CHAPTER 4

4.000 TRANSPORTATION

4A GENERAL CONSIDERATIONS

4A.010 General

The overall goal of this chapter is to encourage the uniform development that is context sensitive to create an integrated, fully accessible public transportation system that will facilitate present and future travel demand to meet the needs of people walking, driving, transit, freight and cycling with minimal environmental impact to the community as a whole. All design standards shall follow accepted engineering practices with an emphasis on safety. Safety shall override the supplemental standards as outlined in this document. See Chapter 3.021 for development within the Urban Growth Area (UGA) boundary.

This chapter provides minimum development standards supplementing the applicable standards as set forth in Chapter 3.010.

4B STREETS

4B.010 General

Roadway design must provide for the maximum conditions anticipated. The width and grade of the pavement must conform to specific standards set forth herein for safety and uniformity.

4B.020 Design Standards

The design of streets and roads shall depend upon their functional classification and usage. The design elements of City streets shall conform to City standards as set forth herein and current design practice as set forth in Chapter 3.010. Standard design cross-sections and structures are shown on the details at the end of this chapter. Alternate structural sections may be used based on the criteria as outlined in Chapter 4B.160. Safety shall be paramount in any roadway design.

All roadways classified as a collector and above shall meet the design standards of the WSDOT Local Agency Guidelines Manual. Local access roadways shall meet the guidelines herein. Any modification to those standards shall comply with the deviation process as established by the WSDOT *Local Agency Guidelines Manual*. Deviations require justification with safety being a prime consideration.

The layout of streets shall be based on their functional requirements, i.e., the grouping of roadways based on the service they provide. See Chapter 4B.025 for Access Management criteria and 4B.030 for Functional Classification

applications. See the table of the Minimum Street Design Standards for design criteria.

A. Alignment. Alignment of boulevards, arterials, and collectors shall conform to the Transportation Comprehensive Plan. The City of Lacey Public Works Director shall approve deviations to the Transportation Comprehensive Plan.

B. Grade. Street grade should conform closely to the natural contour of the land. In some cases a different grade may be required by the City Engineer. See table of Minimum Street Design Standards for specifics.

C. Width. The pavement and right-of-way width depend on the street classification and functional requirements. See street details for specifics. Road widths shall be measured from face-of-curb to face-of-curb on all streets.

D. The General Notes on the following page shall be included on any plans dealing with street design in addition to all applicable requirements in Chapter 3.040.

GENERAL NOTES (STREET CONSTRUCTION)

1. See appropriate detail for specifications for joining new and existing asphalt.

2. Compaction of subgrade, rock, and asphalt shall be in accordance with the most current adopted version of the *WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction*.

3. Form and subgrade inspection by the City is required before pouring concrete. (See WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction 8-14.3 (1) through (4)). Twenty-four hours notice is required for form inspection.

4. See City of Lacey Development Guidelines and Public Works Standards, Chapter 4B.200, for testing and sampling frequencies.

5. The City manufactures and installs public and private street name signs, and regulatory signs at the contractor's/developer's expense. Other signs that shall be manufactured and installed by the City and paid for by the contractor/developer's will include signs for well sites, tank sites, lift stations, odor control stations, maintenance and/or fire access through an easement. (See 4B.050). Signs shall be requested at the time street construction begins.

6. Material used for all plastic stop lines, plastic crosswalk lines, plastic traffic arrows, plastic traffic letters, plastic legends, and plastic symbols shall be Type B – Pre-formed fused thermoplastic at 120 mil thickness.

