

CHAPTER THREE

TRANSPORTATION

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APPENDIX

Appendix III-A. Street Design Guidelines

Appendix III-B. Transportation System Management Summaries

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ACRONYMS

ATC	Advanced Traffic Controller
ADA	Americans with Disabilities Act
BPA	Bonneville Power Administration
CIP	Capital Improvement Program
CMS	Changeable Message Signs
CCTV	Closed Circuit Television Cameras
CTR	Commute Trip Reduction
DART	Dial-A-Ride Transit
EMS	Extinguishable Message Signs
FHWA	Federal Highway Administration
FWCP	Federal Way Comprehensive Plan
GMA	Growth Management Act
HOV	High-Occupancy Vehicles
HAR	Highway Advisory Radio
METRO	King County Metro Transit
LOS	Level of Service
MMLOS	Multi-Modal Level of Service
PSRC	Puget Sound Regional Council
RMS	Ramp Metering Systems
RCW	Revised Code of Washington
RWIS	Roadway Weather Information Systems
SOV	Single-Occupant Vehicle
SEPA	State Environmental Protection Act
SR	State Route
TMS	Traffic Monitoring Station
TDM	Transportation Demand Management
TIP	Transportation Improvement Program
TSM	Transportation Systems Management
VMT	Vehicle Miles Travelled
v/c	Vehicle-to-Capacity
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation

3.0 INTRODUCTION

The Transportation chapter of the *Federal Way Comprehensive Plan* (FWCP) establishes a framework for providing a future transportation system (facilities and services) that supports anticipated land use described in Chapter 2. This chapter focuses on actions and investments needed to create and manage the transportation infrastructure and services to accommodate future growth assumptions.

The City of Federal Way continues to enhance the vibrancy of its community for living, working, and playing. The new public facilities, trails, and roadway investments contribute toward a vibrant downtown that the City will continue to enhance. This Transportation chapter will guide efforts to enhance mobility and safety for all modes of travel in Federal Way through 2040.

The process of providing a transportation system involves numerous agencies at the local, state, and national levels. The cycle of providing a system involves planning, change approval, funding, implementing, operating, maintenance, monitoring, and administering the elements of the system. Also, some of the transportation system is provided by other agencies, such as King County Metro Transit (METRO), Sound Transit, Pierce Transit, and the Washington State Department of Transportation (WSDOT). Where possible, the City partners with these agencies to improve mobility and safety.



Welcome to City of Federal Way Sign at South 320th Street / I-5 Interchange (off-ramp) looking east

3.1 POLICY BACKGROUND

State and county transportation policies provide a statutory framework for the development of City land use policies. It is important to consider state and county level policies when developing the transportation element because they can help guide the development of transportation supportive policy and investment.

State Policies

The Growth Management Act states that, “...a lack of common goals expressing the public’s interest in conservation and the wise use of our lands pose a threat to the environment, sustainable economic development, and the health, safety and high quality of life enjoyed by residents of this state” (RCW 36.70A.010). The Growth Management Act provides a framework for content and adoption of local comprehensive plans. The Growth Management Act provides 13 goals to be, “...used exclusively for the purpose of guiding development of comprehensive plans and development regulations.” A number of the Growth Management Act goals pertain to transportation. They are as follows:

- *Transportation* – Encourage efficient multi-modal transportation systems that are based on regional priorities and coordinated with county and city comprehensive plans.
- *Open Space and Recreation* – Retain open space, enhance recreational opportunities, conserve fish and wildlife habitat, increase access to natural resource lands and water, and develop parks and recreational facilities.
- *Environment* – Protect the environment and enhance the state’s high quality of life, including air and water quality and the availability of water.
- *Public Facilities and Services* – Ensure that those public facilities and services necessary to support development shall be adequate to serve the development at the time the development is available for occupancy and use without decreasing current service levels below locally established minimum standards.

Regional Policies

The Puget Sound Regional Council’s VISION 2040 and the 2012 King County Countywide Policies, both required by the Growth Management Act, provide a regional framework to achieve the goals of the Growth Management Act.

VISION 2040 is the long-range growth management, economic, and transportation strategy for the central Puget Sound region encompassing King, Kitsap, Pierce, and Snohomish counties adopted by the Puget Sound Regional Council (PSRC) in 2008. VISION 2040’s Transportation Strategy provides a framework for long-range transportation planning by emphasizing transportation investments that offer greater mobility options, alternatives to driving alone, and lower transportation-related energy consumption.

The 2012 King County Countywide Policies address changes to the Growth Management Act since its initial adoption in 1990 and reflect the regional direction established in VISION 2040. The countywide policies provide a framework for both King County and its respective cities, such as Federal Way. Adherence to these countywide policies ensures that city plans are consistent with one another. These policies address issues such as the designation of urban growth areas, land use, affordable housing, provision of urban services for future development, transportation, and contiguous and orderly development.

In addition, the King County Countywide Policies call for minimizing air pollution and greenhouse gas emissions through supporting mass transit, encouraging non-motorized modes of travel, and reducing trip lengths. Policies contained in this comprehensive plan have been prepared to implement VISION 2040 and the King County Countywide Policies as they apply to the City.

This chapter must be consistent with both VISION 2040 and the King County Countywide Policies. By implementing the goals in Section 3.3, the Transportation Chapter is consistent with VISION 2040 and the 2012 King County Countywide Policies direction.

3.2 THE TRANSPORTATION CONCEPT

Federal Way is primarily situated between Puget Sound and Interstate-5; see *Map III-1, Overview Map*. State Route 99 (SR 99), a Highway of Statewide Significance, parallels I-5 through the eastern part of the City. The connections of SR 18, a major east-west corridor and Highway of Statewide Significance, with SR 99, SR 161, and I-5 are closely spaced within the City. These routes experience traffic congestion regularly. Traffic incidents occurring along these routes greatly impact transportation conditions for people traveling within the City and connecting between Tacoma, Des Moines, Seattle, and communities to the east. In this regional context, the City coordinates its transportation planning with a variety of jurisdictions, including the State of Washington, Puget Sound Regional Council, King County, and neighboring communities.

The City of Federal Way's existing transportation network accommodates many modes of travel, including walking, bicycling, public transit, and driving. In Federal Way, the predominant mode of travel is the private automobile, which will continue to play a principal role in the City's transportation. However, shorter trip lengths are becoming more common and the total miles people are traveling in vehicles is declining. These two factors affect how people choose to travel, such as by walking, by bicycling, by transit, or by vehicle. To achieve City and regional goals, emphasis will be placed on providing integrated and balanced mobility opportunities for all modes. The transportation concept is intended to facilitate the following:



- Promotion of high-occupancy vehicles (HOV) use such as trains, buses, carpools, and vanpools;
- Incorporation of high-capacity transit such as bus rapid transit, light-rail, and commuter rail;
- Expanded bicycle and pedestrian facilities;
- Maximizing existing infrastructure through transportation system management strategies.

How Do People Travel?

Travel patterns in the Federal Way planning area are shown on *Map III-2 (Travel Patterns from Residential Areas in the Federal Way Planning Area)*. Travel patterns generally follow the hierarchy of roadways; people use neighborhood roads to connect to major collector and arterials. The regional facilities of I-5, SR 99, SR 18, SR 161, and Military Road are the predominant facilities used between Federal Way and neighboring cities.

Travel to work in Federal Way is dominated by the single-occupant vehicle (SOV), which accounts for roughly 75 percent of work trips within the City, according to the American Community Survey. About ten percent of work trips are made by carpools. Transit has seen a significant increase in commute trips since the 1990s, doubling to about seven percent of work trips. Biking and walking modes account for approximately three percent of work trips, while the remaining five percent of work trips is comprised of telecommuters.



Wynstone neighborhood at SW Campus Drive and 12th Avenue SW Intersection



3.3 TRANSPORTATION VISION AND GOALS

It is proposed that the City adopt the following goals and policies with respect to transportation facility improvements that allow it to maintain options into the future, especially with respect to transit enhancements. This may result in a conservative approach to highway improvements that might slow the rate of progress in the area of non-drive alone mode use.

Goal 1

TG1 *Maintain mobility through a safe, balanced, and integrated transportation system.*




Policies

TP1.1 Reduce reliance on drive alone trips by prioritizing and implementing supportive local-level transit, high occupancy vehicle (HOV), and non-motorized improvements.




TP1.2 Develop a transportation system that achieves the following level of service (LOS) metrics:

- Signalized Intersection outside of City Center will experience a 1.2 vehicle-to-capacity (v/c) ratio or lower
- Unsignalized Intersection outside of City Center will experience a 1.0 vehicle-to-capacity (v/c) ratio or lower
- The City Center area will experience an average 1.1 vehicle-to-capacity (v/c) ratio or less.
- Facility completeness as described in the following pedestrian, bicycling, and transit priority areas level of service tables.




Pedestrian Priority Area Level of Service (LOS)

LOS	Within Pedestrian Priority Area Network
	Pedestrian facility as indicated in the Street Design Guidelines
	Provides a lower-level facility than recommended in the Street Design Guidelines
	No pedestrian facility provided

Bicycle Priority Area Level of Service (LOS)

LOS	Within Bicycle Priority Area Network
	Bicycle facility as indicated in Street Design Guidelines
	Provides a lower-level facility than recommended in the Street Design Guidelines
	No bicycle facility provided

Transit Priority Corridor Level of Service (LOS)

LOS	Measurement*	Pedestrian Access (Optional)	Quality of Service (Optional)+
	More than 80% of transit stops meet amenity minimum provisions	Sidewalks and pedestrian crossing opportunities serving stops	All day frequent service; adequate parking at park-and-rides and stations
	More than 60% of transit stops meet amenity minimum provisions	Sidewalks and pedestrian crossing opportunities serving some stops	Peak period service; insufficient parking at park-and-rides and stations
	Less than 60% of transit stops meet amenity minimum provisions	General lack of sidewalks and pedestrian crossing opportunities	N/A

The Street Design Guidelines are provided in Appendix III-A.

*Amenities include bus stop shelter, bench, flag post, and/or concrete waiting area; these amenities are determined based on the number of people using a transit stop as defined by a transit agency.

+Consider the adequacy of parking provided at park-and-rides and transit stations

- TP1.3** Identify the improvements and strategies needed to fully implement the City's Layered Network and meet the level-of-service requirements for transportation.
- TP1.4** Allow improvements to vehicle throughput only where they enhance traffic and pedestrian safety, improve high capacity transit and HOV facilities, or reduce air pollution.
- TP1.5** Enhance mobility using the existing footprint of the roadway and technological advancements. When widening roadways, impacts to non-motorized users and transit vehicles and passengers should be minimized.
- TP1.6** Employ traffic calming measures in neighborhoods through context sensitive design where traffic volumes and speeds consistently exceed reasonable levels and as set forth in the adopted Neighborhood Traffic Safety Program.
- TP1.7** Improve safety on residential streets by:
- Reducing street widths while maintaining on-street parking.
 - Increasing separation between sidewalks and streets.
 - Reducing design speeds to discourage speeding.
 - Limiting the length of straight streets to discourage speeding.
 - Other actions approved by Public Works.
- TP1.8** Use Access Management improvements to reduce crash rates and extend capacity of major arterials.
- TP1.9** Public Works will develop incident response timing plans for major arterials.
- TP1.10** Coordinate with transit agencies to provide convenient non-motorized access to transit facilities.

- TP1.11** Develop code requirements and a designated truck route system that accommodates the needs of the private sector and residents, and provides a balance between movement needs and quality of life.
- TP1.12** Discourage the use of road facilities by vehicles carrying hazardous materials and those with weight, size, or other characteristics that would be injurious to people and property in the City.
- TP1.13** Identify transportation programs and strategies for security and emergency responses.
- TP1.14** Develop and maintain a Layered Network that provides connectivity and recognizes that not all streets provide the same quality of travel experience. Classify streets as Freeway, Principal Arterial, Minor Arterial, Principal Collector, Minor Collector, or Local Street. Ensure that the Layered Network continues to provide for all varieties of street uses including: regional mobility and cross-town trips, commuting, shopping, and recreational travel, property and business access, and parking, regardless of mode.
- TP1.15** Continue to enhance the City’s Layered Network by using the following methods:
- Require dedication of rights-of-way as a condition for development when the need for such rights-of-way is linked to the development or where shown on the Future Roadway Network;
 - Request donations of rights-of-way to the public;
 - Purchase rights-of-way in accordance with State laws and procedures; and
 - Acquire development rights and easements from property owners.

Goal 2

- TG2** *Be fiscally and environmentally sustainable.*

Policies

- TP2.1** Establish a funding program that prioritizes the most critical non-motorized improvements first.
- TP2.2** Develop a program to create portions of the non-motorized system through public-private partnerships.
- TP2.3** Prioritize transportation projects considering concurrency, safety, multimodal enhancements, environmental impacts, and cost effectiveness.

- TP2.4** Assure cost-effective maintenance of transportation facilities under the City’s jurisdiction, including non-motorized facilities.
- TP2.5** Leverage state and federal funds for transportation improvements.
- TP2.6** The maintenance and preservation of existing travel infrastructure shall take precedence over major street improvement projects that expand system capacity.
- TP2.7** Strategically use public and private investment to complement the multi-modal vision of the plan, including “matching” improvements to supplement the efforts of other agencies to provide HOV and transit facilities.
- TP2.8** Capacity enhancements will be constructed where lower cost improvements cannot correct deficiencies; these capacity enhancements will be developed to be as competitive as possible for obtaining grants.
- TP2.9** Develop clean transportation programs and facilities, including actions to reduce pollution and greenhouse gas emissions from transportation.
- TP2.10** Identify stable and predictable funding sources for maintaining and preserving existing transportation facilities and services.

Goal 3

- TG3** *Enhance community health, livability, and transportation by providing a connected system of pedestrian, bicycle, and transit ways that are integrated into a coordinated regional network.*

Policies

- TP3.1** Through subarea planning, with the cooperation of transit service providers, work to make transit part of each neighborhood through appropriate design, service types, and public involvement. This system should provide convenient connections from city neighborhood activity centers to the regional transportation system.
- TP3.2** Prepare, promote, and provide for an enhanced, high-capacity, regional transit system, maintaining area residents’ mobility and travel options. The regional transit system should assist in attaining air quality standards.
- TP3.3** Acquire or preserve rights-of-way for high-capacity transit whenever possible, such as development applications, in advance of their need. Make accommodations for any improvements, whether public or private, to provide for future high-capacity transit needs without major redevelopment.

- TP3.4** Foster phased improvements that expand transit services in time to meet the demand for these services.
- TP3.5** Work with transit agencies to ensure amenities such as shelters, benches, bicycle racks, lighting, and information kiosks are incorporated in the design and improvement of appropriate transit facilities.
- TP3.6** Support transit commuter options (e.g., subscription buses, special commuter services, local shuttles).
- TP3.7** Promote extension of fixed guideway facilities to the regional airport as an effective means of resolving congestion problems that affect City residents and businesses.
- TP3.8** Encourage non-motorized improvements that minimize the need for residents to use motorized modes by extending the existing non-motorized system and providing:
1. Access to activity centers and schools;
 2. Linkage to transit, park & ride lots, and school bus networks;
 3. Completion of planned pedestrian/jogging or bicycle trails;
 4. Designating a network of streets that can safely and efficiently accommodate bicycles; and,
 5. Extend sidewalks to all streets.
- TP3.9** Facilitate a safe school walking routes program, and, where possible, make capital budget decisions that support such a system.
- TP3.10** Provide a one-mile grid of bicycle facilities connecting major activity centers, recreational facilities, and schools.
- TP3.11** Incorporate pedestrian and bicycle features as design elements in the City Center as reflected in the Federal Way Comprehensive Plan Vision and City Center Street Design Guidelines.
- TP3.12** Include sufficient area in rights-of-way for bike lanes, sidewalks, and landscaped medians to provide separation from motorized traffic. Use landscaped medians to separate opposing traffic when safety and aesthetic purposes dictate the need.
- TP3.13** Acquire access paths between existing developments, cul-de-sacs, public facilities, business areas, and transit followed by trail construction to improve

non-motorized circulation. Require the same for all new developments or redevelopments.

- TP3.14** Requiring developers to mitigate the impact of the development on the City’s transportation system by constructing bike lanes, trails, and sidewalks where they would interface with the existing system to the extent allowed by law.
- TP3.15** Develop access management standards to minimize the number of curb cuts on arterials to improve pedestrian and vehicle safety.
- TP3.16** Emphasize the enforcement of laws that reduce pedestrian, cyclist, and vehicle conflict.
- TP3.17** Coordinate development of the non-motorized system with surrounding jurisdictions and regional system extensions.
- TP3.18** Incorporate environmental factors into transportation decision-making, including attention to human health and safety.

Goal 4

- TG4** *Support the City’s land use vision and plan.*

Policies

- TP4.1** Integrate land use and transportation plan decisions to support the land use vision and plan.
- TP4.2** Enhance traffic circulation and access with closer spacing of through streets, where feasible, and limiting the area to be served by a single access point commensurate with planned density.
- TP4.3** Determine street classifications by balancing travel needs with changing right-of-way uses and neighborhood character.
- TP4.4** Protect existing and acquire future right-of-way consistent with functional classification cross-section (transit, rail, bike, and pedestrian) needs.
- TP4.5** Require developments to dedicate right-of-way as needed for development commensurate with the impacts of the development. At a minimum, setback limits shall be used to assure that buildings are not placed within the right-of-way requirements for planned transportation facilities. Right-of-way dedication shall be commensurate with a development’s impact to the existing and planned transportation system.

- TP4.6** Design arterials to fit with the planned character of areas (context sensitive design) they pass through.
- TP4.7** Enhance the viability of regional and local transit service by establishing design standards for streets that move transit, pedestrian, and cyclists in the City Center.
- TP4.8** Monitor growth in population and employment in relation to the land use and growth assumptions of the Transportation Element. Reassess the Land Use and Transportation Elements as needed to ensure that planned improvements will address the potential impacts of growth.

Goal 5

- TG5** *Develop and implement transportation systems management strategies and programs that contribute to the overall effectiveness of the multimodal transportation system.*

Policies

- TP5.1** Reduce auto dependency, especially drive-alone trips, by employing and promoting the application of programs enhance mobility and assist in achievement of the land use vision.
- TP5.2** Use transportation demand management to help achieve an appropriate arterial level of service that balances the City's goals for residents, consumers, employers, and employees.
- TP5.3** Support transportation demand management programs that can be shown to be cost-effective in achieving plan goals. Allow residents and employers discretion to choose the Transportation Demand Management methods they wish to employ.
- TP5.4** Encourage employers to institute complementing Transportation System Management actions to those undertaken by the City.
- TP5.5** Support the achievement of City and regional mode split goals through assisting all Commute Trip Reduction-affected and voluntary employers in the Federal Way planning area to achieve the Commute Trip Reduction (CTR) Act travel reduction goals and target.
- TP5.6** Develop coordinated Transportation Demand Management (TDM) strategies with regional representatives and other adjacent communities.

- TP5.7** Incentivize public/private programs that stimulate transit, car, and van pool use.
- TP5.8** Encourage the provision of a robust transportation alternative rich environment so that all members of the community, including those with transportation disadvantages, have viable travel options or alternatives.
- TP5.9** Prioritize development of HOV and transit priority lanes, and prioritizing transit and HOV movements at traffic signals.
- TP5.10** Continue to implement traffic signal coordination projects as the primary component of a TSM program. As funds permit, monitoring of traffic operations will be carried out to assure efficient timing of traffic signals.
- TP5.11** Public Works will maintain a mechanism for public comments and requests related to traffic monitoring and other areas for proposed transportation enhancements.
- TP5.12** Develop a regular data collection and monitoring program.

Goal 6

- TG6** *Be an active partner by coordinating with a broad range of groups to help meet Federal Way's transportation goals.*

Policies

- TP6.1** Implement federal, state, and countywide planning policies.
- TP6.2** Coordinate transportation improvement programs with appropriate state, regional, and local agencies.
- TP6.3** Public Works shall coordinate with neighboring jurisdictions to develop a fair and consistent means of addressing the impacts of growth and development between jurisdictions without undue administrative burdens.
- TP6.4** The City will continue to cooperate with regional and local transit providers to develop facilities that make transit a more attractive option.
- TP6.5** Work with the transit agencies, WSDOT, King County, and other partners, in applying for funding for HOV improvements that complement transit and non-transit HOV facilities and park and rides within Federal Way.

- TP6.6** Coordinate with other agencies and stakeholders to pursue funding for pedestrian and bicycle amenities.
- TP6.7** Support regional transportation projects that are appropriately designed and will preserve the movement of people and goods on I-5 and state routes.
- TP6.8** Involve major generators of area freight and goods movement in discussions to identify their needs and priorities as part of improvement programming; including access to regional marine facilities.
- TP6.9** Coordinate with local business organizations, and provide feedback to local business organizations on international and regional transportation issues and on transport needs and opportunities related to all modes of transportation.

3.4 EXISTING CONDITIONS

This section provides a summary of the existing transportation conditions in Federal Way. These existing conditions provide a base to create the future transportation vision for the City.

Street and Highway System

Federal Way is served by a network of publicly maintained streets and highways connecting local communities and urban centers in the Puget Sound region, as shown in *Map III-1 (Overview Map)*. There are two major freeways, which are Highways of Statewide Significance, in Federal Way:

- Interstate 5 (I-5) is five lanes in each direction, with a posted speed limit of 60 mph. This freeway serves as the main north/south freeway for regional travel in western Washington.
- State Route 18 (SR 18) is two lanes in each direction, with a posted speed limit of 60 mph. This freeway acts as an east/west alternative to I-90, connecting to I-90 east of Issaquah and serving the communities of Auburn, eastern Kent, Covington, and Maple Valley.

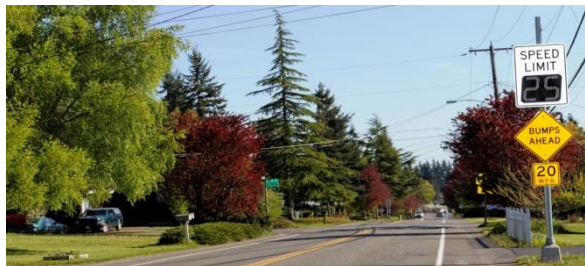
Other primary roadways serve major activity centers within Federal Way, including commercial activities in the South 320th Street corridor between Pacific Highway South (SR 99) and I-5 (the City Center), commercial developments along Pacific Highway South, at South 348th Street and Enchanted Parkway South, and several smaller commercial centers located within various residential areas. The roadway system also serves concentrations of office uses located within the City Center, West Campus, and the former Weyerhaeuser Headquarters/East Campus area. The roadway system within

the City connects to the surrounding regional transportation network, which provides access to other major activity centers including Seattle, SeaTac Airport, Tacoma, the Port of Tacoma, Kent, and Auburn.

Functional Classification of Streets

Public streets are classified according to their functions related to mobility and land access. These functional classifications help facilitate planning for access and circulation, standardization of road designs, and provision of a hierarchy for roadway funding. The types of functional classifications established within Federal Way include, also see *Map III-3 (Functional Classification of Existing and Planned Streets and Highways)* and *Table III-1 (Characteristics of Functional Classification of Streets)*.

- *Freeway:* A multi-lane, high speed, high capacity roadway intended exclusively for motorized traffic with all access controlled by interchanges and road crossings separated by bridges.
- *Principal Arterial:* A roadway connecting major community centers and facilities, often constructed with partial limitations on access and minimum direct access to abutting land uses.
- *Minor Arterial:* A roadway connecting centers and facilities within the community and serving some through traffic while providing greater access to abutting properties.
- *Collector:* A roadway connecting two or more neighborhoods or commercial areas, while also providing a high degree of property access within a localized area. Collectors have been separated into principal and minor designations according to the degree of travel between areas and the expected traffic volumes.
- *Local Street:* All other roadways not otherwise classified, providing direct access to abutting land uses and serving as feeders to facilities with higher functional classifications.
- Designation of roadway functional classification is an integral part of managing street use and land development. The classification of streets is necessary for receipt of state and federal highway funds. It is important to coordinate roadway classification with anticipated land use change and to apply a consistent approach to the designation of facilities. This ensures that roadways are sized correctly and provide the appropriate level of pedestrian and bicycle accommodation to support the surrounding land use. This also helps reduce the likelihood of long-term capacity problems.



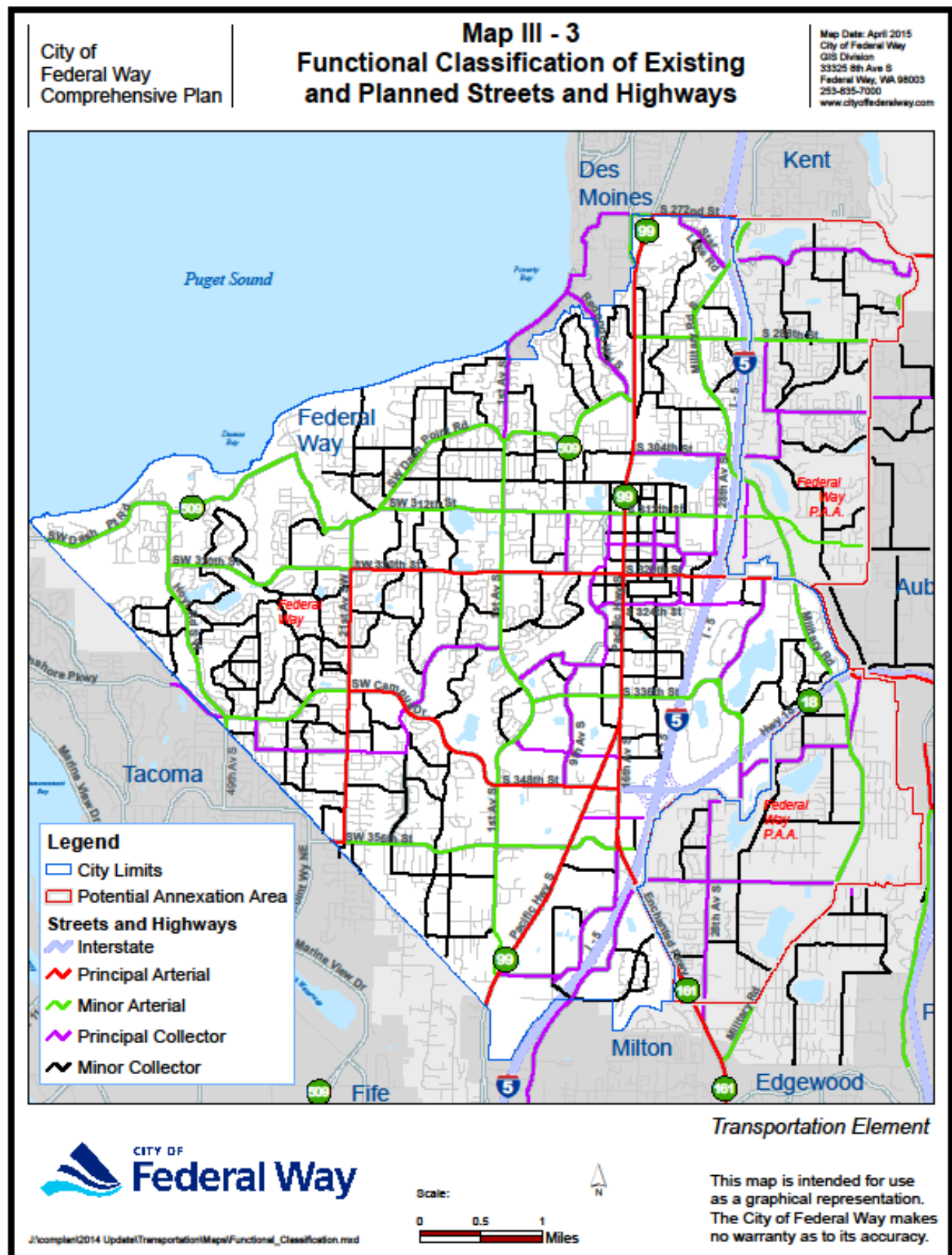


Table III-1
Characteristics of Functional Classification of Streets

Road Classification	Number of Lanes	Right of Way Width ⁷		Expected Daily Traffic
		Existing Code	Posted Speed	
Interstate/Freeways ¹	4+ (varies)	Varies	60mph	30,000+
Principal Arterial ²	2 to 7	68' to 124'	35-50mph	5,000+
Minor Arterial ³	2 to 5	68' to 106'	30-40mph	5,000-35,000
Principal Collector ⁴	2 to 5	68' to 100'	25-35mph	5,000-25,000
Minor Collector ⁵	2 to 3	60' to 80'	25-35mph	1,000-5,000
Local Street ⁶	2	36' to 66'	25-35mph	up to 1,000

1. Limited access, state jurisdiction.
2. Connects subregional activity centers and communities.
3. Provides major movement capacity; collecting neighborhood and business traffic to higher level arterials.
4. Connections between neighborhood or commercial areas. Design consideration for trucks.
5. Channels local traffic to principal collectors or arterials. Design for buses per METRO standards.
6. Primary function is access to abutting land use. Through traffic can be discouraged by use of traffic control devices.
7. The exact cross-sections and standards for a particular street within the community will be established through the City's Development Standards.

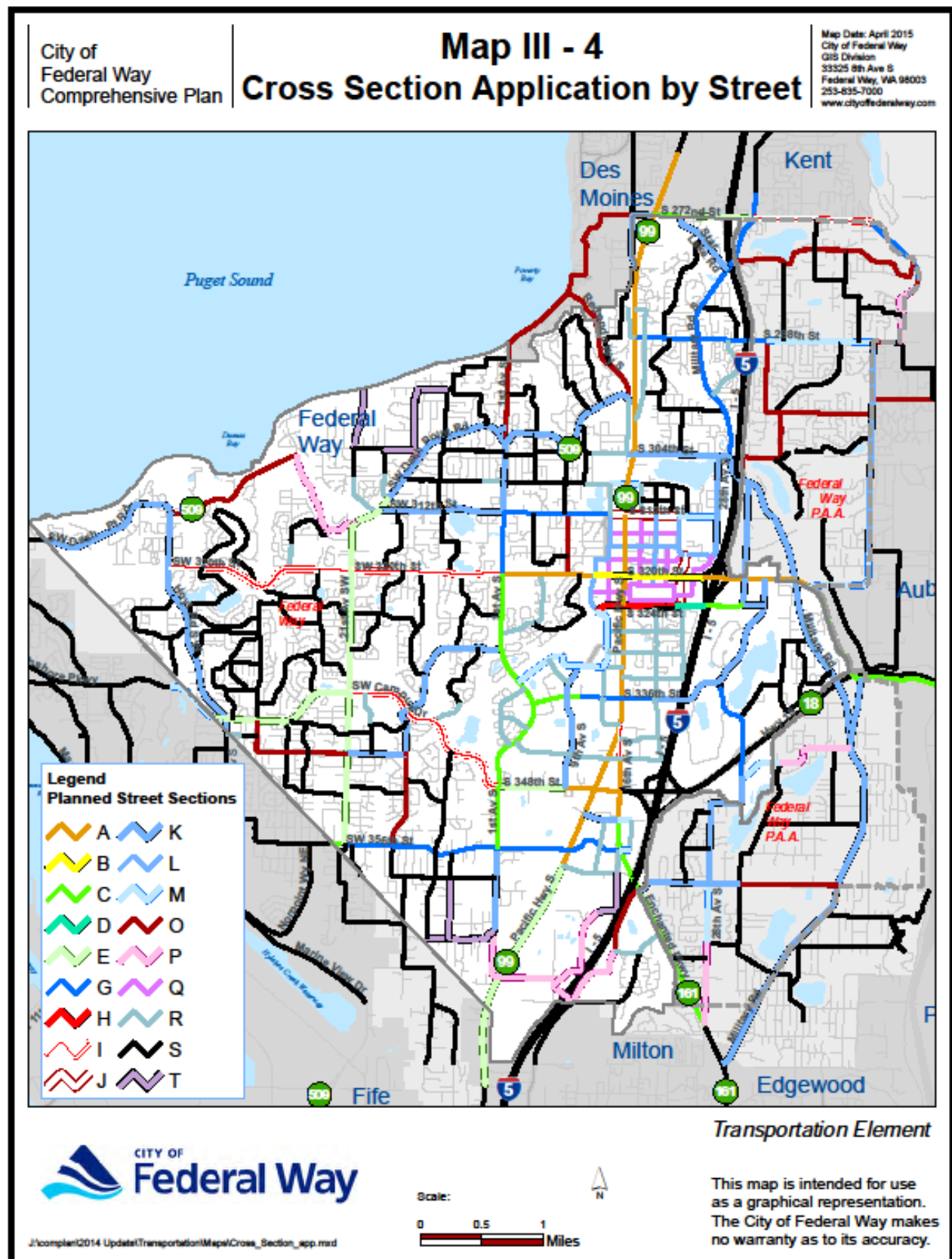
Map III-4 (Cross-Section Application by Street) illustrates which cross-section would be used for each arterial and collector within the community. Since the City does not plan local street networks, the applicable street cross-section for local streets will be established through the City's development review process, which is ongoing.

Access Management Classification

Access management is the regulation of intersection and driveway spacing along a corridor and is intended to enhance safety and preserve capacity of roadways. Roadway crash rates are related to the spacing of turning conflicts. By reducing the number of driveways and turning movements through shared access to multiple parcels, and restricting turning movements in congested areas, the safety and efficiency of the City's streets can be maintained. This improvement also reduces the number of conflict zones for all vehicles, pedestrians, and bicycles.

Access is one of the major factors influencing functional classification. Generally, higher classifications (interstates or freeways) serve a limited access function, while lower classifications (local roads, cul-de-sac streets) serve a local access function. The State of Washington approved legislation requiring that access onto state facilities be granted by permit and that such access conform to an access management classification system (Revised Code of Washington [RCW] 47.50). The WSDOT put into place two administrative codes. The first identifies the administrative process (including permit fees for issuing access permits on state facilities), and the second defines the access classification system (Washington Administrative Code [WAC] 468.51 and 468.52, respectively).

A summary of the access classifications from WAC 468.52 is provided in *Table III-2 (Washington State Access Classification System Chapter 468.52 WAC)*. The criteria used to define the classification system included functional classification, adjacent land use (existing and proposed), speeds, setting (urban or rural), and traffic volumes. The



authority to permit access to state facilities lies with the state in unincorporated areas and with the cities in incorporated areas. All state routes within the City are classified, with the exception of SR 18 and I-5, which are limited access facilities and not subject to the access classification system.

Table III-2
Washington State Access Classification System Chapter 468.52 WAC (7-14-94)

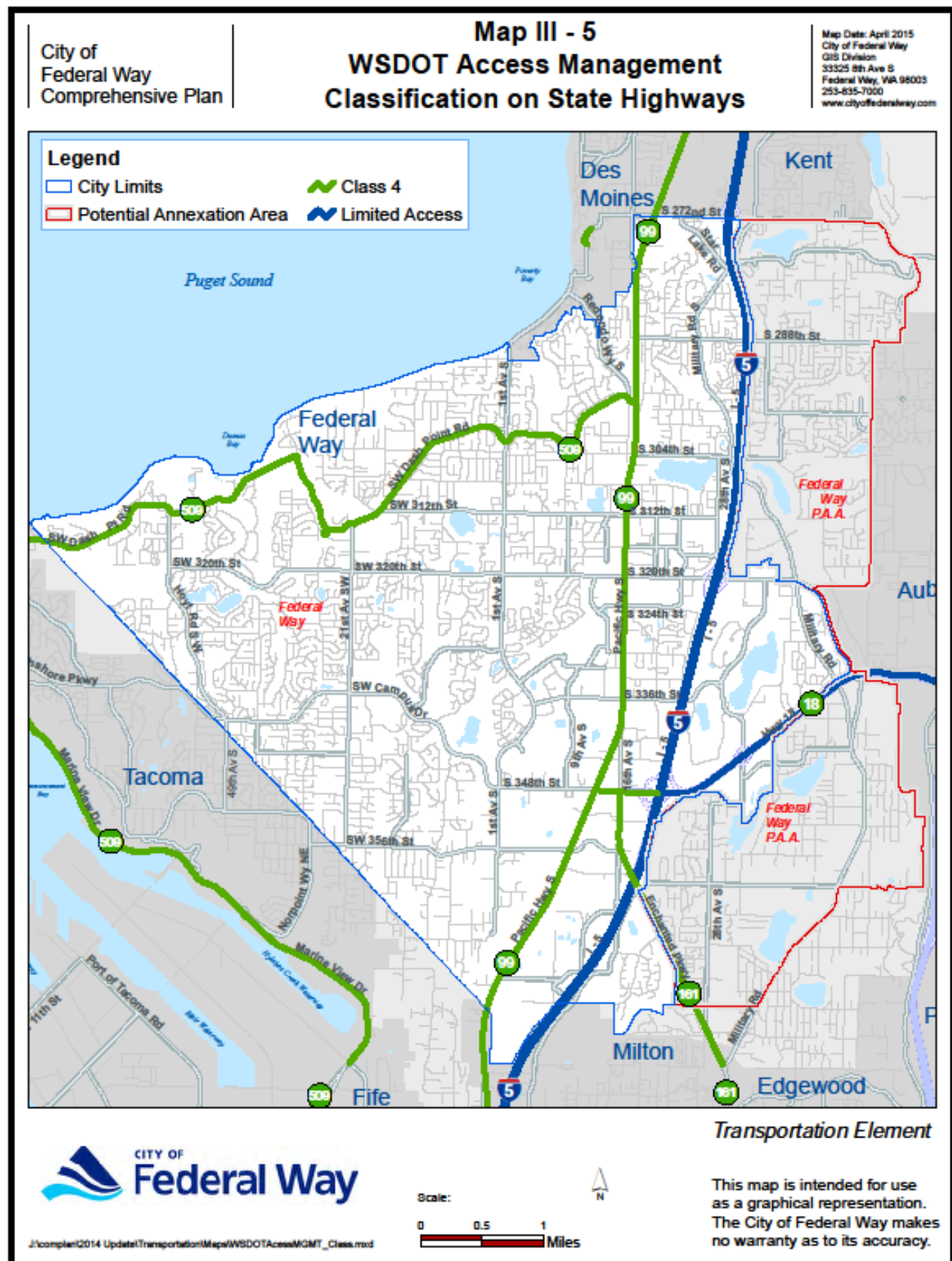
Class	Functional Characteristics	Posted Speed (MPH)	Typical Planned Median Treatment	Planned Intersection Spacing*	Minimum Private Connection Spacing*
1	High speed/volume, long trips serving: interstate, interregional, intercity travel. Service to abutting land subordinate to service of major traffic movements.	50 to 55	Restrictive, where multi-lane is warranted.	1.0 mi	1320 feet. One per parcel
2	Medium to high speeds/volumes, medium to long trips serving: interregional, intercity, intra-city travel. Service to abutting land subordinate to service of traffic movement.	Urban: 35 to 50 Rural: 45 to 55	Restrictive, where multi-lane is warranted.	0.5 mi	660 feet. One per parcel.
3	Moderate speeds/volumes, short trips serving: intercity, intra-city, intercommunity travel. Balance between land access and mobility. Used where land use is less than maximum build out, but development potential is high.	Urban: 30 to 40 Rural: 45 to 55	Restrictive where multi-lane is warranted. Two-way left-turn lane may be utilized.	Rural: 0.5 mi Urban: 0.5 mi/less with signal progression analysis.	350 feet
4	Moderate speeds/volumes, short trips serving: intercity, intra-city, intercommunity travel. Balance between land access and mobility. Used where level of development is more intensive and major land use changes less likely than class 3.	Urban: 30 to 35 Rural: 35 to 45	Restrictive if average daily traffic volumes exceed 25,000.	Rural: 0.5 mi Urban: 0.5 mi/less with signal progression analysis.	250 feet
5	Low to moderate speeds, moderate to high volumes, primarily short trips in intra-city and intra-community travel. Service of land access dominant function.	25-35	Non-restrictive	0.25 mi/less with signal progression analysis.	125 feet

Note: This table is for summary purposes only and is not included in the WAC.

