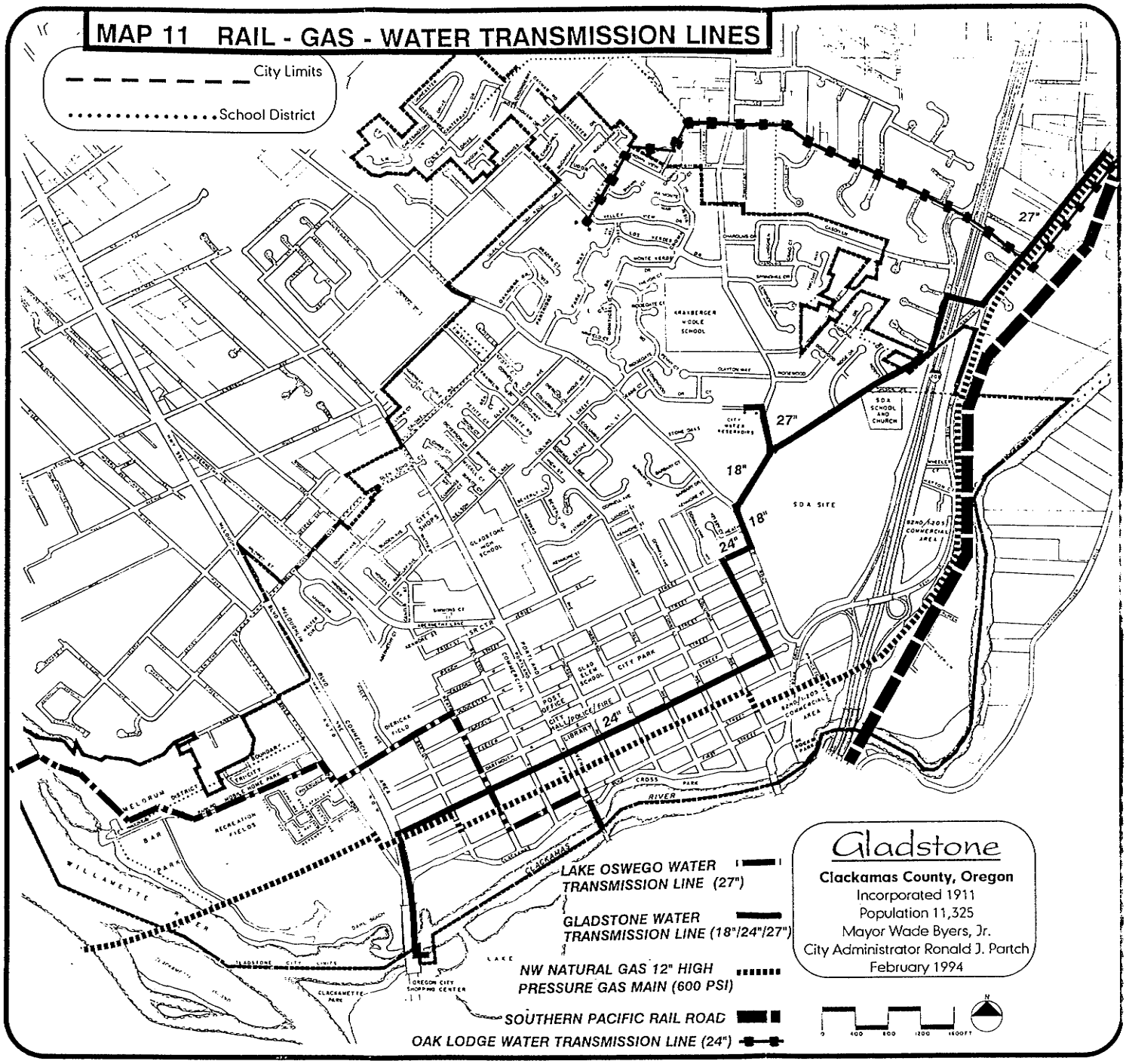
The Oak Lodge Water District 24" water transmission line likewise delivers water from the Clackamas River, along Strawberry Lane and Valley View Road to the Oak Lodge reservoirs off Valley View Drive. These reservoirs provide water service to a limited number of higher elevation city customers.

The City of Lake Oswego also routes a 27" water transmission line through the City of Gladstone and under the Willamette River to the west. (See Map 11) The Lake Oswego water main takes in its supply at the Clackamas River at the foot of Portland Avenue, and continues up Portland Avenue to Arlington Street; Arlington Street to Beatrice Avenue; Beatrice Avenue to Gloucester Street; Gloucester Street to River Road; River Road to Meldrum Bar Park Road; along Meldrum Bar Park Road and north to a point in the northwest point of the park where it continues west under the river. The City of Lake Oswego has indicated its intention to install a new 30" water main parallel to the existing 27" main by the year 2009.

Natural Gas: The Northwest Natural Gas Company operates a 12" High Pressure gas main (600 psi) in the city. It travels east and west through the southern portion of Gladstone from a point at the Willamette River in Meldrum Bar Park/Dahl Beach area to a point on the east city limits. (See Map 11) The gas pipeline proceeds across Meldrum Bar Park to a point on River Road approximately 600' north of the intersection of 99-E and River Road; south on River Road to a point parallel to W. Clarendon Street, crossing under River Road and 99-E to Clarendon Street; Clarendon Street to Barton Avenue; Barton Avenue to Berkeley Street; Berkeley Street to Columbia Avenue; Columbia Avenue to Arlington Street; east on Arlington Street, under I-205, to a point between Edgewater Road and 82nd Drive; and proceeding north parallel to the SPRR tracks between Edgewater Road and 82nd Drive out of the city.

Airport Facilities: There are no airport facilities in the city. The nearest such facilities are Portland International Airport, and a general aviation airport near Mulino.

MAP 11 RAIL - GAS - WATER TRANSMISSION LINES



APPENDIX

TRANSPORTATION

SYSTEM

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APPENDIX

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TABLE A-1
CLACKAMAS COUNTY STREET FUNCTIONAL CLASSIFICATION

Freeway/Expressway:

- Right of way to state and federal standards.
- 4-8 travel lanes, buffered from adjacent properties.
- Serves interregionaland intrareginal trips. Carries heavy volume at high speed.

Major Arterial:

- Right of way - 60 to 110 feet.
- Pavement width - 48 to 66 feet.
- 3-7 travel lanes, buffered if necessary for noise or pollution impact.
- Carries local and through traffic to and from destinations outside local community and connects cities and rural centers. Carries moderate to heavy volume; moderate to high speed.

Minor Arterial:

- Right of way - 60 to 90 feet.
- Pavement width - 40 to 48 feet.
- 2-5 travel lanes, generally located on neighborhood boundaries.
- Connects collectors to higher order roadways. Carries moderate volume at moderate speed.

Boulevard:

- Right of way - 60 to 90 feet.
- Pavement width - 40 to 66 feet.
- 2-6 travel lanes, buffered by landscaping, on neighborhood boundaries.
- A major or minor arterial, with boulevard standards, intended to carry traffic in a pleasant setting. Carries moderate to heavy volume; moderate to high speed.

Collector Street:

- Right of way - 60 feet.
- Pavement width - 24 to 36 feet.
- 2 travel lanes, principal carrier within neighborhoods or single land use areas.
- Links neighborhoods with major activity centers & arterials. Generally not for through traffic. Carries low to moderate volume; low to moderate speed.

Local Street:

- Right of way - 40 feet.
- Pavement width - 22 to 28 feet.
- 2 travel lanes, to serve only traffic with an origin or destination within one neighborhood.
- Provide access to abutting property & connects to higher order roads. Should intersect collectors or, if necessary, minor arterials.

TABLE A-1A

CLACKAMAS COUNTY

URBAN ARTERIAL POLICIES

26.0 Establish the following long range policies for urban arterials:

North Urban Area

I-205. A separated bikeway should parallel I-205 for its entire length in Clackamas County. Traffic demand management, such as ramp metering may be necessary on portions of I-205 to maintain its proper functioning as a freeway.

Johnson Creek Boulevard. Upgrade to urban standards to facilitate industrial access to I-205. Include pedestrian/bikeway facilities. Additional right-of-way may be required in some areas. Roadside parking, access and visual obstructions shall be limited. Improve the intersection with Linwood/Flavel Drive. Johnson Creek Boulevard is appropriate for a transit route. Johnson Creek Boulevard should be developed as a boulevard between 82nd Avenue and 45th. Extend Johnson Creek Boulevard east to the I-205 interchange.

Linwood Avenue. Widen and complete bikeways. Improve intersections with Johnson Creek Boulevard, King Road and Monroe Avenue. Linwood is appropriate for a transit route. Transit-supportive improvements may be required.

Flavel Drive. Widen and include pedestrian/bikeways. Improve the intersection with Johnson Creek Boulevard.

King Road (West of 82nd). King Road is appropriate for a transit route. Bus turnouts and shelters may be required. Improve intersections with 42nd/Harrison, Stanley, Linwood, Bell, and Fuller Roads. Access and visual obstructions should be strictly controlled. The pedestrian/bikeway should be improved.

82nd Avenue. Improve intersections with King Road, Otty Road, and Johnson Creek Boulevard. Control access and visual obstructions. Improve amenities for transit. North of Milwaukie Expressway, 82nd Avenue should be developed as a boulevard.

Harmony Road. Improve intersection with Linwood and Railroad Avenue. Improve crossing of railroad tracks. Access and visibility shall be strictly controlled. Harmony is appropriate for a transit trunk route. Develop a pedestrian/bikeway between Lake Road and Linwood Avenue.

Railroad Avenue. Widen and improve the surface. Improve intersections with Linwood/Harmony and Monroe. Develop pedestrian/bikeway facilities including access across the railroad to employment areas. Control access and visibility. Railroad Avenue is appropriate for a transit trunk route.

Lake Road. Widen with turn lanes where appropriate. Control access. Improve intersections with International Way and Webster/Highway 224. Connect bikeway to other bikeways. Improve alignment north of Highway 224. Lake Road is appropriate for a transit route. Transit-supportive improvements may be required.

Source: Clackamas County Comprehensive Plan, revised 1992.

Webster Road. Improve the curve near Clara Avenue. Improve intersections with Jennings, Roots, Thiessen, and Lake/Highway 224. Webster is appropriate for a transit route. Transit/pedestrian supportive improvements may be required.

Johnson Road and Lake Road East of Webster. Widen between Webster Road and Clackamas Road with turn lanes if needed. Improve intersections with Thiessen and Clackamas. Develop a pedestrian/bikeway. Johnson is appropriate for a transit route. Transit-supportive improvements may be required. Johnson should be emphasized over Clackamas Road as part of a traffic route to I-205 and areas to the east. Access and visibility shall be controlled.

McKinley Avenue Area. Thiessen Road and Roots Road should be improved as part of the major traffic connection to I-205 and areas to the east, including possible realignment and right-of-way acquisition. The improvements shall include pedestrian/bikeway facilities. Access and visibility shall be controlled. A study of the area shall be conducted to determine the exact extent of improvements.

Thiessen Road. Maintain Thiessen Road with two lanes. Improve the existing roadway and widen shoulders with turn lanes where appropriate. Improve intersections with Webster, Johnson, Hill, and Aldercrest. Improve visibility for drivers. Control access for new developments. Develop a pedestrian/bikeway along the entire length of Thiessen including connections to schools and collectors where appropriate. Thiessen is appropriate for a transit route between McLoughlin Boulevard and areas to the east and may have bus turnouts and shelters where appropriate. Additional right-of-way may be required to accommodate turning movements, widening, or pedestrian facilities. Design review of developments and approval of subdivisions adjacent to Thiessen shall require pedestrian and transit-supportive amenities which may include street trees, landscaping, street lights, bike racks, pedestrian access to the street, shelters or outdoor seating.

Concord Avenue. Improve and upgrade as a minor arterial between River Road and Oatfield Road including widening and improvement of intersections with River Road and Oatfield. West of Oatfield, Concord Avenue is appropriate for a transit route, and transit-supportive improvements may be required. Develop a pedestrian/bikeway facility with good connections to other bikeways.

Oatfield Road. Improve traffic flow and visibility at intersections with arterials and collectors. Oatfield is appropriate for a transit route. Bus turnouts and shelters are appropriate. Improve roadway alignment and width around curves near Kellogg Creek. More capacity may be needed between Thiessen Road and Concord Avenue. Improve intersections with Park Avenue, Courtney Avenue, Hill Road, Roethe Road, and McNary Road.

McLoughlin Boulevard. Develop continuous sidewalks and bikeways along both sides of the highway. McLoughlin is appropriate for a transit trunk route with supporting features. Improve pedestrian access to bus stops and pedestrian crossings. Restrict curbside parking and visual obstructions. Improve turning movements in Milwaukie. Improve both intersections with River Road. Additional capacity is needed throughout McLoughlin, but especially from Milwaukie north. McLoughlin should be developed as a boulevard from Oregon City north.

River Road. Complete bikeway connections to other bikeways. River Road is appropriate for a transit route. Transit-supportive features may be required. Control access and visual obstructions. Improve connections to McLoughlin Boulevard. Realign River Road to meet Harrison in Milwaukie.

Jennings Avenue/Roots Road. Improve the connection between Jennings Avenue and Roots Road. Develop a pedestrian/bikeway. Widen with turn lanes where appropriate and smooth vertical and horizontal curves.

I-205 and 82nd Drive Interchange. Initiate a study to determine appropriate interchange improvements and related local street improvements needed to accommodate development at the interchange.

Stevens Road/92nd Avenue Widen and include a pedestrian/bikeway facility. Control access. Intersections with Idleman and Otty Roads should be realigned. Stevens/92nd is appropriate for a transit route. Transit-supportive features may be required. When the Stevens to Otty frontage road is developed, change the portion of Stevens Road bypassed by the frontage road to the collector classification.

Otty Road/Idleman Road (East of 82nd Avenue). When Happy Valley develops to urban density, Otty/Idleman should be improved to full paved curbed width to 82nd. Develop a pedestrian/bikeway facility and control access. Curves should be realigned. Intersections with 82nd, 92nd and Mt. Scott Boulevard should be improved. Otty/Idleman should be developed to be appropriate for transit.

Sunnybrook. Widen to five lanes from 82nd Avenue to 93rd Avenue, to serve as the south leg of the I-205 split diamond interchange.

97th Avenue. Between Sunnyside Road and Sunnybrook Road, 97th Avenue will become a one way southbound street to serve as a couplet with a northbound frontage road to be built as part of the I-205/Sunnyside split diamond interchange.

Mt. Scott Boulevard/129th Avenue. Mt. Scott Boulevard should be improved to full paved curbed width with pedestrian/bikeway facilities. A new road, to bypass 129th from 122nd to King Road, with center turn lane, sidewalks, and bikeway should be built. Access and visual obstructions should be controlled. Intersections with Idleman and Ridgecrest should be improved. At Mt. Scott Boulevard/King Road/122nd Avenue, the road should be widened and the sharp curve smoothed. The Mt. Scott/129th bypass should be developed to be appropriate for transit.

122nd Avenue/Hubbard Road (North of Highway 212). Improve 122nd to full paved curbed width with a pedestrian/bikeway facility. Access and visual obstructions should be controlled. Hubbard Road and 122nd should be developed to be appropriate for transit.

Sunnyside Road (East of 82nd). East of I-205, Sunnyside needs widening, signal improvements, sidewalks, streetlights, and a bikeway. Improvement of intersections at 132nd, 142nd and 147th are required. Developments and subdivisions along Sunnyside shall be subject to strict access control. Sunnyside is appropriate as a transit route. Transit related improvements may be required. Right-of-way sufficient for five lanes shall be acquired. West of 122nd, Sunnyside Road should be developed as a boulevard.

Highway 212 from I-205 to Carver Junction. Highway 212 needs turn lanes and bus turnouts where appropriate and strict access control. Improve intersections with Evelyn and 82nd. Develop a continuous pedestrian/bikeway separated from the roadway where practical and connected to other pedestrian/bikeways. Highway 212 is an appropriate route for transit and shall have transit-supportive improvements where appropriate.

Highway 212 east of Carver Junction. Improve the intersection with Highway 224. Improve curves east of Carver Junction. Widen shoulders sufficiently for a bikeway. Correct visibility deficiencies at intersections of Armstrong Circle, 222nd and 232nd. Improve intersections with Foster and Sunnyside. Improve traffic flow through Boring and Damascus. Control access and parking. Consolidate and improve intersections. Widen Highway 212 to three to five lanes as part of the Sunrise Corridor.

82nd Drive/Evelyn Street. Widen 82nd Drive and include a pedestrian/bikeway. Improve the intersection of 82nd with Highway 212. Control access and parking, and add transit supportive amenities. Widen Evelyn Street from Jennifer Street to Highway 212 and require sidewalks, bikeways, and streetlighting. Improve intersections with Jennifer Street and Highway 212. Add transit-supportive amenities. South of Highway 212, 82nd Drive shall be developed as a boulevard as described in Table V-1. North of Highway 212, review and approval of developments adjacent to 82nd Drive may require pedestrian and transit-supportive features.

102nd Avenue/Clackamas Road/Industrial Avenue/Lawnfield Road. Widen and construct to minor arterial standards. Improve intersections with Highway 212, Mather Road, and Sunnybrook and/or Sunnyside Road. Smooth curves. Pedestrian facilities and streetlights are needed.

Jennifer Street/135th Avenue. Develop as a minor arterial between Evelyn Street and 135th Avenue. Improve intersections with Evelyn Street and Highway 212. Street lights and curbs shall be required. Upgrade to a minor arterial.

142nd Avenue. When the Sieben Creek area develops to urban density, upgrade 142nd Avenue to minor arterial standards. Pedestrian/bikeway facilities and streetlights shall be required.

South Urban Area

Holcomb Boulevard. Within the Urban Growth Boundary, Holcomb should be developed to full paved curbed width with a pedestrian/bikeway and strict access control. Sharp curves should be improved. Holcomb is appropriate for transit.

Warner Parrott/Warner Milne Roads. These roads shall be developed as minor arterials with pedestrian/bikeway facilities and streetlights. Major intersection realignment and improvement is needed at the Leland Road/Linn Avenue intersection with Warner Parrott and Warner Milne. Warner Milne needs capacity improvements which may require widening for additional lanes.