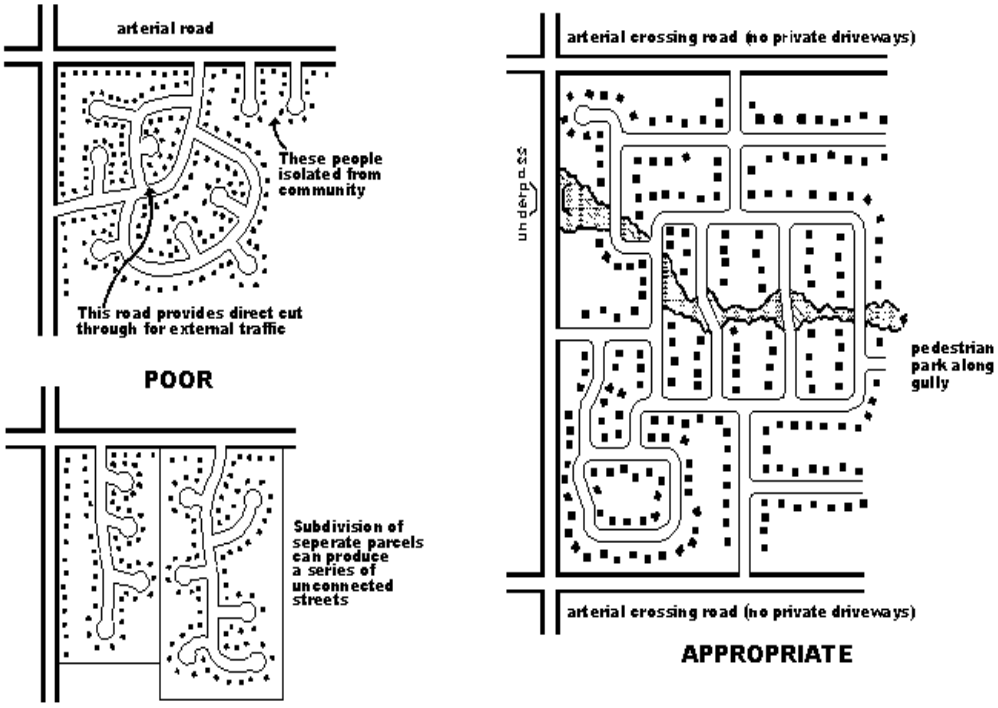
Revised: 03/2014

MINIMUM STREET DESIGN STANDARDS

DESIGN STANDARD	Boulevards	Arterials	Major Collector's	Minor Collector's	Major Local Residential	Minor Local Residential	Private
DESIGN LIMITATIONS	Access and intersections are limited.				Access limited to one driveway per SF residential lot.		
MINIMUM STRUCTURAL DESIGN	See Details 4-6.1 through 4-6.2						
MINIMUM RIGHT-OF-WAY	See Details 4-1.0 through 4-5.1						
MINIMUM PAVEMENT WIDTH	See Details 4-1.0 through 4-5.1						
PARKING LANE	None allowed	None allowed	Allowed on Type I where bulb-out parking is provided. Prohibited on Type II	Allowed on Type I where bulb-out parking is provided. Prohibited on Type II	Bulb-out parking required except in intersection transition section	Allowed	Optional, depends on easement width
MINIMUM ℄ GRADE	With curb and gutter or concrete roadway, minimum grade 0.5% On ACP roadway with no curb and gutter or curb and gutter on one side only, minimum grade 1.0%						
MAXIMUM ℄ GRADE	7.0%	7.0%	10.0%	10.0%	12.0%	12.0%	12.0%
	7 % regardless of roadway classification in Commercial and Industrial Zones						
CURB	Longitudinal slope minimum 0.5% on tangents Minimum curb return grade to catch basin 1.0%						
SIDEWALKS	See Details 4-1.0 through 4-5.1 and Chapter 4C for width variances						
INTERSECTION CURB RADIUS	The minor intersecting street shall control the curb radii						
W/O MEDIAN	35'	35'	30'	30'	25'	20'	10'
WITH MEDIAN	35'	35'	35'	35'	30'	25'	15'
DESIGN SPEED NEW ROAD	40 mph	40 mph	35 mph	35 mph	25 mph	20 mph	20 mph
DESIGN SPEED EXISTING RDS	5 mph above posted speed limit						
MINIMUM CENTERLINE RADIUS WITHOUT	455' @ 30 mph 630' @ 35 mph 860' @ 40 mph		1,120' @ 45 mph 1,430' @ 50 mph		195' @ 20 mph 305' @ 25 mph	100'	Res. = 100' Com. = 195' Industrial = 195'
INTERSECTION	Use AASHTO for centerline radius restrictions at intersections.						
SUPER-ELEVATION	Requires approval of the Director of Public Works. If allowed, design shall be per AASHTO with the maximum superelevation not to exceed 4%				Not allowed		

4B.025 Access Management

The City has adopted these Access Management guidelines. State facilities shall meet these standards in addition to the access requirements as set forth in RCW 47.50, WAC 468-51, WAC 468-52 and all other applicable RCW's and WAC's. Access Management is a tool to address traffic congestion, crashes, and loss of street capacity. The intent of Access Management is to provide access for land development while preserving the flow of traffic in terms of safety, capacity and speed of travel. Studies show the uncontrolled proliferation of driveways and intersections along a given section of roadway reduces the capacity, increases the number and severity of crashes, and inhibits bicycle and pedestrian usage. In addition, poorly designed entrances and exits cause congestion and create a negative image for a commercial district. See figure below for access management examples.



The benefits of access management include:

- Safety – by reducing the number and severity of crashes;
- Operation – by reducing delays while maximizing the roadway potential capacity;
- Environmental – by lowering the amount of air pollution caused by stop-and-go operation thereby increasing fuel economy;
- Economics – by preserving public investment in the roadway infrastructure, avoiding the need for roadway widening or other roadway improvements.