Source: WSDOT *See text of the WAC for exceptions.

Table III-3 (City of Federal Way Access Management Standards) illustrates the City's adopted access classification system. The primary purpose of access management is to improve safety; therefore, higher access classifications are triggered either by crash rates or lane configurations that are less safe at higher volumes. Similarly, access spacing standards are the most restrictive for turning movements with the highest potential for crashes. *Map III-5 (WSDOT Access Management Classification on State Highways)* indicates WSDOT's access classification on state highways in Federal Way.

Map III-6 (City of Federal Way Access Management Classifications) indicates the access classifications within the City. These access standards would be implemented as part of review of land development, as an element of street improvement projects, and to ameliorate locations with high crash rates as a part of traffic safety maintenance.



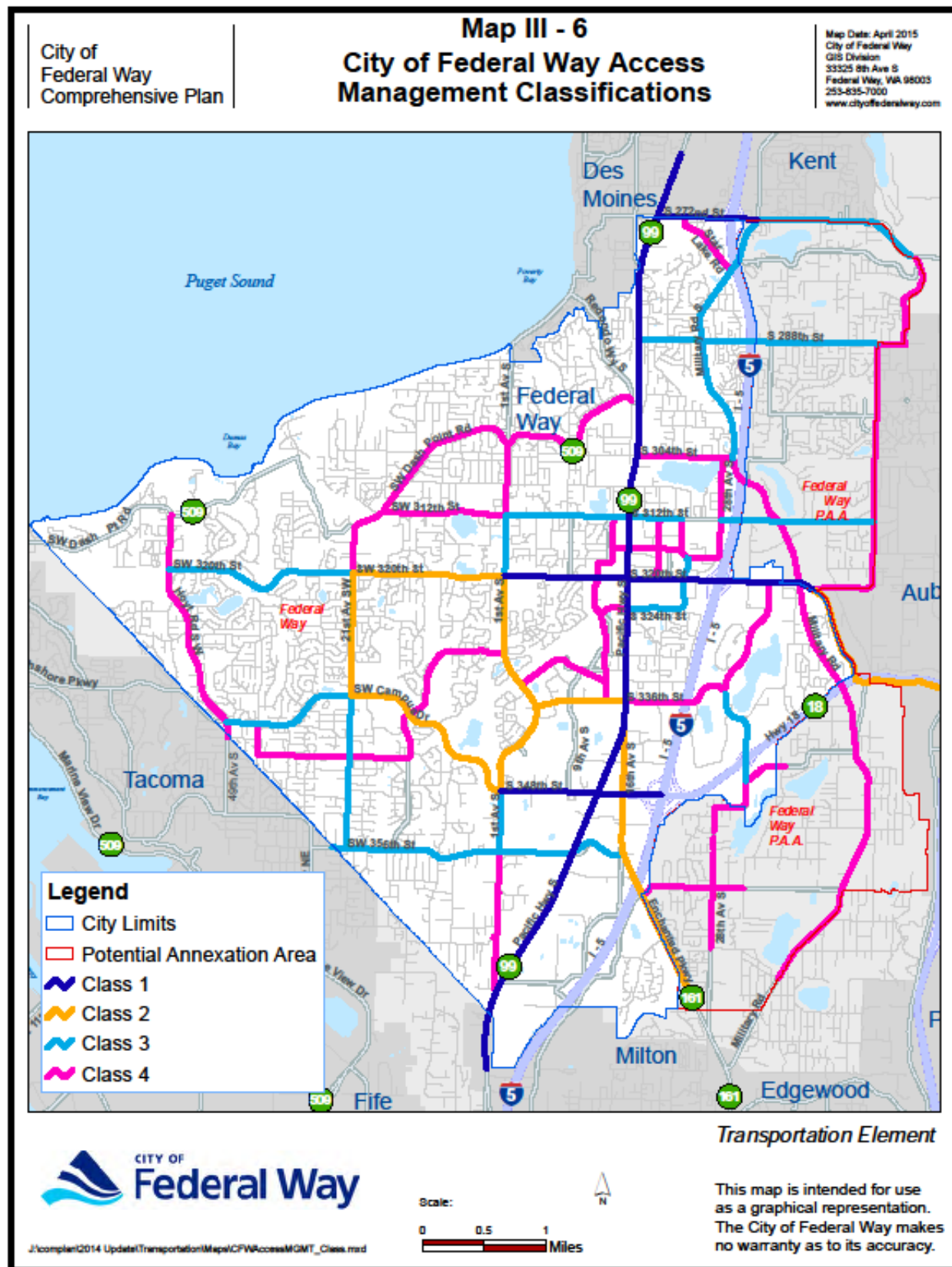


Table III-3
City of Federal Way Access Management Standards

Access Classification	Median Type	Number of Through Traffic Lanes	Spacing of Roadway Elements					Minimum Signal Progression Efficiency** *
			Crossing Movements (feet)	Left-Turn Out (feet)	Left-Turn In (feet)	Right-Turn Out (feet)	Right-Turn In (feet)	
1	Raised	6	Only at signalized intersections.	Only at signalized intersections.	330	150	150	40%
2	Raised	4	330	330	330	150	150	30%
3	Two-Way Left-Turn Lane	4	150	150*	150*	150*	150*	20%
4	Two-Way Left-Turn Lane	2	150*	150*	150*	150*	150*	10%

*Does not apply to Single-Family Residential uses.

**Greater spacing may be required in order to minimize conflicts with queued traffic.

***If the existing efficiency is less than the standard, new traffic signals may not reduce the existing efficiency.

a) Raised Medians will be required if any of the following conditions are met:

- 1) There are more than two through traffic lanes in each direction on the street being accessed.
- 2) The street being accessed has a crash rate over 10 crashes per million vehicle miles, and currently has a two-way left-turn lane.

b) Two-way left-turn lanes will be required if the street being accessed has a crash rate over 10 crashes per million vehicle miles, and currently does not have a left-turn lane.

Street Standards

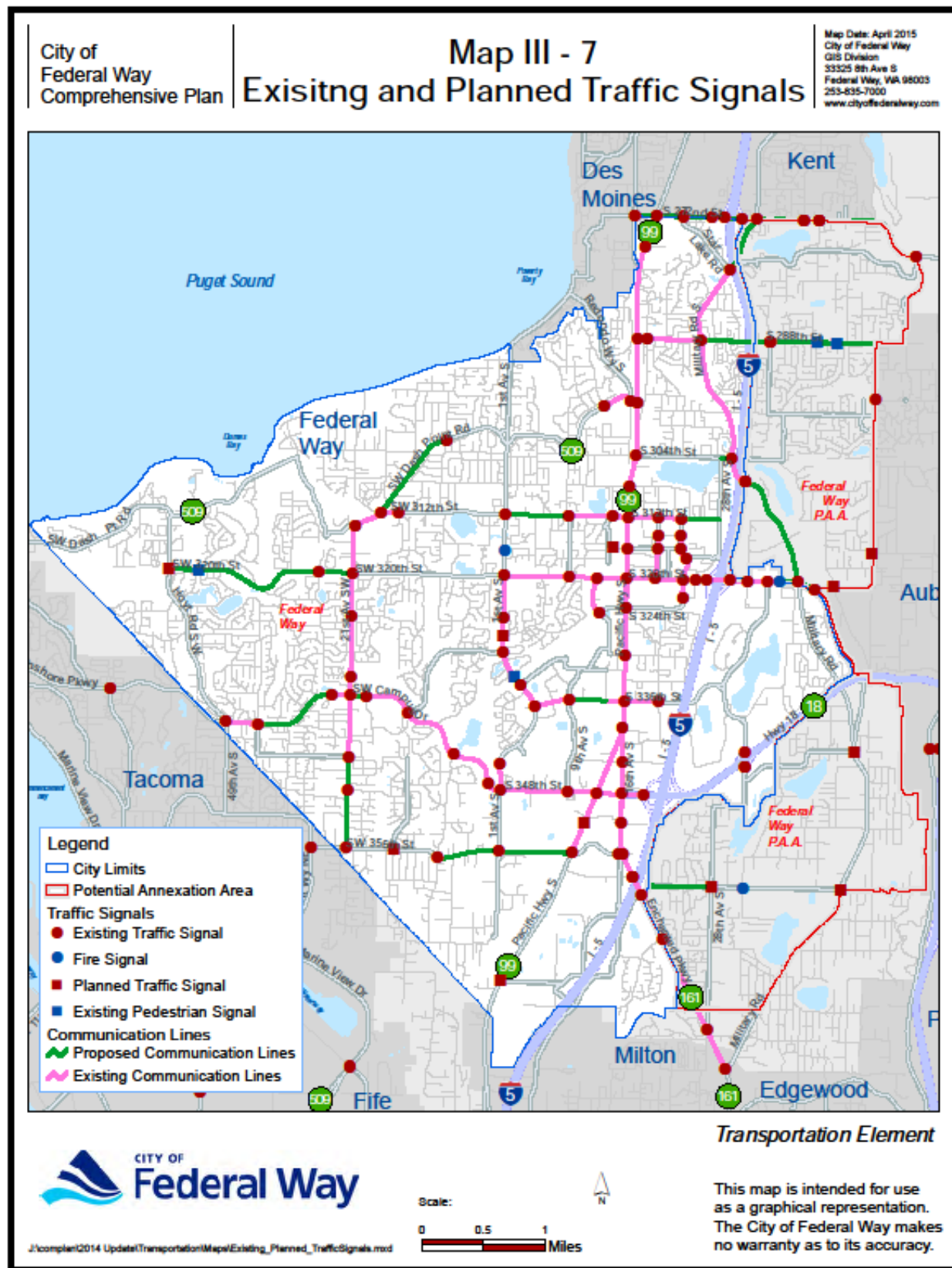
As the transportation system evolves, periodic review of the Federal Way Comprehensive Plan, changes to the subdivision code, and street standards are necessary. Street standards within city code convey the vision of the Comprehensive Plan in greater detail. Similar to the classification map, they guide the development process activities. For example, components of the subdivision code can require certain types of street standards (e.g. widths, parking, etc.) to support designated transit compatible development. Street design standards show preferred cross sections for each arterial and street segment in the City.

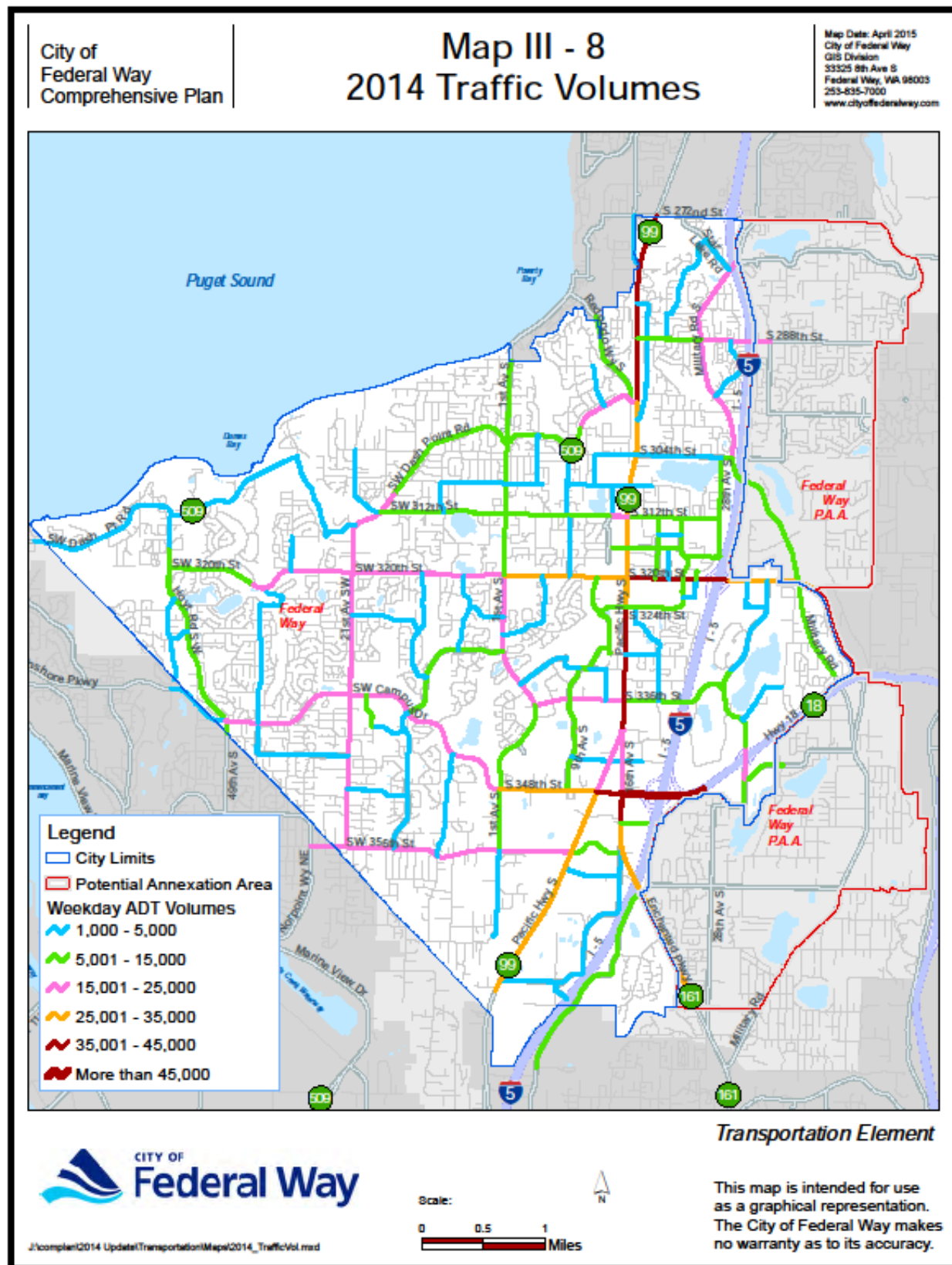
Traffic Signal Locations

Map III-7 (Existing and Planned Traffic Signals) shows the locations of signalized intersections in Federal Way. Currently, signals are maintained and operated by the City under a contract with King County. The ability to coordinate signals and update signal timing plans throughout Federal Way is important to achieve the maximum operating efficiency (move the greatest number of people, freight, and goods) of roadways. Currently, traffic signal timing plans can be adjusted from the traffic control center for most intersections in the City.

Traffic Volumes

Map III-8 (2014 Traffic Volumes) shows the average weekday traffic volumes on selected arterials. Major arterials such as SR 99, SR161, 348th Street, 320th Street, and access points to I-5 carry the most vehicles in the City. Federal Way's busiest arterial, SR 18 between 16th Avenue and the northbound on-ramp of I-5, carries more than 68,000





vehicles per day. In addition, several segments on SR 99 and the segment between SR 99 and I-5 on South 320th Street, carry between 35,000 and 45,000 vehicles per day.

According to the Federal Highway Administration (FHWA), annual vehicle miles travelled (VMT) peaked in year 2007 with a total of over 3 trillion vehicle miles traveled nationwide. Since then, annual vehicle miles travelled has exhibited a downward trend. This downward trend is the result of a number of factors including the “Millennial” generation seemingly be less inclined to drive or own automobiles, higher costs of automobile ownership, healthier lifestyle choices, mixed-use and compact development, and more. Also, the number of people who choose alternative transport modes such as transit, walking, or bicycling over driving is increasing. These trends, if continued, will have an impact on the development of future projections for the way people could choose to travel necessary to plan for the future.

High-Occupancy Vehicle Facilities

High Occupancy Vehicle (HOV) facilities are typically roadway lanes dedicated to vehicles with two or more people per vehicle and include motorcycles. HOV facilities are viewed at the regional, state, and federal levels as essential to meet public travel demand needs because they are capable of moving more people than general purpose travel lanes. Also, HOV facilities provide vital accessibility to developing urban centers in the Puget Sound Region. HOV lanes are provided on I-5 within Federal Way.

Locally, the objective of providing HOV lanes in Federal Way is to improve traffic safety and circulation, and support the use of transit, carpools, and right-turn movements. HOV lanes are provided on 348th Street, SR 99, and on 320th Street.



South 320th Street Looking East

Existing Street Deficiencies

Congested intersections result in people experiencing an increased delay to travel through the intersection. They are typically larger intersections with high vehicle demand and have longer crossing times for pedestrians. Congested intersections in Federal Way are located predominately in the City Center area and along SR 99. East/west routes that experience high levels of vehicle demand include South 320th Street and Campus Drive/South 348th Street.

To determine where intersection deficiencies exist today, the existing traffic volumes and roadway network is compared to the level of service policy (TP 1.2), which defines the volume-to-capacity ratios at signalized and unsignalized intersections in the city. *Map III-9 (2014 Weekday PM Peak Congested Streets and Intersection)* illustrates the results of this analysis.

Traffic Safety

When considering transportation improvements, enhancements to traffic safety must be considered. Collision information for the past five years is reviewed for intersections and street segments to determine areas that could benefit from safety enhancements.

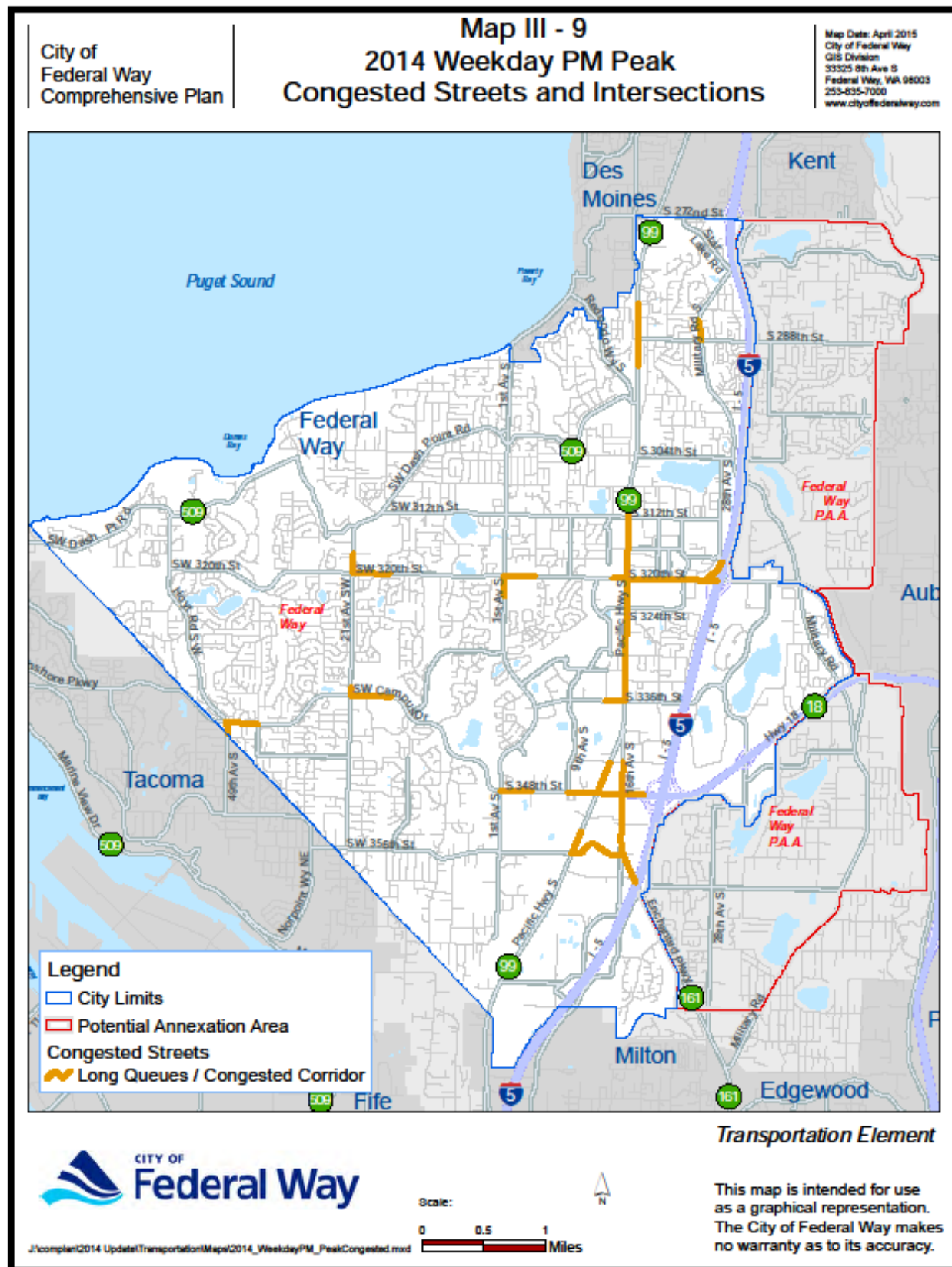
Some collisions in Federal Way are related to congestion; congested roadways can increase user frustration and result in riskier maneuvers. Common risky maneuvers include running a red light at a traffic signal, darting across a busy roadway, rapid lane changes, and speeding. Many collisions in neighborhoods are related to speeding, but also to poor sight distance at unsignalized intersections. The development of the *Future Transportation Vision and Near-Term and Long-Term Projects* considers areas with safety issues.

Non-Motorized

The City developed a stand-alone Bicycle and Pedestrian Master Plan, adopted in March 2012, which establishes a vision for a connected network of bicycle and pedestrian facilities throughout Federal Way. The Plan sets an important foundation to continue the city's success in securing transportation project and program funding. It also establishes an overview of the current status of walking and biking facilities, including barriers and opportunities, and gauges citizen opinion about walking and biking preferences.

The City's overall goal is to set the stage for the city's long-term vision of a safe, accessible, and connected bicycle and pedestrian network.

The Bicycling and Walking goals will guide the city as it moves forward with plan implementation and include:



- Bicycle and Pedestrian Network and Support Facilities;
- Safety, Security, and Equity;
- Transportation and Land Use;
- Education and Awareness;
- Maintenance and Operations.

The Plan is consistent with state policies such as the Growth Management Act (GMA) and the Safe Routes to School program. Additionally, the development of the Plan is crucial for the city to position itself favorably in the competitive transportation funding program. In the process of developing the Plan, the city coordinated with two regional agencies—PSRC and King County.

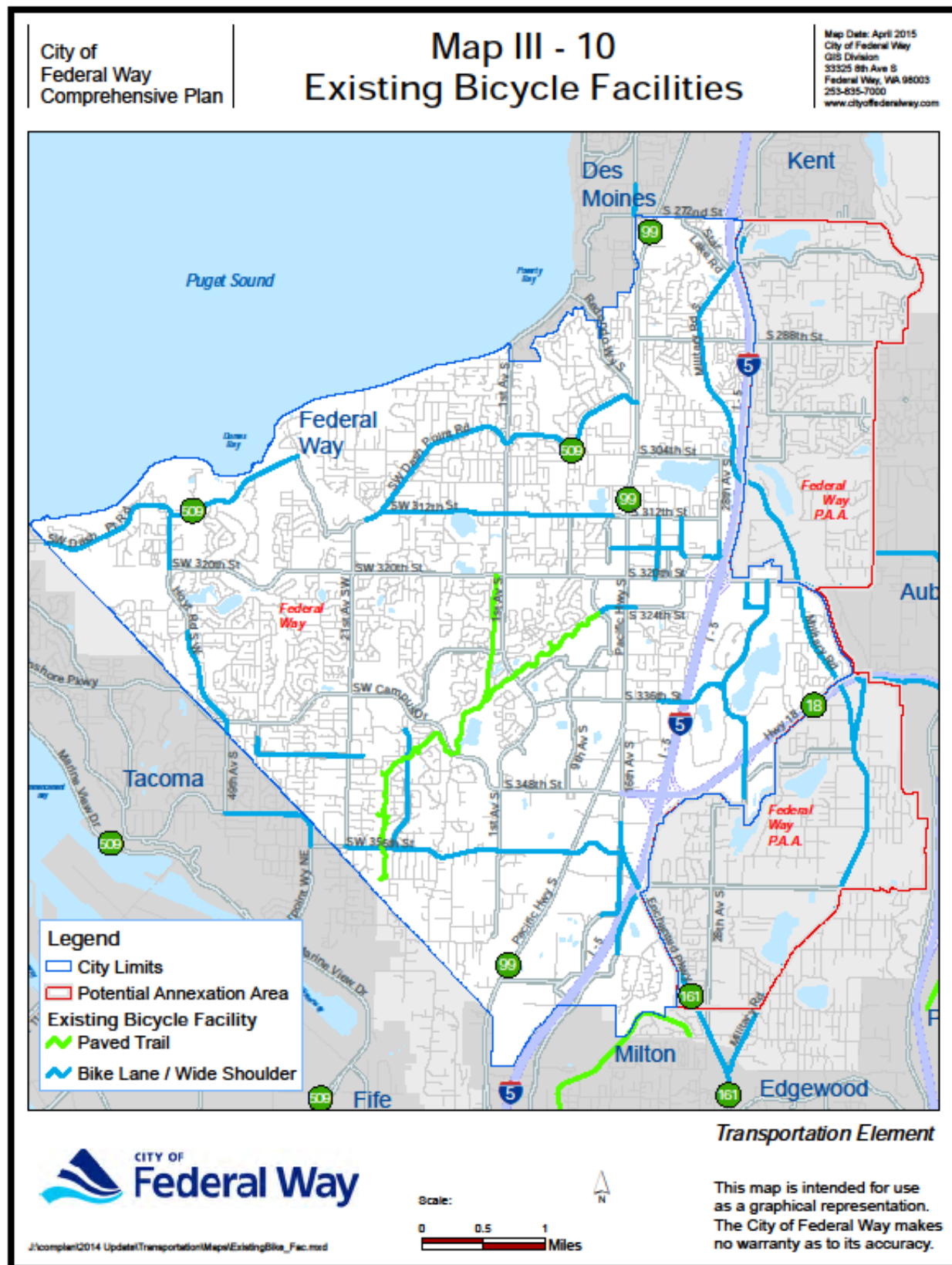
The existing built environment of Federal Way is characterized by conventional suburban style development featuring curvilinear streets, cul-de-sacs, and limited through-street connections. This lack of connectivity poses a challenge in developing a safe and convenient network of bicycling and pedestrian facilities.

Bicycle Conditions

Currently, there are approximately 27 miles of bicycle facilities in Federal Way (summarized in *Map III-10 (Existing Bicycle Facilities)*), which are all either paved trails, bike lanes, or wide shoulders. These facilities consist of the shared-use Bonneville Power Administration (BPA) Trail, bike lanes, and wide shoulders. A challenge in the city is that many potential cyclists do not feel comfortable riding on or crossing high-volume, high-speed roadways, such as SR 99.



Bonneville Power Administration (BPA) Trail Midblock Pedestrian Crossing on SW 356th Street



Pedestrian Conditions

Most of the city's 247 miles of pedestrian facilities are sidewalks. Other facilities include the Bonneville Power Administration (BPA) Trail and recreational trails through park facilities as illustrated in *Map III-11 (Existing Pedestrian Facilities)*. While most of the arterial roadways have sidewalk facilities, some residential and minor roadways may not have facilities.

Federal Way's pedestrian network provides a greater level of connectivity to retail centers than the current bicycle network, although many residents do not find walking to retail centers a pleasant experience due to the high volume and high speeds of traffic on arterial corridors. Also, the State of Washington permits the use of sidewalks by bicyclists unless prohibited in the City. Currently, Federal Way has restrictions for bicycles on sidewalks in the City Center area.

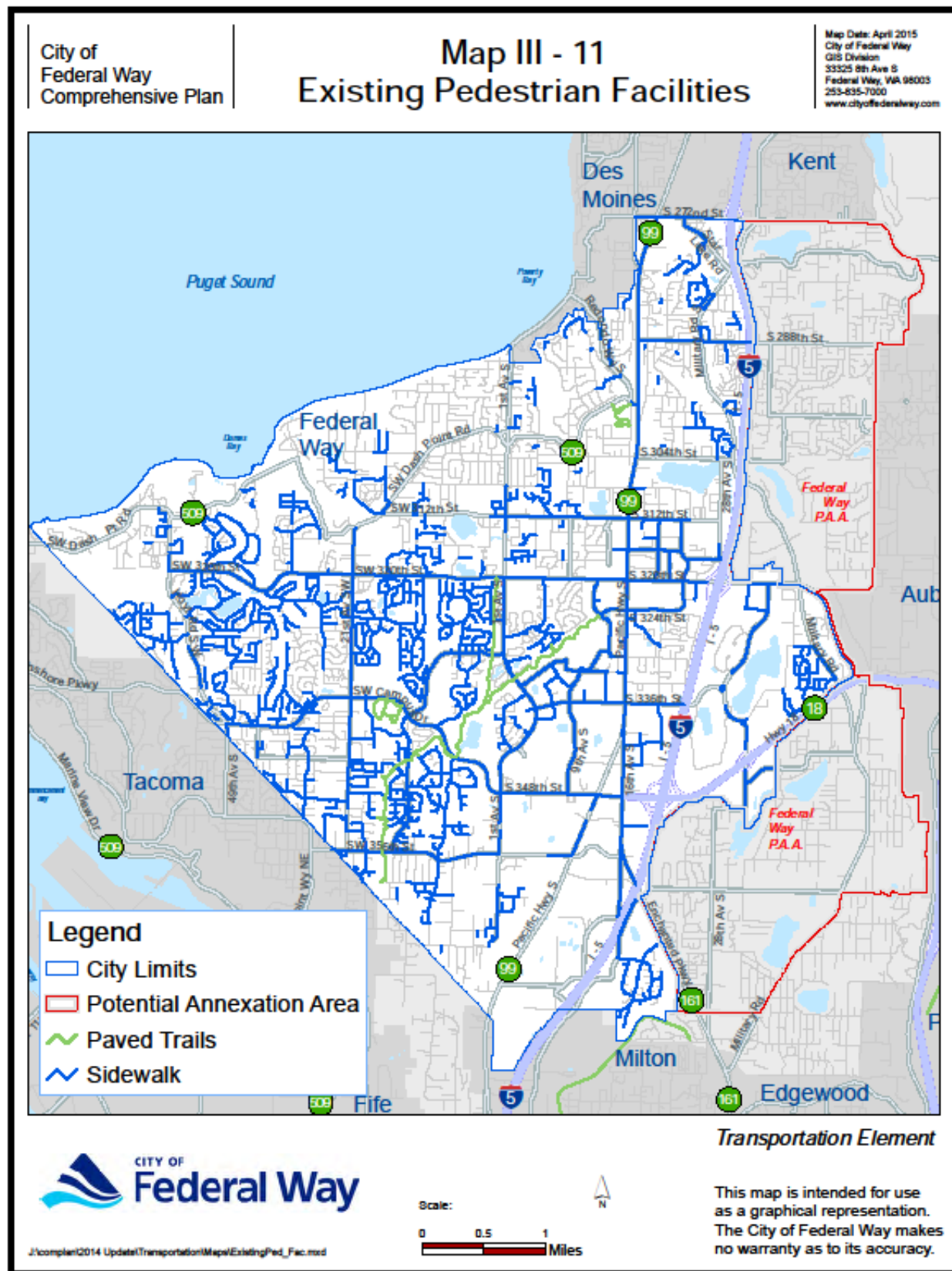
Public Input and Preferences

Public input was considered in the development of the proposed bicycle and pedestrian facility networks and also informed the development of goals and objectives. The following results were collected:

- When trips are less than one mile, residents are more likely to walk.
- People are more apt to bike than walk if a trip is between one and five miles.
- Most residents will drive once trips exceed one mile.
- People who walk in general do so more frequently than those who bike.
- Most people walk or bike for exercise, followed by shopping or errands for walkers and work commute for cyclists.
- The lack of facilities and/or their condition are the primary detractors for people walking and biking more.

Transit

Public transit service is provided to area residents by a combination of fixed-route, express, dial-a-ride, and subscription bus services. King County METRO serves the City directly, while Pierce Transit buses provide connections from the Park and Ride lot on I-5 at South 320th and Federal Way Transit Center to Tacoma and Puyallup. Sound Transit serves the Federal Way and Star Lake Park and Ride lots with regional express buses between SeaTac and Tacoma, and between Federal Way and Puyallup and a feeder route from Northeast Tacoma. Amenities supporting transit patronage include Park and Ride lots and waiting-area shelters. The Federal Way School District and King County's Multi-Service Center also provide special, local area bus services.





Federal Way Transit Center

Locally and nationally, public transit services, ranging from local buses to regional rail, are witnessing increased attention. Despite declining transit ridership in the late 1980s and early 90s, these services are being viewed at the regional, state, and federal levels as essential to meet public travel needs. Many people with low incomes or special mobility needs depend on transit. The City of Federal Way supports the provision of viable transit services as a component in a multimodal transportation system.

Coupled with carpooling and van pooling, improved transit service is viewed by the City of Federal Way as essential to providing area residents with mobility options in the future. Unlike road services however, the City is constrained by state law and federal regulations in its ability to provide these alternatives. The City's involvement with the provision of transit services is indirect—through such efforts as supportive land use planning (to generate sufficient transit patronage) and roadway design features (to accommodate transit and other high occupancy vehicles). The City's planning process has focused on development of a transit-supportive environment, including improved pedestrian and bicycle access to transit. Public Works projects anticipate enhanced regular route, local bus service, and the future implementation of a regional light rail system.

Expansion of regional transit and HOV systems is critical to the achievement of Vision 2040, which guides the regional Metropolitan Transportation Plan. Federal Way's vision, which includes a City Center with surrounding commercial and residential land uses, is enhanced by both an improved regional bus system and a rail system. Local circulation routes will also be essential. The Federal Way plan has been structured with primary emphasis on locations that can become transit centers. In the interim, transit centers will be focused at Park and Ride lots.

In Federal Way there are 24 regular and express service routes that provide nearly 250 bus trips to, within, and through Federal Way each day. In total, about 3,000 to 3,500 person trips are made by regular, express, and Dial-A-Ride service each day. About one percent of all daily (and three percent of peak hour) Federal Way trips are made by transit, which is comparable to other suburban areas.

The majority of service is provided to park and ride facilities where more than half of Federal Way's transit riders access transit. Routes into the neighborhoods of the City are oriented to the higher density areas where there is lower auto ownership and greater reliance on transit.

Under a demonstration project, METRO instituted Dial-A-Ride Transit (DART) service to portions of the City in 1992. Today, DART service follows a semi-fixed routing with service provided to patrons who do not live or work on fixed routes.

Local Transit Service Development

Most transit service to and from Federal Way is oriented toward downtown Seattle. Historic, radial expansion of the system from the downtown is one reason for this. More significant is that density, congestion, and parking costs have kept transit competitive in the downtown Seattle market.