South End Road. South End Road should have an improved connection to Highway 99E near South First Street. Within the Urban Growth Boundary, South End Road should have full paved curbed width with a pedestrian/bikeway. Access should be controlled. South End Road is appropriate for transit. South End Road should be a major connection between the area south of Oregon City and Highway 99E.

Central Point Road. Within the Urban Growth Boundary, Central Point should have full paved curbed width and a pedestrian/bikeway. Access should be controlled. The intersection with Leland should be improved. Central Point is appropriate for transit.

Leland Road. Within the Urban Growth Boundary, Leland should have full paved curbed width and a pedestrian/bikeway. Access should be controlled. Intersections with Central Point, Meyers and McCord should be improved. Leland is appropriate for transit.

Highway 213 South of Oregon City. Highway 213 should have a bikeway, sidewalks, bus turnouts, and shelters where appropriate from Clackamas Community College to the UGB. South of the college, the highway should be widened to four lanes. Turn lanes may be needed at Henrici and Leland Roads. Highway 213 should have strict access and visibility control throughout. The intersection of Beavercreek Road and Highway 213 (Oregon City Bypass) should be grade separated.

Beavercreek Road. Beavercreek Road should have three to five lanes, with full paved curbed width within the Urban Growth Boundary. Access shall be strictly controlled. A pedestrian/bikeway should connect Oregon City to Clackamas Community College and Moss Junior High School.

Redland Road. Redland Road should have paved shoulders suitable for a bikeway between Oregon City and the Redland community.

Clackamas River Drive. Clackamas River Drive shall have pedestrian/bikeway facilities and streetlights from the Oregon City bypass (Highway 213) east to the Urban Growth Boundary.

West Urban Area

I-205. Between I-5 in Washington County and the Willamette River, I-205 should have a separated bikeway facility. Outside of the Urban Growth Boundary, I-205 shall be designated as a scenic highway.

Highway 43. Highway 43 should be developed to full paved curbed width with continuous turn lanes where appropriate. Access and visual obstructions should be strictly controlled. More roadway capacity is needed north of I-205. Highway 43 is suitable for transit and should have bus turnouts and shelters where appropriate.

Terwilliger Boulevard Extension. Terwilliger should have strict access control and wider shoulders. Terwilliger is appropriate for transit and should have bus turnouts and shelters at Tryon Creek State Park.

Stafford Road (North of I-205). Stafford Road will need increased capacity, full paved curbed width, strict access control and a continuous pedestrian/bikeway.

Borland Road. Within the Urban Growth Boundary (UGB), Borland should be developed to full paved curbed width with pedestrian/bikeway facilities on both sides of the road. Outside of the UGB, shoulders should be widened for a bikeway and both vertical and horizontal curves smoothed.

Lower Boones Ferry Road. Lower Boones Ferry should have full paved curbed width with pedestrian/bikeway facilities along the full length. Access and visual impairments shall be strictly controlled. Lower Boones Ferry is appropriate for transit. Bus turnouts and shelters may be required.

County Club Road. Country Club Road is appropriate for transit. Transit-supportive improvements may be required.

Kruse Way. Kruse Way shall be protected with strict access control. As vacant land along Kruse Way develops, a second pedestrian/bikeway facility may be needed along with pedestrian crossings. Kruse Way is appropriate for a transit trunk route. Bus turnouts and shelters should be provided where appropriate. Kruse Way shall be designated a boulevard.

Childs Road. Childs Road in the urban area should have full paved curbed width with pedestrian/bikeway facilities and street lights. Bikeways should be provided east to Stafford Road in the nonurban area. Intersections with Bryant Road and Stafford Road should be improved.

NEW ROADS AND PROJECTS

27.0 Designate and describe new roads and realignments for the urban area: (see Map V-2a and V-2b)

North Urban Area

Jennings Avenue/Roots Road. Realign Jennings and/or Roots to intersect at Webster to improve east/west traffic flow.

Fuller. A new collector will extend south from the intersection of Fuller and Otty Roads and then turn west to the intersection of 82nd Avenue and King Road. It will be developed with pedestrian/bikeway facilities and streetlights.

Monterey. Extend Monterey Avenue west to Fuller Road. This extension will be a collector.

80th Avenue Extension. A new two-lane frontage road parallel to 82nd Avenue will extend south from the extension of Causey and then east to 82nd opposite one of the entrances to the Town Center. The exact location will be determined as part of the Clackamas Town Center design plan.

Johnson Creek Boulevard/I-205 Interchange. A new interchange on I-205 with an extension of Lester west to 82nd Avenue at Johnson Creek Blvd. Related improvements to 92nd and Fuller Road. Provides new access to I-205 and relieves congestion at the Sunnyside/I-205 Interchange.

Monterey Overpass. A pedestrian and vehicle overpass from Stevens Road to Monterey just north of the Town Center. This will improve circulation in the Town Center area and reduce congestion at the Sunnyside I-205 interchange.

Idleman Road/Otty Road/92nd Avenue. Realign intersection to improve traffic flow.

Otty to Stevens Frontage Road. A two-lane frontage road to remove through traffic from neighborhoods along 92nd Avenue and Stevens Road and to improve circulation east of I-205.

Sunnybrook Split Diamond. Reconfigure the Sunnyside/I-205 interchange to a "Split Diamond" design. Includes widening Sunnybrook to five lanes from 82nd Avenue to I-205 and extending Sunnybrook east, behind Kaiser Hospital to 108th or Valley View Terrace.

Sunrise Corridor. A new freeway or expressway from Milwaukie Expressway/I-205 to Highway 212 at approximately 135th. This is the first phase of improvements from the Marquam Bridge along McLoughlin Boulevard, the Milwaukie Expressway, and Highway 212 to Highway 26.

Industrial Avenue. Extend Industrial Avenue north to connect with Lawnfield Road. This extension will be a minor arterial.

Evelyn Street Railroad Overpass. Construct overpass over railroad to connect Evelyn Street to 82nd Drive. Provide new access to I-205 for the Clackamas Industrial Area and relieve congestion at the 82nd Drive/Highway 212 intersection.

Jennifer Street. Complete the connection between Jennifer Street and 135th Avenue. Right-of-way dedication, curbs, and streetlights will be required.

132nd Avenue. Extend southward to intersect Hubbard Road. Develop as a residential collector.

A new residential collector shall connect Mather Road east to 152nd Avenue, running roughly 1,000 feet north of the section line between Sections 2 and 11, T2S, R2E, with deviations as necessary for terrain features.

A new residential collector shall run generally northwest from Mather Road to 97th Avenue.

A new residential collector shall run from Stevens Road east to the vicinity of Otty Road and then turn north and east to Mt. Scott Boulevard in the vicinity of Greiner Lane, with deviations as necessary for terrain features.

A new residential collector will run east from the intersection of Lester Avenue and 92nd Avenue, then turn south to meet Idleman Road in the vicinity of Champagne Lane, with deviations as necessary for terrain features.

A new residential collector shall run between 122nd and 147th, roughly 1,500 to 2,000 feet north of Sunnyside Road, with deviations as necessary for terrain features.

As much as practical, new local roads in the Rock Creek/Sieben Lane and Sunnyside urban areas shall intersect collectors rather than arterials. If intersection with an arterial is necessary, minor arterials are preferred.

South Urban Area

Meyers Road. Extend south and east to meet with the south end of the Oregon City Bypass. Develop as a collector.

West Urban Area

Tannler Drive. Extend generally northward to meet with the north end of Salamo Road, with deviations as necessary for terrain features. Develop as a minor arterial.

TABLE A-2

AVERAGE DAILY AND PM PEAK HOURLY ROADWAY CAPACITY AT LEVEL OF SERVICE "E"

Street Lane Configuration	*Daily Volume*[1]	*Peak Hour Volume*[2]
Two-Way Traffic		
2 lane	*11,300*	*1,400*
3 lane (2 + lefts)	*16,000*	*1,800*
4 lane	*23,900*	*2,800*
5 lane (4 + lefts)	*28,900*	*3,600*
One-Way Traffic		
2 lane	*13,700*	*1,400*
4 lane	*26,400*	*2,800*

The daily service volumes shown are based on a number of inherent assumptions including percentage of green cycle time, percentage of left and right turns, percent of trucks relationship of peak hour traffic to Average Weekday Traffic (AWDT) and directional peaking. PM peak hour service volumes are commonly used in travel demand modeling process.

[1]*Source: Basmaciyan-Darnell, Inc.*
[2]*Source: City of Portland, Office of Transportation*

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TABLE A-3

UNSIGNALIZED INTERSECTIONS
Level of Service Definitions

Reserve Capacity Passenger Cars Per Hour	*Level of Service*	*Expected Delay to Minor Street Traffic*
> 400	*A*	*Little or no delay*
300 - 399	*B*	*Short traffic delays*
200 - 299	*C*	*Average traffic delays*
100 - 199	*D*	*Long traffic delays*
0 - 99	*E*	*Very long delays*
*	*F*	*

*When demand volumes exceed the capacity of the lane, extreme delays will be encountered. This condition usually warrants improvement to the intersection.

Source: Transportation Research Board "Highway Capacity Manual," Special Report 209 (1985).

TABLE A-4

ARTERIAL
Level of Service Definitions

Level of Service	*Typical Traffic Flow Conditions*	*Volume to Capacity Ratio (V/C)*
A	*Relatively free flow of traffic with some stops at signalized or stop sign controlled intersections. Average speeds at least 30 miles p.hour.*	*<0.60*
B	*Stable traffic flow with slight delays at signalized or stop sign controlled intersections. Average speed varies between 25 - 30 miles p.hour.*	*0.60 - 0.80*
C	*Stable traffic flow, with delays at signalized or stop sign controlled intersections greater than at level B, but yet acceptable to the motorist. Average speeds vary between 20 - 35 miles p.hour.*	*0.80 - 0.90*
D	*Traffic flows approach unstable operating conditions. Delays at signalized or stop sign controlled intersections would be tolerable and could include waiting through several signal cycles for some motorists. Average speed is varies between 15 - 20 miles per hour.*	*0.90 - 1.00*
E	*Traffic flow is unstable with congestion and intolerable delays to motorists. Average speed is approximately 15 miles per hour.*	*1.00 - 1.10*
F	*Traffic flow is forced and jammed with stop and go operating conditions and intolerable delays. Average speed is less than 15 miles per hour.*	*> 1.10*

Source: Transportation Research Board " Highway Capacity Manual", Special Report 209, (1985).

TABLE A-5

SIGNALIZED INTERSECTIONS
Level of Service Definitions

Level of Service	Traffic Flow Characteristics
A	**Virtually Free Flow.** Very low average stopped delay, less than five seconds per vehicle. Most vehicles do not stop at all.
B	**Stable Flow.** Average stopped delay of 5.1 to 15.0 seconds per vehicle. More vehicles stop than for LOS A.
C	**Stable Flow.** Average stopped delay of 15.1 to 25.0 seconds per vehicle. Individual cycle failures may begin to appear.
D	**High Density But Stable Flow.** Average stopped delay of 25.1 to 40.0 seconds per vehicle. Influence of congestion becomes more noticeable. Individual cycle failures are noticible.
E	**Operating Conditions at or Near Capacity.** Average stopped delay of 40.1 to 60 seconds per vehicle, the limit of acceptable delay. Poor progression, long cycle length, and high volume/capacity ratios. Individual cycle failures are frequent occurrences.
F	**Forced Flow, Breakdown Conditions.** Average stop delay in excess of 60 seconds per vehicle, unacceptable to most drivers. This condition may also occur at high volume/capacity ratios below 1.00 with many individual cycle failures.

Note: A signal cycle failure is considered to occur when one or more vehicles are forced to wait through more than one green signal indication for a particular approach.

Source: Transportation Reseach Board, "Highway Capacity Manual", Special Report 209, (1985).

REPORTED TRAFFIC ACCIDENTS IN GLADSTONE

TABLE I

Summary: State & Local Streets by Year

	1986	1987	1988	1989	1990	1991	1992	1993
System Street(1)	52	62	47	52	51	50	72	52
Non-System Street (2)	92	93	56	64	89	67	69	75
TOTAL	**144**	**155**	**103**	**116**	**140**	**117**	**141**	**127**

(1) "system" refers to accidents occurring on state highways, i.e. I-205 and 99-E only.

(2) "non-system" refers to traffic accidents that occur on all other Glastone streets.

REPORTED TRAFFIC ACCIDENTS IN GLADSTONE

TABLE II
Summary: Street by Year
(footnotes on last page.)

Non-System Street (1)	1986	1987	1988	1989	1990	1991	1992	1993
Abernethy	2	2	4	1		1		
Addie	1							
Arlington (4)	13	10	3	6	6	5	7	10
Barton		2				2		1
Beatrice		1	2				1	
Bellevue		1	1	2	1	2	2	2
Berkeley (5)	3	3	2		5	5	1	
Beverly				1		1		
Buckingham		1						
Caldwell		2						1
Canterbury			1					
Cason (2)							1	2
Center	1							
Chessington							1	
Chris Court				1				
Clack. Blvd		1					1	
Clarendon	1	1		4		4	1	2
Clayton Way								1
Collins Crest	1							
Columbia		1	4	5	7	3		4
Cornell	1	1		1	1	2	1	
Crownview			1		1			
Dartmouth	2	1	2	3		2	2	4
Edgewater								1

TABLE II

Non-System Street	1986	1987	1988	1989	1990	1991	1992	1993
Exeter	1	3		2	2		3	
Fairfield							1	
Glen Echo	1	2	1		2			5
Gloucester	5	3	2	2	1	2	1	4
Harvard		2			1	1		
Hereford	3	1			1	1		5
High Street				1				
Jennings	3	1			1	1		
Kenmore								1
Los Verdes	1	1						2
Manor					1			
Meldrum Bar								1
Monte Verde		1						
Nelson Lane								1
Oakridge						1		
Oatfield	27	21	15	16	23	19	21	18
Ohlson							1	
Park Way	1							
Portland	12	11	8	14	16	9	9	4
Ridgegate	2	1			1	1		
River Road	2	4	3		4		4	2
Springhill							1	
Stonehill								1
Stonewood							1	
Valley View		1			3			
Webster Rd	3	7	6	4	6	5	6	1

TABLE II (Page 3 of 3)

Non-System Street	1986	1987	1988	1989	1990	1991	1992	1993
Yale Avenue								1
82nd Drive	6	7	1	1	6	1	3	1
State System(3)								
McLoughlin	33	42	32	33	29	35	21	24
I-205	19	20	15	19	22	15	32	28

(1) "non-system" refers to traffic accidents that occur on Glastone streets other than on the State Sytem (I-205 and 99-E).
(2) Cason Road posted speed reduced to 30 mph in 1991.
(3) "system" refers to accidents occurring on state highways, i.e. I-205 and 99-E only.
(4) Arlington Street posted speed reduced to 25 mph in 1994.
(5) Stop signs installed @ Cornell and Harvard in 1992.

REPORTED TRAFFIC ACCIDENTS IN GLADSTONE

TABLE III

Accidents by Intersection by Year(1)
(footnotes on last page)

Non-System Street (2)	At or Near	1986	1987	1988	1989	1990	1991	1992	1993
Abernethy	Barclay			1			1		
	Center		1		1				
	Duniway	1							
	GlnEcho(3)	1	1	3					
Addie	Duniway(9)	1							
Arlington	Barton		1	1			1		1
	Beatrice	2				1		1	
	Chicago	1							
	Columbia	1							3
	Cornell	1				1		1	
	Harvard		1				1		
	Portland	3	2		1			1	3
	Princetn				1				
	Yale		2			2		2	1
	82nd Dr	5	4	2	4	2	3	2	1
Barton	Berkeley						1		
	Clarendn						1		
	Exeter		2						
Beatrice	Berkeley		1						
	Exeter							1	
	Fairfld			1					
	Kenmore			1					
Bellevue	Berkeley				1				
	Clarendon			1				1	
	Dartmouth							1	
	Exeter						1		

TABLE III (Page 2 of 7)

Non-System Street	At or Near	1986	1987	1988	1989	1990	1991	1992	1993
Bellevue	Fairfld					1			
	Hereford		1		1		1		1
Berkeley	Chicago						1		
	Cornell(8)	1	1			2	1		
	Harvard(8)		1			1	2		
	Union	1		1				1	
	Yale	1	1	1		1	1		
	Unknown					1			
Beverly	Harvard				1		1		
Buckingham	Unknown		1						
Caldwell	Scott Lane		1						
	Tims View		1						
Canterbury	Devonshr			1					
Cason	Cason Cir.								1
	Charolais							1	
Center	Howell	1							
Chessington	Chess Ct							1	
Chris Ct.	Glen Echo				1				
Clack Blvd.	Beatrice							1	
	First Ave		1						
Clarendon	Barton				1		1		
	Beatrice(8)						1		
	Chicago	1						1	
	Columbia						1		
	Cornell				1				1
	Harvard						1		
	Union		1						
	Yale				2				
Collins Cr.	Cornell	1							

TABLE III

Non-System Street	At or Near	1986	1987	1988	1989	1990	1991	1992	1993
Columbia	Exeter			1					
	Fairfield			1			1		
	First Ave			2	1	5	1		2
	Herefd(4)				4	1	1		1
	Stonehill		1			1			
Cornell	Exeter	1				1	2	1	
	Herefrd(10)		1		1				1
	Stonehill								1
Crown View	Crown View			1		1			
Dartmouth	Barton	1	1		1		1		1
	Bellevue			1	1				1
	Chicago	1							
	Columbia						1		
	Harvard								1
	Unknown			1	1			2	
Exeter	Beatrice		1		1				
	Bellevue	1	1		1			1	
	Chicago(10)		1					2	
	Union					1			
	Unknown					1			
Fairfield	Harvard					1		1	
Glen Echo	Columbia	1		1					
	Petite Ct.		1			1			1
	Windsor					1			
	Unknown		1						1
Gloucester	Beatrice	1				1	1		
	Bellevue	1					1		
	Columbia	1							1
	Cornell	2			1				