The objective of Access Management:

- Establish guidelines for location and design of driveways;
- Provide access from public roadways;
- Define an access control hierarchy for all roadways;
- Regulate access location and design; intersections, signal and access spacing standards; corner clearances; joint and cross access; functional areas of an intersection; and medians;
- Provide connectivity between neighborhoods and adjoining land uses.

A. Definitions

For the purpose of Access Management, the following definitions shall apply:

"Curb Cut" – An access without a curb radius. Generally used on private streets and driveways.

"Curb Return" – An access with a turning curb radius and constructed to full Americans with Disability Act (ADA) standards. Curb returns shall be installed on all public streets. Private streets and commercial driveways may be evaluated on a case by case basis.

"Road or Driveway" – A traveled surface used to represent an access point onto the roadway. In this Chapter, road and driveway are treated the same; both are access points.

B. Determination of Access Classification

Determination of Access shall be the responsibility of the City. The developer shall provide the following information along with recommendations to assist the City in determining access locations:

1. Local land use plans, zoning, and land development regulations as set forth in adopted comprehensive plans.

2. The current and potential functional classification of the roadway. See Chapter 4B.030.

3. Existing and projected traffic volumes, accident history, and other operational considerations.

4. Existing and projected state, local, and regional planning organization transportation plans and needs, including considerations of new or improved facilities.

5. Drainage requirements.

6. The physical features of lands adjoining the roadway.

7. The type and volume of traffic requiring access.

8. The availability of alternative connections to the existing roadway network.

9. The cumulative effect of existing and projected connections on the roadway's ability to provide safe and efficient movement of people and goods.

C. Access Spacing

Minimum access spacing provides drivers with sufficient perception-reaction time to address one potential conflict area at a time. Access points shall be located to reduce the possibility of weaving, lane shifts, or other conflicts in the traffic stream. Existing access on both sides of the roadway shall be analyzed to determine proper location for a new access. Spacing is important to the safety and capacity of a roadway, as well as the appearance of a corridor. Bicyclists and pedestrians will benefit from the reduced conflicts generated by excessive access points. The following guidelines shall be used for minimum spacing between access points.

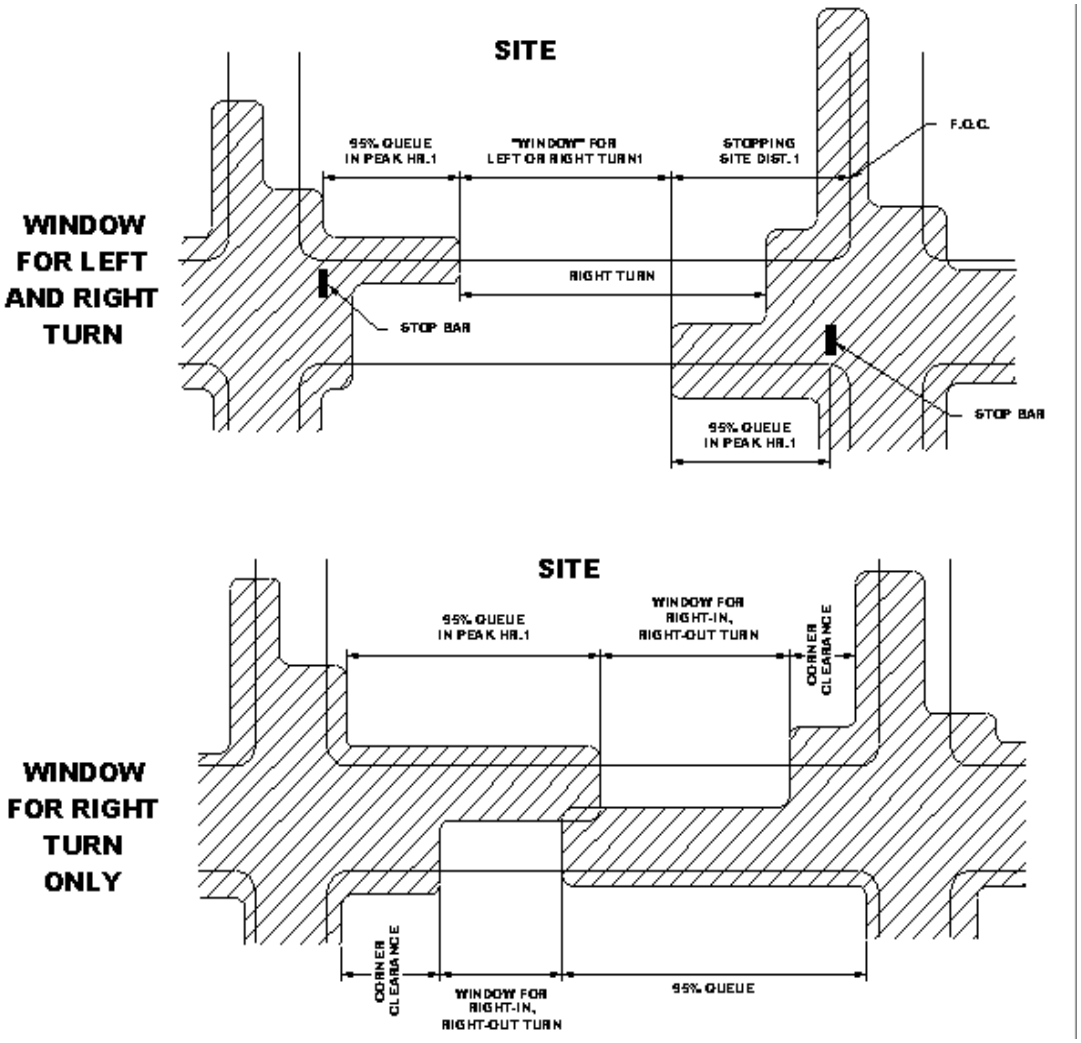
Functional Classification	**Access Spacing**
Boulevard	1320 feet
Arterial	660 feet
Collector	330 feet
Collectors in Business Districts	165 feet