While transit routes exist within Federal Way neighborhoods, the existing street layout, with its many cul-de-sacs and dead-end streets, is not always conducive to transit use. Buses cannot run along every residential street. They usually operate on collector and arterial streets, thus residents often have to walk several blocks to reach a route. Research has shown that when potential patrons have to walk over three miles, many will not use transit.

Because of the distance between residences and bus stops, and frequent express-type service to Park and Ride lots, many transit users travel to the three Federal Way lots near I-5. However, these lots are nearly always at capacity. Efforts to expand their capacity by both METRO and WSDOT have been hampered by the relatively high cost of land to provide for expansion. WSDOT constructed a new 600-space Park and Ride lot at 21st SW at SW 344th Street, and Metro constructed another Park and Ride lot at Pacific Highway South and South 276th Street. Sound Transit constructing a City Center Transit Center with a 1,200 stall parking structure, connecting to an HOV direct access ramp to I-5 via South 317th Street.

In considering future land use and transportation alternatives for the City, a balance must be sought between creating transit compatible land uses and providing system access from park and ride facilities and stations.

Regional Transit System

In November 1996, voters within areas of King, Pierce and Snohomish Counties approved funding for a Regional Transit System including light rail, commuter rail, and regional express bus services. Vision 2040 and the Metropolitan Transportation Plan “Destination 2030,” adopted by the Puget Sound Regional Council, and the Countywide Planning Policies for King County call for a high capacity transit (HCT) system linking urban centers and supported by other travel modes.

High-capacity transit is defined as various types of transit systems operating on an enhanced facility (such as fixed guideway, dedicated right-of-way, priority lane, or freeway/express facility) that is designed to carry a large number of riders at higher speeds than conventional transit. HCT may include a mix of commuter rail, light rail, express bus services and facilities and/or other high capacity transit technologies, plus other associated transit improvements that tie local/regional transit services to each other and to other travel centers.

Today, King County Metro’s RapidRide A-line provides frequent bus service between Tukwila International Boulevard Station and the Federal Way Transit Center generally along International Boulevard and Pacific Highway (SR 99). The City worked closely with Metro on the development of supportive capital infrastructure such as transit lanes, transit signal priority, and stations.

Federal Way is also coordinating with Sound Transit in the development of high capacity transit alternatives to extend the regional light rail system south from the city of SeaTac to Federal Way and eventually Tacoma. The Federal Way Link Extension project will extend light rail from an Angle Lake Station at South 200th Street in SeaTac to Kent/Des Moines by 2023. The planning and environmental process will develop a shovel-ready plan for extending light rail to the Federal Way Transit Center as additional funding is secured.

Implementing the regional transit system will require an array of city efforts in the coming decades. Priorities include city participation in detailed system design, preservation of right-of-way, and station area planning, along with other needs to be identified as the system progresses.

Dial-a-Ride Transit (DART)

As noted above, this service was introduced by METRO in 1992. Dial-A-Ride service is demand activated by the users. Users originally phoned in and van service was provided within two hours. Unlike regular route service, only the area being served was defined, not the routes. The service has since been modified to operate with semi-fixed routes, which due in part to greater schedule reliability, has dramatically increased ridership. Should ridership continue to improve, regular fixed route service may soon be attainable.



Dial-a-Ride Transit (DART)

Paratransit Service

In addition to the service program for general-purpose travel, METRO has embarked on a significant program to improve services for persons who cannot use regular route bus service. This program has been developed to meet the requirements of the Americans with Disabilities Act (ADA) of 1990. It provides high quality public transportation service to eligible customers.

People with limited resources who are either 65 or older or who have disabilities may qualify for Paratransit. Called ACCESS Transportation, Paratransit service currently provides door-to-door transportation Monday through Friday. Monthly and annual pass stickers are available as well. Key elements to METRO's Paratransit Plan are the provision of:

- Supplemental service in Western King County within $\frac{3}{4}$ of a mile on either side of regular route service;
- Next-day reservations up to 14 days in advance, with trips scheduled seven days a week;
- Fares held to the same level as one-zone regular bus fares; and
- Scheduled service to be the same as the near-by, regular routes.

Freight and Goods

Decisions that impact the street and highway system can impact the movement of freight and goods. This can affect the economic competitiveness of local and regional businesses. Today, Federal Way depends on trucks and motorized vehicles for deliveries.

The City's development standards help assure the provision of adequate on-site facilities for freight delivery such as loading docks; loading zones; the width, frequency, and location of driveways; the turning radius at intersections for curbs; and pavement standards to carry heavy vehicles such as trucks and buses. Other City actions include the restriction of over-sized vehicles on roads and bridges that cannot support heavy vehicle weights or size, and the designation of truck routes. Many of these actions are echoed by regional and state activities.

Local Level Needs and Opportunities

Federal Way displays a unique set of circumstances for freight and goods movement. While extensive truck and rail oriented development has not taken place in Federal Way, freight and goods movement, primarily by trucks passing through the City, impacts roadway operations.

Situated between the major urban centers of Tacoma and Seattle, the Federal Way planning area has four primary arterials carrying freight traffic including:

- Military Road, the original arterial through the city, is designed to accommodate heavier freight and goods vehicles. This road no longer carries large numbers of pass-through truck traffic, but provides local access for truck deliveries to established neighborhoods.
- Highway 99 was used as a primary truck route through the area until the interstate system was developed in the 1960s and 70s. Today, SR 99 provides a distribution function, mostly for delivery purposes, but also affording access to regional facilities such as the US Postal facility just west of Pacific Highway near South 336th Street. SR 99 also provides truck freight an alternate route to I-5.
- Today, the major roadways for freight and goods movement into and through the area are provided by I-5 and SR 18. As the regional economy has grown, the volume of truck traffic along these highways has increased. Today, the highest concentration of regional truck traffic passes through Federal Way's section of the I-5 corridor.

Within the City, continued growth of local truck traffic is anticipated. Densification of the urban core, along SR 99 and South 320th, as well as the South 348th corridor, will lead to increased truck trips.

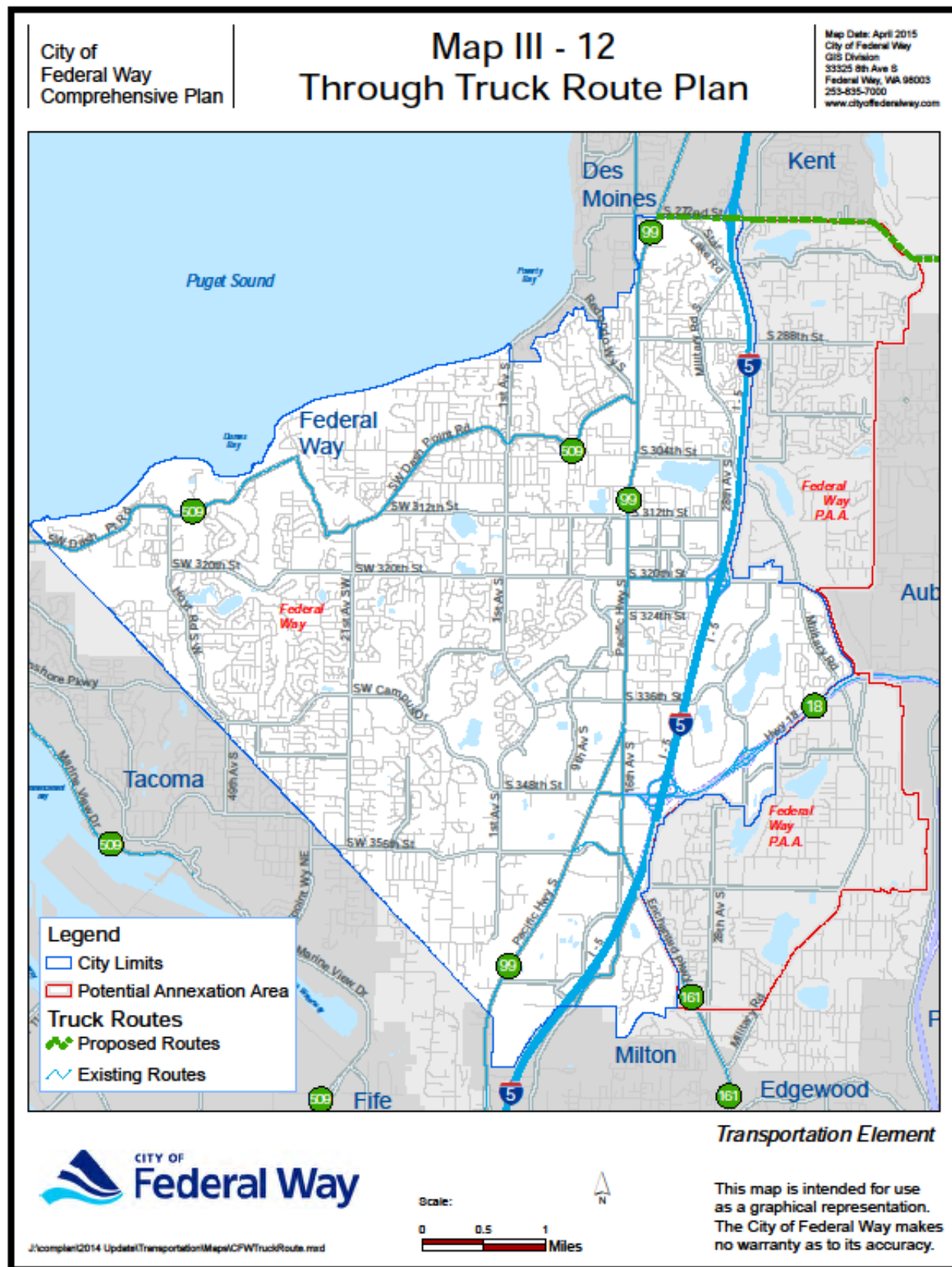
- Street design standards and road classifications adopted under this plan will assure that new and rehabilitated facilities are built to appropriate standards. These efforts are coordinated with the City of Federal Way Truck Route Plan as illustrated in *Map III-12 (City of Federal Way Truck Route Plan)*, which depicts existing and proposed truck routes.

Transportation System Management (TSM)

Transportation Systems Management (TSM) focuses on maximizing use of the existing systems travel capacity. The concept was first originated in the mid-1970s by the U.S. Department of Transportation. Since that time, it has been applied by a host of different ways in cities and metropolitan areas around the country. More recently, the 1991 Federal Transportation Act (ISTEA) expanded the vision of Transportation System Management introducing the term Congestion Management Systems.

The focus of Transportation System Management is to identify ways to manage the transportation system (usually streets and highways, from a local agency perspective) to maximize the carrying capacity of existing facilities. Transportation System Management activities can include new construction, but they typically modify an existing facility. These activities can be grouped into the following categories:

- Geometric Improvements
- Access Management
- Signalization Improvements
- Capacity Enhancements



Not all Transportation and System Management (TSM) strategies are appropriate for a city to undertake. The more popular and successful ones are listed in *Table III-4 (TSM Strategies Applicable to Federal Way)*.

Table III-4
TSM Strategies Applicable to Federal Way

Strategy	Low or None	High
<i>Geometric Improvements</i>		
-Channelization		✓
-Bus Turnouts		✓
-Exclusive Turn Lanes		✓
-Intersection Widening		✓
<i>Signalization Improvements</i>		
-New Signals	✓	✓
-Signal Removal		✓
-Coordination		✓
-Timing/Phasing Optimization		✓
-Monitoring		✓
<i>Access Management</i>		
-Turn Prohibitions		✓
-Restrictive Medians		✓
-Driveway Consolidations/Removal		✓
-Signing		✓
<i>Capacity Enhancements</i>		
-Arterial Frontage Roads	✓	
-Railroad Over-Crossings	✓	
-Intersection Grade Separation	✓	

Intelligent Transportation Systems

Intelligent Transportation Systems is a combination of field devices and communication systems designed to help manage congestion, enhance safety, and inform travelers of multiple travel options. Examples of Intelligent Transportation Systems active in the Federal Way area include:

- Closed Circuit Television (CCTV) Cameras
- Changeable Message Signs (CMS)
- Ramp Metering Systems (RMS)
- Traffic Monitoring Station (TMS)
- Highway Advisory Radio (HAR) & Extinguishable Message Signs (EMS)
- Roadway weather Information Systems (RWIS)
- Fiber Optic (FO) Systems
- Advanced Traffic Controller (ATC)

An Intelligent Traveler Systems Plan, similar to an Intelligent Transportation Systems plan, was developed for the State of Washington. Directed by WSDOT, it established a framework for implementation of a variety of projects. *Appendix III-B (Transportation*

System Management Summaries), *Table B-1* summarizes the main categories of Intelligent Traveler System applications, their relative applicability in Federal Way, and the degree of impact each might have on the City’s vision and plan.

Transportation Demand Management (TDM)

Transportation demand management (TDM) refers to activities that help people use the transportation system more efficiently. The Puget Sound Regional Council’s VISION 2040 requires the identification of transportation system management and demand management programs and strategies.

Appendix III-B, Table B-2 summarizes the various transportation demand management alternatives by their functional grouping and potential effectiveness, implementation difficulties, and expected cost effectiveness. Fortunately, several of the more effective options are within the purview of the City. While many of these transportation demand management strategies will need to be implemented and managed by the private sector, Federal Way can provide the infrastructure needed to support such strategies, such as transit and HOV lanes and expanded bicycle and pedestrian networks.

PSRC’s Vision 2040 identified basic strategies that overlap with those presented in *Appendix III-B*. These strategies include:

- Telecommuting Programs
- Parking Management and Pricing
- Flexible Work
- Shuttle Services
- Ridesharing Programs
- Traveler Information, Public Relations, and Marketing

Commute Trip Reduction

Federal Way is required by the State to provide a Commute Trip Reduction (CTR) plan. This plan applies to employers with more than 100 employees. It provides a framework for reducing the proportions of drive alone commute trips and vehicle miles traveled per employee by affected employers in the City’s jurisdiction, major employment installations, and other areas designated by the City with local major employers to customize strategies and programs to most effectively reduce the number of drive-alone trips employees make.

Federal Way currently has 11 worksites affected by the Commute Trip Reduction (CTR) law. *Figure III-1* summarizes the existing mode split for these employers based on their reporting.

CTR AFFECTED WORKSITES MODE SPLIT

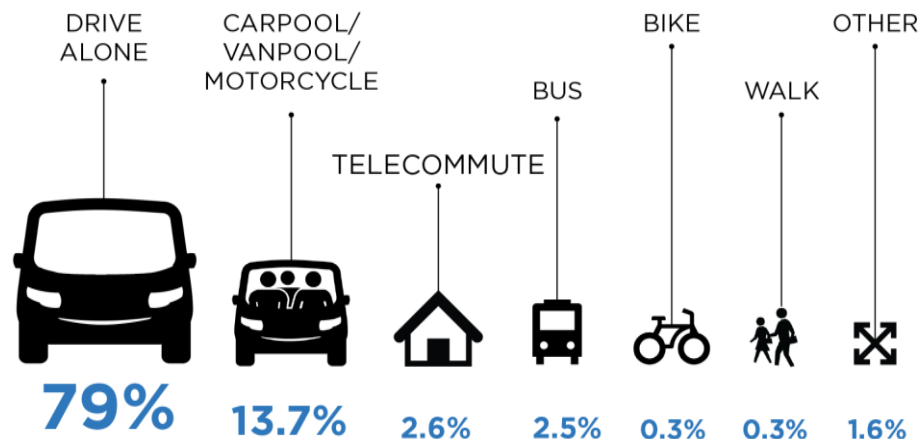


Figure III-1. Existing (2014) Mode Split for CTR Employers

3.5 FUTURE TRANSPORTATION VISION

Federal Way envisions a future transportation system that serves all users and modes of travel by offering a safe and robust network of walkways, bicycle facilities, intersections, and roadways. This chapter describes Federal Way’s vision for its future transportation network and the infrastructure improvements that will get the City there.

As identified in this plan, most of the improvements are focused on the development of a ‘layered’ transportation network, which focuses less on providing vehicular capacity and more on accommodating all modes of travel. While some of the roadway improvements are needed to meet the City’s vehicular level of service (LOS) standard, many of the future improvements could focus on providing safer and more complete facilities for walking, bicycling, and riding transit in order to improve access and mobility for all road users.

This section provides a summary of the layered network, a system for prioritizing modal travel by corridor; the process for predicting future travel demand; how level of service, a measurement of the adequacy of a facility, is evaluated for all modes; and the process employed to prioritize projects.

Introduction to the Layered Network

It can be a challenge for a single roadway to meet the demands and expectations of all modes at any given time. This is also generally not desirable from a user or a planning perspective.

In response to this challenge, the City of Federal Way has adopted a layered network approach that focuses on how the City's transportation network can function as a system to meet the needs of all users. In such a system, individual travel modes are prioritized on different facilities throughout the overall network. *Figure III-2* illustrates the concept of a layered network.

The City will implement this layered network through a system of roadway cross-sections that define each street's user priorities and associated infrastructure needs, see *Appendix III-A (Street Design Standards)*. The City also coordinates recommendations from the Bicycle and Pedestrian Master Plan with roadway projects.

Future Travel

Travel can be described in terms of the purpose of the trip and the trip beginning and end points. Federal Way exhibits a wide variety of travel purposes. Trips cover all modes of travel such as walking, bicycling, driving, and taking transit.

To help predict future travel, transportation professionals develop models that are typically city specific, but coordinated with the regional vision and model. The models were used to estimate existing and future traffic volumes within the Federal Way planning area. The model can also be used to estimate demands for various modes of travel, including auto, carpool, and transit.

There is a fairly consistent relationship between the number of trips produced each day and the density of residential dwelling units. Depending on the density of the area and other factors, it is possible to forecast the total number of trips produced in an area. In a similar fashion, employment densities can be used to forecast person trips attracted to an

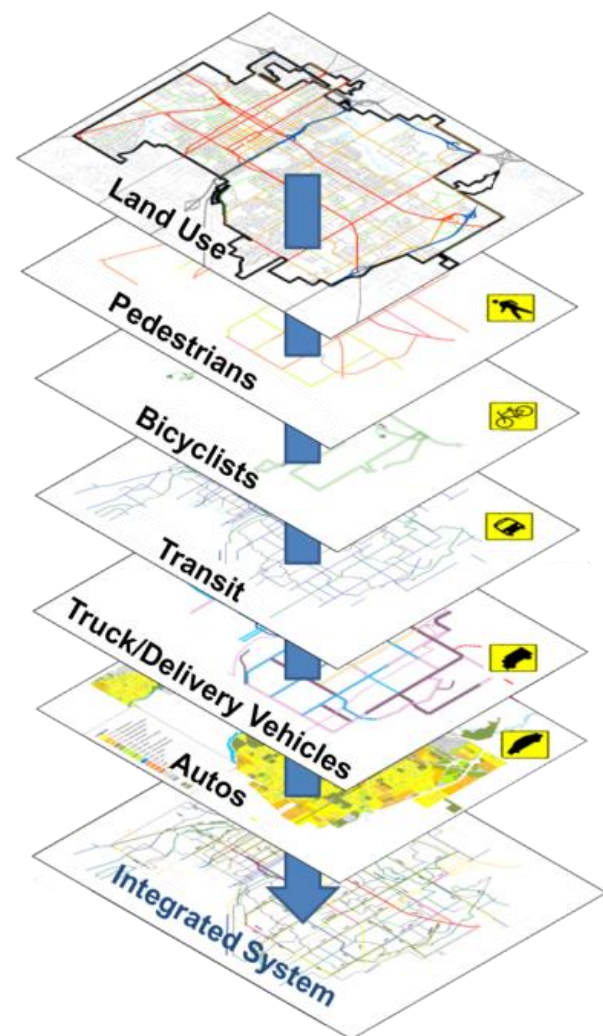


Figure III-2. Layered Network Concept

area. Each parcel of land generates traffic based on its type of use and intensity of development. The evening peak hour is a modeling standard, since it usually is when the highest demand occurs.

The Growth Management Act (GMA) requires that the Transportation Element supports the land uses envisioned in the Comprehensive Plan. Thus, an important component of the work was forecasting how the future land uses envisioned in the City, as well as regional growth, would influence demand on Federal Way's transportation network. The following is a description of the travel demand modeling process:

- *The Modeling Tool:* As a part of the update, Federal Way created a city-focused travel model adapted from the latest version of the Puget Sound Regional Council (PSRC) Trip-Based Travel Model. This model forecasted traffic volumes during the evening commute hour (highest volume hour between 4pm and 6pm) along many of Federal Way's key streets and intersections. This tool provides a reasonable foundation developing year 2019 and 2040 forecasts, as the underlying land use assumptions have been updated to match the land use forecasts for the current Comprehensive Plan.
- *Estimate Land Use Growth in the City:* As a part of the Comprehensive Plan update, the City is planning for expected growth in housing units and employment over the next 25 years through 2040. Based on growth estimates from PSRC and review by City staff, Federal Way is preparing for almost 44,000 housing units, more than 106,000 people and almost 50,000 workers (including the planning analysis area) by 2040. The City then allocates the growth throughout Federal Way based on adopted zoning, observed development patterns, and other city policies.
- *Capture Regional Growth Patterns:* Other communities throughout the region are going through this very same process, based on direction from PSRC. Because travel does not stop at a jurisdiction's borders, it is important to capture how regional growth could influence travel patterns on Federal Way's streets. One of the primary advantages of basing the Federal Way model on the PSRC Trip-Based Travel Model is that all regional growth assumptions are naturally consistent with PSRC estimates.
- *Translating Land Uses into Trips:* The next step is evaluating how the City and regional growth assumptions described above translate into walking, biking, transit, and auto trips. The travel model represents the number of housing units and employees in spatial units called traffic analysis zones (TAZs). Traffic analysis zones can be as small as a few street blocks to as large as an entire neighborhood. They provide a simplified means to represent trip making rather than modeling individual parcels. The travel model estimates trips generated from each traffic analysis zones (both inside and outside of the City) using established relationships between different land use types with trip making. These trips are then assigned onto the roadway network to estimate how much traffic would be on each street during the evening commute hour.

- **Model Refinements:** The final step is refining the forecasts based on reality checks that the travel model may not capture. In this case, travel patterns were refined to reflect existing driver preferences, including recognizing the relative attractiveness of principal and minor arterials over minor collector and local residential streets with significant traffic calming features.

Transportation Level of Service

Transportation level of service (LOS) is a qualitative measure used to evaluate the quality of public infrastructure. Cities have historically measured transportation level of service based on the experience of drivers, in terms of vehicle speed, traffic density, or how long vehicles wait at an intersection. As shown in the *Figure III-3* from Planning Urban Roadway Systems (Institute of Transportation Engineers, 2011), transportation level of service does not have to be limited to the experience of just vehicles. This Transportation Element considers the transportation level (quality) of service for walking, biking, and taking transit in Federal Way. Refer to *Appendix III-C (Concurrency Management System)* for additional information.

Figure III-3
Example Modal Level of Services



Project Prioritization

Project Prioritization is part of the process associated with implementing projects in the order most needed. Because the total estimated cost of all identified network improvements is substantial, it is unrealistic to expect that all of the improvements will be implemented in the near term. Therefore, it is important to establish a strategy for moving

forward. The project prioritization process is a tactical effort to determine the sequence of events to meet strategic goals, as summarized in the Transportation Improvement Program (TIP). To assist city staff, elected officials, and citizens in making potentially difficult near-term decisions, this plan uses a modal focus to evaluate project prioritization and then links each project back to Federal Way's transportation goals. The process for prioritization is described below:

Project Prioritization Step One: Layered Network

All projects are considered as part of the layered network and ranked. This reduces double-counting for level of service improvements and for meeting concurrency, and ensures that the appropriate project modal elements are being considered. The equally-weighted project prioritization measures used to prioritize projects are summarized as follows:

- *Concurrency Requirement:* The project is needed to maintain the proposed multimodal level of service and/or concurrency. Projects that provide improvements for more than one mode would receive higher scores. This includes projects along walking, bicycling, and transit priority areas, and improving roadway conditions.
- *Level of Service Improvement:* The project reduces vehicle delay or enhances the quality of the facility (modal specific) based on the adopted level of service standards. Projects that provide the improvements described in the street standard guidelines would receive higher scores.
- *Safety:* The project enhances a safety concern. Projects that enhance safety would receive higher scores.
- *Severity:* The project enhances a safety concern with a history of severe collisions. Locations with severe or increased severity collisions would receive higher scores.
- *System Efficiency:* The project includes transportation system management elements, including those described in the Intelligent Transportation Systems (ITS) plan. Projects that improve the travel of non-drive-alone trips, including transit, would receive higher scores.
- *Ease of Implementation:* The project is evaluated using engineering judgment to consider the likely scope elements of the project, such as right-of-way acquisition, overall project cost, and sensitive areas impacts. Projects that are easier to implement or have multi-jurisdictional support would receive higher scores.
- *Community Support:* The project has been identified as having community support. Projects that exhibit positive community support would achieve higher scores.
- *Freight:* The project would have an impact on an identified freight route. Projects that enhance freight travel would receive higher scores.

Step Two: Achieving Goals

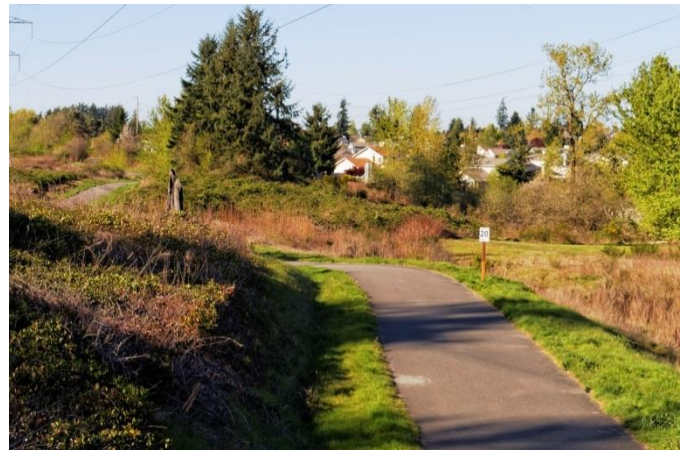
After each ranked project list is created, projects are evaluated by their relationship to the six overarching transportation goals based on a weighting completed by City staff. Projects that meet more goals would achieve higher scores.

Project Prioritization Step Three: Cost / Benefit

A cost / benefit weighting is used to related how well a project performs as part of the layered network and achieves the citywide transportation goals related to the anticipated cost to Federal Way of the project. Projects with a good benefit/cost ratio would receive higher scores.

Process for Modal Integration

The *Bicycle and Pedestrian Master Plan* provides the framework for the walking and bicycling sections and were considered in developing the Transportation Improvement Plan (near-term) and Capital Improvement Program (long-term). To refine the project prioritization, it is recommended that the “Priority Route” selection criteria be employed. The Priority Route selection criteria would assist in determining the routes with the most need and/or potential benefit of walking or bicycling



Bonneville Power Administration (BPA) Trail

facility improvement. These “Priority Routes” are also used as part of the multimodal level of service. The following criteria for identifying priority walking and bicycling routes were proposed in the Bicycling and Pedestrian Master Plan:

- Suitable for bicycling/walking without improvements
- Closes critical gap
- Provides/enhances Safe Route to School connection
- Collision locations
- Service immediate safety need
- Serves key origins and destinations
- Geographic Distribution
- Right-of-Way Available and/or Suitable
- Interface with other transportation modes

Modal Networks

The transportation vision for Federal Way is a multi-modal, integrated transportation system where the focus is on user choice and safety. Still, system needs and future projects are best understood at the modal level. This section summarizes the future transportation vision and establishes multimodal level of service standards and

concurrency framework for roadways, walking, bicycling, and transit. During the prioritization process, projects were identified that contained multi-modal elements.

Street and Highway System

Nearly every street in Federal Way’s roadway network is used by residents and workers at some point each day to access their homes, jobs, and other destinations. Many of these streets are local streets and do not see significant traffic volumes throughout the day. Similarly, goods movement and delivery vehicles use some corridors frequently while other streets see only the occasional local delivery.

Urban areas, such as Federal Way’s City Center, benefit from level of service policies that offer flexibility to balance the level of vehicle congestion with pedestrian, bicycle, and transit access. Also, the level of congestion experienced in Federal Way is greatly impacted by State facilities. The level of service policy proposed for the *Street and Highway System* recognizes this impact to local congestion by adopting an area-wide level of service standard. See *Appendix III-D (Transportation System Management)* for additional information.

To address future roadway needs, Federal Way has adopted the following level of service policy that sets the following standards for the street and highway system:

- Signalized intersections outside of City Center will experience a 1.2 vehicle-to-capacity (v/c) ratio or lower
- Unsignalized intersections outside of City Center will experience a 1.0 vehicle-to-capacity (v/c) ratio or lower
- The City Center area will experience an average of 1.1 vehicle-to-capacity (v/c) ratio or less.

The above standards were used to develop the future roadway improvements, which have been incorporated into the City’s *Street Design Guidelines* (see *Appendix III-A*). The proposed cross-section for each of Federal Way’s streets and types of motorized and non-motorized space improvements are provided. These cross-sections will guide future investments in streetscape and layered network objectives.

Future State Actions

The City’s transportation plan is in compliance with the WSDOT’s direction and vision. The transportation plan for Federal Way relies on the State in the following action areas:

- HOV system completion on I-5 and other freeways.
- Implementation of the State System Plan. This plan identifies, in priority order, the need for maintenance, preservation, safety, economic initiatives, environmental retrofit, and mobility (capacity) improvements. The latter may not be fully funded and may therefore affect the implementation of the following WSDOT projects:

- HOV access improvements, primarily I-5 medians.
 - Interchange improvements for I-5 from SR 18 to SR 161.
 - SR 509 extension from Burien along the western and southern sections of SeaTac Airport south to I-5.
 - The SR 509 extension north from Tacoma to the new SR 167 connection on I-5 at Fife.
- Continued improvements to monitoring, with possible provision of information systems regarding travel conditions.
 - Right-of-way acquisition for rail and the above improvements before construction.
 - The addition of park and ride lots and added capacity for existing ones.
 - SR 18 improvements east of SR 99
 - Advanced vehicle identification (AVI) on SR 99 to provide transit priority.

Map III-13 illustrates roadway locations that do not meet Federal Way's level of service policy.

Traffic Safety

When considering transportation improvements, enhancements to traffic safety must be considered. Collision information for the past five years is reviewed for intersections and street segments to determine areas that could benefit from safety enhancements. These safety issues can be addressed by implementing the following measures:

- Identify high collision locations on an annual basis, and identify projects to enhance safety at these locations.
- Implement access management measures to reduce turning conflicts in high collision corridors
- Enforce intersection sight distance standards to remove vision obstructions on the corners of intersections and at driveways.
- Where supported in residential areas, install traffic calming measures.
- Educate the public through project open houses and press releases on safety benefits of transportation projects.
- Increase enforcement of traffic laws, particularly laws pertaining to behaviors that cause the most severe and highest frequency of crashes.

Regional Growth Center Mode Share Goal

For its regional growth centers (RGCs), Federal Way is required to develop mode split targets that align with the policy goals of planning these areas to be more compact and accessible for walking, biking, and transit modes. The following is a summary of and envisioned future mode split targets for commute trips within Federal Way's City Center Regional Growth Center.

- SOV – 70%
- HOV – 13%
- Walk and Bike – 4%
- Transit – 13%

The non-SOV mode shares reflect the City's goal of accommodating travel by all modes and prioritizing transportation investments within the RGC. These mode share goals also informed the travel modeling performed for this plan to ensure that transportation infrastructure investments align with forecasted travel demand.

High-Occupancy Vehicle (HOV)

HOV enhancements within the Federal Way planning area will consist of signal priority treatments, exclusive lanes, increased park and ride opportunities, and other improvements to be identified as demand increases. These latter improvements can include separate (preferential) access lanes or roadways. This means utilizing HOV lanes on highways and arterial streets wherever practical, if transit and car pool movements can be enhanced, and optimizing the occupancy rate to move the most people possible.

Non-Motorized

As part of the Bicycling and Walking Master Plan, several analysis corridors were developed based on previously proposed facilities, public input, and staff input. The analysis assessed appropriate treatments and preferred bicycle facility types along City roadways. The analysis identified opportunities to incorporate bike lanes into certain existing roadways, but found that there are few opportunities to retrofit roadways to include bicycle lanes.

A multi-modal level of service (MMLOS) analysis was conducted to examine the link and intersection conditions along existing roadways. This analysis helped stakeholders and City staff make decisions based on how roadway configurations affect all users. The results suggest that while the levels of service vary throughout the City, streets at locations with high traffic volumes, higher traffic speeds, and little separation between pedestrians/cyclists and vehicles scored relatively poorly.

In addition, a potential for walking and biking analysis was conducted based on land use characteristics, density of development, and access to transit. The results suggest that the City Center, the Twin Lakes Commercial District Subarea, and their surrounding areas have the greatest potential for active transportation.

Improved walking and biking conditions will improve transportation choices, safety, and mobility for citizens who do not have access to a car. It may also have an overall benefit to residents' health.

Priority Walking and Bicycling Areas

The priority walking and bicycling areas were developed using a potential for active transportation analysis. This includes any method of travel that is human-powered, but most commonly refers to walking and bicycling. The potential for active transportation is commonly measured by considering land use characteristics, density of development, and access to transit. A “heat map” was created by allocating points using the criteria: school, live, work, shop, play, equity, and transit.

Map III-14 (Priority Walking and Bicycling Areas) will be used for determining where investments in bicycling and pedestrian facilities will likely result in the greatest increase in active transportation in Federal Way. Areas that have the greatest potential for active transportation include the City Center, the Twin Lakes Commercial District Subarea, and their surrounding areas. Additionally, investment in bicycle and pedestrian facilities in these areas can support economic development by making these areas more attractive to pedestrians and bicyclists and complementary to mixed use infill development. These “Priority Areas” are also used as part of the multimodal level of service.

Walking

Pedestrian facilities proposed are largely new sidewalk sections. The location of the proposed new sidewalk sections was largely influenced by information the Federal Way School District maintains on recommended walking routes to elementary schools and priority walking and bicycling areas. During citizen engagement, many people commented on the desire to have more sidewalks in their neighborhood specifically related to access to neighborhood schools. Establishing safe and convenient walking routes enables more children to walk to school which improves student health and potentially saves the School District transportation costs where bus routes can sometimes be reduced when safety deficiencies are corrected.

A more complete pedestrian network also can support Federal Way's business centers. With better sidewalk connections, residents who live close to business centers may choose to make more trips by foot. Once a person gets in a car, it is easier to decide to drive far away for that cup of coffee or small errand. Making it easier and more pleasant to walk encourages more localized shopping decisions in a community and supports economic development.

Building on the Walking and Bicycling Priority Areas (see *Map III-14*), *Table III-5 (Pedestrian Priority Area Level of Services)* establishes the level of service standard for pedestrian facilities around the City. The best level of service for walking, indicated in the green row, would provide the proposed facilities exactly as shown, or with greater separation, in the *Street Design*






Rectangular Rapid Flashing Beacon

Guidelines (Appendix III-A). The yellow level of service, which meets the basic needs for safe walking around the City, requires sidewalks or shoulders protected by raised curbs on one side of all the streets called out along Pedestrian Priority Areas. Incomplete or missing pedestrian facilities along Pedestrian Priority Areas would fall into the red category and not satisfy the City's level of service for walking.

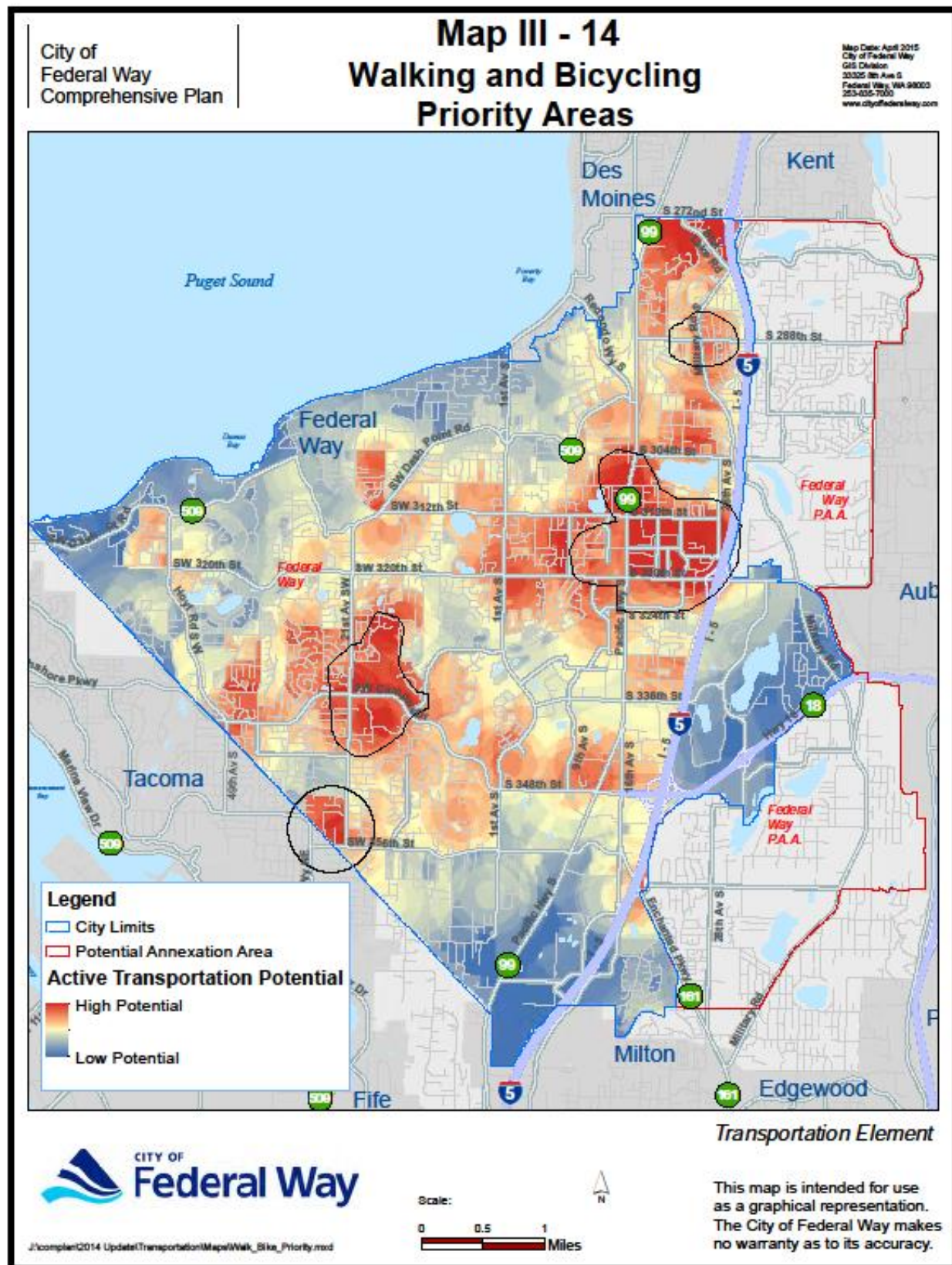
In addition to the presence of pedestrian facilities along a corridor, the City also emphasizes the importance of safe pedestrian crossings. Particularly downtown, at busier transit stops, and within half-mile of schools, the City is looking to provide enhanced crossings at regular intervals. The City has installed Rectangular Rapid Flashing Beacons (RRFBs) at midblock locations to improve pedestrian crossing throughout the City.