TABLE III

Non-System Street	At or Near	1986	1987	1988	1989	1990	1991	1992	1993
Gloucester	Harvard			2					
	Risley				1			1	1
	Yale		2						1
	Unknown		1						
Harvard	Herefrd(10)						1		
	Jersey		1						
	Kenmore		1						
Hereford	Beatrice	1							
	Chicago(10)								1
	Harvard(10)	1	1						
	High St.(10)	1				1			
High Street	Patricia				1				
Jennings	Dagmar	1	1				1		
	Lancaster	1							
	Nottingham	1				1			
Los Verdes	Crownview	1							
	Valley View		1						
Manor	Unknown					1			
Monte Verde	Monticello		1						
Nelson Lane	Sunlite Ct.								1
Oak Ridge	Valley View						1		
Oatfield	Angus		1						
	Caldwell	5	1	1		1	1		1
	Collins Cr	1			1		2	1	
	Dartmouth	2	2		2	1	1	5	1
	Exeter				1				1
	Fairfield		2	1				1	
	Glen Echo	5	2		2	5	5	1	4
	Gloucester		1	4	1	3	3		4

TABLE III (Page 5 of 7)

Non-System Street	At or Near	1986	1987	1988	1989	1990	1991	1992	1993
Oatfield	Hereford			1	2	1	1	3	
	Kenmore	1	1		1	1			2
	Oakridge	1	2	1	2	2			1
	Parkway		1						
	Ridgegate	1			2			2	1
	Stonehill	1			1	1			2
	Webster	6	3	2	1	2	3	4	4
	82nd Drive	3	5	4		5	3	4	1
	Unknown	1		1		1			
Ohlson	Cason							1	
Park Way	Unknwon	1							
Portland Ave	Abernethy		1	1	1		1		1
	Barclay	1	3	2		2	1		
	Berkeley				2	1		1	
	Caldwell				1				
	Clarendon	1	1	1	3	1			1
	Dartmouth (5) (11)	4	1	3	3	7	4		1
	Exeter	1	2		1		2	1	1
	Glen Echo				1		1		1
	Gloucester	4			1	4		7	
	Hereford	1		1	1	1			4
	Jersey		1						1
	Nelson Lane		2						
Ridgegate	Stonewd(8)	1					1		
	Unknown	1	1			1			
River Road	Gloucester		1	1		1		2	
	Mel Bar Rd	2	2	1		3		2	1
	Riverdale		1						1

Non-System Street	At or Near	(7) 1986	1987	1988	1989	1990	1991	1992	1993
River Road	Unknown			1					
Springhill Dr	Sprnghl Pl							1	
Stonewood Dr	Stonewd Ct							1	
Valley View	Crownview					2			
	Oakridge		1			1			
Webster Road	Cason Road		1	2		1	1		2
	Charolais							2	
	Clayton		2			1	1	1	1
	Kirkwood		1	1	2	3		1	
	Los Verdes	1	2	2		1	2		2
	Ridgewood	1			1			1	
	Springhill			1	1		1	1	
	Swanson	1	1						
Yale Avenue	First Street								1
82nd Drive	Unknown	1	1	1	1			1	
	Berkeley					1			
	Columbia		1			1			
	Edgewater					2	1		1
	Hatton Ct.	2							
	I-205	3	5			2		2	
State Syst.(6)									
McLoughlin	No Cross		13	13	7	8	4	9	5
	Arling/River	6	13	11	7	9	14	7	12
	Clarendon	1	3	1	1	3	7	4	1
	Dartmouth		4	2	6	2	4	6	3
	Glen Echo							1	
	Gloucester		9	5	5	5	3	11	5
	River Road							2	1
	Bridge				7	2	3		
I-205		19	20	15	19	22	15	32	28

(1) Reported accidents at Gladstone Intersections have been arranged alphabetically by the city's street hierarchy, ie, where the higher classified street is listed first. For istance, traffic accidents reported at Dartmouth and Oatfield are listed in the Table above as Oatfield at Dartmouth, since Oatfield is a minor arterial and Dartmouth a collector; accidents reported at Portland Avenue and Arlington (both are classified as minor arterials) are listed as "Arlington at or near Portland Ave.".

(2) "non-system" refers to traffic accidents that occur on Glastone streets other than on the State System, i.e., I-205 and 99-E.

(3) 4-way stop installed in 1990.

(4) Stop signs on Columbia installed in 1991.

(5) 4-way stop installed in 1991.

(6) "system" refers to accidents occurring on state highways, i.e. I-205 and 99-E only.

(7) Full year 1986 "system" data not in file.

(8) Stop signs installed in 1992.

(9) 4-way stop installed in 1994.

(10) Stop signs installed in 1994.

(11) Flashing red lights installed in 1994.

TABLE A-7

STREET INTERSECTION ACCIDENTS BY STREET CLASSIFICATION
1986 - 1993

Street Intersections by Street Classification	Number of Accidents	Overall Rank
Minor Arterial/Collector St.	130	1
Minor Arterial/Local St.	108	2
Minor Arterial/Minor Arterial	83	3
Major Arterial/Minor Arterial	79	4
Major Arterial/Collector St.	70	5
Local St./Local St.	33	6
Major Arterial/Local St.	21	7
Collector St./Collector St.	5	8
Collector St./Local St.	0	9

TABLE A-8
TRAFFIC ACCIDENTS ON SELECTED STREETS
BEFORE & AFTER INSTALLATION OF STOP SIGNS
1986 - 1993

Street Intersection	1986	1987	1988	1989	1990	1991	1992	1993	1994
Abernethy Ln./ Glen Echo Ave.	1	1	3	0	0*	0	0	0	-
Portland Ave./ Dartmouth St.	4	1	3	3	7	4*	0	1	-+
Columbia Ave./ Hereford St.	0	0	0	4	1	1*	0	1	-
E.Berkeley St./									
Cornell Ave.	1	1	0	0	2	1	0*	0	-
Harvard Ave.	0	1	0	0	2	1	0*	0	-
Monticello Dr./ Ridgegate Dr.	1	1	0	0	1	0	0*	0	-
Ridgegate Dr./ Stonewood Dr.	1	0	0	0	0	1	0*	0	-
Addie St./ Duniway Ave.	1	0	0	0	0	0	0	0	-*
Hereford St./									
Chicago Ave.	0	0	0	0	0	0	0	1	-*
Harvard Ave.	1	1	0	0	0	1	0	1	-*
Cornell Ave.	0	1	0	1	0	0	0	1	-*
High St.	1	0	0	0	1	0	0	0	-*
W.Clarendon St./ Beatrice Ave.	0	0	0	0	0	1	0	0	-*
Hull Ave./									
Tim's View Ave.	0	0	0	0	0	0	0	0	-*
Hardway Ct.	0	0	0	0	0	0	0	0	-*
Caldwell Rd./ Franklin Way	0	0	0	0	0	0	0	0	-*
Addie St./ Barclay Ave.	0	0	0	0	0	0	0	0	-*
Clackamas Blvd./ Portland Ave.	0	0	0	0	0	0	0	0	-*
Nottingham Dr./ Devonshire Dr.	0	0	0	0	0	0	0	0	-*

*Stop signs installed in this year.
+Flashing red lights installed in this year.

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TABLE A-9

SUMMARY OF COMPLAINTS CONCERNING SPEEDING TRAFFIC
(1991 to Present)

DATE	STREET	REGULATORY ACTION
May 1991	Cason Road	Posted speed reduced
July 1991	Columbia/Hereford	Stop Signs
July 1991	Portland/Dartmouth	Four-way stop
July 1991	W. Dartmouth	None except enforcement
July 1991	W. Gloucester	None except enforcement
August 1991	Abernethy Lane	None except enforcement
October 1991	Meldrum Bar Road	None except enforcement
January 1992	Crownview Drive	Centerline reflectors
January 1992	Monte Verde Drive	Centerline reflectors
January 1992	E. Berkeley	Stop signs
June 1992	W. Gloucester	More speed signs
June 1992	W. Clarendon	Speed limit signs
August 1992	Monticello/Ridgegate	Stop signs
August 1992	Ridgegate/Stonewood	Stop signs
March 1993	W. Dartmouth	Larger speed signs
March 1993	W. Berkeley	Letter to nearby residents
July 1993	Glen Echo/Petite Ct.	Clear vision improved
September 1993	W. Arlington	Speed limit reduced
September 1993	Abernethy Lane	None except enforcement
February 1994	Fairfield Street	None except enforcement
February 1994	Addie Street	Four-way stop at Duniway
February 1994	Devonshire Drive	Stop signs
May 1994	E. Hereford, W. Clarendon	Stop signs
May 1994	Chicago @ Exeter	Stop signs (now 4-way stop)
May 1994	Tim's View @ Hull	Stop signs
May 1994	Hardway Ct. @ Hull	Stop Signs
May 1994	Franklin Way @ Caldwell	Stop Signs
June 1994	Portland @ Dartmouth	Flashing red lights
July 1994	Addie & Barclay	Stop signs (now 4-way stop)
July 1994	High School area	Limited parking signs
July 1994	Oatfield Road	Remove dagmars (lg round road bumps)
September 1994	Nottingham/Devonshire	Stop signs
January 1995	Clack. Blvd. @ Portland	Stops signs (now 3-way stop)

January, 1995

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SECTION A-10

IMPLEMENTATION ORDINANCES

ORDINANCE NO. 1175, Amending Title 17 of the Gladstone Municipal Code [adopted May, 1993]

ORDINANCE N0. 1171, Amending Title 17 of the Gladstone Municipal Code [adopted March, 1993]

ORDINANCE NO. 1175

AN ORDINANCE AMENDING TITLE 17 OF THE GLADSTONE MUNICIPAL CODE BY ADOPTING REVISED STANDARDS TO COMPLY WITH THE TRANSPORTATION PLANNING RULE AND REAFFIRMING ALL REMAINING PROVISIONS OF TITLE 17 OF THE GLADSTONE MUNICIPAL CODE.

The City of Gladstone does ordain as follows:

Section 1. Subsection P of Section 17.50.040 of the Gladstone Municipal Code is amended to read as follows:

"P. Bicycle Routes. Bicycle/pedestrian ways shall be required when consistent with Map 5 of the Comprehensive Plan and when necessary to provide a system of interconnecting walkways and safe, convenient access to a transit stop for school, park, church, day care center, library, commercial center, community center or similar facility. Separate bicycle/pedestrian ways not located in a street right-of-way shall include an eight (8) foot wide usable surface within a twelve (12) foot wide right-of-way, unless conditions warrant otherwise and are illuminated pursuant to 17.44.020(G)."

Section 2. Chapter 17.44 of the Gladstone Municipal Code is amended by adding Section 17.44.030 to read as follows:

"17.44.030 Standards Relating to Commercial and Industrial Development on or Adjacent to Transit Routes. New commercial and industrial development requiring full-site design review located on proposed or existing transit routes shall be subject to the following standards:

A. Building entrances shall be accessible from a public sidewalk. This entrance shall be designed to be attractive and functional and shall be open to the public during all business hours. The access from the sidewalk shall be clearly marked and delineated and shall have limited conflict with automobile traffic.

B. Where pedestrian access crosses driveways, parking and loading areas, the walkway shall be clearly identifiable through the use of elevation changes, different paving material, or similar method.

C. These requirements may be modified if the Planning Commission determines that the proposed use would not likely attract pedestrian traffic; such uses include warehouses and industrial buildings, automobile service uses, or businesses which sell large items such as appliances, furniture, cars, boats."

Section 3. Chapter 17.48 of the Gladstone Municipal Code is amended in the following respects:

A. By adding Section 17.48.050 to read as follows:

"Section 17.48.050 Bicycle Parking Standards.

A. Standards for bicycle parking apply to full-site design review of new construction for multi-family residential (four units and larger) and new commercial/industrial developments. The Planning Commission may grant exemptions to bicycle parking requirements in connection with temporary uses or uses that are not likely to generate the need for bicycle parking.

B. Required bicycle parking must be lighted and be located within fifty (50) feet of an entrance to the building.

1. Location. Bicycle parking may be provided within a building if the location is easily accessible for bicycles.

2. Covered Spaces. Cover for bicycle parking can be accommodated by buildings or roof overhangs, awnings, bicycle lockers, bicycle storage within buildings or free-standing shelters.

3. Signs. If the bicycle parking is not visible from the street or main building entrance, then a sign conforming to the city's standards for on-site traffic control (17.52.060[A]) shall be posted indicating the location of the parking facilities.

4. Rack Type and Dimensions.

a. Bicycle racks must hold bicycles securely by the frame and be securely anchored.

b. Bicycle racks must accommodate 1) locking the frame and one wheel to the rack with a high-security U-shaped shackle lock, or approved substitute, or 2) locking the frame and both wheels to the rack with a chain or cable not longer than six (6) feet.

c. The Planning Commission may approve alternate bicycle racks provided they are convenient and secure.

5. Bicycle parking spaces must be at least six (6) feet long and two (2) feet wide, and in covered situations the overhead clearance must be at least seven (7) feet. An aisle five (5) feet wide for bicycle maneuvering must be provided.

6. Areas set aside for required bicycle parking must be clearly marked and reserved for bicycle parking only.

7. Required parking in all developments required to comply with this section shall provide a minimum five (5%) percent bicycle parking spaces based on the city's required minimum number of automobile parking spaces.

a. All development shall have a minimum two (2) bicycle parking spaces.

b. If more than seven (7) bicycle parking spaces are required, fifty (50%) percent of the spaces shall be covered. One hundred (100%) percent of all bicycle parking spaces for multi-family development of four (4) units and more shall be covered."

B. By adding thereto Section 17.48.060 to read as follows:

"17.48.060 Car Pool and Van Pool Parking. New industrial, institutional and office developments requiring full site design review, including government offices, with fifty (50) or more employee parking spaces, shall designate at least ten (10%) percent of the parking spaces for car pool or van pool parking. The car pool/van pool spaces shall be clearly marked 'reserved - car pool/van pool only.'"

Section 5. Chapter 17.50 of the Gladstone Municipal Code is amended in the following respects:

A. By adding Subsection F of Section 17.50.020 to read as follows:

"F. Ensure that building orientation and site development include appropriate bicycle and pedestrian facilities within and between developments for non-residential developments requiring full site design review pursuant to the following standards:

1. A walkway shall be provided from an abutting street, public sidewalk, bike path or walkway providing reasonably direct pedestrian access to the property. Use of public sidewalks and walkways is encouraged unless the route provided by public assess is twice as long, or 300 feet, whichever is greater, than a walkway on-site.

2. Buildings shall be connected with internal pedestrian facilities.

3. Driveway crossings shall be minimized. Where walkway crosses driveways, parking and loading areas, the walkway shall be clearly identifiable through the use of elevation changes, different paving material, or similar method.

4. Walkways shall be designated as a raised path or be separated from auto travel lanes by raised curb, bollards, landscaping, or other physical barrier, minimum four and one-half (4½) feet in unobstructed width, excluding vehicle overhang."

B. By adding Subsection G to Section 17.50.020 to read as follows:

"G. New industrial, institutional, retail and office developments requiring full site design review that, when completed, generate an average daily traffic of 1,000 trips or greater based on the most recent edition of Institute of Transportation Engineers Report on Trip Generation shall provide either a transit stop on site or connection to a transit stop along a transit route when the transit operator requires such an improvement."

C. Amend Subsection O of Section 17.50.040 to read as follows:

"O. Sidewalks shall be installed on both sides of a public street and at any special pedestrian way within a development, except that the Planning Commission may approve a development without sidewalks on a local street or on a private street if special site conditions exist or if alterative pedestrian routes are available."

Section 7. Subsection A of Section 17.94.020 is amended to read as follows:

"A. Written notice of a hearing shall be mailed to all owners of record of property which is based on the city's most recent Clackamas County Tax Assessment Roll located within 150' of the property which is the subject of the notice. Notice shall also be provided to affected agencies. Notice shall be mailed twenty (20) days in advance of the scheduled hearing."

Section 8. All remaining provisions of Title 17 of the Gladstone Municipal Code are reaffirmed in their entirety.

This Ordinance adopted by the Common Council and approved by the Mayor this 11th day of June, 1993.

Wade Byers, Mayor

Attest:

Verna Howell, CMC, City Recorder

ORDINANCE NO. 1171

AN ORDINANCE AMENDING TITLE 17 OF THE GLADSTONE MUNICIPAL CODE BY REVISING CERTAIN ZONING AND DEVELOPMENT STANDARDS AND POLICIES TO COMPLY WITH NEW STATE LAND USE REGULATIONS, TO IMPROVE THE OVERALL ADMINISTRATION OF THE LAND USE PROCESS, AND REAFFIRMING ALL REMAINING PROVISIONS OF TITLE 17 OF THE GLADSTONE MUNICIPAL CODE.

THE CITY OF GLADSTONE DOES ORDAIN AS FOLLOWS:

Section 1. Title 17 of the Gladstone Municipal Code is amended in the following respects:

A. A new Section 17.06.328 is added to read as follows:

"17.06.328 Manufactured Dwelling. 'Manufactured Dwelling' means a single family dwelling with a Department of Housing and Urban Development (HUD) label certifying that the structure was constructed on or after June 15, 1976, and met the requirements of the Federal Manufactured Housing Construction and Safety Standards and Regulations in effect at the time of construction, consistent with HB2863 Oregon laws 1989. This definition shall not apply to structures known as 'modular homes' where such modular homes are constructed in accordance with all requirements of the state building code for modular homes and bear the Seal of Approval of the Oregon State Department of Commerce, Building Codes Division."

B. Section 17.06.340 is revised to read as follows:

"17.06.340 Mobile Home. 'Mobile Home' means a single family dwelling originally designed and constructed to be movable or portable, constructed to be transported on its own chassis and designed originally without a permanent foundation, whether or not a permanent foundation is subsequently provided, or two or more units separately transportable but designed to be joined into an integral unit, and which do not conform to all requirements of the building code for other residences and not meeting the definition of 'manufactured dwelling'."

C. Section 17.12.020 A. is amended to read as follows:

"17.12.020 A. Single-family dwelling, including manufactured dwellings, subject to the design standards identified in Section 17.12.060;"

D. Section 17.12.060 B. is amended to read as follows:

"17.12.060 B. All manufactured dwellings on individuals lots in this district shall meet or exceed the following design standards:

1. *The manufactured dwelling shall be multi-sectional and enclose a space of not less than 1,000 square feet.*

2. *The manufactured dwelling shall be placed on an excavated, back-filled foundation and enclosed at the perimeter such that if the manufactured dwelling is located not more than twelve inches above grade.*

3. *The manufactured dwelling shall have a pitched roof of not less than three (3') feet height for each twelve (12') feet width.*

4. *The manufactured dwelling shall have exterior siding and roofing which in color, material and appearance is similar to the exterior siding and roofing material on surrounding dwellings.*

5. *The manufactured dwelling shall be certified by the manufacturer to have an exterior thermal envelope meeting performance standards equivalent to the performance standards required of single-family dwelling constructed under the Uniform Building Code.*

6. *The manufactured dwelling shall have a garage or carport constructed."*

E. *Section 17.12.030 is amended by deleting subsection A. 1. and A. 2. and renumbering A. 3. to A. 1. and A. 4. to A. 2.*

F. *Section 17.12.030 A. 4. and Section 17.14.030 A. 1. are amended to read as follows:*

"A single-story detached garage, carport or storage building not exceeding 450 square feet in floor area, may be set upon either of the interior side or rear property lines of said lot. Only one structure may be so located and the wall adjacent to the property line must be of one-hour fire-resistive construction, as approved by the building official.