Table III-5
Pedestrian Priority Area Level of Service (LOS)

LOS	Within Pedestrian Priority Area Network
	Pedestrian facility as indicated in the Street Design Guidelines
	Provides a lower-level facility than recommended in the Street Design Guidelines
	No pedestrian facility provided




Bicycling

The proposed bicycle facilities consist of a variety of facility types that are dependent on the existing configuration and function of the City's roadways. Where possible, bike lanes are proposed, but these popular solutions are limited in Federal Way where there are few cross-town connections and lots of competition for pavement width with virtually all motor vehicle traffic being necessarily funneled into these few corridors.



Building on the *Walking and Bicycling Priority Areas* (see Map III-14), Table III-6 (*Bicycling Priority Area Level of Services*) establishes the level of service standard for bicycling facilities around the City. The best level of service for bicycling, indicated in the green row, would provide the proposed facilities exactly as shown, or with greater separation, in the *Street Design Guidelines* (Appendix III-A). The yellow level of service requires some sort of bicycle infrastructure on streets called out along Bicycling Priority Areas. At a minimum, these facilities would be signed bike routes. Incomplete or missing bicycle facilities along Bicycling Priority Areas would fall into the red category and not satisfy the City's level of service for bicycling.

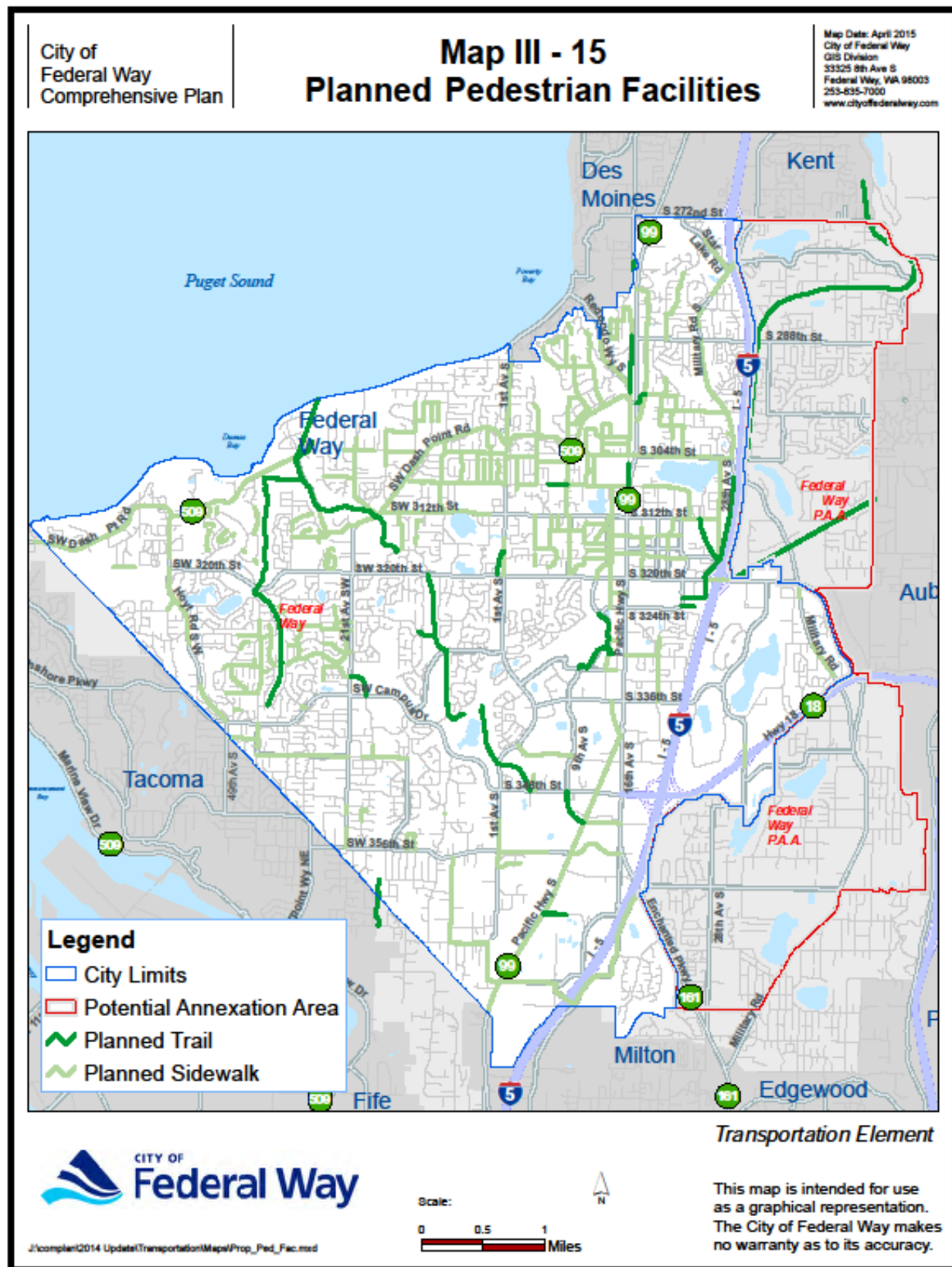
Table III-6
Bicycle Priority Area Level of Service (LOS)

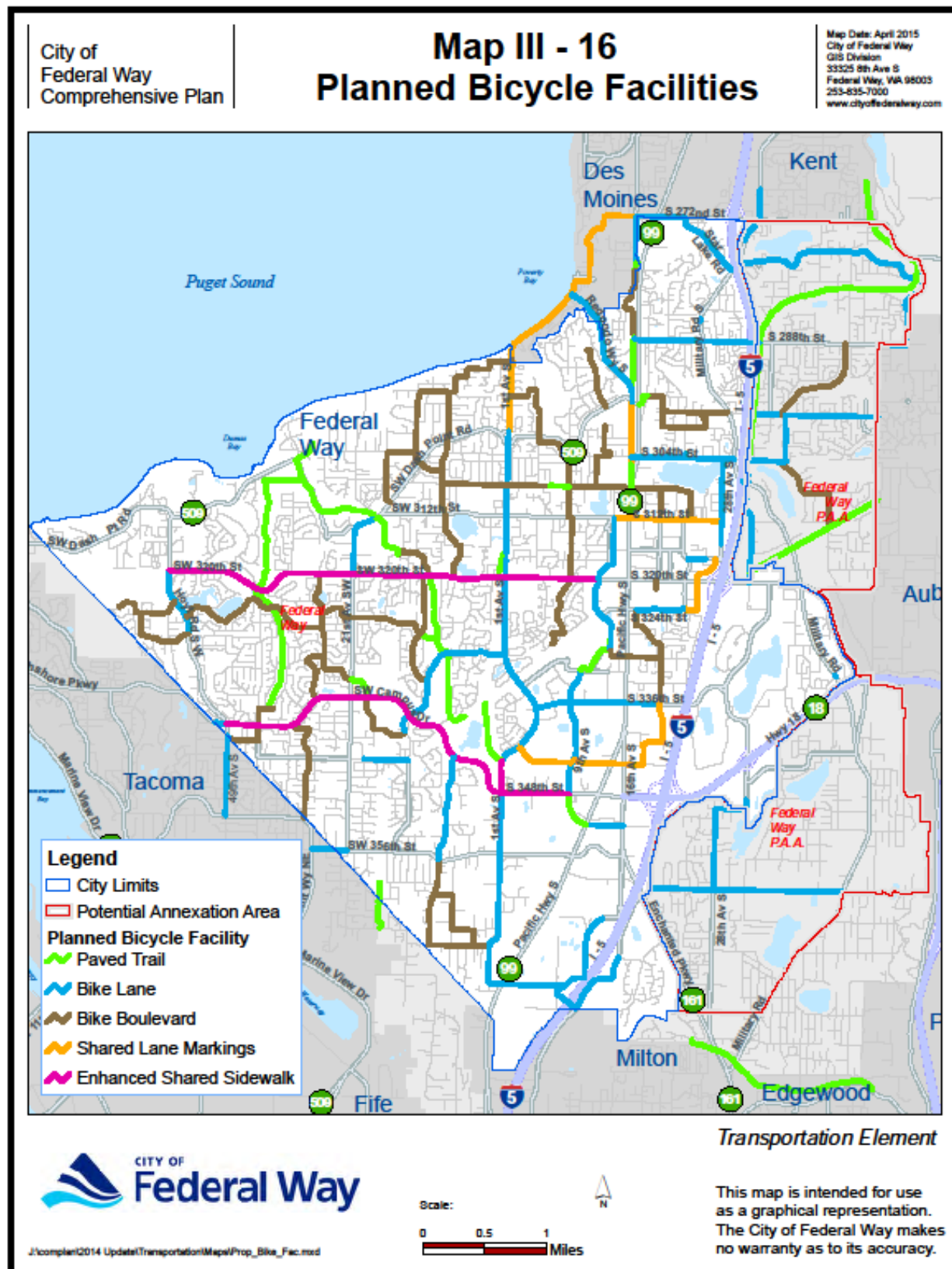
LOS	Within Bicycle Priority Areas Network
	Bicycle facility as indicated in the Street Design Guidelines
	Provides a lower-level facility than recommended in the Street Design Guidelines
	No bicycle facility provided

Proposed Facility Networks

Maps III-15 and III-16 summarize the future bicycle and pedestrian facilities, respectively. The following pedestrian and bicycle facility types are proposed.

- *Bike Boulevard (also called Greenways)*: Low-volume and low-speed (typically residential) streets that have been optimized for bicycle travel. Bicycle Boulevard treatments can be applied at several different intensities.
- *Shared Use Path/Trail*: These provide a desirable facility and recreational trips, particularly for novice riders and for cyclists of all skill levels preferring separation from traffic. Shared use paths generally provide new travel opportunities.
- *Shared Lane Marking*: Also called “sharrows,” shared lane markings are pavement markings used to indicate shared space for bicyclists and motorists on low volume streets that do not have room for bike lanes.
- *Wide Shoulder*: Typically found in less-dense areas, shoulder zones are paved roadways with striped shoulders wide enough for pedestrian and bicycle travel.
- *Bike Lane*: Marked space along a length of roadway designated with paint for the exclusive use by bicyclists. If there is space available, some bike lanes can be buffered with a wider (a minimum two-foot) pavement marking.
- *Enhanced Shared Sidewalk*: Shared bicycle and pedestrian facility adjacent to, but separated from, the roadway. Designed to function similar to a shared use path.





- *Sidewalk Infill/Repair*: Completing sidewalk gaps greatly improves pedestrian connectivity by providing a continuous, barrier-free walkway easily accessible for all users.
- *Accessway*: Simple connectors provide direct routes between residential areas, retail and office areas.

Citizens indicated the greatest preference for facilities separated from vehicles or having clearly designated pavement area exclusively for bikes. However, the opportunities for designated bicycle lanes and separate shared use facilities are limited or expensive. As a result, bicycle boulevards are a key element of building a complete bicycle network in Federal Way.

Due to limited resources, the development of the walking and bicycling network will require further review and establishment of priorities for the near term. The following 2011 planning level estimate costs were developed to help determine the relative scale of investment that will be necessary to implement all of the identified facilities. A summary of projects costs to complete the walking and bicycling layered network, per the *Walking and Bicycling Master Plan*, is presented in *Table III-7 (Non-Motorized Improvement Costs)*.

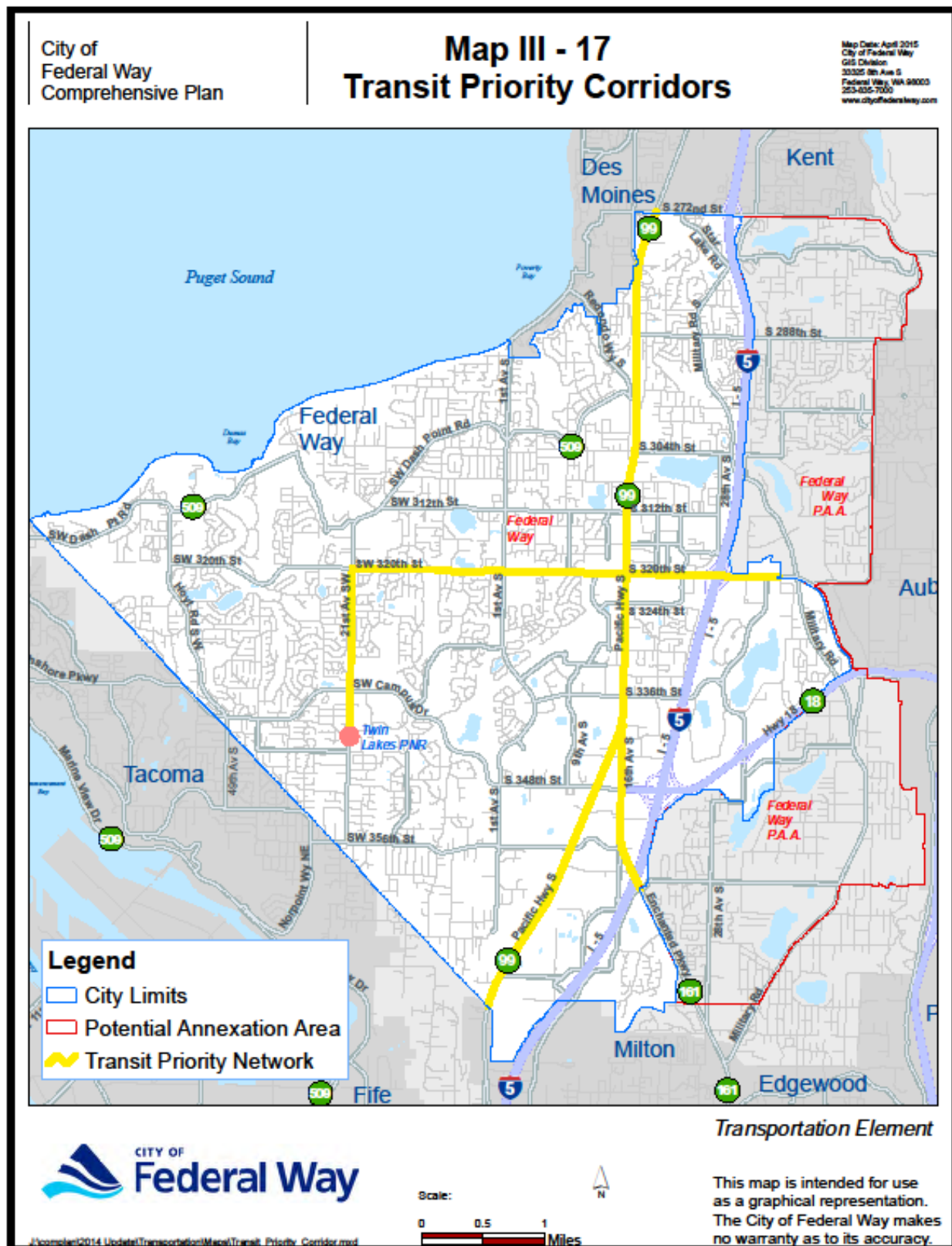
Table III-7
Non-Motorized Improvement Costs

Facility Types	Estimate Costs
Sidewalk Network	\$62 million for facilities on 61 miles roadway (approx. 320,000 linear feet)
Trail network	\$21 million for facilities on 16 miles (84,000 linear feet)
Bicycle Network	\$57 million for facilities on 71 miles of roadway (374,000 linear feet)
Crossing Modifications	\$4 million for modifications at 21 intersections along 320th and 348th/Campus Drive.

Transit

While the City itself does not operate transit, corridors that are welcoming to transit and have appropriate supportive amenities can encourage residents and employees to use transit. This could lead to additional service hours from transit providers such as King County Metro, Pierce Transit, and Sound Transit. The *Transit Priority Corridors* identifies the corridors that the City should focus their efforts on and is shown in *Map III-17 (Transit Priority Corridors)*. The City can enhance transit use by offering:

- Street lighting
- Safe routes for accessing transit stops
- Transportation System Management approaches to enhance transit speed and reliability






Federal Way’s transit level of service is based on the passenger amenities provided at transit stops along Transit Priority Corridors. The transit level of service is determined using a transit agencies policy for the types of passenger amenities provided at transit stops based on the number of passengers accessing the stop. Where more than one transit agency accesses a transit stop, the highest level of amenity provision should be considered the standard. Optionally, the level of service for transit priority corridors could be expanded to consider pedestrian access and the quality of transit service.

The City can achieve the green level of service standard by having over 80% of transit stops meeting amenity minimum provided along transit priority corridors. The yellow standard, which the City will adopt as its minimum target, can be achieved with more than 60% of transit stops meeting minimum amenity provisions. Transit Priority Corridors with less than 60% of transit stops meeting the minimum amenity provision would fall into the red category and not satisfy the City’s level of service for transit. Federal Way’s measurement of transit level of service is summarized in *Table III-8 (Transit Priority Corridor Level of Service)*.

At the time of this update, Pierce Transit, King County Metro, and Sound Transit are undergoing updates of the long range plans.

Table III-8
Transit Priority Corridor Level of Service (LOS)

LOS	Measurement*	Pedestrian Access (Optional)	Quality of Service (Optional)+
	More than 80% of transit stops meet amenity minimum provisions	Sidewalks and pedestrian crossing opportunities serving stops	All day frequent service; adequate parking at park-and-rides and stations
	More than 60% of transit stops meet amenity minimum provisions	Sidewalks and pedestrian crossing opportunities serving some stops	Peak period service; insufficient parking at park-and-rides and stations
	Less than 60% of transit stops meet amenity minimum provisions	General lack of sidewalks and pedestrian crossing opportunities	N/A

*Amenities include bus stop shelter, bench, flag post, and/or concrete waiting area; these amenities are determined based on the number of people using a transit stop as defined by a transit agency.

+Consider the adequacy of parking provided at park-and-rides and transit stations

Freight and Goods

With the enhancement of neighborhood centers, truck deliveries may increase as consumer activity shifts to these areas. While localized neighborhood intrusion is unlikely, isolated cases can be managed using traffic calming techniques. Where pavement, bridge, and neighborhood traffic management systems, or planned land uses indicate that roadways cannot handle truck traffic, designated truck routes will be adopted to protect existing investments and assure continued quality of life.

To accomplish effective planning and management of freight and goods movement in the area, traffic monitoring (volume counts) will include vehicle classification, allowing the patterns of use to be better understood. Another technique that can be employed to assure adequate consideration of truck needs is the involvement of those industries and businesses generating the traffic in roundtable discussions.

Regional Activities

The only trucking center in Federal Way is Ernie’s Center on SR 99 at South 330th Street. This facility caters to the movement of freight and goods by offering fuel. Looking toward the future, several regional road projects may affect freight and goods movement through the area. Improvements along I-5, which will make truck traffic more efficient, include truck-climbing lanes in the Southcenter area. At present, there are major points of delay for peak hour traffic. Trucks arriving on I-5 and on SR 18 just east of I-5 from SR 167 have problems, since they are not able to approach the hill climb at posted speed and delay other travelers. Perhaps one of the most significant regional improvements is the enhanced connection of SR 167 with I-5 at Fife and into the Port of Tacoma. The current industrial development in the area of the Port masks the growing importance of the Green River Valley, both as a transportation corridor and as a generator of freight and goods movement. Increasing accessibility to the SR 167 corridor will provide an alternate route for truck based freight and goods movement.

SR 509 is being studied for consideration of an extension, tying back to I-5 at South 210th Street. This route will open an alternate route to the Port of Seattle’s international freight facilities, as well as to provide access to the airport industrial complex. To the extent that this new route’s design considers impacts to I-5, SR 99, and local street system in Federal Way, it provides great benefit to Federal Way.

Other long range actions that will affect freight and goods movement in this north/south corridor include Intelligent Traveler Service (ITS)—with improved (truck) vehicle identification, and commuter rail service in the Green River Valley. Intelligent Traveler Service features will be incorporated into the “high tech,” I-5 corridor being designed under the state DOT’s Venture Program. Advanced communication systems will allow better detection of slow-downs, accidents, and even hazardous vehicles moving through Federal Way, which certainly affect the City’s local residents traveling these regional facilities.

To the extent that Commuter Rail service in the Valley can avoid impacting freight and goods movement, it is viewed as a positive step in the direction of providing high capacity transit to the south end of the region. Care must be taken to avoid forcing a shift in cargo carrying capacity from rail to truck in the south county corridor. Highway commuter needs warrant keeping this “traffic” on rails.

Consistent with the requirements set at the federal level, PSRC and WSDOT are focusing increased efforts towards understanding freight and goods movement and identifying solutions to problems faced by local, regional, state, and international shippers. Using

studies by the Port of Seattle and WSDOT, PSRC and the Economic Development Council have established a Freight Mobility Roundtable. The Roundtable brings together key carriers, producers, and consumers, as well as nationally recognized consultants on the topic. This effort is seen as setting the pace for other areas around the country. The Roundtable efforts will be linked with a series of other efforts by the Regional Council, including:

- Building a commodities flow database;
- Identifying current and future problem areas that inhibit or restrict the effective movement of freight and goods;
- Recommending road, intermodal, and other system improvements to address these problems, while meeting federal and state Clean Air Act strictures; and
- Developing planning guidelines for use at the local level.

The benefits of supporting these regional activities will be maintenance of accessibility for City residents and businesses.

Transportation System Management

Transportation Systems Management (TSM) focuses on maximizing use of the existing systems travel capacity. Its focus is to identify ways to manage the transportation system (usually streets and highways, from a local agency perspective) to maximize the carrying capacity of existing facilities.

Federal Way outlines their approach for futures transportation system management in their Intelligent Transportation Systems (ITS) plan. These plans define the application of technology to address transportation problems such as congestion, safety, and mobility. As outlined in the ITS Plan, the City has an ever-expanding communication network with plans to create a robust Traffic Management Center (TMC) and a secondary Satellite Management Center. The plan provides a framework to complete gaps in the communication network, install traffic monitoring capabilities, increase staff resources, and increase collaboration with the following entities:

- WSDOT
- King County
- Transit Agencies (King County Metro Transit, Peirce Transit, Sound Transit)
- Adjacent Cities
- Valley Communications (“ValleyCom”)
- Participants of the City of Federal Way Emergency Operations Center

As the ITS program grows to include more technology and extended interagency coordination, the Public Works Department that oversees and operates these projects will periodically update the ITS Master Plan, included in *Appendix III-D*, and evaluate

changing needs and technology. The plan documents current needs and provides a strategic plan for completing proposed ITS projects and programs.

Commute Trip Reduction (CTR) Plan

The City's Commute Trip Reduction (CTR) plan and Transportation Demand Management (TDM) strategies should be updated to reflect new legislation and to be aligned with PSRC's Regional Transportation Demand Management (TDM) Action Plan. The goal of the Federal Way CTR plan is to increase non drive-alone trips in the 2019-2020 timeframe to 24.4% and reduce vehicle miles traveled by approximately 11% and greenhouse gas emissions (GHG) by approximately 22% among major work sites. Building upon the success of the existing commute trip reduction program, the City strives to meet the goals of the plan for the future by working in partnership and coordination with other agencies and employers.

Commute Trip Reduction (CTR) Recommendations

The following recommendations are made for Commute Trip Reduction (CTR):

1. Encourage voluntary expansion of the CTR Program to employers of less than 100 employees as funding allows. The encouragement by employers may be as diverse as subsidized bus passes, car pool space priority, bike racks, shower facilities, van pools, car pool information access, telecommuting, variable work hours, etc.
2. Facilitate enhancements to the HOV System. This may include the acquisition of property for HOV lanes, construction of arterial HOV lanes on City arterials and State highways, and priority treatments for buses at traffic signals. At the very least, opportunities to support improved access to the state system of HOV lanes should be identified and supported.
3. Increase density of land uses and encourage a mix of uses to locate near bus routes, park and ride lots, and transit centers through the adoption of the FWRC and its supporting zoning. This policy is vital to the creation of a regional bus and rail system and will also be an effective way to reduce traffic congestion and air pollution.
4. Enhanced pedestrian and bicycle access and security in the City Center, neighborhood shopping areas, and multifamily nodes.
5. Improve pedestrian and bicycle access to bus routes and transit centers. This can be a requirement of subdivision, development, and redevelopment. The City may need to acquire easements and construct trail connections. Development incentives could be granted for providing such amenities that are pedestrian, bike, and transit friendly.
6. While bicycle, pedestrian, and bus transit services and facilities may be desirable for other reasons; they should not be looked on as highly cost-effective strategies to the exclusion of those actions listed above.

3.6 NEAR-TERM AND LONG-TERM PROJECTS

This chapter presents the Transportation Improvement Plan (near-term) and Capital Improvement Program (long-term) which forms the basis of this Transportation Element. Collectively, they add up to over \$800 million in transportation projects to be constructed over the next few decades.

For planning purposes, the near-term Transportation Improvement Plan represents years 0 to 6 (2016-2021) and is financially constrained to only those projects that could realistically receive funding over the next six years. It is unlikely that all of the projects on the six year list would receive funding because they total over \$257 million. Projects included on the Six-Year Project List are considered community priorities that the City would move forward in the near-term should funds become available. The Transportation Improvement Plan counts on strong coordination with other agencies to help finance needed improvements on the state highway system, facilities in adjacent jurisdictions, along with expanded transit services provided by Metro. These projects provide a starting point for the City in developing its financial constrained Six-Year Transportation Improvement Plan, which is updated every year and is developed based on more updated knowledge related to project feasibility and funding availability.

The long-term Capital Improvement Program list (7-20+ years) reaches out to and potentially beyond the 2040 year time horizon and represents important projects that tend not to have identified funding or are only necessary to address future growth.

The Transportation Improvement Plan and Capital Improvement Program were developed to create a transportation system that realizes Federal Way's ultimate transportation goals:

- *Goal 1:* Maintain mobility through a safe, balanced, and integrated transportation system.
- *Goal 2:* Be fiscally and environmentally sustainable.
- *Goal 3:* Enhance community health, livability, and transportation by providing a connected system of pedestrian, bicycle, and transit ways that are integrated into a coordinated regional network.
- *Goal 4:* Support the City's land use vision and plan.
- *Goal 5:* Develop and implement transportation systems management strategies and programs that contribute to the overall effectiveness of the multimodal transportation system.
- *Goal 6:* Be an active partner by coordinating with a broad range of groups to help meet Federal Way's transportation goals.

With these goals in mind, as well as completing the layered network, the respective project lists were developed.

The Six-Year Project List, *Table III-9 (Transportation Improvement Plan – 2016 to 2021)* seeks to maintain concurrency, focus on projects that provide the most benefit to Federal Way residents, and leverage outside funds to the maximum extent possible. *Map III-18 (Transportation Improvement Plan 2016 – 2021)* displays the locations of these projects in Federal Way. None of these projects conflict with the goals listed above. It is recognized that the availability of outside funds is not always predictable. As a result, any of the projects on the near term list are high priority projects that the City would consider moving forward should funding become available.

Table III-9
Transportation Improvement Plan (TIP) – 2016 to 2021

Capital Projects			
ID**	Location	Description	Total (\$)*
1a	City Center Access Phase 1	Update environmental documentation for modified access at S 320th St & S 324th St	2,500
1b	City Center Access Phase 2	Add HOV lanes on S 320th St, realign ramps in SE quadrant	132,109
2	10th Ave SW @ SW Campus Dr	Add SB right-turn lane	1,229
3	SW 344th St: 12th Ave SW - 21st Ave SW	Extend 3 lane principal collector with bike lanes, sidewalks, illumination	10,164
4	1st Ave S @ S 328th St	Install raised median, improve access at 328th	1,897
5	S 320th St @ 20th Ave S	Add 2nd left-turn lanes EB, WB	2,856
6	SR 99 @ S 312th St	Add 2nd left-turn lane NB	6,708
7	S 304th St @ 28th Ave S	Add NB right-turn lane, signal	2,371
8	S 352nd St: SR 99 - SR 161	Extend 3 lane principal collector and signal at SR-99	5,619
9	SW 320th St @ 21st Ave SW	Add 2nd WB left-turn lane, Interconnect to 26th Ave SW	6,169
10	SW 320th St @ 47th Ave SW	Install traffic signal	569
11	S 312th St @ 28th Ave S	Add SB right-turn lane	771
12	SW 336th Wy / SW 340th St: 26th Pl SW - Hoyt Rd	Widen to 5 lanes, add signal at 26th Pl SW	21,821
13	S 356th St: SR 99 - SR 161	Widen to 5 lanes, bike lanes, sidewalks, illumination	6,112
14	S 356th St @ SR 161	Add 2nd NB Left to SR 161 - support phase of Triangle Project	4,100
15	S 320th St & 1st Ave South	Add EBL, WBL, WBR, NBT, SBR; widen to 5 lanes N to 316 or Alternative Measure	10,460
16	S 344th Wy & Weyerhaeuser Way S	Roundabout	1,763
17	SR 99 HOV Lanes Phase 5: S 340th St - S 356th St	Add HOV lanes, install raised median; roundabout at 340th St, turn lanes at 348th	17,600
18	Citywide	Traffic signal modifications	914
19	S 288th St: Military Rd S – I-5	Overlay	637
20	S 324th St: SR 99 – S 322nd St	Overlay	871
21	16th Ave S: S 344th St – S 348th St	Add SB auxiliary lane	6,105
22	Citywide	Implement Adaptive Traffic Control System	1,000
	Subtotal Capital Projects		244,345

*Costs in 2016 and represent thousands of dollars.

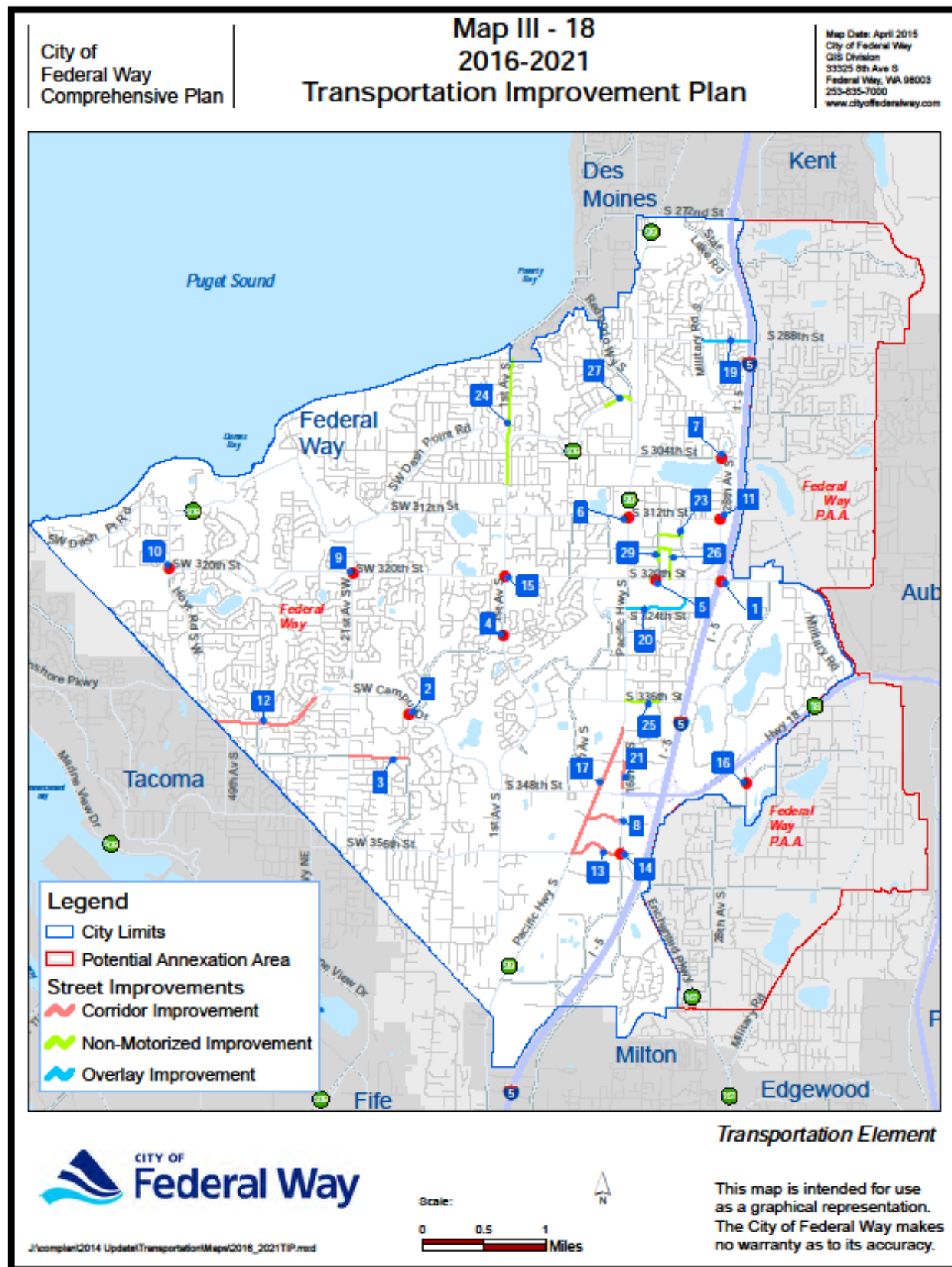


Table III-9 (Continued)

Non-Motorized Capital Projects			
ID	Location	Description	Total (\$)*
23	S 314 th St: 20 th Ave S – 23 rd Ave S	Install sidewalks, ADA ramps, curbs & gutter, pedestrian improvements	3,345
24	1 st Ave S: S 292 nd St – S 312 th St	Shoulder improvements	3,770
25	S 336 th St: SR 99 – 20 th Ave S	Install sidewalk on north side	639
26	21 st Ave S: S 316 th St – S 320 th St	Install sidewalk on west side	1,356
27	SR 509: 11 th Pl S – 16 th Ave S	Install sidewalk on south side	1,500
28	Citywide Pedestrian Safety	Install mid-block crossing treatments	640
29	20th Ave S & S 316th St	Install sidewalk on east and south sides	395
Subtotal Non-Motorized Capital Projects			11,645
TOTAL CAPITAL PROJECT COSTS			185,980

The full list of projects that the City would like to complete during the 20 year planning horizon (including the 6 year projects) are shown in *Table III-10 (Capital Improvement Program – 2016 to 2040)* and illustrated in *Map III-19 (Capital Improvement Plan)*. While all of these projects would help complete the layered network and realize the City's transportation vision, many are deemed to be longer-term.

Table III-10
Capital Improvement Program (CIP) – 2016 to 2040

Project Number	Project Description	Cost (2016 \$1,000)
Capital Project List		
95-17	SR 99: S 340th St - S 356th St: Construct HOV lanes, install raised median; roundabout at 340 th St, turn lanes @ 348th (17)	17,600
97-01	SW 336th Wy / SW 340th St: 26th Pl SW - Hoyt Rd SW: Signal Coordination	283
92-18b	SR 161 @ S 356th St: Add NB left-turn lane, EB right-turn lane, or install roundabout (14)	4,100
92-18a	S 356th St: SR 99 - SR 161: Widen to 5 lane, bike lanes, sidewalks (13)	6,112
16-22	S 352nd St: SR 99 - SR 161: Extend 3 lane principal collector and signal at SR-99 (8)	5,619
16-23	Citywide: Traffic signal modifications (18)	914
16-24	Citywide: Implement Adaptive Traffic Control System (22)	1,000
16-25	16th Ave S: S 344th St - S 348th St: Add SB auxiliary lane (21)	6,105
16-19	1st Ave S @ S 328th St: Install raised median, improve access at 328th (4)	1,897
16-20	S 320th St @ 20th Ave S: Add 2nd left-turn lanes EB, WB (5)	2,856
16-21	Citywide Pedestrian Safety: Install mid-block crossing treatments (28)	640
16-26	S 304th St @ 28th Ave S: Add NB right-turn lane, signal (7)	2,371

Table III-10
Capital Improvement Program (CIP) – 2016 to 2040

Project Number	Project Description	Cost (2016 \$1,000)
94-10b	SR 509: 9th Pl S - 16th Ave S: Widen to 5 lanes, signal at 9th Pl S	8,794
07-06	1st Ave S @ SW 301st St: Install signal or roundabout	404
16-11	8th Ave S @ S 320th St: Add left-turn lanes NB, SB	485
16-13	S 324th St Interchange: Extend 5-lane minor arterial to 32nd Ave S	134,587
07-07	1st Ave S @ S 308th St: Install signal or roundabout	404
07-04	Military Rd S @ S 296th Pl: Install signal or roundabout	404
16-18	16th Av S @ S 341st Pl: Add signal	404
16-01	SR 99 @ S 288th St: Add NB right-turn lane	452
98-32	13th Pl S: S 330th St - S 332nd St: Extend 3 lane collector	4,797
94-24	14th Ave S: S 312th St - S 316th St : Ring Road extension	5,472
93-08	S 316th St: SR 99 - 11th Pl S: Ring Road extension	8,291
01-05	SR 99 @ S 312th St: Add 2nd NB left-turn lane (6)	6,708
07-22	16th Ave S: SR 99 - SR 18: Add HOV lanes	22,384
02-01	City Center Access (Phases 1 and 2): S 320th St @ I-5 Bridge Widening: Add HOV lanes through interchange, reconstruct SE quadrant of interchange to realign ramps (1a & 1b)	134,609
10-01	S 373rd St @ SR99: Add Signal or roundabout or two-way left-turn lane	482
05-03	Weyerhaeuser Wy S @ S 344th Wy: Install roundabout (16)	1,763
05-01	SR 509 @ 4th Ave S: Install roundabout	1,009
07-03	30th Ave S @ S 288th St: Install signal or roundabout	404
98-10c	10th Ave SW @ SW Campus Drive: Add SB right-turn lane (2)	1,229
16-09	SR 99 @ S 312th St: Add 2nd left-turn lane EB, WB, and WB right-turn lane	1,696
02-04	SR 18 @ SR 161: Add 3rd thru lane NB, SB. 3rd left-turn lane NB, SB	12,210
98-07	SW 336th Wy / SW 340th St: 26th Pl SW - Hoyt Rd SW: Widen to 5 lanes (12)	21,821
98-15	Military Rd S: S 288th St - S 304th St: Widen to 5 lanes	23,450
07-01	S Star Lake Rd @ 25th Dr S: Install signal or roundabout	404
16-02	Military Rd S @ S 288th St: Add 2nd left-turn lanes and right-turn lanes eastbound and westbound	2,326
98-10a	SW 344th St: 12th Ave SW - 21st Ave SW: Extend 3-lane principal collector with bike lanes, sidewalks (3)	10,164
99-02	S 320th St @ 1st Ave S: Add 2nd left lanes all legs, WB, SB right-turn lane, widen 1st Ave S to 5 lanes to S 316th St (15)	10,460
98-01	S 304th St @ SR 99: Add left-turn lanes on 304th	1,454
10-01	S Star Lake Rd: @ Military: Add right-turn lane on S Star Lake Rd	401
16-15	SR 99 @ S 324th St: Add 2nd left-turn lanes NB, SB, and NB right-turn lane	3,052
16-16	21st Ave SW @ SW 336th St: Add 2nd left-turn lanes NB, SB, and SB right-turn lane	3,052
00-12	S 308th St: 14th Ave S - 18th Ave S: Widen to 3 lanes	3,198
16-17	S 336th St: SR 99 - 20th Ave S: Widen to 5 lanes, add 2nd left-turn lanes EB, WB	3,721

Table III-10
Capital Improvement Program (CIP) – 2016 to 2040

Project Number	Project Description	Cost (2016 \$1,000)
	@ SR 99	
98-34	21st Ave SW @ SW 320th St: Add WB left-turn lane, interconnect to 26th Ave SW (9)	6,169
92-22	1st Ave S: S 348th St - S 356th St: Widen to 5 lanes, add 2nd SB right-turn lane @ 356th	7,213
93-09	1st Ave S: S 366th St - SR 99: Extend 2-lane road, signal or roundabout at SR 99	7,550
98-05	S 324th St: SR 99 - 23rd Ave S: Widen to 5 lanes	10,552
92-20	47th Ave SW @ SW 320th St: Signalize (10)	569
95-07	S 288th St: 19th Ave S - Military Rd S: Widen to 5 lanes	12,364
93-07c	21st Ave SW: SW 344th St - SW 356th St: Widen to 5 lanes, add 2nd SB right-turn lane @ 356th	21,639
92-14	Military Rd S: S Star Lake Rd - S 288th St Widen to 5 lanes, sidewalks, and illumination	35,456
16-10	23rd Ave S: S 316th St - S 317th St: Add NB lane	678
16-12	11th Pl S @ S 320th St: Add 2nd NB left-turn lane	678
00-02	28th Ave S @ S 312th St: Add SB right-turn lane (11)	771
07-14	23rd Ave S @ S 320th St: Add SB left-turn lane, NB thru and right-turn lanes	8,705
98-13	SW 344th St & 35th Ave SW: 21st Ave SW - SW 340th Street: Bike lanes, sidewalks	12,360
10-01	Military Rd S @ Camelot: Roundabout	1,392
01-03	SR 509 @ 26th Pl SW: Add WB left-turn lane	1,017
07-05	Military Rd S @ S 298th St: Install signal or roundabout	404
14-01	Weyerhaeuser Wy S: S 336th St - 33rd Pl S: Widen to 5 lanes	2,826
92-23	S 304th St: SR 99 - 28th Ave S: Widen to 3 lanes	11,513
16-03	SR 509 @ SW 301st St: Add WB right-turn lane	226
16-14	S 324th St: 11th Pl S - SR 99: Widen to 5 lanes	1,809
07-12	6th Ave SW @ SW 320th St: Install signal or roundabout	404
07-18	Military Rd S @ S 328th St: Install signal or roundabout	404
92-06b	S 356th St: 1st Ave S - SR 99: Widen to 5 lanes	16,416
98-20	S 312th St: 1st Ave S - 14th Ave S: Widen to 5 lanes	28,726
07-20	SW Campus Dr: 1st Ave S - 21st Ave SW: Add HOV lanes	63,956
16-07	SR 509 @ SW 312th St: Add 2nd WB left-turn lane	904
93-12	SR 509 @ 47th Ave SW: Install roundabout	1,009
05-04	S 312th St @ 18th Ave S: Install signal	404
98-17	S Star Lake Rd: S 272nd St - Military Rd S: Widen to 3 lanes (see 10-1) for intersection improvement	9,327
98-39	1st Ave S: SW 301st St - SW 312th St: Widen to 3 lanes	11,725
98-24	Hoyt Rd SW: SW 320th St - SW 340th St: Widen to 3 lanes	12,059
93-07a	21st Ave SW: SW 312th St - SW 320th St: Widen to 5 lanes	12,364

Table III-10
Capital Improvement Program (CIP) – 2016 to 2040

Project Number	Project Description	Cost (2016 \$1,000)
16-04	SR 509 @ SW 308th St: Install roundabout	1,346
16-05	SR 509 @ SW 306th St/12th Av SW: Install roundabout	1,346
16-06	SR 509 @ 16th Ave SW: Install roundabout	1,346
16-08	8th Ave SW @ SW 312th St: Install roundabout	1,346
94-11	S 308th St: 5th Pl S - 8th Ave S: Extend 2-lane street	1,938
07-13	SR 99 @ S 320th St: Add NB right-turn lane	2,883
98-23	47th Ave SW: SR 509 - SW 318th St: Widen to 3 lanes	5,034
98-14	S 288th St: Military Rd S - I-5: Widen to 5 lanes	11,541
94-10a	SR 509: 1st Ave S - 9th Pl S: Widen to 3 lanes	15,634
94-17	SR 509: 1st Ave S - 16th Ave SW: Widen to 3 lanes	29,846
05-02	City Center Couplet: S 316th St/S 324th St: 11th Pl S - 23rd Ave S: Restripe for clockwise couplet	808
07-02	SR 99 @ S 288th St: Add EB left-turn lane	1,131
07-15	25th Ave S @ S 320th St: Add 2nd EB left-turn lane, NB right-turn lane	13,001
98-18	28th Ave S: S 304th St - S 317th St: Widen to 3 lanes	16,416
98-57	SR 509: 30th Ave SW - 47th Ave SW: Widen to 3 lanes	18,760
98-58	SR 509: 47th Ave SW - West City Limits: Widen to 3 lanes	23,450
07-19	1st Wy S @ S 336th St: Add 2nd SB left-turn lane	7,365
98-30	10th Ave SW @ SW 334th St: Signalization or roundabout	404
11-01	21st Ave S @ S 320th St: Install signal	404
98-26	S 320th St @ 5th Ave S: Signalization	404
00-07	S 348th St @ 9th Ave S: Add 2nd SB left-turn lane	2,326
92-12	4 Av S: S 312 St - S 316 Pl: improve vertical alignment	3,1978
95-02	S 312th St: 23rd Ave S - 28th Ave S: Widen to 3 lanes	7,461
98-31	SW 356th St @ 13th Wy SW/14th Ave SW: Signalization	404
07-16	Military Rd S @ S 320th St: Add 2nd NB left-turn lane	5,620
98-29	SW 320th St @ 11th Ave SW: Signalization	404
14-02	SR 509 @ 30th Ave SW: Install roundabout	1,009
98-28	SW 320th St @ 7th Ave SW: Signalization	404
98-19	S 308th St: 8th Ave S - 14th Ave S: Install curb, gutter, sidewalks	5,330
92-11	SW Campus Dr: 1st Ave S - 7th Wy SW: Widen lanes/sidewalk	2,073
00-16	SR 99 @ Spring Valley Montessori School: Add NB left-turn lane	6,977
95-20	Military Rd S: S 320th St - SR 18: Widen to 3 lanes	38,373
	Subtotal Capital Projects	1,015,244

Non-Motorized Capital Projects		
Project Number	Project Description	2016 cost
00-06b	S 314th St: 20th Av S - 23rd Ave S: Add sidewalks and street lights (23)	2,665
98-41	1st Ave S: S 292nd St - S 312th St: Shoulder improvement (24)	3,770
16-30	S 336th St: SR 99 - 20th Ave S: Add sidewalk north side (25)	639
16-29	21st Ave S: S 316th St - S 320th St: Install sidewalk on west side (26)	1,356
16-27	SR 509: 11th Pl S - 16th Ave S: Install sidewalk on south side (27)	1,500
16-28	20th Ave S & S 316th St: Install sidewalk on east and south sides (29)	395
98-39	9th Ave S: S 332nd St - S 348th St: Widen for Bike Lanes	15,634
98-42	S Park & Ride Trail: SR99 @ 352nd - S 348th @ 9th: Extend Trail	1,493
Subtotal Non-Motorized CIP		27,452

	Total City Expenditures	1,042,696
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3.7 FINANCING AND IMPLEMENTATION

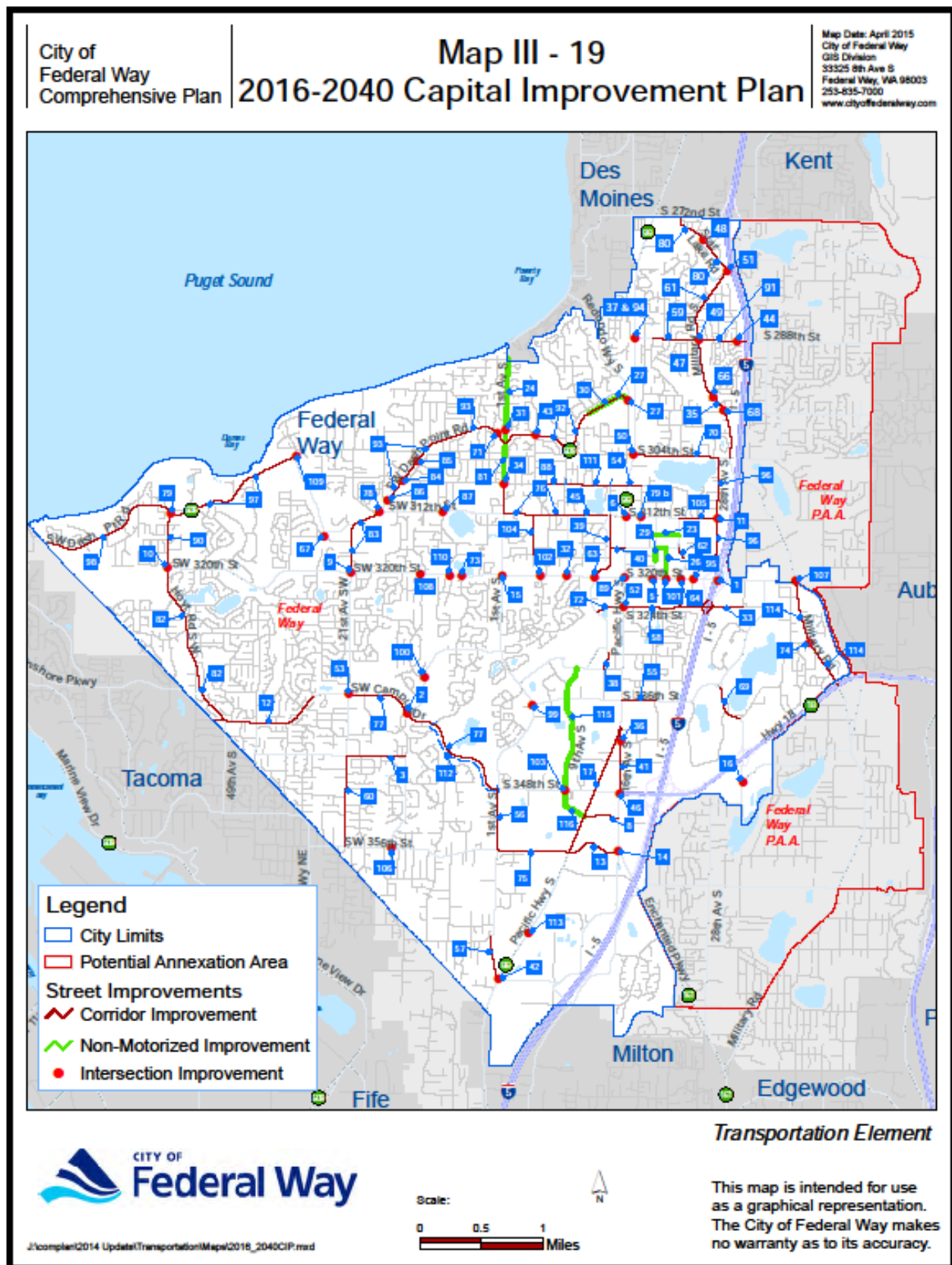
Provision of transportation facilities and services requires the timing of new projects to meet the needs of the community. At the same time, existing facilities must be maintained and the public's investment protected, maximizing the life of the infrastructure. The purpose of this section is to describe various strategies available to the City to implement the preferred transportation and land use plan.

The preferred plan proposes a balanced investment among modes of travel, providing mobility options and increasing the commitment to travel by transit, ridesharing, bicyclists, and pedestrians.

The implementation plan for Federal Way focuses on the next six-year time period within which to forecast needs and to identify reliable options for transportation funding.

Financing

The purpose of a transportation financing strategy is to develop an adequate and equitable funding program to implement transportation improvements in a timely manner. Without adequate funding the transportation plan cannot be implemented in an efficient and cost-effective manner. The financing program recognizes various user groups and modes.



Funding sources are not fixed and require annual review and reprogramming. Where non-City funds are sought, the City's projects may be competing for limited funds. Without attention to financing requirements, the operation, maintenance, and expansion of the transportation system will not occur in a timely fashion.

Estimates of Revenue

The last five years (2009 to 2014) of financial revenues were reviewed. *Table III-11* presents annual revenue estimates for six existing sources of revenue for transportation capital improvements for the City of Federal Way. Each source of revenue has a low estimate, a high estimate, and the average of the two. It should be noted that the City has been successful to attaining state and federal grants, with roughly two-thirds of revenue from these sources.

Table III-11
Estimates of Specific Revenue by Sources 2015-2040 (\$ Millions)

	Source of Revenue	Low Estimate (\$)	High Estimate (\$)	Average (\$)
1.	Federal Grants – Annual Average	1.2	2.5	1.9
2.	State Grants - Annual Average	1.4	2.9	2.2
3.	Motor Vehicle Fuel Tax	0.2	0.4	0.3
4.	Road/Street Maintenance	0.2	0.4	0.3
5.	Traffic Mitigation	0.2	0.4	0.3
6.	Transfer from Other Sources such as Real Estate Excise Tax and Community Development Block Grants	1.1	2.3	1.7
	Total: Existing Annual Revenue for Capital	4.4	8.8	6.6
	Total: 25-year Revenue for Capital	110	220	165

The estimate of each of the existing revenue sources listed in *Table III-11* is described below in *Existing Revenues for Transportation Capital Projects*, with existing revenue sources numbered 1 through 6.

Existing Revenues for Transportation Capital Projects

1. Federal Grants – Annual Average (net of Committed Grants)

The estimate is based on the annual average of \$2.5 million of federal grants received by the City since 2009. The low estimate of \$1.2 million is based on 50 percent of the historical average, while a high estimate of \$2.5 million is based on 100 percent of the historical average. The average of these values is \$1.9 million.

2. *State Grants – Annual Average (net of Committed Grants)*

The estimate is based on the annual average of \$2.7 million of state grants received by the City since 2009. The low estimate of \$1.4 million is based on 50 percent of the historical average, while a high estimate of \$2.9 million is based on 100 percent of the historical average. The average of these values is \$2.2 million.

3. *Motor Vehicle Fuel Tax*

The Street Fund was established to account for the receipt and disbursement of state levied unrestricted motor vehicle fuel taxes, which must be accounted for in a separate fund. The Street Fund is used primarily for ongoing operating and maintenance expenses of the street system. However, the City transfers a portion of the Street Fund money to the City's capital improvement program (CIP) for transportation projects. The estimate is based on the annual average of \$311,000 received by the City since 2009. A low estimate of \$155,000 is based on 50 percent of the historical average. The high estimate of \$311,000 is based on 100 percent of the historical average. The average of these values is \$233,000.

4. *Road and Street Maintenance*

The Street Fund funds ongoing operations and maintenance of the Federal Way street system. Since 2009, an annual average of \$371,000 has been allocated from this fund. A low estimate of \$186,000 is based on 50 percent of the historical average. The high estimate of \$371,000 is based on 100 percent of the historical average. The average of these values is \$278,000.

5. *Traffic Mitigation*

Federal Way assesses traffic impact mitigations for new developments through a combination of impact fees for system-level improvements and SEPA traffic mitigation for site-specific impacts. The City has collected an annual average of \$432,000 in traffic mitigation fees since 2009. Prior to 2010 the City also collected SEPA-based mitigation fees for system-level improvements. When impact fees were adopted, the SEPA mitigation was limited to site-specific impacts. A low estimate of \$216,000 is based on 50 percent of the historical average. The high estimate of \$432,000 is based on 100 percent of the historical average. The average of these values is \$324,000.

6. *Transfer from Other Sources*

Federal Way also uses funds from other sources, such as real estate excise taxes (REET) and community block grants, to fund many types of infrastructure improvements, including transportation projects. This estimate is based on an average of \$2.3 million transferred from other sources since 2009. A low estimate of \$1.1 million is based on 50 percent of the historical average. The high estimate of \$2.3 million is based on 100 percent of the historical average. The average of these values is \$1.7 million.

Future Revenues for Transportation Capital Projects

A key GMA planning requirement is the concept of fiscal restraint in transportation planning. A fiscally constrained Transportation Element must first allow for operation and maintenance of existing facilities, and then capital improvements. To introduce fiscal constraint into the plan, an inventory of revenues and costs was undertaken to identify funds that are likely to be available for capital construction and operations.

The proposed Transportation Element for Federal Way contains a variety of projects that would cost approximately \$850 million over 25 years. *Table III-12* summarizes the costs of the major types of transportation investments by type. The Transportation Element focuses on capital projects that will help the city achieve its mobility goals. The plan also includes ongoing pavement maintenance to ensure that the roadway network is kept in good condition.

Table III-12
Costs of Federal Way Transportation Element (25+ years)

Project Type	Description	Total Cost (\$ Millions)
Intersections	Traffic signals and roundabouts	4-6
Streets	Street extensions and widenings	20-25
Multimodal Projects	Sidewalks, trails, bike lanes, and downtown investments	14-16
Maintenance	Overlay and pavement repair, lighting, signal operations, snow removal	15-20
	Total	53-67

*Costs denoted in millions

It is worthwhile to note that average annual funding for transportation (including maintenance) in the City of Federal Way has averaged around \$9 million in recent years. Revenues include those from outside sources and grants, general city funds, real estate excise taxes, impact fees, and gas tax receipts. The City aggressively pursues federal and state funding sources for transportation projects in order to maximize the use of City funds to maintain City streets and fund improvements to streets that would not fare well in grant-funding selection criteria.

Based on the data in *Table III-11 (Estimates of Specific Revenue by Sources 2015-2040 [\$ Millions])* the City's existing revenue sources could generate between \$110 and \$220 million over the next 25 years.

The comparison of revenues to costs indicates that the City will need to carefully prioritize its projects, since not all of the transportation needs are likely to be affordable with existing revenue sources during the 25-year period. If this occurs, the City has several options:

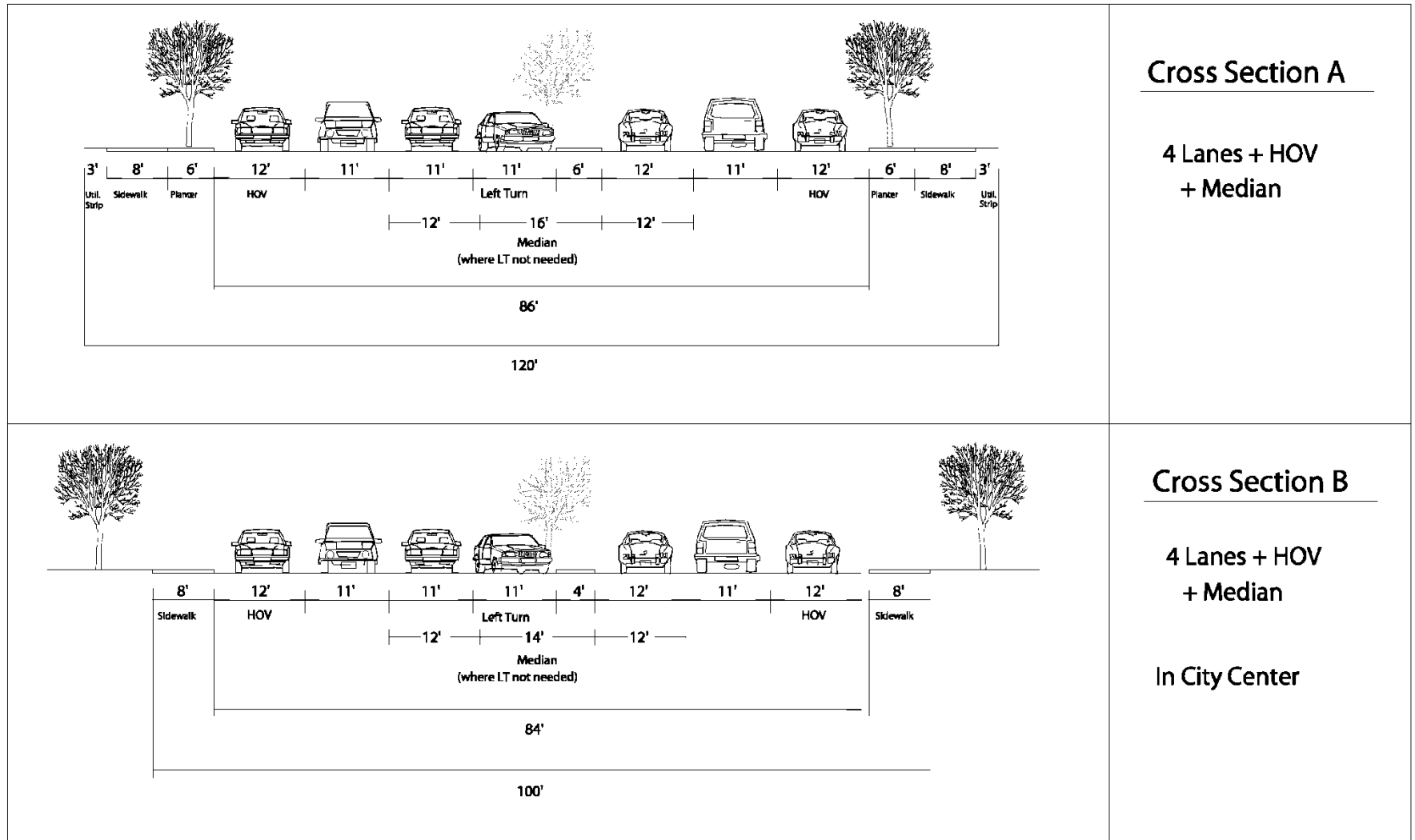
- Increase the amount of revenue from existing sources, including impact fees, real estate excise taxes, transportation benefit district, or increased general fund revenues.
- Adopt new sources of revenue:
 - Proceeds from General Obligation Bonds
 - Creation of Local Improvement Districts
 - Reciprocal impact fees with adjacent jurisdictions
 - Business license fee per employee
 - The city can explore the feasibility and likely revenue amounts from these or other sources as the plan is implemented over the next several years.
- Lower the level of service standard, and therefore reduce the need for some transportation improvements.

Note that the City could also weigh changing the land use element to reduce the amount of development planned (and thus reduce the need for additional public facilities). However, overflow from congested freeways would be likely to congest City arterials regardless.

Transit Funding

Operating funding for transit services primarily comes from local (regional) sales tax revenues, farebox revenues and in the case of Sound Transit, a Motor Vehicle Excise Tax. Capital funding primarily comes from federal grants. Metro bus service is allocated to three subareas of King County, the East, South, and West (Seattle/north suburban) subareas. The West subarea has 63 percent of the bus service. Due to the 2008 recession, Metro modified criteria for allocating transit service, and Federal Way had somewhat less service cuts than many cities in the South subarea. The current economic recovery allowed King County to stave off further planned service reductions, and is developing a Long Range Plan to build support for a new revenue package.

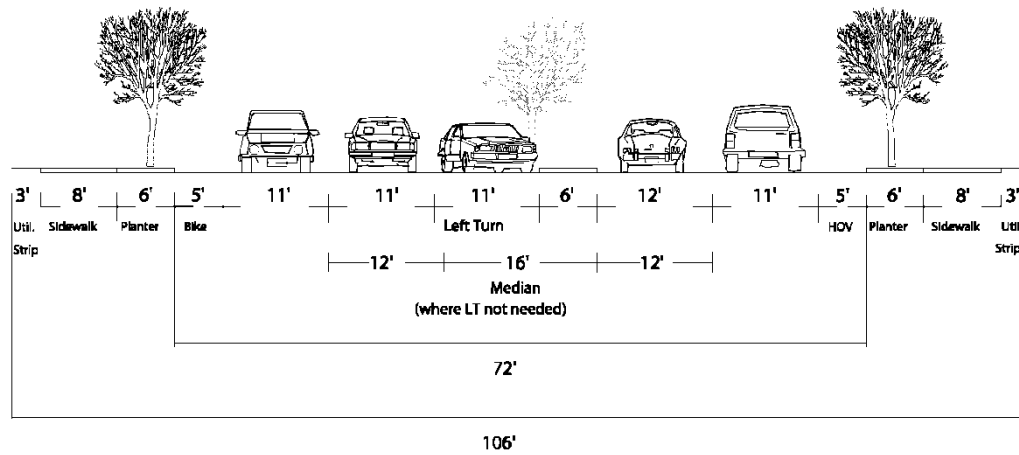
APPENDIX III-A: Street Design Guidelines



Roadway Cross Section A & B

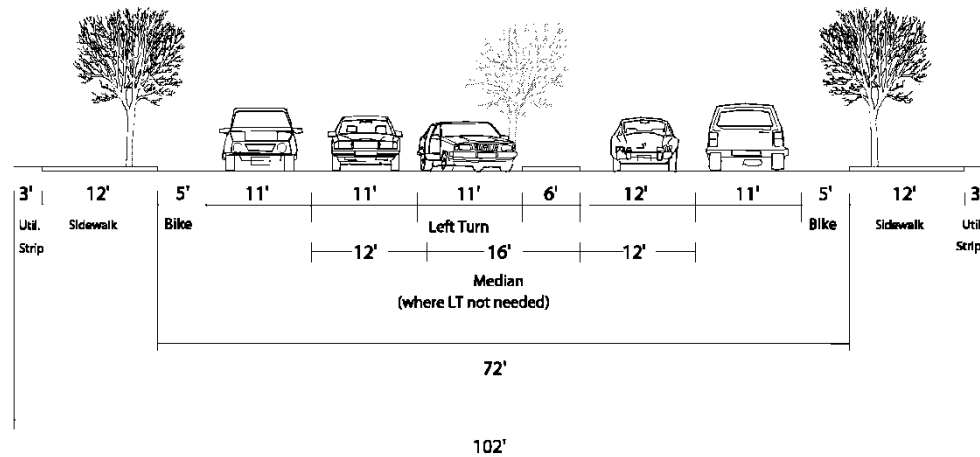


FIG. III-3 (a-b)



Cross Section C

4 Lanes + Bike
+ Median



Cross Section D

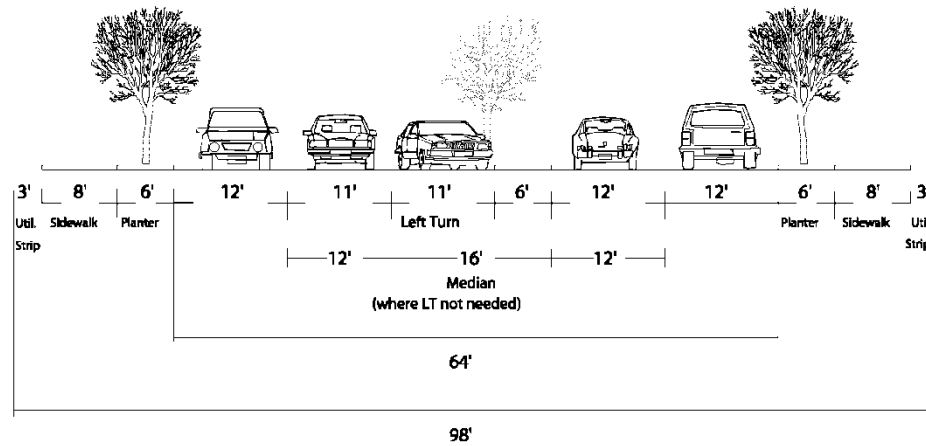
4 Lanes + Bike
+ Median

In City Center

Roadway Cross Section C & D

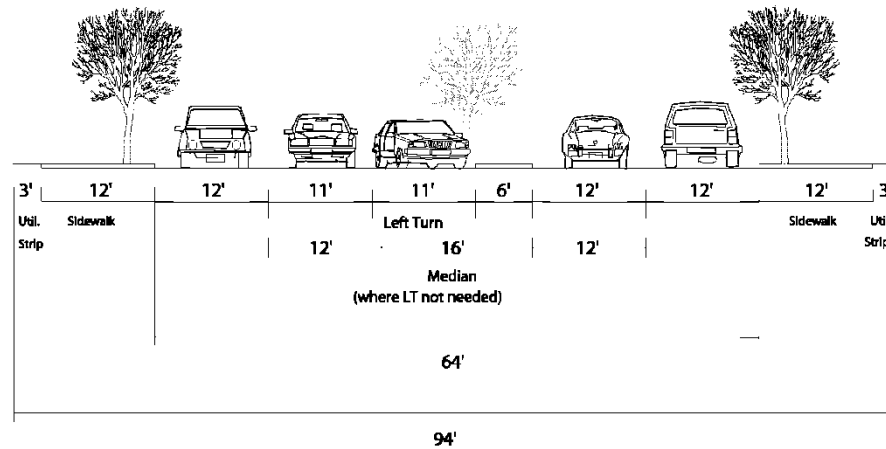


FIG. III-3 (c-d)



Cross Section E

4 Lanes + Median



Cross Section F

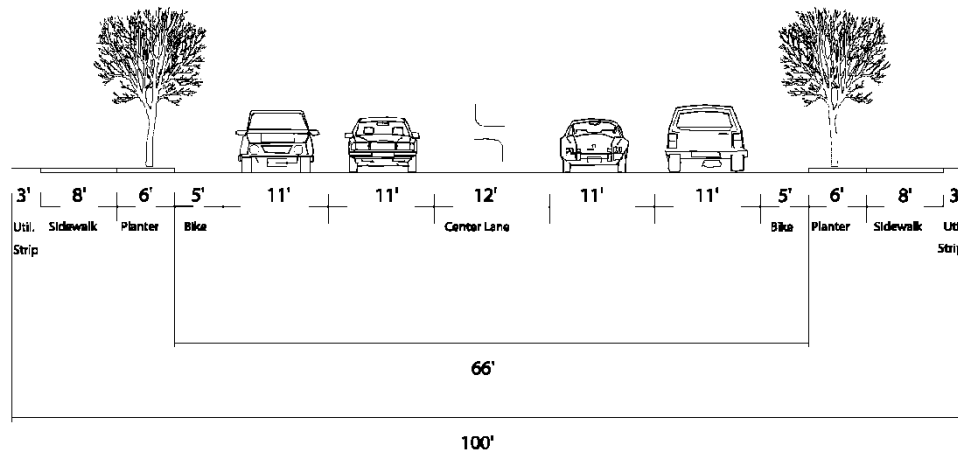
4 Lanes + Median

In City Center

Roadway Cross Section E & F

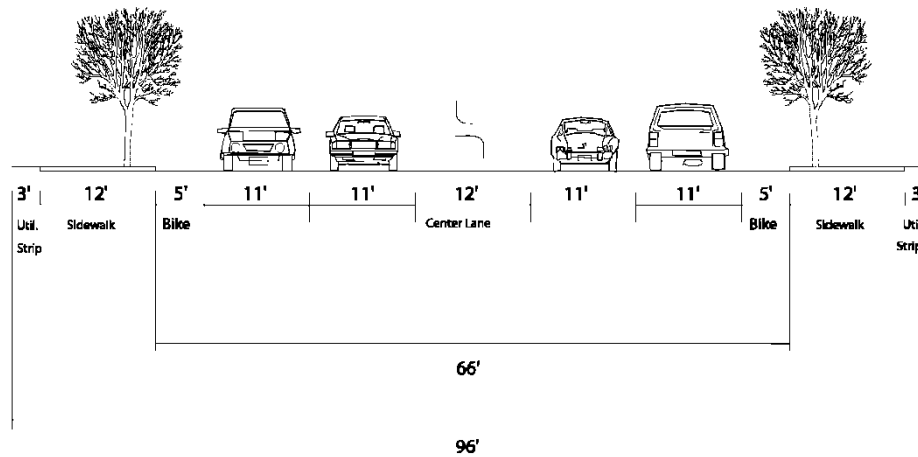


FIG. III-3 (e-f)