G. *Section 17.76.020 A. is amended to read as follows:*

"17.76.020 A. Continuance of a non-conforming use. Subject to the provisions of this section, a non-conforming use or structure may be continued but may not be altered or extended. The extension of a non-conforming use to a portion of a structure which was arranged or designed for the non-conforming use at the time of passage of the ordinance codified in this title is not an enlargement or expansion of a non-conforming use. A non-conforming structure which conforms with respect to use may be altered or extended provided the alteration or extension conforms to the standards of this title."

H. *Section 17.46.020 B. is amended to read as follows:*

"17.46.020 B. Parking and loading areas. The following landscape requirements shall apply to parking and loading areas:

1. *In addition to the requirements of Subsection A. of this Section, a parking or loading area providing ten (10) or more spaces shall be improved with defined landscaped areas totaling no more than 25 sq. ft. per parking space;*
2. *A parking or loading area shall be separated from any lot line adjacent to a street by a landscaped strip at least ten (10') feet in width, and any other lot line by a landscaped strip at least five (5') feet in width.*
3. *A landscaped strip separating a parking or loading area from a street shall contain:*
   a. *Street trees spaced as appropriate to the species, not to exceed twenty-five (25') feet apart, on the average,*
   b. *Low shrubs not to reach a height greater than three (3') feet spaced no more than five (5') feet apart, on the average, and*
   c. *Vegetative ground cover.*

I. *Section 17.06.155 is amended to read as follows:*

"17.06.155 Dwelling unit. 'Dwelling unit' means one or more rooms for occupancy by one family for living purposes that is identified by a single street address and has common

entrances and internal access. Trailer coaches shall not be considered as dwelling units, except when located in mobile home courts or parks."

J. *Section 17.94.020 is amended by adding a new Sub-section 17.94.020 E. to read as follows:*

"17.94.020 E. Written notice as described in 17.94.020 shall be provided to residents of mobile home and manufactured dwelling parks of applications that would change the zone of property which include all or part of the park in which they reside."

K. *Section 17.06.320 is deleted.*

L. *Section 17.06.335 is deleted.*

M. *Section 17.06.400 is amended to read as follows:*

"17.06.400 Partition land. 'Partition land' means to divide an area or tract of land into two or three parcels within a calendar year when such area or tract of land exists as a unit or contiguous units of land under single ownership at the beginning of such year. Partition land does not include divisions of land resulting from lien foreclosures, divisions of land resulting from the creation of cemetery lots, and divisions of land made pursuant to a court order, including, but not limited to, court orders and proceedings involving testate or intestate succession, and partition land does not include any adjustment of a lot line by the relocation of a common boundary where an additional parcel is not created and where the existing parcel reduced in size by the adjustment is not reduced below the minimum lot standards established by the zoning ordinance. Any property divided by the sale or grant of property for state highway, county road, city street or other right-of-way purposes shall continue to be considered a single unit of land until such time as the property is further subdivided or partitioned.

N. *Section 17.30.030 A. is amended to read as follows:*

"17.30.030 A. All subdivision plats and partition maps shall be approved by the planning commission or City Council, upon appeal, in accordance with the regulations set out in this title."

O. *Section 17.30.040 is amended to read as follows:*

"17.30.040 Land Divisions--Generally. A land division, whether by subdivision, partitioning, or a lot line adjustment, shall conform to the Gladstone Comprehensive Plan and any plans supplementary to it, shall take into consideration any preliminary plans and improvements made in anticipation thereof, and shall conform with state laws and requirements of the zoning districts, development standards and procedures established by Title 17."

P. *Sub-sections A. and B. of Section 17.34.010 are deleted.*

Q. *The first two lines of Section 17.34.020 are amended to read as follows:*

"17.34.020 Partitions--Generally. All partitions shall be approved under the following procedure:"

R. *Section 17.34.040 is deleted.*

S. Section 17.34.050 is deleted.

T. Section 17.34.050 A. is renumbered 17.34.010 A. and is amended to read as follows:

"17.34.010 Further Partitioning. A. A parcel of land or contiguous parcels under a single ownership within the City shall not be partitioned into two (2) or less than four (4) parcels for transfer of ownership or building development, so as to conflict with applicable standards for subdivisions and partitions as set forth in this title. Such land partitioning, other than subdivisions, shall be approved pursuant to the following additional procedure:

1. If a parcel of land is being partitioned twice within a year into more than two parcels, full compliance with all requirements for subdivision may be required if the Planning Commission determines, in its judgement, that the entire parcel being partitioned is in the process of being divided."

U. Section 17.44.020 is amended by adding the following:

"Section 17.44.020 I. Trash Disposal and Recycling Collection. In addition to the preceding standards, new construction requiring full site plan review shall incorporate functional and adequate space for on-site storage and efficient collection of mixed solid waste and source separated recyclables prior to pick-up and removal by haulers.

1. Minimum storage area for trash and recyclables shall be established by one of the following methods: minimum standards method or franchise hauler review method.

a. Franchise Hauler Review Method. The applicant shall submit plans for storage and collection of solid waste and recyclables that are acceptable to the city's franchise solid waste hauler; acceptance may be indicated on the site plan and/or by separate attachment; or

b. Minimum Standards Method. The applicant shall submit plans for storage of solid waste and recyclables in accordance with the following:

(1) Multi-family complexes containing ten (10) or fewer dwelling units shall provide a minimum fifty (50) square feet; developments containing more than ten (10) residential units shall provide an additional five (5) square feet per dwelling unit above ten (10).
(2) Non-residential developments shall provide a minimum storage area of ten (10) square feet plus:

- ♦ office - 4 square feet/1,000 square feet gross floor area (GFA)
- ♦ retail - 10 square feet/1,000 square feet GFA
- ♦ wholesale/warehouse/manufacturing - 6 square feet/1,000 square feet GFA
- ♦ educational & institutional - 4 square feet/1,000 square feet GFA
- ♦ Other - 4 square feet/1,000 square feet GFA

c. The storage area requirement is based on the predominate use of the building, as described above in b.(2). If a building has more than one use and that use occupies 20% or less of the floor area of the building, the floor area occupied by that use shall be counted toward the floor area of the predominate use. If a building has more than one of the uses listed above in b. (2) and that use occupies more than 20% of the floor area of the building, then the storage area requirement for the whole building shall be the sum of the requirement for the area of each use.

d. The specific requirements shall meet the Uniform Fire Code and are based on an assumed storage height of four feet for solid waste/recyclables. Vertical storage higher than four feet but not hither than seven feet may be used to accommodate the same volume of storage in a reduced floor space.

Section 2. All remaining provision of Title 17 of the Gladstone Municipal Code are reaffirmed in their entirety.

This Ordinance adopted by the Common Council and approved by the Mayor this 9th *day of* March, *1993.*

Attest:

Wade Byers
Wade Byers, Mayor

Verna Howell, CMC
Verna Howell, CMC
City Recorder

ORDINANCE NO. 1131

AN ORDINANCE REPEALING TITLE 16 AND 17 OF THE GLADSTONE MUNICIPAL CODE AND READOPTING COMPREHENSIVE PLAN, SUBDIVISION, ZONING AND DEVELOPMENT STANDARDS AS TITLE 17 OF THE GLADSTONE MUNICIPAL CODE.

THE CITY OF GLADSTONE DOES ORDAIN AS FOLLOWS:

Section 1. Titles 16 and 17 of the Gladstone Municipal Code are repealed.

Section 2. Title 17 of the Gladstone Municipal Code is readopted as reflected in Exhibit "A" attached hereto and incorporated herein by reference.

This ordinance adopted by the Common Council this 13th *day of* March, *1990.*

Approved by the Mayor this 13th *day of* March, *1990.*

Attest:

H. Wade Byers Jr.
Mayor

Jenna Howell
City Recorder

SECTION A-11

TRAFFIC CALMING STRATEGIES

The following materials on neighborhood traffic management techniques and traffic calming strategies are available at City Hall:

- ***Neighborhood Stop Plan Report, City of Portland Office of Transportation, Bureau of Traffic Management, August, 1993.***

- ***Neighborhood Traffic Management for Local Service Streets, City of Portland Office of Transportation, Bureau of Traffic Management, March, 1992.***

- ***Reclaiming Our Streets: Traffic Solutions, Safer Streets, More Livable Neighborhoods, Reclaiming Our Streets Task Force, in cooperation with City of Portland Office of Transportation, Bureau of Traffic Management, February, 1993.***

- ***Speed Bump Evaluation, City of Portland Office of Transportation, Bureau of Traffic Management, June, 1992.***

- ***Stop Sign Evaluation Final Report, City of Portland Office of Transportation, Bureau of Traffic Management, June, 1992.***

- ***The Traffic Calming Program, City of Portland Office of Transportation, Bureau of Traffic Management, September, 1994.***

RECLAIMING OUR STREETS*

Making Streets Where You Live More Livable.

Objectives:

- ***1)*** *Reduce traffic speeds and volumes on neighborhood streets to make them safer for pedestrians, bicyclists, and residents, with special regard for children.*

- ***2)*** *Increase bicyclist and pedestrian safety, and encourage cycling and walking as transportaion modes.*

- ***3)*** *Reduce deaths, injuries, and property damage resulting from driving under the influence of intoxicants (DUII) and from failure to use safety restraints.*

- ***4)*** *Increase the use of alternative transportation while decreasing auto use.*

Implementation Approaches:

- ***1) Education:*** *a)media campaign; b)publicity; c)community efforts, campaigns, projects; d)educational programs; e)written materials.*

- ***2) Encouragement:*** *a)promotion; b)programs; c)business activities.*

- ***3) Engineering:*** *a)street system planning; b)street design; c)signs and signals; d)bicycle; e)pedestrians; f)code changes/land-use; g)transit planning.*

- ***4) Enforcement:*** *a)police; b)community projects; c)adjudication; d)fines.*

- ***5) Legislation:*** *a)safety; b)funding.*

**Reclaiming Our Streets: Traffic Solutions, Safer Streets, More Livable Neighborhoods, Reclaiming Our Streets Task Force, in cooperation with City of Portland, Bureau of Traffic Management, February, 1993.*

CITY OF PORTLAND
BUREAU OF TRAFFIC MANAGEMENT

NEIGHBORHOOD STOP PLAN
REPORT

August 16, 1993

OVERVIEW

The City of Portland's Bureau of Traffic Management, having undertaken a study of its existing stop sign warrants, included an investigation of a systematic approach to stop sign installation. A systematic approach entails examining an area and establishing stop controlled intersections in an alternating pattern throughout that area. This is considered to be a more proactive approach to stop sign installation, in comparison to the current reactive approach whereby stop signs are installed at individual intersections to address safety issues.

This systematic approach to stop sign installation is referred to as the Neighborhood Stop Plan (NSP). Rather than establishing through streets, the NSP establishes a pattern of stopping traffic on every other block, a pattern commonly referred to as a "Denver Stop" pattern. This report addresses the results of a pilot project that was initiated to determine the impact that a Neighborhood Stop Plan would have on neighborhood liveability and safety.

Basis of Need

There were several reasons for initiating a study of this neighborhood-wide approach to stop sign installation. The first need arises from driver expectancy that is created when an area has a high percentage of stop signs that have been previously installed. If a large number of intersections are stop controlled, a driver anticipates that all intersections are regulated (i.e., if you have just passed three stop controlled intersections, you are not expecting the next one to be uncontrolled). The City of Portland currently has a number of neighborhood areas that are over 50% stop controlled, so the need for an area-wide approach becomes more apparent with each additional stop sign installation. And, given the likelihood of all intersections needing some form of traffic control in the future, the NSP might be a more efficient and comprehensive tool for the city to utilize in bringing about that eventuality. Additionally, it was desirable to understand the NSP's impact on driver behavior and to ascertain whether the NSP is an appropriate tool to address liveability issues.

Benefits

Possible benefits expected due to the installation of a Neighborhood Stop Plan were as follows:

* A reduction in the number of accidents that occur due to false driver expectations.

* Existing or potential speeding problems may be curbed because the stop pattern eliminates long stretches of non-stopped roadway, which is especially important around schools and parks.

* A more even distribution of traffic throughout the neighborhood.

* Of those that stated that stop sign disregards had occurred, 36% stated that it had occurred a lot in the beginning but now rarely occurs while 25% stated that it is a constant occurrence.

It is important to note that our questionnaire does not allow us to determine the residents opinions as to what constitutes "constant occurrence" or "occurred a lot"; different respondents may have different interpretations of these terms. Furthermore, although many residents state that vehicles have run the stop signs, there have been no reported accidents due to stop sign disregards in the seven months since the installation of the NSP. Thus, our data does not substantiate their perceptions. However, we will further investigate this issue as data becomes available.

Summary of Analysis

In conclusion, having considered the four factors of velocity, volume, accidents, and citizen perception, it appears that the stop plan has been a positive addition to the safety and liveability of the neighborhood. There was some beneficial effect (albeit minimal) on velocities in the neighborhood, as demonstrated through data showing that there were no 85th percentile speeds above 25 mph at any of the locations after the stop sign installation. There was no discernable effect on volumes; however, this was to be expected given the lack of significant cut-thru traffic in the area. There have been no reported accidents in the seven months of accident data available since the stop plan installation as compared to seven accidents in the same seven months of the previous year; which demonstrates an improvement in safety. And finally, the survey of residents in the area indicated that most residents also feel that it has improved neighborhood safety and liveability. Thus, this project seems to have been successful in achieving the goal of enhanced neighborhood liveability.

RECOMMENDATION

By using a more proactive and comprehensive approach like that of the NSP, neighborhood traffic control will become more logical, speeding may be moderated, traffic volumes might be more evenly distributed through the residential area, and the overall safety and liveability of Portland's neighborhoods may be improved. Thus, it is our recommendation that the Neighborhood Stop Plan be utilized as a traffic management tool to promote neighborhood liveability in the City of Portland.

However, because of the time and money needed to initiate NSP projects, it seems more appropriate to utilize this concept within the structure of an established program like that of the Neighborhood Traffic Management Program. District Operations, because of limited staff and funding would be better served in utilizing this concept for infill purposes only. Ant the other option of having an independent Neighborhood Stop Plan program is not being pursued because it appears that the benefits obtained thru the NSP are not so considerable that they would warrant a program developed solely for this purpose. NTMP, however, can easily absorb the needed neighborhood notification and

PORTLAND OFFICE OF TRANSPORTATION
BUREAU OF TRAFFIC MANAGEMENT

STOP SIGN EVALUATION

FINAL REPORT

Earl Blumenauer, Commissioner of Public Works
Felicia Trader, Director
Goran Sparrman, City Traffic Engineer
Linda Dartsch, Assistant City Traffic Engineer
Rob Burchfield, Principal Engineer
Jamie Moorman, Engineering Associate

Portland, Oregon
June 1992

STOP SIGN EVALUATION

INTRODUCTION

The Bureau of Traffic Management (BTM) responds to many requests to install stop signs in the City of Portland. Currently, there are an estimated 10,000 uncontrolled intersections in the city. A rational and consistent approach is needed for determining when to install stop signs.

Portland's current criteria (also known as warrants) for installing stop signs are modelled after the warrants in the Manual on Uniform Traffic Control Devices (MUTCD), with some supplements to the Two-Way warrants to provide additional guidance. These warrants date back to the 1962 publication of the MUTCD. The MUTCD has been revised and updated a number of times, but the warrants have remained the same.

Historically, Portland's philosophy has been that local street intersections are uncontrolled, and that stop signs are used sparingly to address significant safety problems. As additional intersections are controlled, the result is neighborhoods with a patchwork of controlled and uncontrolled intersections. Considering the confusion this causes, in conjunction with the growth in travel that has accompanied the growth in population, the original philosophy behind stop sign use may no longer be appropriate.

In 1990, BTM undertook a comprehensive study of stop signs. The purpose of this study was to 1) identify the impacts of stop signs on accidents and speed; 2) evaluate how well current warrants meet the needs we are trying to address, 3) determine whether the warrants should be changed, and 4) evaluate the potential for installing stop signs on an area-wide basis.

Activities included: a literature search; a comparison of reported accidents and total number of accidents; and an analysis of accidents, speeds, and compliance at stop signs.

LITERATURE REVIEW

STOP SIGN WARRANTS

The first aspect of the literature review focused on Stop Sign warrants. An investigation was made into the warrants of 13 jurisdictions including the City of Portland. The purpose of this review was to find other communities which were using warrants different from the MUTCD. We were looking for some examples or a model we could use for supplementing the MUTCD. The warrants for specific traffic characteristics were studied. Tables 1 and 2 are summaries of the specific warrants used by each jurisdiction.

A summary of Two-Way Stop warrants used by the different jurisdictions can be found in Table 1. The warrants were based on four main characteristics: volume of the intersection; number of correctable accidents; visibility; and unusual or special conditions, which include different types of land use, such as schools, parks, fire stations, etc., or the geometry of the roadway, such as steep hills, curves, etc. Some of the jurisdictions use a point system in which each traffic characteristic is allotted a certain number of points depending on the severity of the problem. The point system consists of 35 possible points with a minimum requirement of 18 points to authorize the installation of a stop sign. Other jurisdictions used

the warrants specified in the MUTCD or those set up by the California Department of Transportation (CalTrans).

The All-Way Stop warrants are summarized in Table 2. These warrants were based on: the functional classification of the street; volume; volume split; number of correctable accidents; visibility; or unusual or special conditions. The city of Concord, CA included a set of conditions for residential areas that would reduce the requirements for the volume warrant. Three of the jurisdictions used a point system for All-Way Stop warrants which consisted of a minimum requirement of 28 points out of 50 points possible to authorize the installation of an All-Way Stop. Other jurisdictions adopted the MUTCD or the CalTrans warrants.