Cross Section G

5 Lanes + Bike



Cross Section H

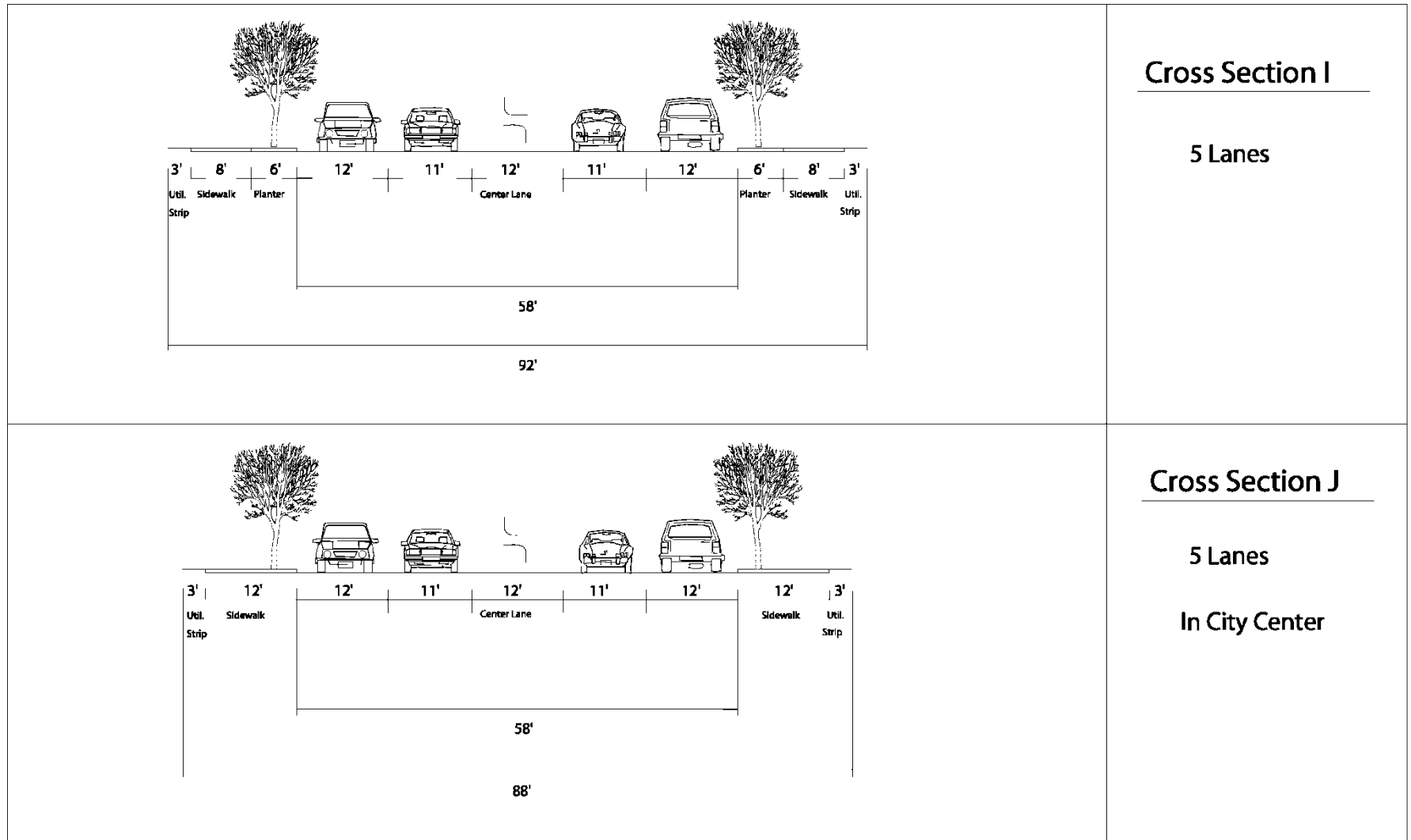
5 Lanes + Bike

In City Center

Roadway Cross Section G & H



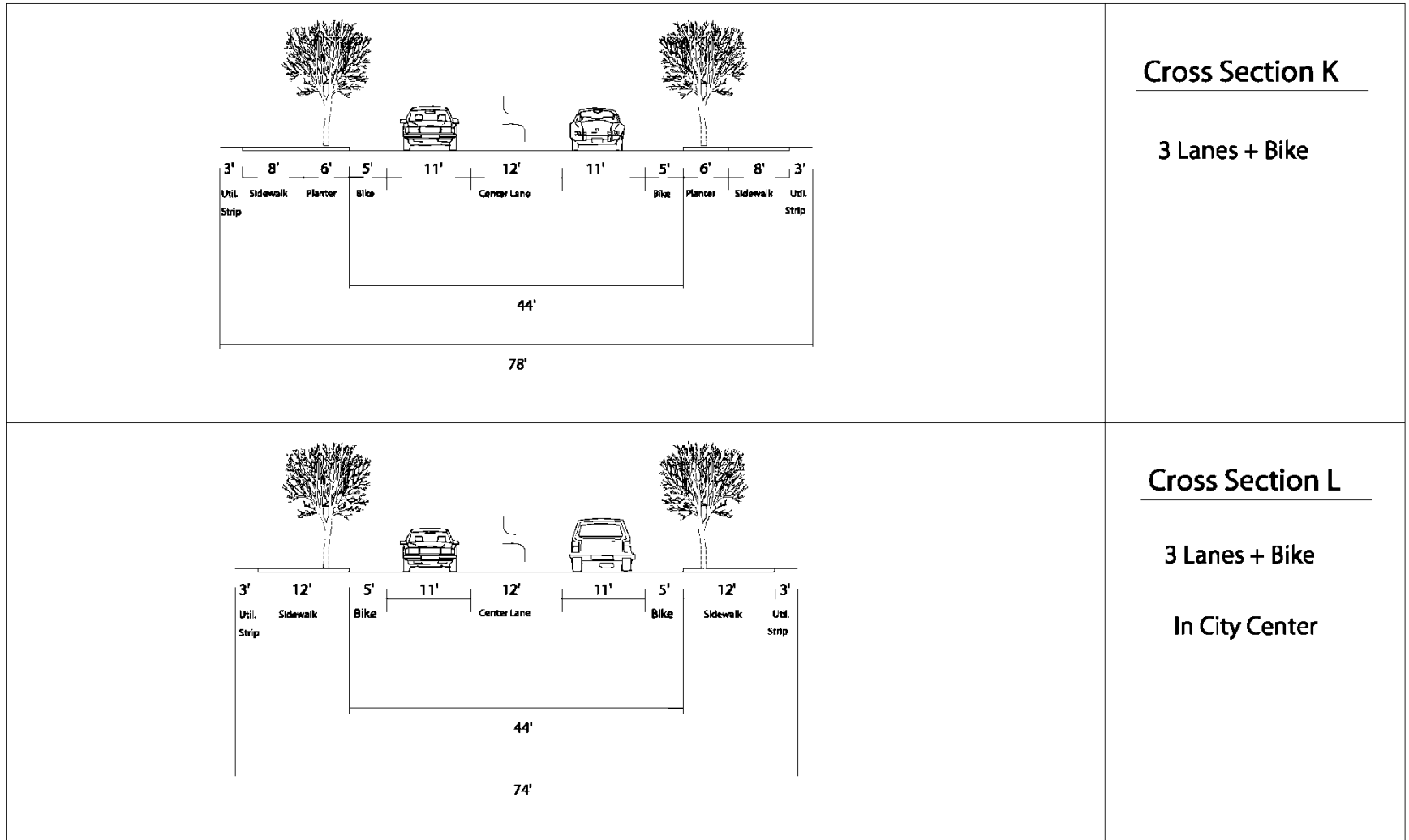
FIG. III-3 (g-h)



Roadway Cross Section I & J



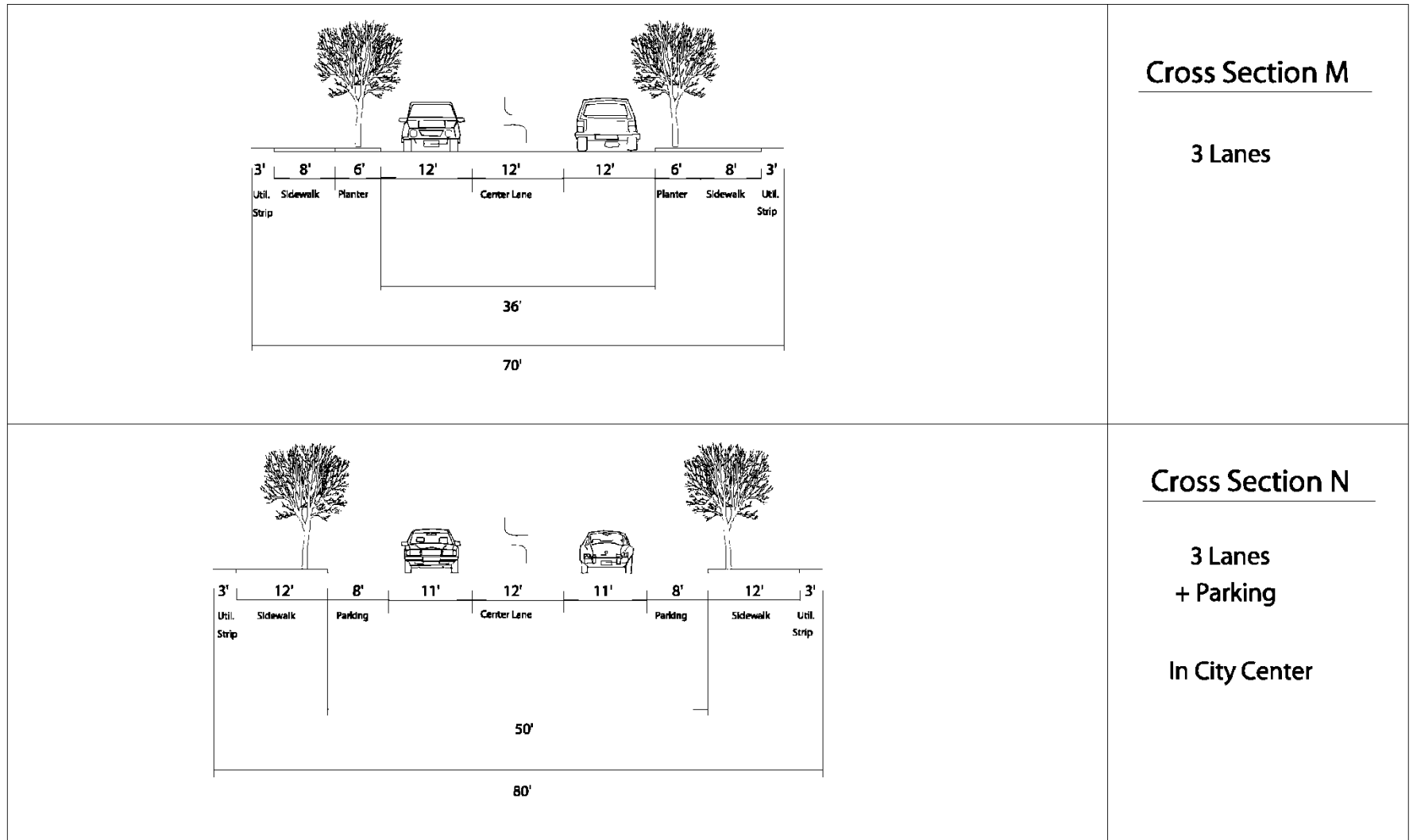
FIG. III-3 (i-j)



Roadway Cross Section K & L



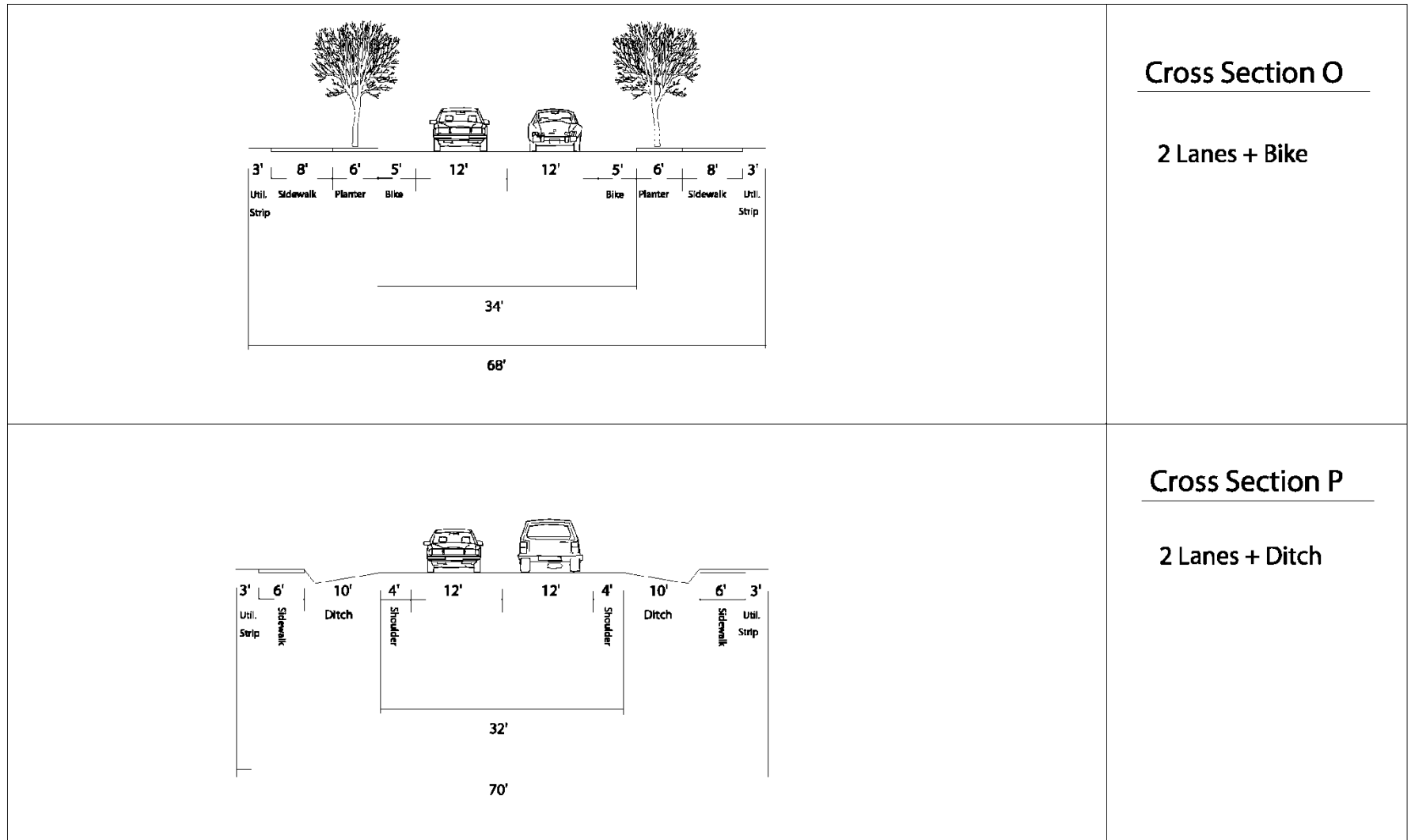
FIG. III-3 (k-l)



Roadway Cross Section M & N



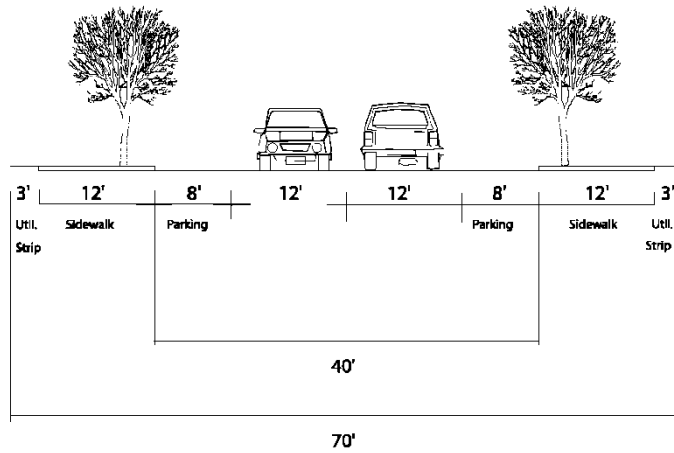
FIG. III-3 (m-n)



Roadway Cross Section O & P



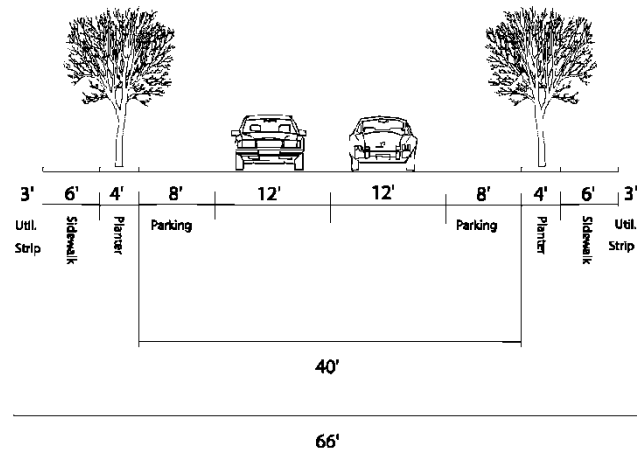
FIG. III-3 (o-p)



Cross Section Q

**2 Lanes
+ Parking**

In City Center



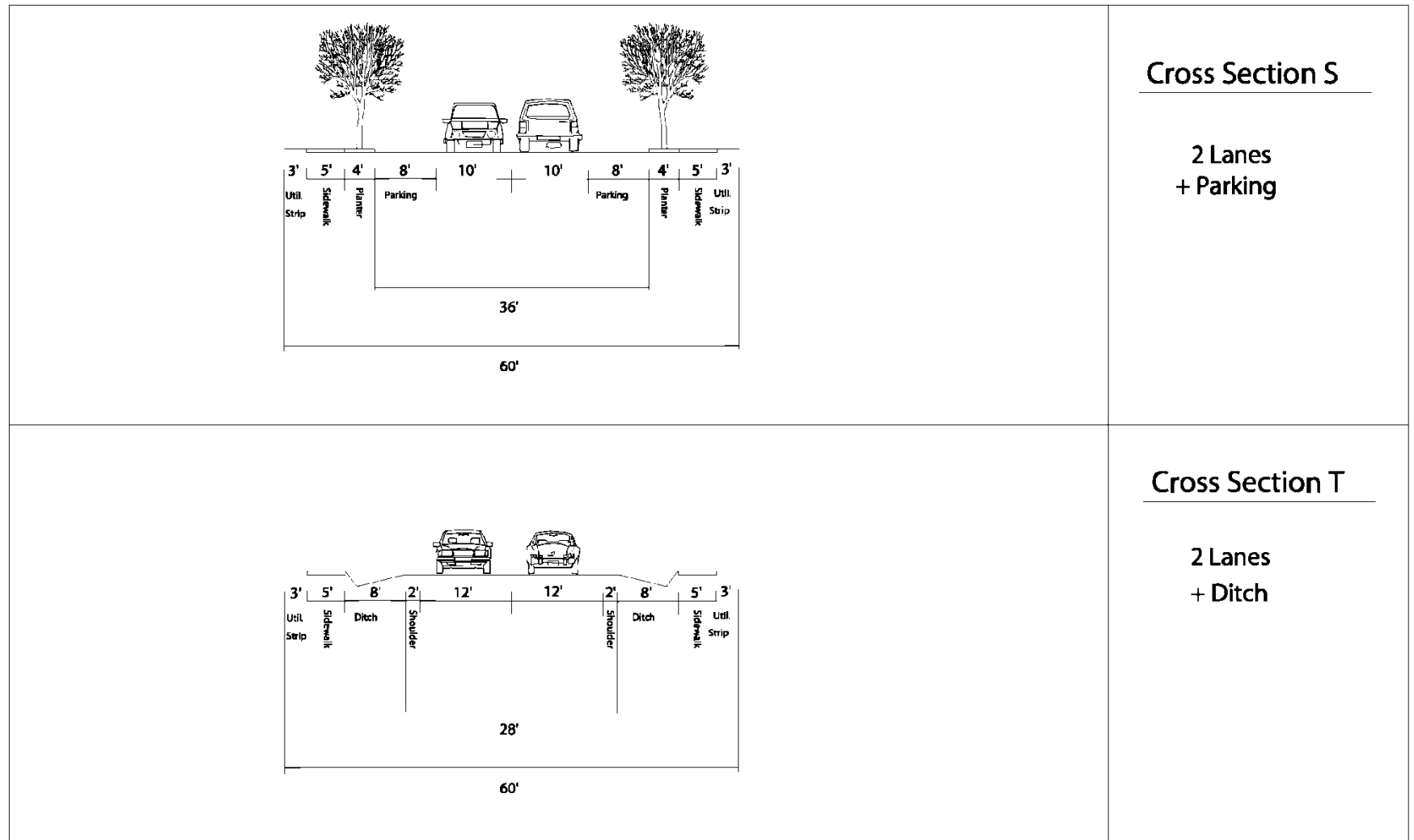
Cross Section R

**2 Lanes
+ Parking**

Roadway Cross Section Q & R



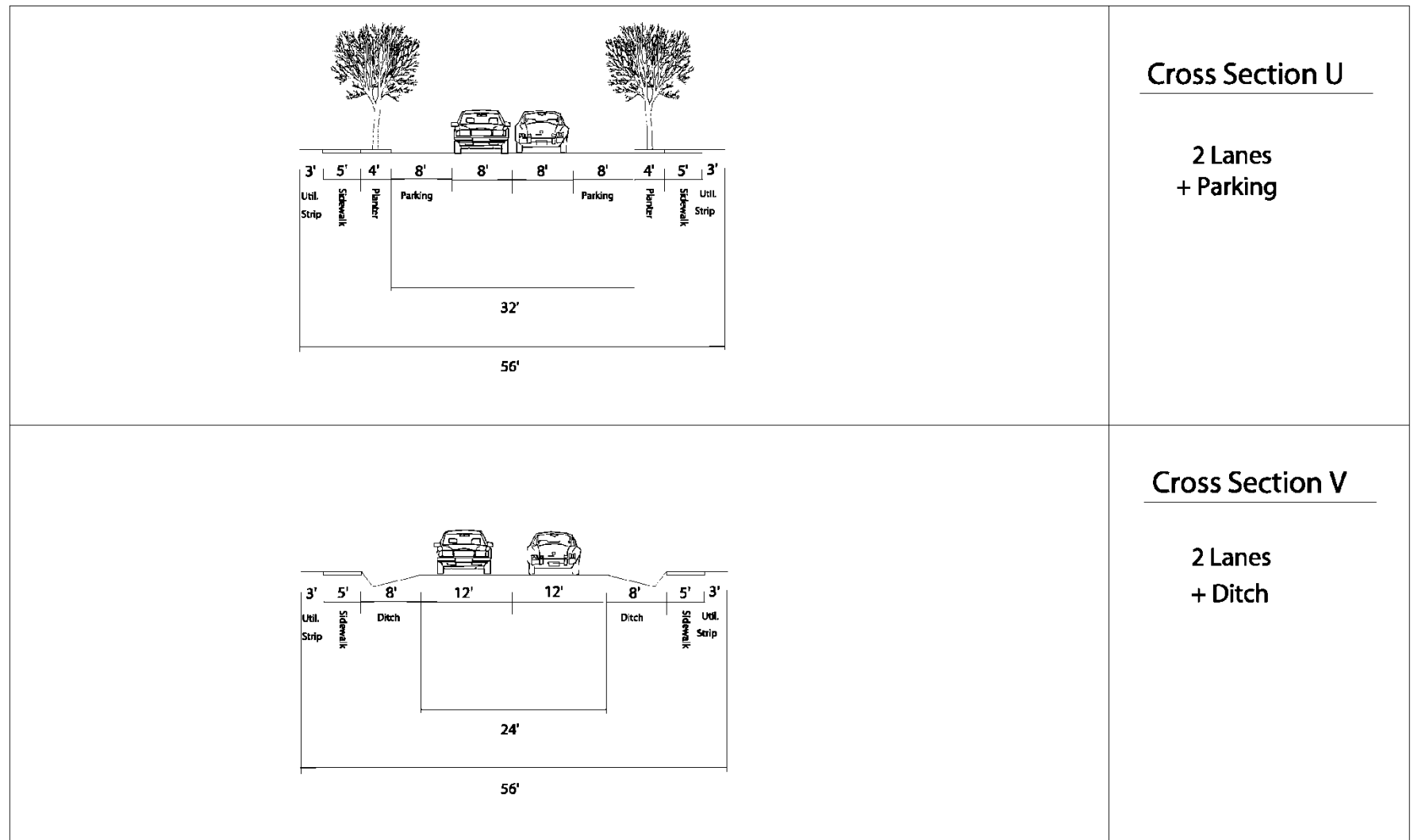
FIG. III-3 (q-r)



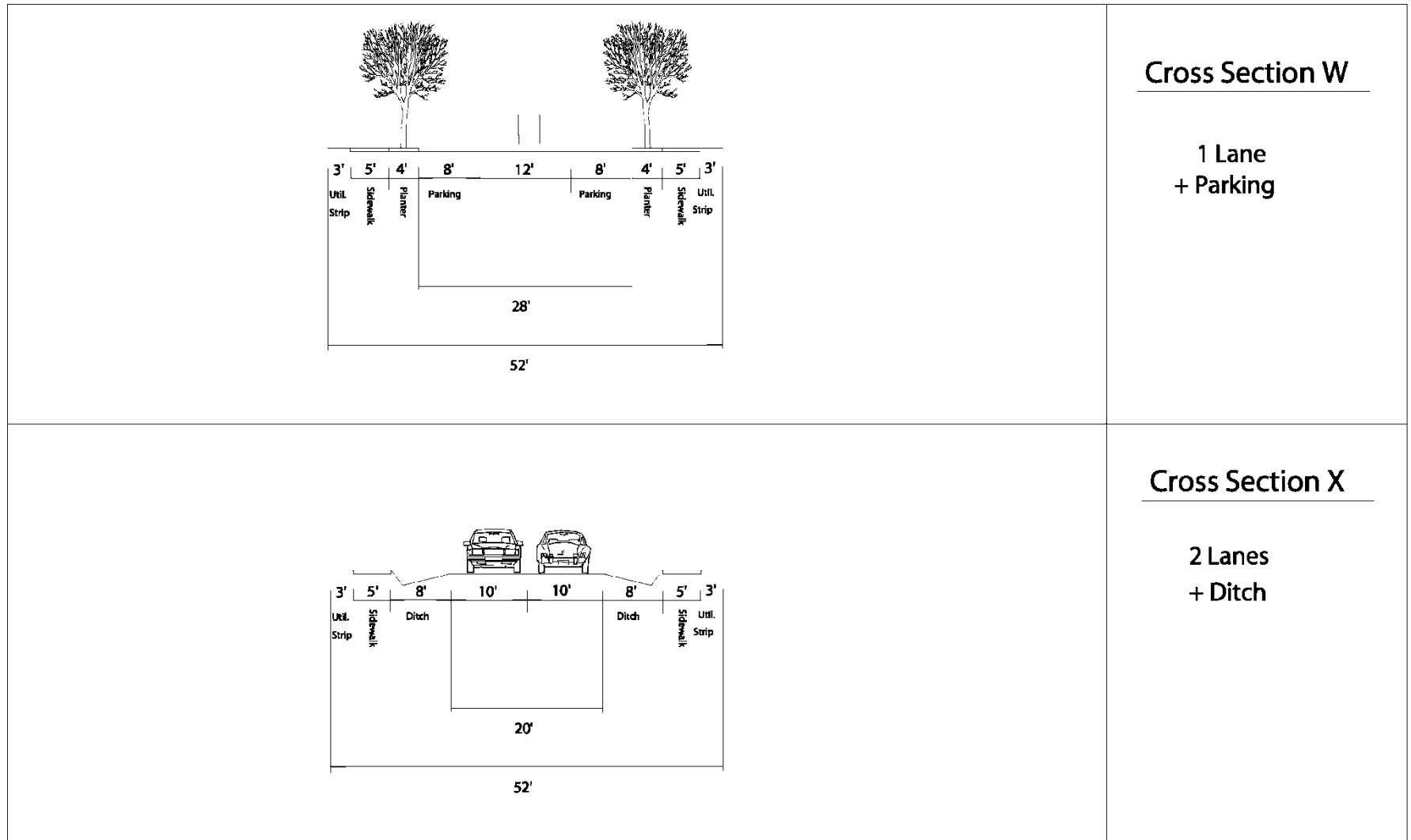
Roadway Cross Section S & T



FIG. III-3 (s-t)



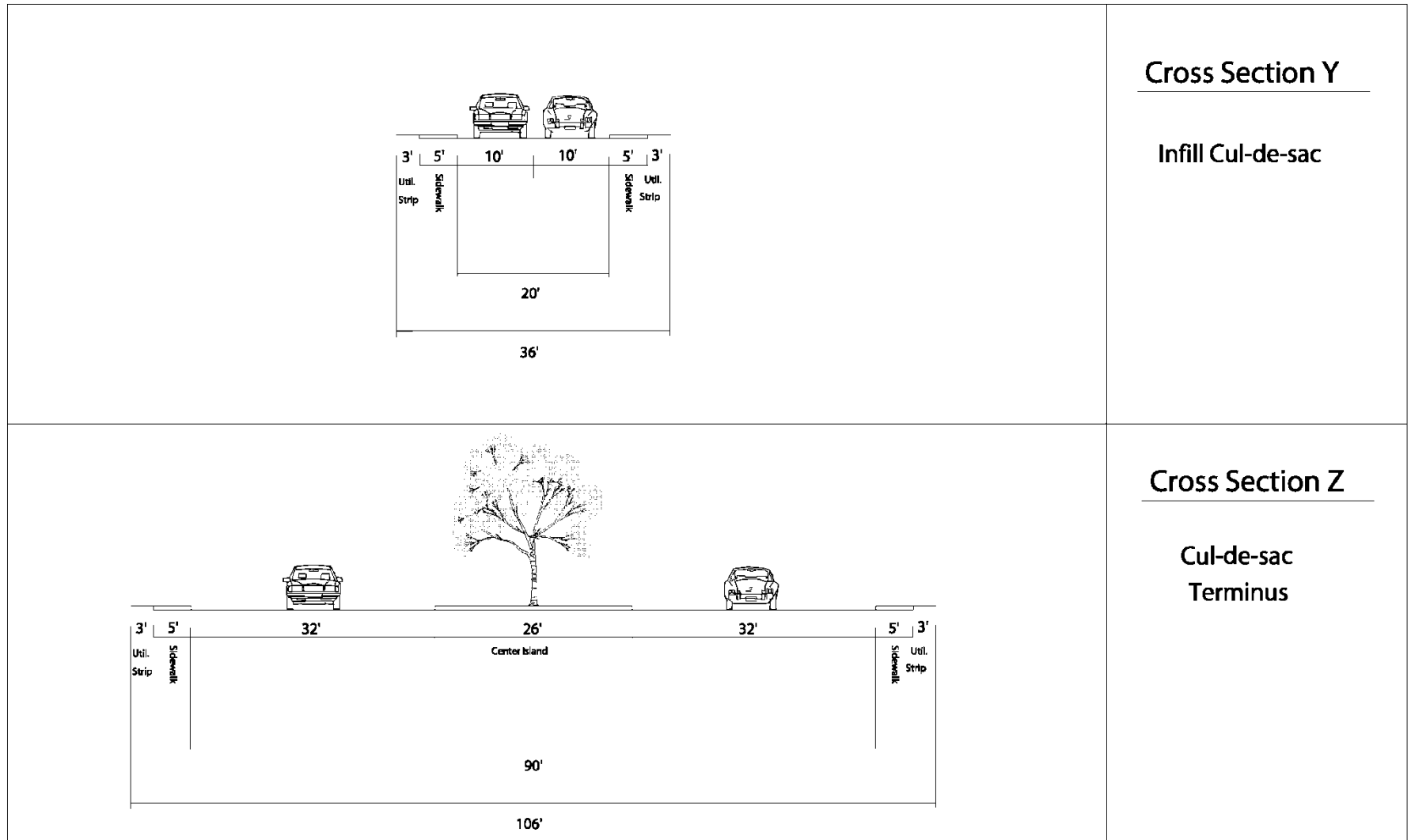
Roadway Cross Section U & V



Roadway Cross Section W & X



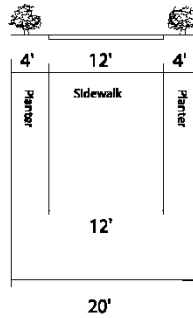
FIG. III-3 (w-x)



Roadway Cross Section Y & Z



FIG. III-3 (y-z)



Path Section

**Non-Motorized
Path**

Special Cross Sections



FIG. III-4

APPENDIX III-B: Transportation System Management Review Summaries

This Appendix includes a summary of Intelligent Traveler Systems (ITS) applications and an evaluation of transportation demand management strategies in Federal Way.

Table B-1 provides a summary of the main categories of ITS application, their relative applicability in Federal Way, and the degree of impact each might have on the City's vision and plan.

Table B-1. Intelligent Traveler Systems (ITS) Applications in Federal Way

ITS CATEGORY	EXAMPLE APPLICATION AREA	DEGREE OF CITY CONTROL	IMPACT TO VISION
Public Transit	Monitoring of Transit Operations	→	→
	Automatic Fare Payment	↘	→
	Dynamic Ridesharing	→	→
	✓ HOV Lanes & Parking	↗	↗
	✓ HOV-Signal Priority	↗	↗
	HOV-Automated Highways	→	→
	✓ Employer-Based TDM Initiatives	→	↗
	Vehicle Guidance & Control	↘	→
	Road Use Pricing	→	→
	Ferry Management	N/A	N/A
Traveler Information	Traveler Information Databases	→	↗
	Trip Planning (Pre-trip)	↘	↗
	Trip Guidance En Route	↘	→
	Vehicle Monitoring & Warning Systems	↘	↘
Traffic Management	Incident Detection & Management	→	→
	✓ Traffic Network Monitoring	↗	↗
	Communication Systems	→	→
	✓ Traffic Control Systems	↗	↗
	Construction Management	→	→
Freight & Fleet Management	Route Planning & Scheduling	↘	→
	Vehicle & Cargo Monitoring	↘	↘
	Regulatory Support	↗	→
	Internodal Port Transfers	N/A	N/A
Other Services	Emergency Service System Mgt.	↗	→
	Enforcement Services	↗	→
	Traveler Safety/Security	→	→
	Air Quality Monitoring & Pricing	↘	→

↗ - High/Positive

→ - Somewhat/Possibly

↘ - Low/Questionable

✓ - Pursue

Table B-2 provides a summary of the analysis of the various TDM alternatives by their functional grouping and potential effectiveness, implementation difficulties, and expected cost effectiveness. Fortunately, several of the more effective options are within the purview of the City. While many of these TDM strategies will need to be implemented and managed by the private sector, Federal Way can provide the infrastructure needed to support such strategies, such as transit and HOV lanes and expanded bicycle and pedestrian networks.

Table B-2: Evaluation of TDM Strategies

Evaluation Criteria for Transportation Demand Management (TDM) Strategies	Potential Effectiveness	Implementation Difficulties	Incremental Cost	Who Pays			
				Taxpayers	Users	Employers	Municipality
PUBLIC MODE SUPPORT MEASURES							
Public Education and Promotion	Increases the effectiveness of other strategies up to 3%	None	Low-medium	✓		✓	✓
Area-wide Ride matching Services	0.1-3.6% VMT reduction	None	Low			✓	✓
Transit Services	Up to 2.5% VMT reduction	Ongoing competition for public funds	Medium-high	✓	✓	✓	
Vanpool Service	Up to 8.3% commute VMT reduction	High fares compared to transit; finding riders & drivers	Medium		✓	✓	
Transit and Vanpool Fares	Up to 2.5% regional VMT reduction	Competition for public funds; equity concerns	Medium	✓	✓	✓	
Non-Motorized Modes	0-2% regional VMT reduction	Minimal for low cost actions; great for high cost actions	Low-high	✓	✓	✓	
HOV Facilities	Up to 1.5% VMT reduction & .2% trip reduction	High cost; public acceptance	Medium-high	✓			
Park and Ride Lots	0-0.5% VMT reduction	None	Medium-high	✓			
EMPLOYER BASED TDM MEASURES							
Monetary Incentives	8-18% trip reduction at site	Tax implications for some subsidies	Low-medium			✓	
Alternative Work Schedules	As much as a 1% regional VMT reduction	Employee or management reluctance	Low			✓	
Commute Support Programs	0.1-2.0% regional VMT reduction	None	Low			✓	
Guaranteed Ride Home	Unknown	Liability concerns of employers	Low		✓	✓	

Evaluation Criteria for Transportation Demand Management (TDM) Strategies	Potential Effectiveness	Implementation Difficulties	Incremental Cost	Who Pays			
				Taxpayers	Users	Employers	Municipality
Parking Management	20-30% site reduction in SOV trips	Employee opposition	Low to revenue producing		✓	✓	
Facility Amenities	Minimal alone	Space; local zoning requirements	Low to revenue producing			✓	
Transportation Management Associations	6-7% commute trip reduction*	Funding and political support required	Low-medium			✓	✓
*These results are from pre CTR experiences. A broader range of effectiveness would be expected in the presence of CTR legislation.							
PRICING STRATEGIES							
Gasoline Tax Increases	4-10% regional VMT reduction	Public resistance; legislative action; travel alternatives required	Revenue producing		✓		
VMT Tax	0.1-11% regional VMT reduction	Public resistance; legislative action; travel alternatives required	Revenue producing		✓		
Congestion Pricing	Up to 5% regional VMT reduction	Public and political resistance; travel alternatives required; technical and enforcement difficulties	Revenue producing		✓		
Parking Tax	1-5% regional VMT and trip reduction	Legislative action; negative public sentiment; opposition from private sector	Revenue producing		✓	✓	
TELECOMMUNICATIONS STRATEGIES							
Telecommuting	Up to 10% commute VMT reduction	Prevailing corporate culture	Low			✓	
Advanced Telecommunications	Moderate to high	Untested, unproven concepts	Low-high	✓	✓		
LAND USE STRATEGIES							
Development Impact Mitigation	Varies with mitigation requirements	Landowner and developer resistance	Low to medium		✓	✓	
Mixed Land Use/Jobs Housing Balance	VMT reductions up to 10%	Public resistance; slow rate of effective change	Low to medium	✓	✓		✓
Transit-Oriented and Pedestrian Friendly Design	Increase in transit, bike, and pedestrian trips	Requires design review; developer resistance	Medium to high	✓		✓	✓

Evaluation Criteria for Transportation Demand Management (TDM) Strategies	Potential Effectiveness	Implementation Difficulties	Incremental Cost	Who Pays			
				Taxpayers	Users	Employers	Municipality
Residential Density Increases	VMT reductions of up to 10% per household	Public and developer resistance to required densities	Medium to high	✓			
Employment Center Density Increases	SOV work trip reductions of up to 50%	Large increase in density often required to realize significant change	Medium to high	✓		✓	
Parking Management	1 to 5% region-wide VMT reduction	Local council action required; public/retailer resistance; enforcement issues	Low		✓	✓	
On-Site Amenities	Unknown; probably reflects effectiveness of mixed use development	Requires policy changes, public, and private inertia are barriers	Low to medium	✓			
POLICY & REGULATORY STRATEGIES							
Trip Reduction Ordinances	.1 - 4% regional VMT reduction	Legislative action required; resistance to expanded regulation	Low-medium	✓		✓	✓
Restrict Access to Facilities and Activity Centers	2.8-10% VMT reduction	Political will to face public opposition	Low to high	✓			
Support New Institutional Arrangements	Unknown	Require strong advocacy, public, & private support	Low to high	✓			
Increase HOV lanes to 3+	Possible 1.5% reduction	Legislative action needed; public resistance	Low	✓			
Parking Restrictions	1-5% trip reduction	Public, developer resistance	Low			✓	

APPENDIX III-C: CONCURRENCY MANAGEMENT SYSTEM

CONCURRENCY MANAGEMENT SYSTEM

The transportation chapter of the GMA (RCW 36.70A) requires each city and county planning under GMA requirements to incorporate a Concurrency Management System (CMS) into their comprehensive plan. A CMS is a policy to determine whether adequate public facilities are available to serve new developments. In this manner, concurrency balances the transportation investment program with land use changes envisioned by the City over the next several years.