After reviewing the warrants, we concluded that no other jurisdiction provided a good model for Portland, but we were able to define what we thought we needed and to develop modifications that we felt would suit our needs.

The second aspect of the literature search involved the impacts of installing stop signs. A search was made through a database to locate articles with information about stop sign effects. The research focused on safety, speed, economic impacts, and the environment. This information is summarized on pages 5 and 6. The abstracts and copies of the articles are also available from BTM.

CONCLUSION

The effect of Two-Way stop signs on speed is varied. Most speeds did not change significantly. At some locations speeds increased, while at other locations, speeds decreased. The impact of All-Way stop signs on speed, accidents and compliance involves some trade-offs. An All-Way Stop which does not meet the warrants may show a decrease in speed, but compliance is likely to be very poor due to the drivers' feeling that the stop is unnecessary. With poor compliance, accidents are likely to increase which presents a safety problem.

From these results, it appears that the underlying rationale for installing stop signs as a traffic control device should be continued. Stop signs should not be installed for the sole and primary purpose of regulating speed due to the potential negative impact on traffic safety.

STOP SIGN IMPACTS

I. Safety Effects

A. Accidents -

In general, when stop signs are warranted, they can reduce the number of accidents. The signs are more effective when placed at high-accident locations.

B. Compliance -

Unwarranted stop signs encourage disrespect for traffic control devices and, as a result, can create safety problems.

II. Impacts on Speed

The MUTCD states that "Stop Signs should not be used for speed control.

A. Warranted Stop Signs -

When warranted, Stop Signs have been found to decrease the 95th percentile speed. However, they have a small area of influence where speeds are concerned.

B. Stop Signs Placed for Speed Control -

Studies have shown that the difference in average speeds after stop sign installations is not significant, and can sometimes tend to increase at mid-block due to the driver trying to make up for time lost.

C. Stop Sign Removal -

There is no significant change in speeds.

III. Economic Impacts (Costs in general)

The cost increase for installing stop signs is greater than the amount of savings generated from reducing the number of accidents. There are additional costs for sign material, installation, and maintenance.

A. Fuel Consumption -

Fuel consumption is increased because additional fuel is required for stopping and idling. It is more of an issue if petroleum prices are high and supply is low.

B. Travel Time -

Stop signs create extra delay because of the additional time required to stop and the additional time spent idling.

C. Vehicle Operating Costs -

Operating costs increase. This includes the cost of idling, and the cost of stopping instead of continuing at the same speed.

IV. Environmental Impacts

A. Pollution (Air, Noise) -

Stop signs create an increase in air pollution and noise pollution. Costs arise from air pollution for health impacts.

B. Vehicle Emissions -

Three types of emissions were researched. These include carbon monoxide (CO), hydrocarbons (HC) and nitrogen (N). Increases in CO can create health problems and additional costs.

SPEED BUMP EVALUATION

For The
Neighborhood Traffic Management Program

CITY OF PORTLAND, OREGON

STATUS REPORT

June, 1992

Bureau of Traffic Management
Office of Transportation

EXECUTIVE SUMMARY

One of the greatest concerns of people living in the City of Portland is speeding traffic on residential streets. Speeding traffic is a threat to traffic safety and neighborhood livability. In response to these concerns, the City of Portland has undertaken a testing process to determine if speed bumps could be used as a tool to combat speeding problems. In November 1990, the City began three phases of speed bump research, testing, and analysis.

The City of Portland tested three speed bump designs. The design used in the Phase I and Phase II tests was a 12-foot wide by 3-inch high Watts speed bump design. In Phase III, a 14-foot wide by 3-inch high Watts speed bump design and a 22-foot wide by 3-inch high Seminole speed bump design were tested in response to concerns from residents that the 12-foot Watts speed bump design was too severe and slowed traffic too much.

The Phase I test was conducted in March 1991. This test was developed to determine the effects of an individual 12-foot Watts speed bump on emergency service and municipal service vehicles in an isolated setting. Results showed general acceptance of the speed bumps.

The Phase II test was conducted to determine the traffic effects of several speed bumps on residential streets, solicit public comments, and develop a revised set of criteria for the potential use of speed bumps. This test began in July 1991 on five residential streets within the City of Portland. A total of 27 speed bumps were constructed at a cost of approximately $1,655 per speed bump.

Criteria developed to select the streets for testing limited the potential candidates to streets with the following characteristics: available speed and volume data, a 25 mph speed limit, a measured speeding problem, existing curbs and drainage, relatively flat, and a petition to test from a majority of the residents on the street. In addition, the potential candidate streets are not primary emergency response routes and diversion to adjacent parallel streets is not likely to occur as a result of the speed bumps.

The following are the results of the Phase II test:

1. The 12-foot Watts design speed bump was very effective in slowing traffic speeds at the speed bump and at midblock locations.

2. The 200- to 500-foot spacing of the speed bumps used appears to be effective.

3. There was a tendency for motorists to try to drive around the speed bumps to lessen their impact. At this point, it does not seem to be a problem.

4. Based on public comments, residents living on the street tend to like the speed bumps, while other drivers tend to dislike them.

5. The speed bumps do not appear to create a hazard that could increase vehicle accidents on the street.

6. Minor variations in the speed bump construction create noticeable changes in the ride characteristic of the speed bump.

Residents on three of the five test streets voted by a wide majority to keep the speed bumps because they liked the performance and results of the speed bumps the way they were. Residents on the other two test streets wanted to test a speed bump that would be less abrupt. These will be retrofitted with the 14-foot Watts speed bump as a part of the Phase III testing.

The Phase III test was undertaken based on data and comments from the Phase II test, to test additional speed bump designs that would be less abrupt, and to allow a majority of vehicles to travel closer to the speed limit. Two additional designs were accepted for testing; a 14-foot wide by 3-inch high Watts design and a 22-foot wide by 3-inch high Seminole design. In March 1992, one speed bump of each design was constructed at the Portland Fire Bureau's driver training facility for comparison with the 12-foot design.

The purpose of the Phase III testing was to evaluate the impact on emergency, transit, and passenger vehicles, to document the motion of typical passenger vehicles across the speed bumps at various speeds—and to choose the speed bump design or designs that would be effective in reducing speeds, acceptable by residents, and be adaptable to the wide variety of streets in the City of Portland.

The 14-foot Watts speed bump slowed both fire and transit vehicles to a speed of approximately 20 mph. The 22-foot Seminole speed bump slowed the transit vehicle to approximately 20 mph and the fire vehicles to a speed of approximately 25 mph. The 14-foot speed bump appears to resolve some of the problems with abruptness while still being effective for streets with a 25 mph speed limit. The 22-foot speed bump may be an effective way of reducing high vehicle speeds on streets with speed limits greater than 25 mph.

It is recommended that the City of Portland's Bureau of Traffic Management should develop policy and design guidelines based on the findings of the multiphased speed bump tests. These guidelines should address the following:

1. Continue testing the two alternative speed bump designs to determine their effects to traffic on residential streets.

2. Impact on emergency services. Continue coordination with the Fire Bureau in the use of speed bumps and other traffic management devices.

3. The use of speed bumps in the Neighborhood Traffic Management Program (NTMP). This will provide an additional valuable tool for controlling speeding problems in residential areas.

4. The use of speed bumps on gradient streets. During the tests, speed bumps were not used on any sections of roadway with a slope of more than 2 percent.

5. Limiting the use of a single isolated speed bump.

6. Investigating the potential use of speed bumps where crime problems may exist.

7. The effects of speed bumps on major snow and ice routes.

8. The effects of vehicles driving around the speed bumps to lessen their severity. This does not appear to pose a safety problem.

9. Financing of speed bumps. The City of Portland typically finances all traffic management devices.

10. Procedure for removal of speed bumps if unforseen significant diversion happens or if residents decide they do not want speed bumps after they were constructed.

11. Use of speed bumps on streets without curbs.

VI. CONCLUSION

The purpose of the multiphased speed bump testing was to develop an effective and safe device for controlling speeding problems on residential streets. Three phases of testing were conducted to determine speed bump effectiveness and acceptability.

Phase I was developed to determine the effects of a single 12-foot Watts speed bump on emergency service and municipal vehicles. The results of the Phase I testing were very positive. From the comments and observations, all participants accepted the use of speed bumps; some accepted with conditions.

Phase II was developed to determine the effects of multiple 12-foot Watts speed bumps on typical residential traffic. Vehicular speed and volume data was collected to determine changes in traffic speeds and volumes, and neighborhood meetings were held to discuss other issues such as aesthetics, noise, and other observations about the speed bumps.

Phase III was developed to evaluate two additional speed bump designs. Additional speed bump designs were developed because of concerns about the abruptness of the 12-foot Watts speed bump and the possibility that vehicles were slowing too much. The Phase III test determined the effects of a single 14-foot Watts speed bump and a 22-foot Seminole speed bump on emergency service vehicles. In addition, physical comparisons between the 12- and 14-foot Watts speed bumps and the 22-foot Seminole speed bump were made to measure the up and down movements of a vehicle traveling over each speed bump.

The following summarizes the findings of the tests:

Phase I

1. The 12-foot Watts speed bump slowed fire and ambulance vehicles to a speed of approximately 15 mph over the speed bump.

2. There appears to be no safety problems.

3. Each speed bump should be clearly marked to define the extent and location of the speed bump and to give adequate warning to drivers.

Phase II

1. The Watts design speed bump is very effective in slowing traffic speeds at the speed bump and at midblock locations. The measured reductions in 85th percentile speeds on all test streets ranged from 3 mph to 11 mph.

2. High volume streets saw a significant reduction in traffic volumes. Low volume streets saw a small reduction in traffic.

3. There is a chance for diversion of traffic, particularly non-local traffic, to adjacent streets. This problem could be significant on streets that carry high traffic volumes (1,000 ADT or greater) prior to the installation of speed bumps. Diversion is also possible for streets in a grid pattern.

4. The 200- to 500-foot spacing of the speed bumps used was effective. However, it may be desirable to place speed bumps towards the higher 500-foot spacings.

5. There is a tendency for motorists to try to drive around the speed bumps to lessen their impact.

6. Based on public comments, residents living on the street tend to like the speed bumps, while other drivers tend to dislike them. Overall, there is some feeling among residents that the speed bumps may be too abrupt.

7. The speed bumps do not create a hazard that could increase vehicle accidents on the street.

8. Minor variations in the speed bump construction create noticeable changes in the ride characteristic of the speed bump.

9. Three of the five test streets voted by a wide majority to keep the speed bumps. The other two test streets will be retrofitted with the 14-foot Watts speed bump and will vote whether to keep them in the summer of 1992.

Phase III

1. The 14-foot Watts speed bump slowed fire and transit vehicles to a speed of approximately 20 mph. The 22-foot Seminole speed bump slowed the transit vehicle to approximately 20 mph and the fire vehicles to a speed of approximately 25 mph.

2. The 14-foot speed bump appears to resolve the problems with abruptness while still being effective for streets with a 25 mph speed limit.

3. The 22-foot speed bump may be an effective way of reducing high vehicle speeds on streets with speed limits greater than 25 mph.

4. Two speed bump designs will allow for more flexibility of slowing vehicle speed on a wide variety of streets.

VII. RECOMMENDATION

The City of Portland's Bureau of Traffic Management should develop policy and design guidelines based on the findings of the multiphased speed bump tests. These guidelines should address the following:

1. Acceptance and continued testing of the two alternative speed bump designs to determine their effects to traffic on residential streets. Residents on two of the previous speed bump test streets have expressed interest in retrofitting the 14-foot speed bumps on their streets and continuing to test their effects. The 22-foot Seminole speed bumps should also be tested on residential streets.

2. Impact on emergency services. Continue coordination with the Fire Bureau in the use of speed bumps and all other traffic management devices. Improvements to response time on other sections of their route or by other means (signal pre-emption) may mitigate the effects of the speed bumps.

3. The use of speed bumps in the Neighborhood Traffic Management Program (NTMP). This will provide an additional valuable tool for controlling speeding problems in residential areas. Speed bumps have generated considerable public interest. It is important to continue to involve residents in the traffic management process. See Appendix F, page 77, for a discussion on speed bumps as an NTMP tool or as a separate process.

4. The use of speed bumps on gradient streets. During the tests, speed bumps were not used on sections of roadway with a slope of 5 percent or greater. Concerns about weather conditions, the lack of familiarity with speed bumps, and the lack of speed bump information on flat roadways governed their use to this point. It is possible that speed bumps could be tested on sections of street with a slope greater than 5 percent, but at this time it is important to understand the full effects of speed bumps on level streets.

5. Limiting the use of a single isolated speed bump. As suggested by other cities surveyed, a series of speed bumps spaced at intervals from 200 feet to 500 feet (500 feet preferable) appears to work very well.

6. Investigating the potential use of speed bumps in crime control. It has been suggested that speed bumps could help in crime control by reducing the ability for a rapid vehicle escape. At this time there is no information regarding the effects of speed bumps on crime control.

7. The effects of speed bumps on major snow and ice routes. These effects presently are not known. It could be difficult to remove snow using a snow plow on a street with speed bumps. Sanding trucks should work on streets with speed bumps.

8. Motorists trying to drive around the speed bumps to lessen their severity. This does not appear to pose a safety problem (no problems have been observed in other cities) on streets with curbs. The City will investigate the possibility of using speed bumps on streets without curbs by using either natural landmarks or plastic wands to keep

vehicles from driving around the bumps. This test will be conducted in the summer of 1992.

9. Financing of speed bumps. The City of Portland typically finances all traffic management devices. If speed bumps become another NTMP device, the cost would be incurred as part of the program. It takes a considerable amount of time for City staff to plan, prepare, collect data, locate, and notify residents of a speed bump project. Additional staff time, and the potential for the concentration of speed bumps in specific neighborhoods based on wealth, could create problems if speed bumps were financed by residents.

10. Removal of speed bumps. The NTMP typically tests traffic management devices to determine if the final constructed project is successful, acceptable to residents, and has not created any significant negative impacts. If speed bumps are constructed and do not meet the above criteria found during testing, the City of Portland should develop a plan for correcting any of the problems.

KH/jp
GRP$NTM:[SPEEDBUMP]KH-FINAL-REPORT.WP (7/23/92)

SLURRY SEAL SCHEDULE

Street Name/ Section	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Abernethy Lane				X	X		X				
Glen Echo-Ptld								X			
Abernethy Ct.											
Addie Street											
Glen Echo to Barclay			X								
G.Echo-Center								X			
Angus Way		X									
Arlington, E.								X			
Arlington, W.											
Ptld - Barton	X							X			
Ptld-Barton(20')			X	X	X						
Ptld-Barton(30')						X	X(2)				
Barbary Court											
Barbary Drive											
Barclay Avenue			X								
Barton Avenue											
Fairfld-Exeter		X									
Exeter-Arlgtn			X								
Arlgtn-Berkly					X						
Drtmth-Exeter					X						
Beatrice Ave.											
Jersey-Abenthy			X								
Ipswich-Clack.			X								
Herfd-Glouces.					X						
Bellevue Avenue											
Jersey-W.Clack.			X								
Herfd-Glouces.					X						
Ben Court			X	X							
Berkeley St., E.				X							
Berkeley St., W.											
300 Block						X					
400 Block						X(2)					
200 Block							X				
Beverly Drive											
Beverly Lane											
Bev. Dr to End	X										

SLURRY SEAL SCHEDULE - PAGE 2

Street Name/ Section	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Braden Court				X				X			
Buckingham Court			X								
Buckingham Drive Valley Vw-Buck.Ct.			X								
Caldwell Road		X					X				
Cameron Way											
Canterbury Drive		X			X		X				
Cason Circle			X								
Cason Lane Charolais-City Lmt Chrls Way-7615			X				X				
Cason Road Ridge Dr-Webster Webster - City Lmt			X	X							
Center Street Addie - Abernethy All		X						X			
Charolais Court			X								
Charolais Drive All Charolais-Webster			X				X				
Charolais Way Charolais Dr-Ct. Charls Dr-Cason Rd Charls Dr-Cason Ln			X X				X				
Chessington Court		X									
Chessington Lane		X									
Chicago Avenue Hereford-Dartmouth Clarendon-Arlington					X X						
City Hall Parking Lot		X									
City Shops Lot				X	X		X(2)	X			
Chris Court	X										
Churchill Drive		X						X			
Cindy Lane											

Street Name/ Section	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Clackamas Blvd., E. Cornell to Harvard						X					
Clackamas Blvd., W.			X								
Clarendon Street, E. Stocker Pk-Chicago					X						
Clarendon Street, W.		X						X			
Clayton Way All Webster-2 Spd Bum			X			X		X			
Collins Crest Ave. All Columbia-Cornell		X			X		X				
Columbia Avenue Collins Crst-end Arlngton-Hereford Cornell-N. End Gravel @ N. end of Hereford Collins Crst-Stnhl		X		X	X X		X				
Cornell Avenue Exeter-Fairfield Herefd-North End 1480 to 1515 Collins to End Clack.-Hereford Gloucstr-Dartm. Columbia-Coll. Crst	X X X	X		X	X	X	X				
Cornell Place											
Cottonwood Ct.											
Craig Court			X								
Crownview Court	X										
Crownview Drive All Los Vrds-Via Monte Mar Cul-de-sac Los Vrds-Monte Ver	X						X X				
Cummings Court											

SLURRY SEAL SCHEDULE - PAGE 4

Street Name/ Section	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Dagmar Road					X						
Dahl Beach Road					X	X	X	X			
Dahl Parking Lot					X(2)	X		X			
Dartmouth Street, E. Ptld - Chicago(N.) Harvard-Oatfield All	X			X		X(2)		X			
Dartmouth St, W. Portland to Barton 400 Block Ptld-Hamiltn Drvwy All	X	X				X		X			
Debbie Court			X								
Devonshire Dr.		X					X				
Dickerson Lane											
Dierickx Court			X								
Dogwood Court		X									
Doncaster Drive All (1' from curbs)		X					X				
Donna Lynn Way	X										
Duniway Avenue All Dirt portion of Ptld		X				X		X			
Durie Court				X							
Echo Way											
Edgewater Road				X			X				
Evergreen Lane				X			X				
Exeter Street, E. Union to Cornell Harvard-Oatfield Columbia-Cornell	X			X			X				
Exeter Street, W.											

Street Name/ Section	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Fairfield Street, E. Harvard-Cornell 100 Block Harvard to Yale				X	X		X				
Fairfield Street, W. Portland to Barton				X							
First Street				X							
Franklin Way			X	X							
Glen Echo Ave, E.							X	X			
Glen Echo Ave, W. 99-E to Abernethy								X			
Glen Echo Court					X						
Gloucester St., E. Blocks 100, 300							X				
Gloucester St., W. Portland-Beatrice Ptld-Risley(20'cntr) Ptld-Risley(30'cntr)	X				X	X					
Goetz Road			X								
Hardway Court			X								
Harvard Avenue Nelson to Jersey Clack.-Clarendon Blocks 500,700,800		X		X	X						
Hattan Court							X				
Heather Way											
Hereford Street, E.											
Hereford Street, W.											
High Street Hereford-Patricia	X										
Howell Street		X						X			
Hull Avenue											
Ipswich Street, W.			X				X				
Jennings Avenue											

Street Name/ Section	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	19
Jersey Street, E.		X									
Jersey Street, W. Bellevue-Beatrice			X								
Kelsey Court											
Kenmore Street, E. High to Cornell Harvard-Dead end	X					X	X				
Kenmore Street, W.											
Kirkwood Road Webster-Top of hill					X						
Lancaster Drive	X				X			X			
Landon Street	X										
Library Parking Lot							X				
Londonderry Lane		X						X			
Los Verdes Drive			X				X				
Lundgren Way			X								
Lynne Court											
Madrona Court		X									
Manor Drive	X		X	X							
McCall Court				X							
McLoughlin Blvd.											
Meldrum Bar Pk Rd											
Monte Verde Drive Ridgegate-LosVerdes All Crownview-Montic.	X			X			X	X			
Monticello Court		X									
Monticello Drive Winfield Ct-17900 All MonteVerde-Ridgegt	X	X					X				
Nelson Lane Gravel portion-Hrvd				X	X			X			

Street Name/ Section	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Nottingham Drive		X					X				
Oakridge Drive Oatfield-Quail Ct. Quail/Partrdg/Oatfld All	X		X				X				
Oatfield Road											
Ohlson Road			X	X							
Ormae Road											
Paola Court		X			X			X			
Park Way All 6615 to 6765			X				X	X			
Partridge Circle	X				X		X				
Patricia Drive			X					X			
Penny Court		X									
Petite Court			X	X							
Portland Avenue Clack.-Arlington Glen Echo-Caldwell	X		X								
Princeton Street											
Quail Court to Valley Vw Rd. All	X							X			
Ridge Drive	X										
Ridgegate Court		X									
Ridgegate Drive		X									
Ridgewood Drive All-New Subdiv.		X									
Rinearson Road											
Risley Avenue				X			X				
River Lane											
River Road Glouc.-Rinearson (East Lane)	X										

Street Name/ Section	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	199
Riverdale Drive											
Scott Court											
Scott Lane		X					X				
Sr. Center Parking						X					
Shadow Court		X			X	X		X			
Shawn Court			X								
Shawna Lane											
Simmons Court											
Sladen Avenue				X							
Springhill Court			X								
Springhill Drive			X								
Springhill Place			X								
Stone Oaks Court											
Stonehill Drive	X				X		X				
Stonewood Court			X		X		X				
Stonewood Drive			X				X				
Sunlite Court											
Timothy Way			X								
Tims View Avenue		X					X				
Trevor Court		X									
Tryon Court											
Tudor Court											
Tudor Drive	X				X						
Union Avenue											
Valley View Drive Valley View Rd to Crownview Dr. Val Vw Rd-city lim. All			 X X					 X			
Valley View Road			X					X			
Via Del Verde Ave.											

Street Name/ Section	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Via Monte Mar Ave	X						X				
Watts Street				X							
Webster Road											
Webster Tank Lot					X						
Welter Circle	X		X	X							
Wheeler Court											
Windsor Drive	X		X	X							
Winfield Court		X	X								
Yale Avenue First to Berkeley Clarendon-Exeter Fairfield-Glouces.				 X X X							
82nd Drive First-Turnaround				 X							

(2) - Two lifts

SECTION A-13

SUMMARY OF TSP IDENTIFIED TRANSPORTATION SYSTEM NEEDS

Transportation Planning Rule Requirement: ***The TSP shall identify transportation needs relevant to the planning area and the scale of the transportation network being planned.***

STREET NETWORK NEEDS AND PROPOSED ACTIONS

RECOMMENDATION: Add the following projects to the Gladstone Capital Improvement Plan

A. Transportation Capacity Needs

1. OATFIELD ROAD WIDENING AND SIGNALIZATION (Webster Road to 82nd Drive)

Proposed Actions: Widen this section of Oatfield Road to 3 lanes to include a continuous left-turn lane; Redesign the Oatfield Road/Webster Road intersection/traffic signal to include a southbound left-turn lane; Add a traffic signal at Gloucester Street (a Collector Street); Co-ordinate the traffic signals at Webster, Gloucester and 82nd Drive, and; Install a sidewalk along the west side of Oatfield Road.
Estimated costs = $1,300,000.

Street Conditions: Principal north/south minor arterial and transit route; Primary connection to 82nd Drive and I-205 interchange; Uniform pavement width; No curbs/few sidewalks; 1,760' (0.33 mi.); 60' R/W (85' @ 82nd Dr.); 40' pavement width (45' Hereford to Webster); Part of regional bicycle route with 8' wide designated bike lanes on each side of street; No on-street parking; Traffic signals @ Webster Road and 82nd Drive; STOP signs on all six intersecting cross streets; 15 access points (8 cross streets/7 driveways).

Traffic Volume/Congestion History:
- @ Webster Rd.: 8,400 (1973/74) - 14,400 (1993) = +71% increase;
- @ Gloucester St.: 15,200 (1992)
- @ Dartmouth St.: 12,592 (1986)
- @ 82nd Dr.: 7,800 (1973/74) - 15,900 (1992) = +104% increase.

Current Level of Service (LOS):
- @ Webster Rd.: NA @ Gloucester Dr.: "E" (1993)
- @ Dartmouth St.: "D" (1988) @ 82nd Dr.: "D" (1988)

Projected Traffic Volumes/LOS (in year 2009): @ Webster Rd.:
- with no development on SDA site: 18,400 = +34%/LOS "D" sbnd/"E"-"F" nbnd
- with development on SDA site: 21,400 = +56% /LOS "E"-"F" both directions

Projected Traffic Volumes/LOS (in year 2009): @ 82nd Dr.
- with no development on SDA site: 13,400 = +60%/LOS "E"-"F"
- with development on SDA site: 15,600 = +86%/LOS "E"-"F"

(Proposal submitted to ODOT in 4/1993 for consideration in Statewide Transportation Improvement Program, and to Metro in 3/1995 for Region 2040 funding.)

2. E. ARLINGTON STREET SIGNALIZATION (@ 82nd Drive)

Proposed Actions: Install traffic signal at intersection to facilitate safe traffic flow, and coordinate with traffic signal @ Oatfield Road.
Estimated costs = $130,000.

Street Conditions: Intersection of two minor arterials: Arlington Street connects McLoughlin Blvd. (99-E) with 82nd Drive and High Rocks commercial district; 82nd Drive connects with Oatfield Road and I-205 interchange ramps; Both streets are public transit routes; 60' (Arlington) x 75' (82nd Dr.) R/W; 36' (Arlington) x 48' (82nd Dr.) pavement width; Continuous left-turn lane from Arlington St. to Oatfield Road; Sidewalks on both streets, both sides; Bicycle lanes on both sides of 82nd Drive; STOP sign on E. Arlington Street is only traffic control device presently available to assign vehicle priority.
Traffic Volume/Congestion History: 3,200 (1973/74) - 4,350 (1992) = +36% increase
Current Level of Service (LOS): "F" (1988)
Projected Traffic Volumes/LOS (in year 2009):
with no development on SDA site: 9,000 = +107%/LOS "F"
with development on SDA site: 10,000 = +130%/LOS "F"

(Proposal submitted to ODOT in 4/1993 for consideration in Statewide Transportation Improvement Plan.)

3. GLADSTONE I-205 INTERCHANGE/82nd DRIVE

Proposed Actions: Improvements to interchange capacity/configuration; Consideration of adding auxiliary lane on southbound Gladstone interchange ramp, and adding loop ramp off of interchange for traffic heading southbound onto I-205. (see Figure 1)
Estimated costs = $12,000,000.

Street Conditions: Increasing freeway traffic volumes, and completion of E. 82nd Drive/Evelyn Street bypass in 1992 has increased traffic use at interchange, particularly southbound truck traffic from Clackamas Industrial Area, which currently must make a left turn at the interchange to go south on I-205. Future development of nearby SDA property would significantly increase traffic volumes at the interchange.
Traffic Volume/Congestion History:
@ I-205 @ Interchange: 114,000
@ Oatfield Rd. to I-205 Ramps: 6,200 (1973/74) - 22,000 (1988/89) = +255%
Current Level of Service (LOS):
@ I-205 Ramps: "C" (1988)
Projected Traffic Volumes/LOS (in year 2009): Oatfield Rd. to I-205 Ramps:
with no development on SDA site: 22,000 = +21%/LOS "D"; ramps LOS "F"
with development on SDA site: 32,800 = +49%/LOS "E"-"F"; ramps LOS "F"

(Proposal submitted to ODOT in 1993 for consideration of preliminary engineering only [$500,000] in Statewide Transportation Improvement Plan)

4. E. DARTMOUTH STREET (@ Oatfield Road)

Proposed Actions: Widen Oatfield Road, from 82nd Drive to Webster Road, to provide continuous left-turn lane, as part of larger Oatfield Road project (see A.1 above).

Street Conditions: A principal collector street and transit route connects Oatfield Road (minor arterial and transit route) to Portland Avenue (minor arterial and transit route); Site of numerous public sector and commercial activities, including city hall, library and post office; 60' (Oatfield Rd.) x 80' (Dartmouth St.) R/W; 40' (Oatfield Rd.) x 56' (Dartmouth St.) pavement width; Sidewalks on Dartmouth St. (s. side only); STOP sign on Dartmouth St. only traffic control device; Lack of left-turn lane on Oatfield Rd. at intersection contributes to traffic congestion and accidents.
Traffic Volume/Congestion History: 1,700 (1973/74) - 2,950 (1988/89) = +74 increase
Current Level of Service (LOS): "D"
Projected Traffic Volumes/LOS (in year 2009):
with no development on SDA site: 4,500 = +53%/LOS "F"
with development on SDA site: 5,200 = 76%/LOS "F"

5. E. GLOUCESTER STREET SIGNALIZATION (@ Oatfield Road)

Proposed Actions: Widen Oatfield Road, from 82nd Drive to Webster Road, to provide continuous left-turn lane, and install traffic signal, as part of larger Oatfield Road project (see A.1 above).

Street Conditions: A principal collector street that connects McLoughlin Blvd. (major arterial with traffic signal), Portland Avenue (minor arterial with traffic signal) and Oatfield Road (minor arterial); 60' R/W on both streets; 28' (Gloucester St.) x 40' (Oatfield Rd.) pavement width; No sidewalks on either street; Bicycle lanes on Oatfield Rd.; STOP sign on Gloucester St. only traffic control device; Lack of left-turn lane on Oatfield Rd. and traffic signal at intersection contributes to traffic congestion and accidents.
Traffic Volume/Congestion History: 800 (1973/74) - 2,800 (1993) = +250% increase
Current Level of Service (LOS): "E"
Projected Traffic Volumes/LOS (in year 2009):
with no development on SDA site: 3,500 = +56%/LOS "F"
with development on SDA site: 4,300 = +91%/LOS "F"

Other Roadway Needs

B. Safety Needs

1. OATFIELD ROAD WIDENING AND SIGNALIZATION (Webster Road to 82nd Drive)

Proposed Actions: see A.1 above.

Street Conditions: see A.1 above.
Traffic Accident History: 90 accidents on this section of Oatfield Rd., 1986 - 1993, including reported accidents at the following intersections (accident site rank):

@ Webster Rd.: 25 (rank: #4) @ 82nd Dr.: 25 (rank: #4)
@ Gloucester St.: 16 (rank: #8) @ Dartmouth St.: 14 (rank: #9)

Street Section/Intersection: Webster Road to Jennings Avenue
Traffic Accident History: 70 accidents on this section of Oatfield Rd., 1986 - 1993, including reported accidents at the following intersections (accident site rank):

@ Glen Echo Ave.: 24 (rank: #5) @ Caldwell Rd.: 10 (rank: #12)
@ Oakridge Dr.: 9 (rank: #13) @ Kenmore St.: 6 (rank: #16)

2. W. ARLINGTON STREET INTERSECTION IMPROVEMENTS (@ River Road/99E)

Proposed Actions: Preliminary engineering through construction to improve "crown" of 99E and to upgrade traffic signals to better accommodate multiple turn movements (see Figure 2). Estimated costs = $500,000.
Street Conditions: Four leg intersection involving a major arterial (McLoughlin Blvd./99E: 34,000 ADT/1993), minor arterial (Arlington St.: 5,200 ADT/1988/89), and minor arterial (River Road: 3,600/1988/89); R/W: 99E (120'-165'); W. Arlington St.(60'); River Road (60'); Pavement width: 99E (84'); W. Arlington St. (45'); River Road (46'); Multiple vehicle movements; River Road enters 99E at much less than a right angle, making clear vision difficult; Existing "crown" of 99E restricts field of vision from adjoining streets; Traffic signal with sign warning motorists on W. Arlington St. to yield to oncoming traffic from River Road.
Traffic Accident History: 79 accidents, 1986 - 1993 (accident site rank: #1)

(Proposal submitted to ODOT 4/1993 for consideration in Statewide Transportation Improvement Plan.)

3. E. ARLINGTON STREET SIGNALIZATION (@ 82nd Drive)

Proposed Actions: See A.2 above

Traffic Accident History: 23 accidents, 1986 - 1993 (rank: #6)

C. Bridge Needs

PARK PLACE BRIDGE REUSE STUDY

Proposed Actions: Conduct feasibility study, in coordination with Tri-Met/Metro, to assess benefits of reconstructing bridge to accommodate LRT or two HOV bus lanes to facilitate high capacity transit service between Oregon City, Gladstone (SDA), and Clackamas Town Center transit center.
Estimated construction costs = $2,000,000.

Location/Connection: Connects 82nd Dr. in Gladstone to Hwy 213 in Oregon City
Current Condition: Pedestrian and bicyclist use only (very good condition)/not authorized for automobile or bus use (weight limitations); 235' span/18' width.

D. Reconstruction Needs

1. ABERNETHY LANE WIDENING AND SIDEWALKS (Glen Echo Avenue to Portland Avenue)

Proposed Actions: Widen pavement to uniform collector standard of 36' (8' parking areas/10' travel lanes); Install sidewalk on east side of street/separated bicycle path on west side; Provide hard surface accommodation for transit stops on west side of street.
Estimated costs = $300,000.

Street Section: Glen Echo Avenue to Portland Avenue
Street Conditions: North-south collector street and transit route; Non-uniform pavement width; Few curbs/no sidewalks; 2,590'; 70'-75' R/W; Pavement width 22'-33'(near Portland Avenue; Fair condition; Separated pedestrian walkway/bicycle path south and west of roadway/not paved except for short section west of Beatrice Avenue past Abernethy Ct., and along Senior Center; STOP signs @ Glen Echo Avenue (4-way), and Portland Avenue; STOP signs on all four intervening cross streets.
Traffic Conditions: 10 traffic accidents reported along this street, 1986-1993 (rank: #15); traffic volume counts @ Glen Echo: 3,100 ADT (1973/74)/@ Portland Avenue: 3,000 ADT (1988/89); Number of access points along this section: 6 streets/22 driveways (all on east and north sides).

(Storm drainage improvements completed in 1995 in preparation for street work.)

2. E. GLOUCESTER STREET WIDENING, SIDEWALKS, SIGNALIZATION (Portland Avenue to Oatfield Road)

Proposed Actions: Widen pavement to uniform collector standard of 36' (8' parking areas/10' travel lanes); Or to minor arterial standard of 42' (8' parking areas/13' travel lanes); Or to 48' (8' parking areas/10' travel lanes/two 6' bicycle lanes); Uniform curbs and sidewalk along entire length; Traffic signal @ Oatfield Rd.
Estimated costs = $950,000.

Street Conditions: Principal east-west collector street with direct connection to McLoughlin Blvd. (traffic light @ 99E); Non-uniform pavement width/incomplete curbs and sidewalks; 3,070'; 60' R/W; Pavement width 36' west of Harvard/28' east of Harvard; Generally fair pavement condition; No on-street parking east of Harvard; Curbs and sidewalks west of Harvard/mostly none east of Harvard; Grade school abuts Gloucester St. between Chicago and Harvard; School crosswalk @ Harvard; Traffic light @ Portland Ave; STOP sign @ Oatfield Rd.; STOP signs on all six intervening cross streets.
Traffic Conditions: 16 traffic accidents reported @ Oatfield Rd, 1986-1993 (rank: #8)/16 traffic accidents reported @ Portland Ave., 1986-1993,(rank: #8); Traffic volumes have increased @ Portland Ave. 96% from 1973/74 (1,200 ADT) to 1988/89 (2,350 ADT) and @ Oatfield Rd. 263% from 1973/74 (800 ADT) to 1992 (2,900 ADT); Number of access points along this section: 8 cross streets/ 78 driveways (45 N/33 S).

3. W. ARLINGTON STREET RECONSTRUCTION AND CURBING (99E to Portland Avenue)

Proposed Actions: Remove asphalt overlay buildup/restore pavement crown to correct elevation; Install new curbs entire length; Replace poor sidewalks.
Estimated costs: $400,000.

Street Conditions: Principal east-west minor arterial and transit route; With direct connection to McLoughlin Blvd. (traffic light @ 99E); 2,315'; 60' R/W (120' @ 99E); uniform pavement width 36' (not to minor arterial standard)/45' @ 99-E; Fair to poor pavement condition, with very inadequate subsurface/street base that requires annual slurry seal coating; 95% complete curbs and sidewalks on both sides; Curbs poor to very poor: Very shallow to even with pavement, crumbling, or missing; Sidewalks poor to fair; STOP sign @ Portland Avenue; STOP signs on all three intervening cross streets (see B.1 above).
Traffic Conditions: 79 traffic accidents reported @ McLoughlin Blvd., 1986-1993, (rank: #1)/8 over remainder of section; Traffic volume counts @ 99E: 5,200 ADT (1988/89)/ @ Portland Avenue: 4,753 ADT (1987); Number of access points along this section: 5 cross streets/37 driveways (21 N/ 16 S).