Level of Service (LOS) Standards

Level of Service (LOS) on a street or roadway is a qualitative description of traffic flow conditions during a specific time period. This measure considers travel conditions as perceived by motorists and passengers in terms of travel speed, travel time, freedom to maneuver, traffic interruptions, delays, comfort, and convenience. Levels of service have traditionally been given letter designations from A through F, with LOS A representing ideal operating conditions, and LOS F representing “forced flow” conditions beyond capacity.

Level of service is used by the City of Federal Way for two primary purposes: (1) to calculate the amount of transportation facilities the City needs in the future, and (2) to measure the adequacy of the public services which serve existing and proposed development. The two uses of LOS utilize the same basic standards and methodology, such that consistency is maintained.

LOS Standard – The City’s goal is to maintain or improve upon a PM peak hour roadway LOS so that it is at least within capacity. However, as regional facilities become increasingly congested due to growth, capacity improvements on City streets would quickly become negated by traffic diverting from the freeway system. The plan expects some change in the present patterns of travel behavior through increased use of non-SOV modes, such as walking, bicycling, transit, carpooling, and vanpooling. The LOS standard should reflect the impact of increased non-SOV modes of transportation.

LOS Methodology – Within urbanized areas, most of the roadway congestion occurs at signalized intersections. However, it is not always practical to measure traffic flows at every intersection, and this type of detailed analysis does not provide a full perspective on how well the overall roadway network is performing. Due to the complex nature of traffic flows and the ability of motorists to take alternative routes for similar trips, the City of Federal Way has selected a LOS methodology that is an expansion of the traditional LOS measurements presented in the Highway Capacity Manual. The City uses the following two criteria for measuring LOS.

Volume/Capacity (V/C) Ratio – The volume/capacity (v/c) ratio directly compares the volume on a roadway segment or intersections with the capacity of that facility to

carry traffic volumes. The ratio, expressed in a range as shown in Table C-1, can be used as a planning level LOS indicator.

Table C-1. Planning and Operational Levels of Service

Analysis Procedure	A	B	C	D	E	F
Planning ¹ (v/c)	0.00 - 0.60	0.61 - 0.70	0.71 - 0.80	0.81 - 0.90	0.91 - 1.00	>1.00
Operational ² Delay (sec)	0.00 - 10.00	10.00 - 20.00	20.00 - 40.00	40.00 - 60.00	60.00 - 80.00	>80.00

¹Transportation Research Circular 212, Interim Materials on Highway Capacity. ²Highway Capacity Manual (2000).

The capacity of the roadway segment reflects the condition of the road (e.g. width of lanes, amount of driveway disturbances, whether there exists a left turning lane, etc.) and the type of traffic control along its length (e.g. frequent traffic signals reduce capacity). In an operational analysis, the level of service standard for planning purposes will be a v/c of 1.00 for unsignalized intersections, 1.20 for signalized intersections, and an average of 1.10 for the City Center area, with a LOS of E, using a 120-second cycle at signalized intersections. In order to reflect an emphasis on non-SOV modes, LOS will be measured by average delay per person rather than the Highway Capacity Manual's average delay per vehicle. The City chooses this methodology to determine development impacts and mitigations.

Legislative Requirement

The transportation element section of the Washington State GMA reads: “Local jurisdictions must adopt and enforce ordinances which prohibit development approval if the development causes the level of service on a transportation facility to decline below standards adopted in the transportation element of the comprehensive plan, unless transportation improvements or strategies to accommodate the impacts of development are made concurrent with development (RCW 36.70A.070).”

The phrase “concurrent with development” means that public infrastructure improvements and strategies required to service land development be in place, or financially planned for, within six years of development. In Washington State, the transportation CMS's must include all arterials and transit routes; but may include other transportation services and facilities.

Highways of Statewide Significance (HSS) are exempt from concurrency requirements, but local agencies are required to identify their comprehensive plan's impacts on the HSS network. In Federal Way, the HSS network consists of I-5 and SR 18 east of I-5. These impacts are quantified in Table C-2:

Table C-2. Impacts to Highways of Statewide Significance – 2000 to 2020

Highway Segment	I-5 North of South 272 nd Street	I-5 North of South 320 th Street	I-5 North of SR 18	I-5 South of SR 18	SR 18 East of I-5
Increase in Hourly Volumes	459	476	357	137	750

However, it should also be recognized that City streets act as an overflow conduit for the HSS network due to the failure of the state to provide adequate capacity on the HSS network. A sample of these impacts is quantified in Table C-3.

Table C-3. Impacts to City Streets From State's Failure to Provide Adequate Capacity on Highways of Statewide Significance in 2020

Roadway Segment	SR 99 North City Limits	SR 99 North of South 320 th Street	SR 99 South of South 324 th Street	SR 99 South City Limits	SR 161 South City Limits
Increase in Hourly Volumes	1020	391	431	1252	323

A comparison of these tables indicates that the City's streets generally would be more impacted by regional traffic than the planned growth would impact the HSS network.

Concurrency Management

The application of concurrency for transportation assures that improvements and programs for accommodating planned growth are provided as development permits are issued. The concurrency strategy balances three primary factors: available financial resources, acceptable transportation system performance conditions, and the community's long-range vision for land use and transportation. The City has identified probable financial capabilities, anticipated system performance conditions (level-of-service), and has proposed a roster of transportation investments and programs that implement the FWCP.

The FWCP presents an allocation of estimated available transportation resources matched to planned improvements, which are scheduled over the planning period. With the general estimates of costs, revenues, and timing for construction, as required by the GMA, the plan predicts the acceptance of development permits that are consistent with its policies.

The GMA requires that a contingency plan be outlined in case the City should fail to obtain the resources anticipated to make the necessary transportation improvements to maintain the adopted LOS standards. This analysis is sometimes

termed “plan-level concurrency.” Strategies for maintaining or rectifying adopted LOS standards in the event of a budget shortfall include the following:

- Increase the level of funding commitments in subsequent years;
- Review and adjust the City’s overall land use vision to lower the overall transportation demand;
- Reprioritize improvements to address system capacity needs as the highest priority; and
- Modify (i.e., lower) the LOS standard to match available resources.

Regular updating of the FWCP and Transportation chapter will afford opportunities for the City to modify the LOS standard or to secure other funding sources necessary to implement the capital improvements needed to maintain the adopted level of service standard.

Concurrency Testing

State law requires that a concurrency “test” be applied to all development proposals as a condition of granting a development permit. A concurrency test compares a proposed development’s need for public facilities and services to the “capacity” of the facilities and services that are available to meet demand. Other questions that need to be addressed are at what point in the development process does concurrency apply, what types of development permits are subject to the concurrency test, and should fees be charged for concurrency testing to cover staff and administrative costs associated with the testing.

Federal Way’s approach is to implement transportation improvements and programs that it can afford to finance. These improvements and programs are based upon the FWCP, which includes a level-of-service standard for the transportation system. The primary purpose of the Concurrency Management Program is to allocate available resources based on the timing and location of development, and to assess mitigation fees based upon each new development’s share of the improvements that are planned in the subarea within which it is located. Level-of-Service measures the outcome of and progress toward the planned growth rate.

Concurrency Management and SEPA

While concurrency requirements are similar in many ways to the requirements of the State Environmental Protection Act (SEPA), there are some important differences, as follows:

- Concurrency requirements are more demanding; if they are not met, denial of the project is mandated.
- Concurrency is based on a Level-of Service (LOS) standard; SEPA has no specific standard as its basis.

- Concurrency requirements only apply to capacity issues; SEPA requirements apply to all environmental impacts of a project, including transportation safety.
- Concurrency has timing rights related to development; SEPA does not.

Therefore, concurrency does not replace SEPA, but rather becomes an integral part of a comprehensive program that relates private and public commitments to improving the entire transportation system. SEPA will focus primarily on site impacts that could result in additional transportation requirements in specific instances (particularly access to the site or impacts in the immediate vicinity that could not have been anticipated in the overall transportation investment strategy for the system). Concurrency conclusions in the FWCP do not excuse projects from SEPA review. However, they do address major system infrastructure issues that must be properly administered under both SEPA and the GMA.

APPENDIX III-D: ITS MASTER PLAN

**CITY OF FEDERAL WAY
INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
Master Plan**



City of Federal Way

**INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
MASTER PLAN**

**DRAFT REPORT
May 15, 2015**

**CITY OF FEDERAL WAY
INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
Master Plan**

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**CITY OF FEDERAL WAY
INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
Master Plan**

1. INTRODUCTION

Intelligent Transportation Systems (ITS) are defined as the application of technology to address transportation problems such as congestion, safety, and mobility. In the Puget Sound Region, substantial investments in ITS have been made by cities and counties and the Washington State Department of Transportation (WSDOT). The City of Federal Way has an ever-expanding communication network with plans to create a robust Traffic Management Center (TMC) and a secondary Satellite Management Center. This document provides a plan to complete gaps in the communication network, install traffic monitoring capabilities, increase staff resources, and increase collaboration with the following entities:

- WSDOT
- King County
- Transit Agencies (King County Metro Transit, Pierce Transit, Sound Transit)
- Adjacent Cities
- Valley Communications ("ValleyCom")
- Participants of the City of Federal Way Emergency Operations Center (EOC)

As the ITS program grows to include more technology and extended interagency coordination, the Traffic Division that oversees and operates these projects will periodically update the ITS Master Plan and evaluate changing needs and technology. This plan documents current needs and provides a strategic plan for completing proposed ITS projects and programs.

1.1 PLAN OVERVIEW

This ITS Master Plan is organized into the following chapters:

- **The Current Transportation Environment:** This chapter discusses the current transportation environment in Federal Way includes the roles and responsibilities of various groups that are involved with operating and maintaining the transportation systems and roads as well as other agencies that are considered stakeholders for the development of the Federal Way ITS program.
- **Review of Plans and Anticipated Regional Projects:** Existing reports and plans were reviewed to gain an understanding of transportation issues and planned projects in Federal Way. These documents include the Transportation Element of the Comprehensive Plan, the 2015 - 2020 six-year Transportation Improvement Plan (TIP), the 20-year Capital Improvement Plan, and Vision 2040 issued by the Puget Sound Regional Council.
- **ITS Existing Conditions and Needs Assessment:** This chapter provides overview of the systems in place today and an identification of implantation needs for problem locations (corridors, intersections, etc.) that may have applicable ITS solutions.
- **Concept of Operations:** The concept of operations establishes the roles and responsibilities between organizations, and the level of information sharing among those organizations.
- **ITS Master Plan Projects List:** This chapter provides a project list based upon identified needs and the Concept of Operations.

2. CURRENT TRANSPORTATION ENVIRONMENT

With a 2014 population of 90,150, Federal Way is the fifth largest city in King County and the eleventh largest in the State of Washington¹. The city limits encompass 22.5 square miles with 292 centerline miles of paved streets. Interstate (I) - 5 bisects the city running north and south, State Route (SR) 99 runs parallel to I-5. State Route 509 connects southwest Pierce County with SR 99 in the northern portion of Federal Way. SR 161 and SR 18 also service Federal Way connections to north, south, east, and west of the city.

The area employs 29,200 jobs with the major employers being the City of Federal Way, Weyerhaeuser, and St Francis Medical Center. Origin-destination studies show the major arterials as access to I-5 for work based trips as well as carrying through-traffic from north and south of Federal Way commutes. The City has completed major investments into the roadway network and park & rides, which includes widening and adding five core lane miles of HOV lanes on SR 99 and additional HOV lane miles on S 348th Street (access to SR 18). Construction of the Sound Transit Station was completed in 2006 with direct access to I-5.

2.1 ITS PROGRAM STAKEHOLDERS

Within the City, the Traffic Division of Public Works conducts planning, design, operations, and maintenance of the existing traffic signal interconnect system. Those functions shall remain the same for the future ITS system in Federal Way. The division regularly coordinates with other City and non-City agencies. The following are considered key stakeholders for both the existing and future programs.

- **WSDOT Northwest Region:** WSDOT is responsible for the operation and maintenance of I-5 while Federal Way maintains and operates the other state routes within the city. WSDOT's Northwest Region operates a Traffic Systems Management Center (TSMC) located in Shoreline. WSDOT monitors roadway conditions via their many traffic cameras. The TSMC monitors, detects and responds to traffic incidents and shares information with the Washington State Patrol (WSP) via a direct link to WSP's Computer Aided Dispatch (CAD) system. WSDOT also posts real-time traveler information messages to the WSDOT web site and statewide 511 systems. The 511 system is a telephone traveler information system that provides customized road reports and other information based upon a traveler's location. Currently WSDOT allows Federal Way to access video images from the City TMC. Today WSDOT has fiber optic systems along S 320th Street, SR 161, and SR 99 entering the City of Kent. Federal Way's planned program connects to these extension areas.
- **King County Road Services:** King County Road Services division has an active ITS program with an ACTRA centralized signal control system. King County has a Traffic Control Center (TCC) in downtown Seattle, and has a multi-phase ITS Strategic Plan.
- **City of Auburn:** Federal Way shares its boundaries with Potential Annexation Areas (PAA) of King County bordering Auburn's recently annexed areas. Auburn operates and maintains a TMC. Federal Way's concept master plan would connect to this system.
- **City of Kent:** The City of Kent shares a north boundary with Federal Way. There is a planned Kent ITS network connection along S 272nd Street to connect to ValleyCom Dispatch and Auburn's TMC. ValleyCom Dispatch is the regional 911 communications dispatch center.
- **King County Transit Speed and Reliability:** King County Metro's Speed and Reliability Division works with local jurisdictions to deploy Transit Signal Priority. TSP is currently being deployed within

¹ Source: Office of Financial Management's (OFM) April 1, 2014 population estimate.

**CITY OF FEDERAL WAY
INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
Master Plan**

Federal Way on the main transit corridors of SR 99 and S 320th Street. As part of the implementation on Metro's A-Line, Metro installed fiber-optic network on SR99 between Federal Way and Tukwila, with shared operations and responsibility between Metro, WSDOT, and the cities on the route.

- **Sound Transit and Pierce Transit:** Both transit agencies serve Park & Rides within Federal Way. Sound Transit provides regional transit connections to areas north and south of Federal Way and Pierce Transit provides service to and from the City of Tacoma area, south of Federal Way. Real-time traffic information will be provided at Park & Ride facilities to provide commuters and drivers valuable decision-making information.
- **Federal Way School District:** The Federal Way School District is headquartered next to the City Hall. The intent of this stakeholder partnership is to share data for transportation services and emergency management personnel, which dispatches to all of the schools within Federal Way.
- **Emergency Management:** The Federal Way Emergency Operations Center (EOC) is located at City Hall at Federal Way with a secondary command center at the South King Fire and Rescue station near 1st Ave S and S 320th Street. This ITS Plan includes a satellite TMC at the South King Fire and Rescue station. The Fire Department is dispatched via ValleyCom Dispatch located in Kent. The Fire Department responds to incidents across the city and along freeways from several fire stations. The City's arterials are the main routes used by the Fire Department, and Opticom emergency vehicle signal preemption is installed at the signalized intersections on these routes. Other operation members of the EOC are Lakehaven Utility District, Puget Sound Energy, and representatives from St. Francis Hospital.
- **Law Enforcement:** The Federal Way Police Department is located in the same building as Public Works and assists in staffing the EOC. The Federal Way Police Department operates the "Safe City" project, which includes 34 pan-tilt-zoom cameras located in the City Center of Federal Way. Integrating the "Safe City" video monitoring system with the TMC is an opportunity to leverage existing ITS resources to improve traffic management capabilities.

3. REVIEW OF PLANS AND ANTICIPATED REGIONAL PROJECTS

3.1 REVIEW OF PLANS

The ITS Master Plan is intended to integrate with other local and regional planning efforts.

- **Federal Way Comprehensive Plan - Transportation Element:** The goal of the Federal Way Transportation Element is to provide a balanced multi-modal transportation system that will support land use patterns and adequately serve existing and future residential and employment growth within the City. This Transportation Element of the Comprehensive Plan comprises a set of framework transportation policies to support Federal Way's land use Vision and a more detailed and technical plan for implantation of the framework policies. The Transportation Element coordinates transportation projects with other relevant projects in adjacent jurisdictions and the region. Concurrent with this ITS plan update, Federal Way has updated the Comprehensive Plan integrating new policy framework consistent with the Puget Sound Regional (PSRC) Vision 2040 document. The ITS Master Plan is intended to fold into the Transportation Element of the Comprehensive Plan.
- **6-Year Transportation Improvement Plan (TIP) 2016 - 2021:** The TIP is updated annually and is part of the overall Capital Improvement Program for the City. The TIP includes prioritized project descriptions and projected funding for transportation improvements. TIP projects are evaluated and programmed based on the following criteria:

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- Concurrency Requirement
- Level of Service Improvement
- Collision Rate Improvement
- Collision Severity Rate Improvement
- HOV Supportive
- Non-Motorized Supportive
- Community Support
- Air Quality
- Ease of Implementation
- Benefit/Cost Ratio

ITS projects do not have a dedicated funding source, so incorporating ITS elements into programmed TIP projects is an important strategy to expand the program capabilities. The 2016-2021 TIP includes construction of three new traffic signals but does not explicitly include ITS communication elements with the exception of implementing adaptive control systems.

• **Puget Sound Regional ITS Architecture:** The Puget Sound Regional ITS Architecture was updated in 2008 and provides a framework for ensuring institutional agreement and technical integration for the implementation of ITS projects or groups of projects. The Regional ITS is a federally mandated planning document that provides a framework for the integrated deployment of ITS within the Puget Sound Region. Since Federal Way is part of the Puget Sound Regional ITS Architecture, the City is not required to develop a separate regional architecture. However, as funding applications for new projects are developed, the City will need to self-certify that it has met the Federal requirements for ITS Architecture compliance.

• **PSRC Destination 2030 and Vision 2040:** The PSRC's Destination 2030 Transportation Improvement Plan carries several projects sponsored by Federal Way. The ITS Master Plan identifies projects that can be folded into the regional program. An example of the projects would be fiber network connections with CCTV sharing capabilities incorporated into existing projects, HOV Queue jump lanes, future Transit Signal Priority, Incidence Response Programs, and the TMC and Satellite TMC.

3.2 ANTICIPATED REGIONAL PROJECTS

WSDOT has planned several projects in the Federal Way area and the transportation network that affects functions with the City roadway network and represent opportunities to expand ITS infrastructure.

• **SR 167 Extension, Tacoma to Edgewood (interchange near MP 139):** Improvements include new construction of a freeway segment. The SR 167 Extension is a critical missing link in the state's highway network. Its completion is expected to improve safety and reduce congestion along local roads and freeways in the surrounding area. Construction is currently unfunded.

• **I-5 SR 509 Corridor Completion and Freight Improvement Project:** When finished, SR 509, the South Airport Access roadway, and new I-5 lanes and improvements will become a key component within the Seattle and south King County transportation network. When considered in conjunction with the planned Alaskan Way Viaduct improvements, the project provides a critical north-south corridor alternative to I-5 through Seattle and South King County.

4. ITS EXISTING CONDITIONS AND NEEDS ASSESSMENT

4.1 EXISTING ITS SYSTEM

Central Signal System: Traffic signal communication consists of six pair copper wire and fiber optic interconnections. In-cabinet dial up modems communicate with four main master controllers via Aries (version 3.41) software system. There are 85 signalized intersections within the city.

- 74 signals are interconnected
- 11 signals are not interconnected to the system

Signal Priority: Transit Signal Priority (TSP) has been implemented along several corridors in coordination with King County Metro Transit and Pierce Transit:

- SR 99 @ S 276th Street (Park & Ride location)
- SR 99 @ SR 509
- SR 99 @ S 288th Street
- SR 99 @ S 304th Street
- SR 99 @ S 308th Street
- SR 99 @ S 312th Street
- SR 99 @ S 316th Street
- S 316th Street @ 20th Ave S and 23rd Ave S
- S 317th Street @ 23rd Ave S (Regional Transit Center)

Real-time Traffic Monitoring: WSDOT is employing a program called “Traffic Busters”. This program was implemented in 2008. The program goals are to proactively manage traffic congestion using an ITS network to connect to agencies, equipment share with agencies, provide a complete regional traffic (C2C) signal communications link, and provide for a web site with agreements and contracts. Twenty-two agencies are connected to this system.

“Traffic Buster” System Architecture:

- Access to 1 gigabit synchronous backbone
- 100 megabit agency connection to the backbone
- Private network with a sub-network for agency use
- Share Cameras 10 at a time (MPEG4 encoders)
- See cameras 4 at a time (MPEG4 Decoders)
- PC terminal and software as needed
- IP network for C2C connections
- Phase 1 provides: Regional network camera coordination
- Phase 2 provides: Regional data collection, signal coordination, and incident management plans

WSDOT “Traffic Busters” 24 strand fiber was installed in 2010 from I-5 at S 320th Street along S 320th Street to SR 99. In coordination with this project, Federal Way installed 24-strand fiber at SR 99 at S 320th Street south on SR 99 to 16th Ave S; along 16th Ave S south to SR 18; then west on SR 18 (S 348th Street) to connect with the intersection of 9th Ave S (Park & Ride).

4.2 NEEDS ASSESSMENT

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The transportation needs and problem locations identified by Traffic Division staff generally fall within the areas of Traffic Management for mobility and safety, Emergency Management, and Road Maintenance. Incident management is also considered part of Traffic Management, with an incident considered to be a planned or unplanned event that results in traffic congestion versus an emergency being a major catastrophe that results in an activation of the EOC.

Traffic Management: The deployment of a robust TMC and Satellite TMC will enable many opportunities for centralized control of future ITS field devices. In order for the City to maximize the return on the TMC investment, there is a need for devices that can provide a high level of real-time traffic monitoring and congestion management. The replacement and supplement of in-pavement loop detectors with video detection at key intersections can provide enhanced traffic data while reducing maintenance costs. Cameras that provide automated traffic counts would provide important data for signal timing plans. In addition, additions of Pan-Tilt Zoom (PTZ) traffic cameras and greater access to WSDOT freeway cameras will also provide significantly enhanced real-time monitoring capability. The procurement of fixed and/or portable Dynamic Message Signs at the interchange access to the City at SR 18 and S 320th Street as well as at key locations along the major corridors of SR 99, SR 161, SR 18, SR 509 are needed for providing en-route information to travelers. These signs could also be used for any construction notifications for impacts to main travel ways.

The Traffic Division has noted these key traffic and safety needs:

- Coordinate with WSDOT, King County, and other cities to address management of incidents on I-5 and SR 18. Additionally, explore techniques to handle congestion on the City arterials due to incidents and special events. This may include development of “action plan sets” – predefined signal coordination plans that are designed to provide high-capacity throughput on detour routes.
- Continued fiber optic system installation as well as bringing on line all signalized intersections. Include 24-count fiber on all signal capital projects.
- Investment in a more robust TMC with modern hardware and software resources. The current workstation and connectivity are inadequate to effectively leverage the existing ITS infrastructure.
- Conduct a systems engineering plan to evaluate the software and equipment necessary to effectively interface with the ITS system.
- Current level of staff resources is hindering ability to dedicate time to traffic signal management and fully engage ITS partners. To support the expanded real-time monitoring of traffic conditions, additional TMC staff would be required. The traffic division does not have staffing to manage a TMC with and there is not a dedicated TMC operator at this time. With the expansion of the City’s ITS program, the staffing of the TMC during peak travel hours should be considered. Up to two persons might be required for this duty to cover the required time periods.
- Build relationship with Police Department to share Safe City surveillance equipment.
- Continue to explore ways to make Transit Signal Priority more effective and reliable.
- Explore implementation of adaptive control strategies, which adjust timing in real-time.
- Speed Monitoring and dangerous curve warnings.
- Improved safety and visibility at school and pedestrian crossings.
- Automated downloads of traffic volume data
- Real-time traffic conditions data broadcast to the public same as WSDOT and the City of Bellevue’s traffic flow maps.

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Emergency Management: Over the past few years there have been discussions promoted by the Federal Way Traffic Division (support to EOC) with Emergency Management regarding ITS needs for enhancing traffic/emergency management. The following are highlights of the discussed needs to support the EOC via an ITS:

- Development of a citywide emergency response plan coordinated with an ITS system.
- Access to a TMC and Satellite TMC functioning with the EOC to include traffic camera images, signal system workstation, and access to weather and traffic sensor data from future devices.
- Pre-defined signal timing plans for major incidents such as earthquakes, floods, and HAZMAT spills. Timing plans would also be needed for accommodating traffic incidents on I-5 and events that affect I-5 in Tacoma and Seattle.
- The EOC could also receive information and notifications of snow plowing and other road maintenance activities.
- A procedure by which the EOC could request specific messages to be sent on the Dynamic Message Signs.

Road Maintenance: The Federal Way Streets Division manages road maintenance. An ITS system would benefit this Division of the Public Works Department with:

- Ability to detect real-time flooding and icy conditions from the field.
- Ability to remotely alert motorists to hazardous conditions.
- Ability to remotely monitor road conditions, including conditions at construction work zones.

5. CONCEPT OF OPERATIONS

As the City moves forward with implementation of their ITS program, it is necessary to consider how the various City divisions and departments will work together with key stakeholders to most effectively accomplish their goals and objectives as a roadway service provider. A Concept of Operations identifies two things:

1. The roles and responsibilities that an agency and partners have in deploying and operating ITS projects and programs.
2. The electronic information exchanges that need to occur between the agencies.

The previous sections of this report present the Federal Way ITS program in terms of the existing and planned projects and identified needs. The Concept of Operations is intended to provide a view as to how Federal Way would operate on a day-to-day basis with a fully functional ITS program in place. The Concept of Operations establishes the roles and responsibilities for operations and maintenance of equipment, and also the levels of electronic information and device control sharing among the partners. Essentially, the Concept of Operations defined what information is electronically gathered and manipulated by each agency, and how it is shared with other agencies to the benefit of all. Because the Concept of Operations defines information sharing links between agencies it is also a required link two agencies that wish to send streaming video to each other, compared to two agencies who simply wish to share traffic volume data,

The City's Concept of Operations must blend with the Puget Sound Regional ITS Architecture. The Regional ITS Architecture is a technical framework for the deployment and integration of ITS in a given area. The Puget Sound Regional ITS Architecture, developed for the Puget Sound Regional Council (PSRC), includes a Concept of Operations from a regional perspective. However, a more detail

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analysis from Federal Way's perspective is warranted as part of the Master Plan development. The Concept of Operations is intended to be forward thinking to support the current and new projects that will be identified in this ITS Master Plan. In addition, by identifying electronic linkages between agencies necessary for sharing information and video images, the Concept of Operations begins to define requirements for the communications infrastructure that will be needed to support future projects.

This section provides the recommended Concept of Operations for the City of Federal Way.

5.1 Approach to Developing the Concept of Operations

In developing a Concept of Operations, it is recognized that relationships between agencies embody two main components:

- 1) what roles and responsibilities does each agency play in the relationship, and
- 2) what kinds of information are shared. Seven types of roles or responsibilities are used to describe agency-to-agency relationships. They are listed as follows from the lowest to the highest level of interaction.

- **Consultation:** One party confers with another party, in accordance with an established process, about an anticipated action and then keeps that party's information about actions taken.
- **Cooperation:** The parties involved in carrying out the planned and/or project development processes work together to achieve a common goal or objective.
- **Coordination:** The comparison of the transportation plans, programs, and schedules of one agency with related plans, programs, and schedules of other agencies, and adjustment of plans, programs and schedules to achieve general consistency.
- **Information Sharing:** The electronic exchange of data and device status information between parties for the purpose of coordinated responses, planning, and analysis.
- **Control Sharing:** The ability, through operational agreements, to allow for one party to control another party's field devices to properly respond to incident, event, weather, or traffic conditions.
- **Operations:** One party fully operates field equipment of a second party, typically because the second party does not have this capability and contracts for the service.
- **Maintenance:** One party maintains the equipment for a second party.

Along with these seven roles and responsibilities are associated information types that are typical for agency-agency exchange. Five primary types of electronic information exchanges are identified:

- **Video:** The dissemination of live video and still images from one party's field cameras to another's via email, web page, or ftp site.
- **Data:** The dissemination of data from one party to another party. Data can include but is not limited to, traffic data, weather data, parking data, transit data, etc.
- **Command:** The ability for one party to control field devices. Command can include but is not limited to, changing DMS messaging, changing traffic signal timing, camera control, etc.

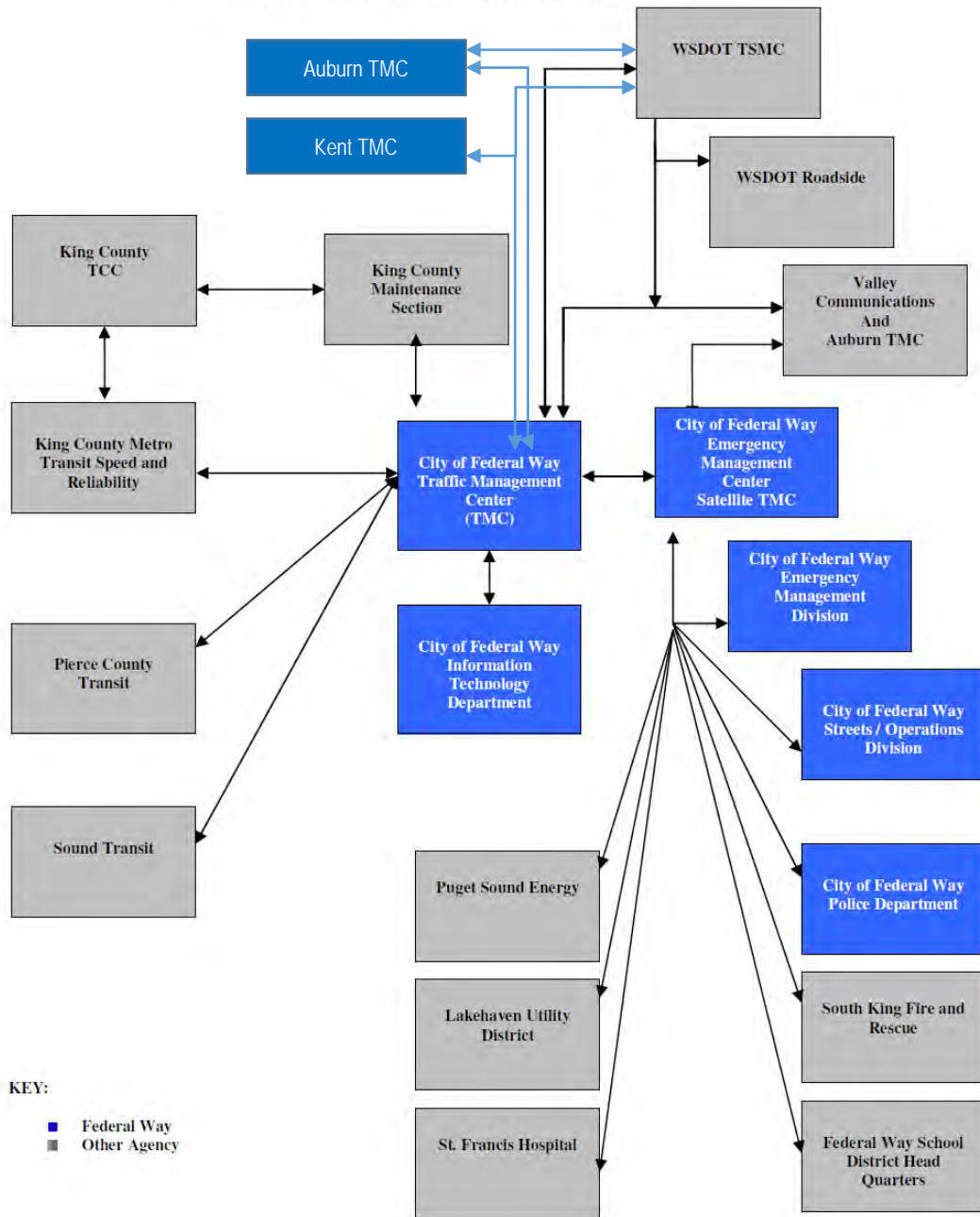
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- **Request:** The ability for one party to solicit either data or request a change, such as DMS messaging or signal times, from another party.
- **Status:** The ability for one party to monitor field devices, and receive such information as current signal timing/response plan, current message sets, etc.

A diagram representation of these relationships for Federal Way is provided in FIGURE 1 on the next page.

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FIGURE 1: CONCEPT OF OPERATIONS
INFORMATION SHARING, DATA, AND VIDEO FLOW CONCEPT



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The roles and responsibilities of these entities in the Federal Way ITS Program are described below:

- **City of Federal Way TMC:** The TMC would operate the city's centralized signal system and monitor the conditions on the city arterials and freeways. The TMC also coordinates and shares other agency data and monitored conditions.
- **City of Federal Way EOC:** The Federal Way EOC would receive direct communications from the TMC and the satellite TMC. This data share would be in the form of camera images via the intranet and/or email notifications for a web page or ftp site. Cameras would provide traffic issues, weather and/or emergency issues. The satellite TMC would provide backup access to the City Hall location. The EOC would also have the ability to request that a particular message be placed on the future DMS or traveler information web page. The EOC would have the ability to have a subset of participants in this program to effectively manage direction of the operations with:
 - **City of Federal Way Streets / Operations Division**
 - **City of Federal Way Police Department**
 - **South King County Fire and Rescue**
 - **Federal Way School District Head Quarters**
 - **Puget Sound Energy**
 - **Lakehaven Utility District**
 - **St. Francis Hospital**
- **Valley Communications:** As mentioned earlier, the Valley Communications Center is the hub for all 911 communications in South King County located in the City of Kent. At the north boundaries of Federal Way on S 272nd Street, the City of Kent plans a fiber optic connection through to Valley Communications. Federal Way would be able to connect to this system at S 272nd Street @ SR 99. This vision of partnership would include all the Federal Way EOC operations support, the City of Kent, the City of Auburn, WSDOT, and the participants of all operations of Valley Communications. Data sharing would include traffic conditions and emergency response messages through cameras via intranet and/or email. Through the Federal Way EOC messages would be able to be sent out to future DMS with traveler information and/or emergency notification instructions.
- **Auburn TMC:** Federal Way envisions a partnership with the Regional fiber consortium to connect to this system and carry this system to the City of Auburn's TMC. Also see Valley Communications above.
- **WSDOT Roadside:** As mentioned previously, WSDOT would provide Federal Way with viewing access to some of their I-5 cameras and new technology for the program "Traffic Busters". In turn, Federal Way could share its cameras with conditions on S 320th Street, SR 99, SR 509, SR 161, and SR 18.
- **WSDOT TSMC:** WSDOT and Federal Way would have a center-to-center connection that would be in operation. The "Traffic Buster" WSDOT program connects fiber optics to WSDOT hub at I-5 just south of S 320th Street. Federal Way envisions that this would allow future camera viewing internal to Federal Way along arterials that parallel the freeways and ramp terminals. Adding ramp terminals to this system would promote access to the central system of both agencies and coordinate traffic with the ramp terminal queues mitigating backups on and off of I-5.
- **King County Maintenance and King County TCC:** Federal Way would data share camera images and traffic data with King County Maintenance. King County contracts with Federal Way for maintaining traffic signals. This process would effectively manage signal issues with a shorter response time. King County Maintenance shares traffic data and monitoring with the King County

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Traffic Control Center (TCC). Both agencies would be able to share information with the Federal Way TMC. King County has expressed a desire to operate a regional transportation data warehouse that could be used to “power” regional traveler information systems, such as a regional arterial traffic flow map. If the data warehouse is developed, Federal Way would like to share data through that channel.