E. Operations & Maintenance Needs

1. STREET SLURRY SEAL PROGRAM

The City has undertaken extensive review of the comparative merits and cost effectiveness of utilizing asphalt overlay or slurry seal for maintaining the surface and subsurface integrity of local street facilities, and has determined that a conscientious
slurry seal maintenance program is superior to asphalt overlay in most aspects. A slurry seal schedule is proposed to be compiled on all streets in the city to provide an historic summary of the year and street section-slurry sealed to allow for an ongoing overview of maintenance needs and effectiveness.

2. TRAFFIC COUNT AND SPEED MONITORING AWARENESS RADAR TRAILER

The City purchased a multi-function traffic management device in May 1995 to assist city staff in monitoring and analyzing traffic operations, including: Conducting peak hour and Average Daily Traffic (ADT) volume count surveys on selected streets; Promoting speed awareness by area motorists through the visual display of the speeds of oncoming vehicles; Monitoring the range and median speeds traveled by motorists on selected streets; and, Conducting radar speed enforcement by city police officers. This instrument represents both a useful instrument for ongoing assessment of traffic volume/street capacity issues, as well as an effective public relations and police enforcement tool.
Estimated costs = $11,273.

BIKEWAY NETWORK NEEDS AND PROPOSED ACTIONS

A. East/West Interconnection Needs

Existing Network Conditions: No existing designated bike routes provide east/west connections through community, access central corridor (Portland Avenue), allow for system loops, or connect existing regional north/south bicycle routes.

1. Clackamas Blvd., from Dahl Beach Road to 82nd Drive. [As already noted on Map 5.] Proposed route connects existing bicycle routes in Meldrum Bar Park along Dahl Beach Road and Meldrum Bar Park Road with 82nd Drive regional bike route, and creates system loops. Proposed route also provides connection to Portland Avenue corridor, Cross Park and High Rocks Park, the High Rocks commercial district, and Park Place Bridge over the Clackamas River. The proposed route would be designed as a separated bike path from Dahl Beach Road, under the 99E bridge to an as yet undetermined point on Clackamas Blvd. where it would continue as a shared roadway to the 82nd Drive bike lanes.

$12,500 has been received by the city for construction of the separated bike path portion of the proposed route by a private developer as a condition of developing the Rivergreens Apartments Phase II project. Completion of this section of the bike path, from Dahl Beach Road to a point under the 99E bridge should follow the dedication of easements, as conditions of development, of the future development of the Jack Parker and/or bowling alley (Tri-City Development) properties.

2. Bicycle Routes in Meldrum Bar Park. [Amend Map 5 to reflect proposed additions and deletions.] Delete extensions noted on Map 5 from River Road to Dahl Beach, due to access loss following construction of Rivergreens Apartments. Add existing shoulder bikeway along Meldrum Bar Park Road, from River Road to end. Add section of shared roadway bicycle route along Dahl Beach Road from point where separated park bikepaths cross roadway, to start of proposed Dahl Beach Road/Clackamas Blvd. bicycle route.

3. Gloucester/Hereford Streets, from River Road to Oatfield Road. [Amend existing route noted on Map 5 by eliminating Risley Avenue/Dierickx Field/Hereford Street connection, due to ball field development, but retain Risley Avenue/Abernethy Court connection; extend route east of Harvard Avenue to Oatfield Road.] Proposed shared roadway route connects existing River Road and Oatfield Road regional bicycle routes. Proposed route also provides connection to activity centers clustered along the Portland Avenue central corridor, and creates system loops.

The proposed route is split between Gloucester and Hereford Streets in order to take advantage of the only traffic signal permitting safe crossing of McLoughlin Blvd. (Gloucester Street) between Glen Echo Avenue and Arlington Street, as well as providing the most direct connection to River Road and Meldrum Bar Park. From Beatrice Avenue east to Oatfield Road this bicycle route is proposed to travel along Hereford Street because of this street's more uniform pavement width and extensive curb and sidewalk network. If E. Gloucester Street is reconstructed in the future (pavement widened to 36', uniform curbs and sidewalks) and bicycle activity is sufficient, designated bike lanes could be included, and routing along Hereford Street discontinued.

4. Beverly Lane/Collins Crest, from Harvard Avenue to Oatfield Road. [Largely as noted on Map 5, except connection from existing bicycle routes on Beverly Lane and Collins Crest to be via accessway between cul-de-sacs on these two streets, instead of via connection t High Street bicycle route (to be deleted as High St. not constructed.)]

5. Penny Court/Clayton Way, from Ridgegate Drive to Webster Road. [New addition to Map 5.] Proposed shared roadway route connects existing bicycle route on Webster Road to proposed bicycle route on Ridgegate Drive, and creates system loops. Accessway between Penny Court and Clayton Way provides direct connection along this route.

6. Strawberry Lane, from Webster Road to Cason Road (Clackamas County). [As already noted on Map 5.] Planned bike lane route connects existing regional bicycle route on Webster Road to proposed bicycle route along Cason Road (shared roadway initially, but intended for bike lanes, as Cason Road is widened to full collector street standards). Clackamas County funding has been committed for construction in 1997. Proposed bicycle route along Cason Road would create system loop.

7. Duniway Avenue Accessway, connecting two dead-ends of Duniway. [Add to Map 5.] This proposed route will provide connection between the separated bikepath/pedestrian way on Abernethy Lane with the proposed route on Portland Avenue and Gladstone High School, and create system loops. There are currently no sidewalks along Duniway Avenue. This section is designed to connect the two dead-ends of Duniway Avenue with a 12' wide serviceway that would also be suitable for fire and police emergency vehicle use. The accessway would include either removable gates, bollards, or barriers to discourage non-official vehicle access, but allow pedestrian, bicycle, and emergency use (see Figure 4). Construction of this accessway may occur as a condition of land use approval of development of abutting properties or in lieu of street frontage improvements.

Distance: Approximately 125'
Existing completion (Portland Avenue to Abernethy Lane): 0'
Estimated costs: $7,500

B. North/South Interconnection Needs

Existing Network Conditions: Five regional, designated bicycle routes are located in the western and eastern portions of the city; Few system loops in place among existing routes; and No interior north/south routes along city's central corridor to provide connections among its many public sector and small business activity center clusters.

8. Cornell Avenue, from Clackamas Blvd. to Collins Crest Street. [Amend Map 5 to delete bicycle routes on Yale Avenue and High Street, and replace with Cornell Avenue route.] Proposed shared roadway bicycle route connects Cross Park on the Clackamas River, bicycle routes on Clackamas Blvd. and Hereford Street. This connection is made possible by an existing accessway between Cornell Avenue (dead-end) and Cornell Avenue (cul-se-sac) in the Salty Acres subdivision. System loops are created via Collins Crest/Oatfield Road regional bikeway, and proposed Collins Crest/Beverly Lane accessway/Harvard Avenue.

9. Abernethy Lane, from Beatrice Avenue to Portland Avenue. [New addition to Map 5.] Designation of this section of the existing separated bike path along Abernethy Lane, from Glen Echo Avenue to Portland Avenue, merely recognizes its existing usage by bicyclists.

10. Harvard Avenue/Nelson Lane, from Beverly Lane to Portland Avenue. [Amend Map 5 to extend existing bicycle route along Harvard Avenue.] Proposed shared roadway bicycle route would extend existing route around the Gladstone High School to complete a system loop, and connect to Portland Avenue route.

PEDESTRIAN NETWORK NEEDS AND PROPOSED ACTIONS

A. Incomplete Sidewalk Network

Existing Network Conditions: Incomplete sidewalk network city-wide provides limited safe, convenient, and direct connections throughout the community and among activity centers, although, coverage on most arterials and collector streets is fairly good if designated bicycle lanes are included for pedestrian useage. Sidewalk network varies considerably from neighborhood to neighborhood. Inconsistent, incomplete network provides limited system loops. See Maps 7, 7A, 7B, 7C, 7D and Table IV-2 for a description of the extent of sidewalk coverage.

Proposed Actions: To achieve an incremental infill of the city's sidewalk network it is recommended to amend Section 17.50.040 (15) of the Gladstone Municipal Code, as noted below. This action is designed to provide additional guidance and authority to the Planning Commission to determine where and under what conditions sidewalks should be installed on local streets, in association with new development or redevelopment of property.

RECOMMENDATION: Amend Section 17.50.040 (15) of the Gladstone Municipal Code (new text language in **bold**):

> (15) Sidewalks shall be installed on both sides of public street and at any special pedestrian way within a develop-ment, except that the Planning Commission may approve a development without sidewalks on a local street or on a private street if special site conditions exist, or if alternative pedestrian routes are available, **or if the proposed sidewalk would likely not become part of a completed pedestrian route.**

Explanation: The purpose of this zoning code text amendment is to help clarify city policies regarding requirements for sidewalks. Developments that need land use approval from the Gladstone Planning Commission are required to comply with city standards for streets, water and sewer utilities, drainage, etc. Chapter 17.50 of the Gladstone Municipal Code contains the city's standards pertaining to vehicle and pedestrian circulation, and Section 17.50.040 (15) cited above, contains requirements for sidewalks. In staff's opinion, the text amendment is needed because:

- The city is largely fully developed with an established street and pedestrian network; there are very limited opportunities for extension of the existing sidewalk network as a condition of future land use approval.

- The city's discretion for requiring sidewalks has already been somewhat eroded by the state Transportation Planning Rule, which requires sidewalks on collector and arterial streets for all new developments. The Transportation Planning Rule is silent on requirements for sidewalks on local streets.

* The proposed language addresses the potential that property owners may be required to build sidewalks that go nowhere. Currently, 17.50.040 (15) requires sidewalks as a condition of development approval on local streets except when the Planning Commission can determine either that site conditions prevent sidewalk installation or that alternate pedestrian facilities exist. Whereas the Planning Commission typically has applied a common sense approach to the requirement for sidewalks, including the test that public improvements should be commensurate with the value of private development, a continuing problem arises when a property owner is faced with installing sidewalks along his frontage on a local street when it's questionalbe that the sidewalks will ever connect with other pedestrian facilities.

* The proposed language will not remove the Planning Commission's authority to require sidewalks on local streets as a condition of subdivision development or as a condition of approval for design review or conditional use, such as for multi-family developments, churches, day care centers and businesses.

The Transportation System Plan contains a series of maps on the current extent of the pedestrian network (Maps 7, 7B, 7C, 7D), connections to activity centers (Maps 7A, 7B1, 7C1, 7D1), and connections to transit stops (Map 8), which may assist the city in its considerations.

Proposed Actions: To achieve a more rapid and extensive completion of the city's curb and sidewalk network than private initiated endeavors would likely achieve, the city has taken the initiative for identifying and financing "pedestrian corridors." The following proposed "pedestrian corridors" would establish a spatially distributed network that provides safe and direct connections between activity centers and residential areas, as well as create corridor cross-connections and system loops.

RECOMMENDATION: Add the following projects to the Gladstone Capital Improvement Plan.

a. **Beatrice Avenue, from Clackamas Blvd. to Hereford Street.** This proposed route provides connection to existing completed east/west sections of the sidewalk network from Arlington Street to Hereford Street; provides connection to the proposed bicycle/pedestrian path from Meldrum Bar Park to Clackamas Blvd., and to Dierickx Field; fills in north/south network gap, roughly equidistant (approx. 1,200') between largely complete sidewalk sections on McLoughlin Blvd. and Portland Avenue; creates system loops; and, provides connection to a transit stop on Arlington Street. Located in low-moderate income neighborhood eligible for Community Development Block Grant funds.

   Distance less cross-streets: 1,820' (one side)/3,640' (both sides)
   Existing completion: 0' Remaining uncompleted: 1,820' (1)/3,640' (2)
   Cross-streets: 9 Handicapped ramps needed: 18 (one side)/36 (both sides)
   Estimated costs: $52,600 (one side)/$105,200 (both sides)

b. **Portland Avenue, from Clackamas Blvd. to Glen Echo Avenue.** This largely completed section of the pedestrian network is perhaps the principal pedestrian corridor in the city, traverses its central core and provides connection to clusters of public sector and retail

service activity centers along most of its entire length. It also provides access to completed east/west sidewalk sections on Arlington, Dartmouth and Hereford Streets, as well as the pedestrian path on Abernethy Lane. Curbs and sidewalks are proposed to be extended to Glen Echo Avenue to provide connection to the pedestrianway created with the widening of Glen Echo, from Portland Avenue to Oatfield Road, and create system loops.

Distance less cross-streets: 4,130' (one side)/8,260'(both sides)
Existing completion: 3,660' (1)/7,320' (2) Remaining uncompleted: 470' (2)
Cross-streets: 14 Handicapped ramps needed: 16 (1995 CDBG funding allowed completion of curb ramps from Clackamas Blvd. to Ipswich Street)
Estimated costs: $23,800 (both sides plus complete curb ramps entire length)

c. **Harvard Avenue, from Clackamas Blvd. to Beverly Lane/Collins Crest.** This partially completed section of the pedestrian network provides connection to Cross Park, Max Patterson Memorial Park, grade school, and high school; provides connection to existing completed east/west sections of the sidewalk network on Arlington, Dartmouth, Gloucester (west only), and Hereford Streets, as well as needed access to/from the Collins Crest neighborhoods; fills in north/south network gap, roughly equidistant (approx. 900') between the completed sidewalk sections on Portland Avenue and the proposed route on Cornell Avenue; creates system loops; and, provides connection to transit stops on Arlington and Dartmouth Streets.

Distance less cross-streets: 3,035' (one side)/6,070' (both sides)
Existing completion: 1,465' (1)/2,830' (2) Remaining uncompleted: 1,570'(1)/3,140'(2)
Cross-streets: 13 Handicapped ramps needed: 20 (one side)/34 (both sides)
Estimated costs: $49,400 (one side)/$93,400 (both sides)

d. **Cornell Avenue, from Clackamas Blvd. to Collins Crest.** This proposed route provides connection to Cross Park and Max Patterson Memorial Park, as well as access to existing sidewalk sections providing connection to the High Rocks commercial district; provides connection to existing east/west sections on Arlington, Dartmouth and Hereford Streets, as well as needed access to the Collins Crest neighborhoods, via an accessway between Cornell Avenues in the Salty Acres and Kevin Terrace subdivisions; fills in north/south network gap, roughly equidistant (approx. 900'-1,200') between the existing bicycle lanes on Oatfield Road and the proposed route on Harvard Avenue; creates system loops; and, provides connection to transit stops on Arlington and Dartmouth Streets.

Distance less cross-streets: 4,485' (one side)/8,970' (both sides)
Existing completion: 1,560'(1)/2,210'(2) Remaining uncompleted: 2,925' (1)/6,760' (2)
Cross-streets: 16 Handicapped ramps needed: 27 (one side)/44 (both sides)
Estimated costs: $82,800 (one side)/$174,800 (both sides)

e. **Beverly Lane/Collins Crest, from Harvard Avenue to Oatfield Road.** This largely completed section of the proposed pedestrian network provides otherwise limited

east/west connection to the high school and other major activity centers along Portland Avenue. It is the closest feasible east/west route in this part of the city within 1,600' (Beverly Lane section) of the east/west route along Hereford Street. It provides connection between the proposed north/south routes on Harvard Avenue and the existing bicycle/pedestrian lanes on Oatfield Road, as well as an east/west continuation along the existing completed sidewalk sections on Ridgegate Drive that provide access to Kraxberger Middle School. This route creates system loops, and provides connection to a transit stop on Oatfield Road.

Distance less cross-streets: 2,265' (one side)/4,530' (both sides)
Existing completion: 1,815' (1)/3,630' (2) Remaining uncompleted: 450' (1)/900' (2)
Cross-streets: 8 Handicapped ramps needed: 5 (one side)/16 (both sides)
Estimated costs: $13,500 (one side)/$32,400 (both sides)

f. **Los Verdes Drive/Valley View Road, from Webster Road to Jennings Avenue.** This partially completed section of the proposed pedestrian network provides otherwise limited north/south connection between the northernmost neighborhoods in the city and access to activity centers in the central and western sections, as well as Kraxberger Middle School on Webster Road. It is the closest feasible parallel route roughly equidistant (approx. 1,800') between existing bicycly/pedestrian routes on Oatfield and Webster Roads. It provides connections to existing east/west sidewalk sections on Park Way, Monticello, Ridgegate, and Crownview Drives; and, creates system loops. A portion of Valley View Road (approx. 600') is within Clackamas County, and would require coordination and cooperation to complete this section of the sidewalk network.

Distance less cross-streets: 2,955' (one side)/5,910' (both sides)
Existing completion: 1,755' (1)/3,510' (2) Remaining uncompleted: 1,200'(1)/2,400'(2)
Cross-streets: 8 Handicapped ramps needed: 9 (one side)/22 (both sides)
Estimated costs: $32,100 (one side)/$67,800 (both sides)

g. **Oakridge Drive, from Oatfield Road to Valley View Road.** This partially completed section of the proposed pedestrian network provides the closest east/west connection to Oatfield Road for residents in the northernmost neighborhoods, roughly equidistant (approx. 800') between Jennings Avenue (Clackamas County, no sidewalks) and the completed sidewalk section on Park Way. It provides connection between the existing bicycle/pedestrian route on Oatfield Road and the proposed route on Valley View Road/Los Verdes Drive. This route creates system loops, and provides connection to a transit stop on Oatfield Road.

Distance less cross-streets: 2,100' (one side)/4,200' (both sides)
Existing completion: 1,400' (1)/2,800' (2) Remaining uncompleted: 600' (1)/1,200' (2)
Cross-streets: 6 Handicapped ramps needs: 1 (one side)/2 (both sides)
Estimated costs: $12,900 (one side)/$25,800 (both sides)

h. **Penny Court/Clayton Way, from Ridgegate Drive to Webster Road.** This partially completed section of the proposed pedestrian network provides otherwise limited

east/west connection between the existing sidewalk section on Ridgegate Drive and existing bicycle/pedestrian route on Webster Route, via an accessway between Penny Court and Clayton Way. This proposed route provides access to routes that connect with activity centers in other portions of the city; creates system loops around Kraxberger Middle School; and provides connection to transit stops on Clayton Way at Webster Road, and on Ridgegate Drive at Oatfield Road.