- **King County Metro Speed and Reliability:** The Speed and Reliability division of Metro, which works with local cities to deploy Transit Signal Priority, has expressed a need for the technology. Currently, Metro has no automated way of knowing what happens at the intersection beyond the driver’s request. TSP equipped signals in Federal Way may be unnecessarily pre-empted without the traffic information of the downstream signals. Deploying this information would assist both Metro and the City to manage traffic conditions effectively. Additionally, Metro buses would have the capability to give travel times on routes to effectively measure needs and promote accomplishments in signal coordination with the ITS.
- **Pierce Transit and Sound Transit:** Both agencies operate within the Federal Way. Setting up data stations at the Park & Rides where Federal Way TMC would post traveler information would empower not only drivers but also transit users through the region. Data sharing would be terminals showing traffic conditions and alternative routes that are available and routes to avoid.

6. FEDERAL WAY ITS PROJECT DESCRIPTIONS

The Concept of Operations and needs identified by stakeholders, combined with other factors over the years, guided the development of potential projects for the City of Federal Way. Factors that influence the selection of projects include the following:

- “Trouble Spots”, defined as mobility and safety issues, and key intersections on the arterial network.
- Gaps in existing and planned ITS deployments.
- Locations of key centers, including transportation, event, and employment centers.
- Transit corridors.
- Communications infrastructure.
- Projects identified by stakeholders as future or currently unfunded projects.
- Opportunities for coordination between City departments and other regional agencies.

6.1 TRAFFIC MANAGEMENT

Traffic Management projects include those that use ITS to improve roadway surveillance and monitoring, data collection, traffic flow improvements, data collection improvements, and incident response, to improve safety and reduce congestion on the roadway. The following Traffic Management project list represents the recommended projects to be explored for further implementation in Federal Way.

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TM-1: Vehicle Detection Expansion Project

Description: This project is an ongoing program to expand and upgrade vehicle detection across the City via programmed CIP projects. Traditional in-pavement loops should be replaced or supplemented with radar or video detection cameras to provide traffic data and video images back to the TMC. This data can be used to supplement traffic management and congestion monitoring, adjust signal timing, and also share with the public as traveler information.

Pre-manufactured induction loops are the most accurate and reliable among detection technologies, and therefore remain often specified. However, induction loops require extensive underground wiring and therefore are the most damaging when installed in existing roadway surfaces. Due to potential surface damage from saw-cuts and trenching, it is recommended that Federal Way allows installation of loops only under new roadways where loops and lead-ins can be placed in the base course before paving.

Video detection offers flexibility because detection areas can be added or adjusted by simple commands on a computer screen. Unfortunately, video detection continues to have significant disadvantages because it can be affected by adverse weather conditions, sun glare, shadows, and snow or grime on the lens, which results in diminished detection accuracy.

RADAR detection, also referred to as "NIDS" (non-intrusive detection systems) or "Wavetronix," now comes in several forms and can be applied for dilemma zone detection, stop line and queue detection, and general vehicle counting. These systems consist of pole- or mast-arm-mounted sensors and a controller mounted to the inside wall of the signal cabinet. Wavetronix Matrix system which offers the advantage of flexibility because, like video detection, detection areas can be added or adjusted for size and area by simple commands on a laptop or PDA screen. However, unlike video detection, the system is not affected by adverse weather conditions such as snow, wind, or sun glare.

Justification: Depending on the size of an intersection, NIDS detection is slightly higher in initial costs than in-pavement loops. The long term costs for maintenance requirements for NIDS detection are lower than in-pavement saw-cut loops considering the negative impact to pavement longevity.

Dependencies: This project could be deployed independently; CIP project based, or in tandem with the Communications Plan and Automated Traffic Counts projects.

Stakeholders:

- City of Federal Way
- Travelers
- Transit
- Local and State Government Transportation Departments and EOC's

Estimated Costs: Estimated costs for a full program over 20 years for a city wide program at an estimated 80 signals, video detection, pan tilt zoom cameras, counting loops, controller conversions would be approximately \$10,000 per intersection and misc mid-block locations as determined by the engineering analysis.

A program would be approximately \$450,000 for every 6 years.

Assumes 80 intersections	80	\$ 10,000.00	\$ 800,000.00	
30 mid blocks and/or ramp terminals	30	\$ 10,000.00	\$ 300,000.00	
LS controller upgrades	1	\$ 75,000.00	\$ 75,000.00	
				\$ 1,175,000.00
Design costs @ 15%			\$ 176,250.00	\$ 176,250.00
Construction Management Costs @ 15%			\$ 176,250.00	\$ 176,250.00
Total contract estimate				\$ 1,527,500.00

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TM-2: Adaptive Control System and Systems Engineering Management Plan

Description: This project would develop Federal Way's Systems Engineering Management Plan, which would contain an evaluation and recommendation for an Adaptive Control System.

The main benefits of adaptive signal control technology over conventional signal systems are that it can improve travel time reliability; reduce congestion by creating smoother traffic flow and prolong the effectiveness of traffic signal timing.

The systems engineering management plan is a typical part of any ITS project development process and is required on any federal-aid project that has an ITS work element, per 23 CFR 940.11. The systems engineering management plan will include components such as assessing Federal Way's system's needs and its relationship to the regional architecture; defining other specific requirements for the project/system; and defining the operations and maintenance requirements for the system.

Justification:

- This project would maximize the effectiveness and improve traffic flow along targeted corridors. It would also provide greater flexibility along corridors to adapt to changing traffic patterns, specifically relating to incidents on the freeway.
- This project could reduce or eliminate the need for adding additional vehicle lanes by increasing the effectiveness of the existing roadway system.

Dependencies:

The dependencies will be developed as part of the Systems Engineering Management Plan. Generally, signal interconnect along selected corridors will be needed.

Stakeholders:

- City of Federal Way
- Travelers
- Transit
- Local Agencies and WSDOT

Estimated Costs: Approximately \$1,000,000 for phase 1.

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TM-3: Dangerous Curve Warning System	
<p>Description: The City has identified several sharp curves that can be hazardous to motorists traveling too fast. This project would install radar speed detection and flashing dynamic message signs to alert drivers. Identified locations would be evaluated citywide.</p> <p>This project could initially be deployed at a single location as a demonstration project using a speed radar trailer.</p>	
<p>Justification:</p> <ul style="list-style-type: none">• Potential loss of life and property.	
<p>Dependencies:</p> <ul style="list-style-type: none">• Funding.	
<p>Stakeholders:</p> <ul style="list-style-type: none">• City of Federal Way• Travelers• Transit	
<p>Estimated Costs: Estimated costs for 20 signs is \$200,000.00</p>	

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TM-4A: Fiber interconnect (Signal Interconnections)

21st Ave SW @ SW 325th Pl to 21st Ave SW @ SW 356th St

Description: The interconnecting of traffic signals allows the signals at various intersections along a corridor to be controlled centrally by the TMC, and coordinated with other nearby signals, resulting in improved traffic flow along a given corridor.

Although the majority of Federal Way's signals have been interconnected, they are on a dial up copper wire and phone system to master controllers. Not all of the controllers have a master isolating a few signals. The dial up system is archaic and does not centrally control all the signals. This project segment interconnects six signals with improved technology.

Note: The segment between 336th and 344th has been completed

Justification:

- Interconnected signals provide better traffic flow and rapid response to incidents because of the ability to adjust signal timing from the TMC.
- Today, there is fiber interconnect being installed that will complete one full loop, interconnecting the rest of the signals into a second loop and into the first loop will complete the job.

Dependencies:

- Funding.
- Availability of Communications. The Communications Plan shall identify a strategy and prioritization of each fiber interconnection segment.

Stakeholders:

- City of Federal Way
- Travelers
- Transit
- All bordering agencies and WSDOT

Estimated Costs:

	6 controller fiber modems
\$ 219,700.00	Assumes 25% conduit installation
	Assumes 100% 24 strand fiber material costs
	Assumes 100% 24 pull fiber labor costs
	Assumes lump sum testing and terminations
	Assumes (2) cameras per controller intersection
	No new loops
	no new cabinets
	Design costs @ 15%
	Construction Management Costs @ 15%

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TM-4B: Fiber interconnect (Signal Interconnections)

9th Ave S @ S 336th to 13th Place @ 336th

Description: The interconnecting of traffic signals allows the signals at various intersections along a corridor to be controlled centrally by the TMC, and coordinated with other nearby signals, resulting in improved traffic flow along a given corridor.

Although the majority of Federal Way's signals have been interconnected, they are on a dial up copper wire and phone system to master controllers. Not all of the controllers have a master isolating a few signals. The dial up system is archaic and does not centrally control all the signals. This project segment interconnects two signals with improved technology.

Justification:

- Interconnected signals provide better traffic flow and rapid response to incidents because of the ability to adjust signal timing from the TMC.
- Today, there is fiber interconnect being installed that will complete one full loop, interconnecting the rest of the signals into a second loop and into the first loop will complete the job.

Dependencies:

- Funding.
- Availability of Communications. The Communications Plan shall identify a strategy and prioritization of each fiber interconnection segment.

Stakeholders:

- City of Federal Way
- Travelers
- Transit
- All bordering agencies and WSDOT

Estimated Costs:

	2 controller fiber modems
\$ 57,850.00	Assumes 25% conduit installation
	Assumes 100% 24 strand fiber material costs
	Assumes 100% 24 pull fiber labor costs
	Assumes lump sum testing and terminations
	Assumes (2) cameras per controller intersection
	No new loops
	no new cabinets
	Design costs @ 15%
	Construction Management Costs @ 15%

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TM-4C: Fiber interconnect (Signal Interconnections)

S 316th S: SR99 to 20th Ave S and 20th Ave S: 314th S 320th St

Description: The interconnecting of traffic signals allows the signals at various intersections along a corridor to be controlled centrally by the TMC, and coordinated with other nearby signals, resulting in improved traffic flow along a given corridor.

Although the majority of Federal Way's signals have been interconnected, they are on a dial up copper wire and phone system to master controllers. Not all of the controllers have a master isolating a few signals. The dial up system is archaic and does not centrally control all the signals. This project segment interconnects four signals with improved technology.

Justification:

- Interconnected signals provide better traffic flow and rapid response to incidents because of the ability to adjust signal timing from the TMC.
- Today, there is fiber interconnect being installed that will complete one full loop, interconnecting the rest of the signals into a second loop and into the first loop will complete the job.

Dependencies:

- Funding.
- Availability of Communications. The Communications Plan shall identify a strategy and prioritization of each fiber interconnection segment.

Stakeholders:

- City of Federal Way
- Travelers
- Transit
- All bordering agencies and WSDOT

Estimated Costs:

	4 controller fiber modems
\$ 80,795.00	Assumes 25% conduit installation
	Assumes 100% 24 strand fiber material costs
	Assumes 100% 24 pull fiber labor costs
	Assumes lump sum testing and terminations
	Assumes (2) cameras per controller intersection
	No new loops
	no new cabinets
	Design costs @ 15%
	Construction Management Costs @ 15%

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TM-4D: Fiber interconnect (Signal Interconnections)

S 312th St: SR99 to 23rd Ave S Ave S and 23rd Ave S: S312th St to S 317th St

Description: The interconnecting of traffic signals allows the signals at various intersections along a corridor to be controlled centrally by the TMC, and coordinated with other nearby signals, resulting in improved traffic flow along a given corridor.

Although the majority of Federal Way's signals have been interconnected, they are on a dial up copper wire and phone system to master controllers. Not all of the controllers have a master isolating a few signals. The dial up system is archaic and does not centrally control all the signals. This project segment interconnects six signals with improved technology.

Justification:

- Interconnected signals provide better traffic flow and rapid response to incidents because of the ability to adjust signal timing from the TMC.
- Today, there is fiber interconnect being installed that will complete one full loop, interconnecting the rest of the signals into a second loop and into the first loop will complete the job.

Dependencies:

- Funding.
- Availability of Communications. The Communications Plan shall identify a strategy and prioritization of each fiber interconnection segment.

Stakeholders:

- City of Federal Way
- Travelers
- Transit
- All bordering agencies and WSDOT

Estimated Costs:

	6 controller fiber modems
\$ 116,350.00	Assumes 25% conduit installation
	Assumes 100% 24 strand fiber material costs
	Assumes 100% 24 pull fiber labor costs
	Assumes lump sum testing and terminations
	Assumes (2) cameras per controller intersection
	No new loops
	no new cabinets
	Design costs @ 15%
	Construction Management Costs @ 15%

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TM-4E: Fiber interconnect (Signal Interconnections)

23rd Ave S: S 320th St to S 322nd St

Description: The interconnecting of traffic signals allows the signals at various intersections along a corridor to be controlled centrally by the TMC, and coordinated with other nearby signals, resulting in improved traffic flow along a given corridor.

Although the majority of Federal Way's signals have been interconnected, they are on a dial up copper wire and phone system to master controllers. Not all of the controllers have a master isolating a few signals. The dial up system is archaic and does not centrally control all the signals. This project segment interconnects two signals with improved technology.

Justification:

- Interconnected signals provide better traffic flow and rapid response to incidents because of the ability to adjust signal timing from the TMC.
- Today, there is fiber interconnect being installed that will complete one full loop, interconnecting the rest of the signals into a second loop and into the first loop will complete the job.

Dependencies:

- Funding.
- Availability of Communications. The Communications Plan shall identify a strategy and prioritization of each fiber interconnection segment.

Stakeholders:

- City of Federal Way
- Travelers
- Transit
- All bordering agencies and WSDOT

Estimated Costs:

	2 controller fiber modems
\$ 30,355.00	Assumes 25% conduit installation
	Assumes 100% 24 strand fiber material costs
	Assumes 100% 24 pull fiber labor costs
	Assumes lump sum testing and terminations
	Assumes (2) cameras per controller intersection
	No new loops
	no new cabinets
	Design costs @ 15%
	Construction Management Costs @ 15%

CITY OF FEDERAL WAY
INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
Master Plan

TM-4F: Fiber interconnect (Signal Interconnections)

S 320th St: 25th Ave S to Military Rd S

Description: The interconnecting of traffic signals allows the signals at various intersections along a corridor to be controlled centrally by the TMC, and coordinated with other nearby signals, resulting in improved traffic flow along a given corridor.

Although the majority of Federal Way's signals have been interconnected, they are on a dial up copper wire and phone system to master controllers. Not all of the controllers have a master isolating a few signals. The dial up system is archaic and does not centrally control all the signals. This project segment interconnects six signals with improved technology.

Note: Communications from 25th to I-5 northbound ramps is complete.

Justification:

- Interconnected signals provide better traffic flow and rapid response to incidents because of the ability to adjust signal timing from the TMC.
- Today, there is fiber interconnect being installed that will complete one full loop, interconnecting the rest of the signals into a second loop and into the first loop will complete the job.

Dependencies:

- Funding.
- Availability of Communications. The Communications Plan shall identify a strategy and prioritization of each fiber interconnection segment.

Stakeholders:

- City of Federal Way
- Travelers
- Transit
- All bordering agencies and WSDOT

Estimated Costs:

	6 controller fiber modems
\$ 119,600.00	Assumes 25% conduit installation
	Assumes 100% 24 strand fiber material costs
	Assumes 100% 24 pull fiber labor costs
	Assumes lump sum testing and terminations
	Assumes (2) cameras per controller intersection
	No new loops
	no new cabinets
	Design costs @ 15%
	Construction Management Costs @ 15%

**CITY OF FEDERAL WAY
INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
Master Plan**

TM-4G: Fiber interconnect (Signal Interconnections)

SR 161: SR18 to Milton Rd

Description: The interconnecting of traffic signals allows the signals at various intersections along a corridor to be controlled centrally by the TMC, and coordinated with other nearby signals, resulting in improved traffic flow along a given corridor.

Although the majority of Federal Way's signals have been interconnected, they are on a dial up copper wire and phone system to master controllers. Not all of the controllers have a master isolating a few signals. The dial up system is archaic and does not centrally control all the signals. This project segment interconnects five signals with improved technology.

Justification:

- Interconnected signals provide better traffic flow and rapid response to incidents because of the ability to adjust signal timing from the TMC.
- Today, there is fiber interconnect being installed that will complete one full loop, interconnecting the rest of the signals into a second loop and into the first loop will complete the job.

Dependencies:

- Funding.
- Availability of Communications. The Communications Plan shall identify a strategy and prioritization of each fiber interconnection segment.

Stakeholders:

- City of Federal Way
- Travelers
- Transit
- All bordering agencies and WSDOT

Estimated Costs:

	5 controller fiber modems
\$ 154,830.00	Assumes 25% conduit installation
	Assumes 100% 24 strand fiber material costs
	Assumes 100% 24 pull fiber labor costs
	Assumes lump sum testing and terminations
	Assumes (2) cameras per controller intersection
	No new loops
	no new cabinets
	Design costs @ 15%
	Construction Management Costs @ 15%

**CITY OF FEDERAL WAY
INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
Master Plan**

TM-4H: Fiber interconnect (Signal Interconnections)

SR 99: 16th Ave S to S 356th St

(This project is being constructed by SR 99 Phase V to be constructed in 2016-2018)

Description: The interconnecting of traffic signals allows the signals at various intersections along a corridor to be controlled centrally by the TMC, and coordinated with other nearby signals, resulting in improved traffic flow along a given corridor.

Although the majority of Federal Way's signals have been interconnected, they are on a dial up copper wire and phone system to master controllers. Not all of the controllers have a master isolating a few signals. The dial up system is archaic and does not centrally control all the signals. This project segment interconnects three signals with improved technology.

Justification:

- Interconnected signals provide better traffic flow and rapid response to incidents because of the ability to adjust signal timing from the TMC.
- Today, there is fiber interconnect being installed that will complete one full loop, interconnecting the rest of the signals into a second loop and into the first loop will complete the job.

Dependencies:

- Funding.
- Availability of Communications. The Communications Plan shall identify a strategy and prioritization of each fiber interconnection segment.

Stakeholders:

- City of Federal Way
- Travelers
- Transit
- All bordering agencies and WSDOT

Estimated Costs:

	3 controller fiber modems
\$ 115,960.00	Assumes 25% conduit installation
	Assumes 100% 24 strand fiber material costs
	Assumes 100% 24 pull fiber labor costs
	Assumes lump sum testing and terminations
	Assumes (2) cameras per controller intersection
	No new loops
	no new cabinets
	Design costs @ 15%
	Construction Management Costs @ 15%

**CITY OF FEDERAL WAY
INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
Master Plan**

TM-4I: Fiber interconnect (Signal Interconnections)

S 356th St: 21st Ave SW to SR99

Description: The interconnecting of traffic signals allows the signals at various intersections along a corridor to be controlled centrally by the TMC, and coordinated with other nearby signals, resulting in improved traffic flow along a given corridor.

Although the majority of Federal Way's signals have been interconnected, they are on a dial up copper wire and phone system to master controllers. Not all of the controllers have a master isolating a few signals. The dial up system is archaic and does not centrally control all the signals. This project segment interconnects three signals with improved technology.

Justification:

- Interconnected signals provide better traffic flow and rapid response to incidents because of the ability to adjust signal timing from the TMC.
- Today, there is fiber interconnect being installed that will complete one full loop, interconnecting the rest of the signals into a second loop and into the first loop will complete the job.

Dependencies:

- Funding.
- Availability of Communications. The Communications Plan shall identify a strategy and prioritization of each fiber interconnection segment.

Stakeholders:

- City of Federal Way
- Travelers
- Transit
- All bordering agencies and WSDOT

Estimated Costs:

	3 controller fiber modems
\$ 184,600.00	Assumes 25% conduit installation
	Assumes 100% 24 strand fiber material costs
	Assumes 100% 24 pull fiber labor costs
	Assumes lump sum testing and terminations
	Assumes (2) cameras per controller intersection
	No new loops
	no new cabinets
	Design costs @ 15%
	Construction Management Costs @ 15%

**CITY OF FEDERAL WAY
INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
Master Plan**

TM-4J: Fiber interconnect (Signal Interconnections)

21st Ave SW: SW 312th St to SW 320th St

Description: The interconnecting of traffic signals allows the signals at various intersections along a corridor to be controlled centrally by the TMC, and coordinated with other nearby signals, resulting in improved traffic flow along a given corridor.

Although the majority of Federal Way's signals have been interconnected, they are on a dial up copper wire and phone system to master controllers. Not all of the controllers have a master isolating a few signals. The dial up system is archaic and does not centrally control all the signals. This project segment interconnects three signals with improved technology.

Justification:

- Interconnected signals provide better traffic flow and rapid response to incidents because of the ability to adjust signal timing from the TMC.
- Today, there is fiber interconnect being installed that will complete one full loop, interconnecting the rest of the signals into a second loop and into the first loop will complete the job.

Dependencies:

- Funding.
- Availability of Communications. The Communications Plan shall identify a strategy and prioritization of each fiber interconnection segment.

Stakeholders:

- City of Federal Way
- Travelers
- Transit
- All bordering agencies and WSDOT

Estimated Costs:

	3 controller fiber modems
\$ 73,450.00	Assumes 25% conduit installation
	Assumes 100% 24 strand fiber material costs
	Assumes 100% 24 pull fiber labor costs
	Assumes lump sum testing and terminations
	Assumes (2) cameras per controller intersection
	No new loops
	no new cabinets
	Design costs @ 15%
	Construction Management Costs @ 15%

**CITY OF FEDERAL WAY
INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
Master Plan**

TM-4K: Fiber interconnect (Signal Interconnections)

S 312th St: 14th Ave SW to 8th Ave S

Description: The interconnecting of traffic signals allows the signals at various intersections along a corridor to be controlled centrally by the TMC, and coordinated with other nearby signals, resulting in improved traffic flow along a given corridor.

Although the majority of Federal Way's signals have been interconnected, they are on a dial up copper wire and phone system to master controllers. Not all of the controllers have a master isolating a few signals. The dial up system is archaic and does not centrally control all the signals. This project segment interconnects three signals with improved technology.

Justification:

- Interconnected signals provide better traffic flow and rapid response to incidents because of the ability to adjust signal timing from the TMC.
- Today, there is fiber interconnect being installed that will complete one full loop, interconnecting the rest of the signals into a second loop and into the first loop will complete the job.

Dependencies:

- Funding.
- Availability of Communications. The Communications Plan shall identify a strategy and prioritization of each fiber interconnection segment.

Stakeholders:

- City of Federal Way
- Travelers
- Transit
- All bordering agencies and WSDOT

Estimated Costs:

	3 controller fiber modems
\$ 156,650.00	Assumes 25% conduit installation
	Assumes 100% 24 strand fiber material costs
	Assumes 100% 24 pull fiber labor costs
	Assumes lump sum testing and terminations
	Assumes (2) cameras per controller intersection
	No new loops
	no new cabinets
	Design costs @ 15%
	Construction Management Costs @ 15%

**CITY OF FEDERAL WAY
INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
Master Plan**

TM-4L: Fiber interconnect (Signal Interconnections)

SR 509: SW 312th St to 8th Ave SW

Description: The interconnecting of traffic signals allows the signals at various intersections along a corridor to be controlled centrally by the TMC, and coordinated with other nearby signals, resulting in improved traffic flow along a given corridor.

Although the majority of Federal Way's signals have been interconnected, they are on a dial up copper wire and phone system to master controllers. Not all of the controllers have a master isolating a few signals. The dial up system is archaic and does not centrally control all the signals. This project segment interconnects one signal with improved technology.

Justification:

- Interconnected signals provide better traffic flow and rapid response to incidents because of the ability to adjust signal timing from the TMC.
- Today, there is fiber interconnect being installed that will complete one full loop, interconnecting the rest of the signals into a second loop and into the first loop will complete the job.

Dependencies:

- Funding.
- Availability of Communications. The Communications Plan shall identify a strategy and prioritization of each fiber interconnection segment.

Stakeholders:

- City of Federal Way
- Travelers
- Transit
- All bordering agencies and WSDOT

Estimated Costs:

	1 controller fiber modems
\$ 72,150.00	Assumes 25% conduit installation
	Assumes 100% 24 strand fiber material costs
	Assumes 100% 24 pull fiber labor costs
	Assumes lump sum testing and terminations
	Assumes (2) cameras per controller intersection
	No new loops
	no new cabinets
	Design costs @ 15%
	Construction Management Costs @ 15%

**CITY OF FEDERAL WAY
INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
Master Plan**

TM-4M: Fiber interconnect (Signal Interconnections)

SW 320th St: 47th Ave SW to 21st Ave SW

Description: The interconnecting of traffic signals allows the signals at various intersections along a corridor to be controlled centrally by the TMC, and coordinated with other nearby signals, resulting in improved traffic flow along a given corridor.

Although the majority of Federal Way's signals have been interconnected, they are on a dial up copper wire and phone system to master controllers. Not all of the controllers have a master isolating a few signals. The dial up system is archaic and does not centrally control all the signals. This project segment interconnects two signals with improved technology.

Justification:

- Interconnected signals provide better traffic flow and rapid response to incidents because of the ability to adjust signal timing from the TMC.
- Today, there is fiber interconnect being installed that will complete one full loop, interconnecting the rest of the signals into a second loop and into the first loop will complete the job.

Dependencies:

- Funding.
- Availability of Communications. The Communications Plan shall identify a strategy and prioritization of each fiber interconnection segment.

Stakeholders:

- City of Federal Way
- Travelers
- Transit
- All bordering agencies and WSDOT

Estimated Costs:

	2 controller fiber modems
\$ 160,550.00	Assumes 25% conduit installation
	Assumes 100% 24 strand fiber material costs
	Assumes 100% 24 pull fiber labor costs
	Assumes lump sum testing and terminations
	Assumes (2) cameras per controller intersection
	No new loops
	no new cabinets
	Design costs @ 15%
	Construction Management Costs @ 15%

**CITY OF FEDERAL WAY
INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
Master Plan**

TM-4N: Fiber interconnect (Signal Interconnections)

SW 340th St/ SW 336th Wy: Hoyt Rd to 24th Place SW

Description: The interconnecting of traffic signals allows the signals at various intersections along a corridor to be controlled centrally by the TMC, and coordinated with other nearby signals, resulting in improved traffic flow along a given corridor.

Although the majority of Federal Way's signals have been interconnected, they are on a dial up copper wire and phone system to master controllers. Not all of the controllers have a master isolating a few signals. The dial up system is archaic and does not centrally control all the signals. This project segment interconnects two signals with improved technology.

Justification:

- Interconnected signals provide better traffic flow and rapid response to incidents because of the ability to adjust signal timing from the TMC.
- Today, there is fiber interconnect being installed that will complete one full loop, interconnecting the rest of the signals into a second loop and into the first loop will complete the job.

Dependencies:

- Funding.
- Availability of Communications. The Communications Plan shall identify a strategy and prioritization of each fiber interconnection segment.

Stakeholders:

- City of Federal Way
- Travelers
- Transit
- All bordering agencies and WSDOT

Estimated Costs:

	2 controller fiber modems
\$ 102,830.00	Assumes 25% conduit installation
	Assumes 100% 24 strand fiber material costs
	Assumes 100% 24 pull fiber labor costs
	Assumes lump sum testing and terminations
	Assumes (2) cameras per controller intersection
	No new loops
	no new cabinets
	Design costs @ 15%
	Construction Management Costs @ 15%

**CITY OF FEDERAL WAY
INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
Master Plan**

TM-40: Fiber interconnect (Signal Interconnections)

S 288th St: SR99 to 45th PI S

Description: The interconnecting of traffic signals allows the signals at various intersections along a corridor to be controlled centrally by the TMC, and coordinated with other nearby signals, resulting in improved traffic flow along a given corridor.

Although the majority of Federal Way's signals have been interconnected, they are on a dial up copper wire and phone system to master controllers. Not all of the controllers have a master isolating a few signals. The dial up system is archaic and does not centrally control all the signals. This project segment interconnects five signals with improved technology.

Justification:

- Interconnected signals provide better traffic flow and rapid response to incidents because of the ability to adjust signal timing from the TMC.
- Today, there is fiber interconnect being installed that will complete one full loop, interconnecting the rest of the signals into a second loop and into the first loop will complete the job.

Dependencies:

- Funding.
- Availability of Communications. The Communications Plan shall identify a strategy and prioritization of each fiber interconnection segment.

Stakeholders:

- City of Federal Way
- Travelers
- Transit
- All bordering agencies and WSDOT

Estimated Costs:

	5 controller fiber modems
\$ 189,150.00	Assumes 25% conduit installation
	Assumes 100% 24 strand fiber material costs
	Assumes 100% 24 pull fiber labor costs
	Assumes lump sum testing and terminations
	Assumes (2) cameras per controller intersection
	No new loops
	no new cabinets
	Design costs @ 15%
	Construction Management Costs @ 15%

**CITY OF FEDERAL WAY
INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
Master Plan**

TM-4P: Fiber interconnect (Signal Interconnections)

Military Rd S: 31st Ave S to S 272nd St

Description: The interconnecting of traffic signals allows the signals at various intersections along a corridor to be controlled centrally by the TMC, and coordinated with other nearby signals, resulting in improved traffic flow along a given corridor.

Although the majority of Federal Way's signals have been interconnected, they are on a dial up copper wire and phone system to master controllers. Not all of the controllers have a master isolating a few signals. The dial up system is archaic and does not centrally control all the signals. This project segment interconnects four signals with improved technology.

Justification:

- Interconnected signals provide better traffic flow and rapid response to incidents because of the ability to adjust signal timing from the TMC.
- Today, there is fiber interconnect being installed that will complete one full loop, interconnecting the rest of the signals into a second loop and into the first loop will complete the job.

Dependencies:

- Funding.
- Availability of Communications. The Communications Plan shall identify a strategy and prioritization of each fiber interconnection segment.

Stakeholders:

- City of Federal Way
- Travelers
- Transit
- All bordering agencies and WSDOT

Estimated Costs:

	4 controller fiber modems
\$ 234,000.00	Assumes 25% conduit installation
	Assumes 100% 24 strand fiber material costs
	Assumes 100% 24 pull fiber labor costs
	Assumes lump sum testing and terminations
	Assumes (2) cameras per controller intersection
	No new loops
	no new cabinets
	Design costs @ 15%
	Construction Management Costs @ 15%

**CITY OF FEDERAL WAY
INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
Master Plan**

TM-4Q: Fiber interconnect (Signal Interconnections)

Potential Annexations Areas (PAA) from King County

S 360th St: Milton Rd S to Military Rd S

Military Rd S: S 360th St to S 320th St

S 321st St: Peasley Canyon Rd to 51st Ave S

51st Ave S: S 321st St to S 316th St

Description: The interconnecting of traffic signals allows the signals at various intersections along a corridor to be controlled centrally by the TMC, and coordinated with other nearby signals, resulting in improved traffic flow along a given corridor.

Although the majority of Federal Way's signals have been interconnected, they are on a dial up copper wire and phone system to master controllers. Not all of the controllers have a master isolating a few signals. The dial up system is archaic and does not centrally control all the signals. These project segments install new traffic signals and interconnect the major roadways of the Federal Way PAA signals with improved technology.

Justification:

- Interconnected signals provide better traffic flow and rapid response to incidents because of the ability to adjust signal timing from the TMC.
- Today, there is fiber interconnect being installed that will complete one full loop, interconnecting the rest of the signals into a second loop and into the first loop will complete the job.

Dependencies:

- Funding and Cost Benefit.
- Availability of Communications. The Communications Plan shall identify a strategy and prioritization of each fiber interconnection segment.

Stakeholders:

- City of Federal Way
- Travelers
- Transit
- All bordering agencies and WSDOT

Estimated Costs:

	10 controller fiber modems
\$ 2,411,500.00	Assumes 25% conduit installation
	Assumes 100% 24 strand fiber material costs
	Assumes 100% 24 pull fiber labor costs
	Assumes lump sum testing and terminations
	Assumes (2) cameras per controller intersection
	No new loops
	no new cabinets
	Design costs @ 15%
	Construction Management Costs @ 15%

**CITY OF FEDERAL WAY
INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
Master Plan**

TM-5: Event Management Plan

Description: Directing traffic during both planned and unplanned events is a major traffic management issue. This project would develop a plan and “technology toolkit” for congestion management during planned events in and outside of the city. The technologies could include portable devices such as DMS to direct vehicles to available parking, camera, and detection that could be installed in advance on an as-needed basis. Events that occur are Regional and National Events such as events at the Aquatic Center, the Triathlon, and at Enchanted Parkway.

Justification:

- Traffic disruptions during major events impact emergency management response and public access to events.

Dependencies:

- Funding

Stakeholders:

- City of Federal Way
- Travelers
- Transit
- All bordering agencies and WSDOT
- King County Road Services
- Organizations who could help develop the scenarios the event management plan would address.

Estimated Costs: Estimate includes plan development and mobile DMS and wireless camera units.

Total estimated budget costs: \$100,00.00

**CITY OF FEDERAL WAY
INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
Master Plan**

TM-6: Communications Plan

Description: This project would develop a detailed ITS Communications Plan for Federal Way to link up the City's future ITS deployment. The Plan would identify options for accessing existing, and building new communications infrastructure to support existing ITS deployments and recommended projects identified in the ITS Master Plan. As one example, the Communications Plan would consider new fiber being installed as part of the Federal Way School District relocation and routed to Park & Rides. The Communications Plan would identify other key needs of transferring information and address alternative communication approaches and provide order of magnitude of cost estimates.

Justification:

- Ensures efficient utilization of existing and planned communication infrastructure.
- The structured expansion of the City's communication network is vital for access to real-time information from devices such as vehicle detectors and camera's.

Dependencies:

- None, this project is recommended for early deployment.

Stakeholders:

- City of Federal Way
- Travelers
- Transit
- All bordering agencies and WSDOT
- King County Road Services

Estimated Costs: Cost for deployment and development of a citywide communications plan.

Total estimated budget costs: \$75,000.00

**CITY OF FEDERAL WAY
INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
Master Plan**

6.2 EMERGENCY MANAGEMENT

Emergency Management Projects include those that would improve the city's ability to provide a coordinated response to a major disaster, either manmade or natural. Federal way has a finalized Emergency Plan in place.

EM-1 : Center to Center Communications with the Federal Way EOC and Satellite communications for TMC

Description: The Federal Way Emergency Operations Center is housed within City Hall along with the TMC. There is a second command center at the South King Fire and Rescue station near 1st Ave S and S 320th Street. Both locations serve as a center for local agencies to coordinate responses and manage a major emergency. Federal Way Public Works has been assigned a seat at the EOC, which is activated in situations such as earthquakes, terror threats, and other situations.

Justification:

- Expanded access to WSDOT video and data, in the spirit of regional coordination.
- Contribute to improved data sharing between regional centers.

Dependencies:

- TM2 - WSDOT Video Access Upgrade

Stakeholders:

- City of Federal Way
- All bordering agencies and WSDOT
- King County Road Services
- King County Emergency Management
- WSDOT

Estimated Costs: Cost for deployment and development of a Satellite TMC for the EOC.

Total estimated budget costs: \$250,000.00

6.3 MAINTENANCE

Maintenance projects are those that would provide weather and road conditions monitoring for increased efficiency of road maintenance operations.

M-1 : Road/Weather Information System

Description: Pavement sensors can be installed that would provide the maintenance office and TMC with alerts of potentially hazardous conditions, such as ice, flooding, or snow along City streets. The City could then post a warning message to motorists on a Dynamic Message Sign. This project would deploy these pavement conditions sensors at key location and provide notification to motorists when hazardous conditions such as water over the roadway or ice are detected. The weather data from these sensors would also be sent back to the TMC and the maintenance office for monitoring and to assist the maintenance dispatch in allocating resources. Cameras could also be deployed at these sites for confirming conditions and warning sign functionality.

Justification:

- Potential reduction in loss of life and property.
- More efficient allocation of City maintenance resources, such as snowplows and anti icing, because of real-time conditions data.

Dependencies:

- Assess communications capability at remote sites.

Stakeholders:

- City of Federal Way Maintenance and Public Works Department
- King County Road Services
- General Public

Estimated Costs: The City of Federal Way already has a weather station on top of City Hall. Costs for integration into the TMC are included in this central system costs. Pavement monitoring sensors for deployment at hazardous locations would be the only incurred costs. Potential locations for this equipment and the sensor locations would need a citywide evaluation.

Capital Cost for Evaluation and Equipment; TBD at a later date

**CITY OF FEDERAL WAY
INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
Master Plan**

6.4 TRAVELER INFORMATION

Traveler information provides for the dissemination of roadway information collected by the TMC to reach travelers both pre-trip and en-route so that they may make informed travel decisions.

TI-1: Regional Traveler Information
<p>Description: The King County ITS Strategic Plan has identified projects to provide regional arterial traveler information via the internet and potentially WSDOT 511 phone system. This project should provide the communications link and processing capabilities to automatically share information from Federal Way's ITS systems, such as traffic flow data and camera images, to the King County regional system, WSDOT 511, and/or the City web site or public access cable channel.</p>
<p>Justification: This project would maximize the return on investing in ITS such as communications, traffic camera images, and vehicle detection by providing information to the broadest possible audiences.</p>
<p>Dependencies:</p> <ul style="list-style-type: none">• Federal Way ITS Project Arterial Flow Map would provide useful information that could be distributed through additional channels.• Regional agreement must be reached on traveler information concept, including commitment from one agency to provide the central data warehouse.
<p>Stakeholders:</p> <ul style="list-style-type: none">• City of Federal Way• King County• General Public Access Cable Channel• WSDOT
<p>Estimated Costs: Costs include integration and web/cable TV interfaces.</p> <p>Total project cost that includes engineering, construction administration, and contingencies \$150,000.00</p>