Distance less cross-streets: 1,320'(one side)/2,640' (both sides)
Existing completion: 770' (1)/1,520' (2) Remaining uncompleted: 550' (1)/1,100' (2)
Cross-streets: 3 Handicapped ramps needs: 1 (one side)/2 (both sides)
Estimated costs: $11,900 (one side)/$23,800 (both sides)

i. **Duniway Avenue Accessway, connecting two dead-ends of Duniway.** This proposed route will provide connection between the separated bikepath/pedestrian way on Abernethy Lane with the proposed route on Portland Avenue and Gladstone High School, and create system loops. There are currently no sidewalks along Duniway Avenue. This section is designed to connect the two dead-ends of Duniway Avenue with a 12' wide serviceway that would also be suitable for fire and police emergency vehicle use. The accessway would include either removable gates, bollards, or barriers to discourage non-official vehicle access, but allow pedestrian, bicycle, and emergency use. (See Figure 4)

Distance: approximately 125'
Existing completion (Portland Avenue to Abernethy Lane): 0'
Estimated costs: $7,500

Installation of sidewalks on both sides of this proposed accessway to complete connections to Abernethy Lane and Portland Avenue would provide for a safer and more convenient route for pedestrian travel for area residents.

Distance less cross-streets and accessway: 1,355' (one side)/2,710' (both sides)
Existing completion: 0' Remaining uncompleted: 1,355' (1)/2,710' (2)
Cross-streets: 3 Handicapped ramps needs: 4 (one side)/ 6 (both sides)
Estimated costs: $30,700 (one side)/$59,600 (two sides)

j. **Monticello Drive, east side, between Ridgegate Drive and Winfield Court.** This largely completed section of curb and sidewalk provides reasonably direct connection between Los Verdes Drive and the existing bicycle/pedestrian route on Oatfield Road, and site of a transit stop. This short section of missing sidewalk section presents a safety hazard to pedestrians who must cross on to the street at a point where visibility by pedestrians and motorists is very poor due to a blind curve and tall landscaping. The subject properties are currently undeveloped. (Tax Lots #15700 [owner Clackamas County], and #15800 [owner Gladstone resident])

Distance: approximately 283'
Handicapped ramps needed: 0
Estimated costs: $5,000

k. **City Park perimeter, Exeter St., Fairfield St., Cornell Ave.** This proposed route provides connection to existing completed east/west sections of the sidewalk network on Exeter and on Gloucester Streets, west of Harvard Avenue; provides connection to the proposed north/south route along Cornell Avenue, between Collins Crest Street and Cross Park, and along Harvard Avenue, between the high school and Cross Park; and creates system loops.

Distance: 1,050'
Handicapped ramps needs: 2
Estimated costs: $22,500

l. **Chicago Avenue, between Hereford and Dartmouth Streets, and Fairfield Avenue, between Portland and Chicago Avenues.** This partially completed section of the pedestrian network near Gladstone Grade School is an area of heavy pedestrian activity (mostly young children), bus and automobile traffic. It is a principal pedestrian corridor that provides east/west connection to activity centers along Portland Avenue on Gloucester, Exeter and Dartmouth Avenues. The section along the south side of Fairfield Avenue is included to complete the network coverage in this pedestrian area, and provide direct access to a transit stop on Portland Avenue.

Distance less cross-streets: 1,200' (one side)/2,400' (both sides)
Existing completion: 1,000' Remaining uncompleted: 200'(1 side)/1,400'(2 sides)
Cross-streets: 5 Handicapped ramps needed: 3 (1 side)/6 (2 sides)
Estimated costs: $6,250 (one side)/$32,500 (both sides)

PUBLIC TRANSPORTATION NEEDS AND PROPOSED ACTIONS

A. Frequency of Service

Existing Conditions: Frequency of service varies by route, but in most instances is far less frequent than the minimum peak commute period service frequency of 10 minutes associated with regional trunk routes. See specific route service frequency below.

Proposed Actions: Request Tri-Met improve frequency of service to regional trunk minimum service frequency of 10 minutes during peak commute hours, as appropriate, and as noted below:

* **Transit Route:** #32 Oatfield Road
  Current peak commute period frequency of 14 - 30 minutes is insufficient to encourage optimal ridership. Endeavor to improve frequency of service to regional trunk minimum service frequency of 10 minutes during peak commute hours.

* **Transit Route:** #33 McLoughlin Blvd.
  Current peak commute period frequency of 9 - 15 minutes is good, however,

improvement to uniform, consistent regional trunk minimum service frequency of 10 minutes would encourage optimal ridership.

* **Transit Route:** #34 River Road
  Current peak commute period frequency of 30 -35 minutes is insufficient to encourage optimal ridership, given the recent construction of 334 units of multi-family housing (Rivergreens Apartments) on River Road since the last Tri-Met bus ridership survey in 1990. An additional 64 unit multi-family housing complex is scheduled for construction in 1995 just north of the Tri-City Mobile Home Park. Endeavor to improve frequency of service to regional trunk minimum day base rate of 15 minutes.

* **Transit Route:** #79 Canby-Clackamas Town Center
  Current peak commute period frequency of 52 - 60 minutes is insufficient to encourage optimal ridership. Endeavor to improve frequency to a minimum 15 - 30 minutes.

B. Transit Stops

Existing Conditions: While the number and spacing of transit stops is satisfactory on all of the four bus routes that service the community, passenger protection from adverse weather conditions, through provision of bus stop shelters, is largely absent from all stops. This lack of bus shelters discourages ridership. Selected high ridership transit stops with high daily ridership and without bus shelter protection are prioritized below, by transit route and total daily ridership (1990 Tri-Met survey).

Transit Stop	#32 Oat.	#33 99-E	#79 Canby-CTC	Total
Arlington @ Portland Ave.	28	27	12	67
Portland @ Ipswich St.	--	38	--	38
Glen Echo @ Mildred	--	38	--	38
Abernethy @ Portland	--	31	--	31
Arlington @ McLoughlin	7	15	5	27
Portland @ Fairfield St.	23	--	--	23
Arlington @ Barton Ave.	5	12	3	20
Oatfield @ Oakridge Dr.	20	--	--	20
Arlington @ Beatrice Ave.	5	11	3	19
Oatfield @ Webster Rd.	--	9	10	19
Arlington @ Bellevue Ave.	4	8	3	15
Oatfield @ Ridgegate Dr.	14	--	--	14
Abernethy @ Thriftway	11	--	--	11
Abernethy @ Center St.	--	10	--	10
Oatfield @ Collins Crest	9	--	--	9
Oatfield @ SDA Camp	8	--	1	9

Transit Route: #34 River Road
High density residential housing complexes, recently constructed and planned, near McLoughlin Blvd. and the Tri-City Mobile Home Park, might generate greater transit ridership

along this route if bus shelters were installed near the current stops at McLoughlin Blvd., Dahl Park Road, and the Tri-City Mobile Home Park.

Proposed Actions: request Tri-Met install appropriate bus stop shelters at selected high passenger bus stops, as prioritized in table above, as well as on #34 River Road bus route to reflect recent high density residential development along this route.

PRELIMINARY STREET IMPROVEMENT PLAN

1995:	
Plant street trees along Abernethy Lane	$10,000
Grind surface & pave sections of Oatfield Rd. south of Webster Rd.	100,000
Install curb and sidewalk near grade school	20,000
Install sidewalk along one-half of 100 block of East Dartmouth Street	6,000
Install sidewalk on west side of Valley View Road	10,000
Construct bikeway on north side of Cason Road	50,000
Subtotal	$196,000
1996:	
Gravel five blocks of road shoulder along East Gloucester Street	30,000
Install curb and sidewalk and asphalt pave Abernethy Lane*	300,000
Install sidewalk along northerly and easterly side of high school	35,000
Subtotal	$265,000
1997:	
Gravel and slurry seal shoulders of East Exeter and Fairfield Streets	50,000
Asphalt pave Webster Road	200,000
Install sidewalk along 200 block of Ipswich Street*	10,000
Install sidewalk along 300 block of West Hereford Street*	7,000
Gravel slurry seal shoulders of Caldwell Road for bikeway	30,000
Subtotal	$267,000
1998:	
Reconstruct West Arlington Street including new curbs*	$400,000
Install sidewalk along Charolais Drive near Webster Road	15,000
Subtotal	$415,000
1999:	
Construct Center Turn Lane on Oatfield south of Webster Rd.	$400,000
Subtotal	$400,000
2000:	
Install curb and sidewalk and pave 5 blocks of East Gloucester	300,000
Install curb and sidewalk on Bellevue, Beatrice and Barton Avenues*	250,000
Subtotal	$550,000
2001:	
Install traffic signal at Oatfield and Gloucester intersection	$130,000
Install left turn lane on Oatfield south bound at Webster Rd.	200,000
Synchronize signals on Oatfield Rd. at Webster, Gloucester and 82nd Dr.	15,000
Subtotal	$345,000
2002:	
Construct sidewalk along west side of Oatfield Rd. south of Webster Rd.	$50,000
Install traffic signal in the 82nd Drive and Arlington intersection	130,000
Construct sidewalk on westerly side of Valley View from Oakridge to Jennings	35,000
Subtotal	$185,000
2003 or after:	
Reconstruct 82nd Drive and I-205 Interchange (local match only)	$350,000
Subtotal	$350,000
ESTIMATED TOTAL	$2,973,000

*Could be partially funded by federal Community Development Block Grants

GLADSTONE COMPREHENSIVE PLAN

GOALS, OBJECTIVES, POLICIES AND IMPLEMENTATION STRATEGIES

APRIL, 1979

b. Develop a program for removing other architectural barriers to make all parts of the city more accessible to the transportation disadvantaged.

c. Research possible inputs and influence on Tri-Met's policies with regard to the accessibility of public transit facilities to handicapped persons.

Policy 5

Design and develop safe pedestrian/bicycle crossings at potentially hazardous locations.

Implementation

a. Seek funds for the provision of a median to provide a waiting/orientation area for pedestrians and sidewalks on and along Highway 99E.

b. Seek funds for improved pedestrian/bicycle crossings on Oatfield at Collins Crest and Webster Road and crossing on 82nd Avenue at the Gladstone Center area as well as other hazardous locations within the area.

Policy 6

Monitor and map traffic accidents on a quarterly basis to alert city officials and public to problems and the need for corrective measures.

Implementation

Designate staff time for the collection, mapping, publication and distribution of information to the Traffic Safety Commission and the public on a regular quarterly basis.

Policy 7

Designate the following streets as indicated below and physically define their function.

FREEWAYS
I-205

MAJOR ARTERIALS
Highway 99E

MINOR ARTERIALS
Arlington Street
82nd Drive
River Road
Webster Road
Oatfield Road
Jennings Avenue
Portland Avenue (Arlington to Glen Echo)
Glen Echo Avenue (River Road to 99E)

Implementation

Amend subdivision ordinance accordingly.

Policy 10

Develop street improvement schedules.

Implementation

a. Assign staff time for the study of traffic volumes and street capacities and conditions.

b. Prioritize and coordinate street resurfacing and public service underground improvements to minimize costs and disruption.

Policy 11

Solicit and utilize citizen input in planning traffic safety improvements so they better serve residents and to minimize social costs.

Implementation

The Traffic Safety Commission shall continue to advise the City Council, Planning Commission and city staff on traffic safety matters.

SECTION A-15

GLADSTONE BIKEWAY PLAN

Prepared by the Gladstone
Park Board as an Element
of the
Gladstone Comprehensive Plan

April, 1976

CITY OF GLADSTONE PLANNING DEPARTMENT
525 Portland Ave.
Gladstone, Oregon 97027

656-5223

GLADSTONE BIKEWAY

INTRODUCTION

Historically, the concept of "two-wheeler" dates back to ancient Egypt and Rome. The actual invention of the bicycle occurred at the turn of the 18th Century with the "clerefere", a pedal-less structure steered by the rider's feet. Later versions included the "draifine", the "hobby horse", the "bones shaker" with the first pedal drive system and later the "safety" model from England with it's air cushioned tires that fostered the gay nineties "bike craze" and paved the road for the coming of the automobile.

Bicycling thus reached it's first intensive use prior to the 1900's when it became a viable alternative to the horse and buggy, however, with the advent of the automobile and it's higher speed, the bicycle soon lost it's viability.

Today we are faced with increasing urban congestion, environmental concerns and continued need for fuel conservation which is placing high values on alternative modes of travel to that of the private automobile. If cycling and walking are to become viable alternative modes of travel to that of the automobile, they must be treated as an element in the overall transportation system for the Gladstone area.

STUDY ORGANIZATION

The Gladstone Bikeway Plan is being developed as part of the Transportation Element of the Gladstone Comprehensive Plan. The Gladstone Park Board and the Citizens' Advisory Committee are charged with developing this Bikeway Plan. Organizations to be contacted for review and comment of the plan draft of this Bikeway Plan include the Park Board, Citizens' Advisory Committee, Traffic Safety Commission, Planning Commission, City Council, Columbia Region Association of Governments, Clackamas County Planning Department, neighboring cities, high school and grade school officials, teachers and students and the general public.

FINDINGS

The Gladstone area is the crossroads of four regional bikeway routes, River Road, Oatfield Road, Webster Road, Clackamas Blvd./82nd Street.

- Most of the topography of the Gladstone area is well suited for bicycling
- Cycling is a viable recreation activity for all age groups
- Cycling initial cost and maintenance are minimal compared to the private automobile
- Cycling is a non-polluting mode of travel
- Cycling fosters energy conservation
- The Northeast portion of Gladstone, due to it's steep terrain, is not well suited for bikeways
- State owned lands located along the Willamette and Clackamas Rivers are activity generating areas and therefore suitable for a connection to local and regional bikeways
- Marsh lands located North of Glen Echo between Addie Street and Watts Street are well suited for parks and/or open space designation and therefore should be connected by local bikeways
- Existing pedestrian trails should be considered for potential bikeways

ASSUMPTIONS

The bicycle is a viable alternative to the automobile for short hauls such as trips to work, school, shopping, etc.
The latent demand for cycling would be realized through the development of various bicycle routes and facilities
Meandering and inconvenient bike routes will not be utilized as actively as direct and convenient bike routes
Cycling could adequately serve as a major mode of transportation within the city
Funding for bikeway construction will continue to be available for the region

GOALS

To develop a system of bikeways that are safe, convenient and attractive
To develop a system of bikeways that is an integral part of the Gladstone area transportation plan
To provide adequate physical support facilities for bicycle transportation
To develop adequate support service programs

OBJECTIVES

To develop a bikeway that forms an integrated circulation system throughout the city
To develop a bikeway system that interconnects schools and parks
To develop a bikeway system that's a prelude to the development of a greenway system throughout the Gladstone area
To develop a bikeway system that minimizes conflicts between bicyclists, motorists and pedestrians
To develop a bikeway system that will be developed in a manner that will encourage cycling to become a recreational activity as well as a mode of travel
To develop loops for exercise and recreation (i.e. one route to destination and another to origin)
To establish adequate bike parking and locking facilities at major activity nodes and mass transit transfer stations
To develop a bikeway plan review process to insure that the plan reflects any changes in problems, needs or conditions

POLICIES

To develop Class I Bikeways on all new collectors and arterials...or improvements at least Class II
To give cyclists the right-of-way on all local streets (see Major Street Plan)
To require a minimum of five (5) feet on all new sidewalk construction and to all replacement sidewalk construction
To require curb cuts and ramps for all new curb construction and to all replacement construction (See ORS Chapter 179)
To recognize sidewalks as a viable bikeway on all residential streets which do not have designated bikeways

POLICIES (Continued)

To recognize sidewalks as a viable bikeway for areas where bicycle travel conflicts with cars (i.e. narrow roads, heavy traffic, etc.)
To provide fencing where bikeways conflict with private property rights (i.e. where bikeway travels along easements abutting private property)
To illuminate all bikeways with relative scale lighting to promote security

DESIGN CRITERIA

To interconnect activity nodes (to include schools, parks and historic sites, shopping areas, employment areas, churches, mass transit transfer stations, city hall, library and other community facilities)
To connect with regional and neighboring city bikeways
To provide widespread distribution of balanced spacing of routes
Develop route loops to offer varied route trips
To offer parallel routes to major streets where possible
To provide easy access to bikeways from neighborhoods

GLADSTONE BIKEWAY PROGRAM

POLICIES

1. Trails, bikeways and pedestrian ways should form an integrated circulation system throughout the city.
2. Trails, bikeways and pedestrian ways should be safe and convenient.
3. Trails, bikeways and pedestrian ways should be developed in a manner that will encourage walking and/or cycling to become a recreational activity as well as a mode of travel.
4. To develop a trail and bikeway system that interconnects schools and parks.
5. To develop a trail and bikeway system as a prelude to the development of a greenway system throughout the city.
6. Trails, bikeways and pedestrian ways should be given right-of-way on all local streets (see Major Street Plan)
7. To avoid major auto congestion and dangerous locations
8. To develop loops for exercise and recreation (i.e. one route to destination and another to origin)
9. To develop Class I Bikeway on all new collectors and arterials...on improvements at least Class II.
10. To use curb cuts to encourage younger students to use bikes
11. To encourage curb cuts for bikes where bicycle travel conflicts with cars (i.e. narrow roads)- all local streets (see Major Street Plan)
12. To provide fencing where bikeway is in conflict with private property rights (i.e. side or behind home)
13. To illuminate all bikeways with relative scale lighting to promote security

DESIGN CRITERIA

1. Connect activity nodes
    a. Schools
    b. Park and historical sites
    c. Shopping areas
    d. Employment areas
    e. Churches
    f. Mass transit connection points

g. Other communite facilities
   1. City Hall
   2. Library

2. Connect with regional and neighborhood city bikeways
3. Offer parallel routes to major streets where possible
4. Provide easy access to bikeways from neighborhoods
5. Provide widespread distribution and balanced spacing of routes
6. Striping in residential neighborhoods is aesthetically undesirable

BIKEWAY PLAN REVIEWING BODIES

1. Citizens' Advisory Committee
2. Traffic Safety Commission
3. Planning Commission
4. Area Bike Clubs
5. Neighborhood cities and unincorporated areas councils
6. High school and grade school officials, teachers and students
7. General public