The spacing standards are for full access. Restricted access (right-in, right-out), shall be half the amount shown in the table above provided that the requirements in 4B.025E, Medians, can be met.

If the spacing requirements and the connectivity requirements as outlined in this Chapter cannot be met, the access shall be designed using the objectives herein and as approved by the City. All distances given in this Chapter are measured centerline to centerline.

D. Functional Area

The functional area of an intersection is defined as the area beyond the physical intersection that comprises decision and maneuver distance plus any required vehicle storage length. The "clear area" between functional areas can be defined as the "window" in which direct access can be provided. The figure below illustrates an available window. The greater the window, the greater the flexibility in site circulation design.



The higher the speed of traffic or traffic volume, the longer the functional area needs to be. The functional area of nearby intersections determines where direct access can be provided without creating safety and congestion problems.

As the intersection functional areas become closer, direct access may be limited to right-in, right-out only. If no access window is available, site access

should only be provided to secondary roads. For specific design criteria, use the ITE *Traffic Engineering Handbook*, most current edition.

See 4B.140, Driveways, for corner clearance restrictions within the functional area of an intersection. See 4B.025E for Median opening restrictions within an intersection functional area.

E. Medians

Raised or landscaped medians in the center of a road separate opposing lanes of traffic, and shall be used to restrict turning and crossing movements. Studies show thoroughfares with raised medians are safer than undivided roads with center two-way left turn lanes. Medians prevent head-on collisions and also provide a refuge for pedestrians as they cross the roadway.

Median openings shall not occur within the functional area of an intersection. See 4B.025D for more information on Functional Areas. See 4B.140 for driveway restrictions in the functional area of an intersection. A double yellow center stripe is required 12 inches off the face of the median curb.

Medians are required as specified on the applicable roadway detail at the end of this Chapter. Medians shall be designed so as not to limit turning radius or sight distance at intersections. A non-restrictive median or two way left turn lane may be used when special conditions exist. Medians shall be formed with a WSDOT Standard Plan F1 Cement Concrete Barrier Curb or Mountable Cement Concrete Curb as applicable. Placement of the curbs shall be based on the State Design Manual requirements. Landscaping shall be installed when directed by the City Engineer. Irrigation shall be installed per Chapter 6.210.

When retrofitting existing sites where medians cannot be installed because of limited right-of-way, barrier curbs between opposing lanes of traffic shall be installed. The use of a concrete barrier island used to divert traffic (i.e. a “pork chop” shaped barrier) restricting turns to

Right-in, right-out only, is generally not effective unless combined with a barrier curb or other appropriate treatment as determined by the City Traffic Engineer.

Reflective tubular plastic delineators and raised pavement markers shall be included with any curb or other raised features constructed within the roadway. Delineators shall be installed at the nose ends of these curbs.

4B.030 Functional Classification and Connectivity

Roadway hierarchy based on functional classification provides a network of streets based on distinct travel movements and the service they provide. Roadway layout shall be based primarily on the safety, efficiency of traffic flow, and functional use of the roadway. Roadways are divided into boulevards, arterials, major and minor collectors, major and minor local residential, private streets, and alleys.

Roadways of all classifications shall be planned to provide for connectivity of existing and proposed streets in relation to adjoining parcels and possible future connections as approved by Public Works. New development roadway systems should be designed so as to minimize pedestrian travel to bus stops.

Boulevards and arterials are intended for the efficient movement of people and goods and have the highest level of access control. They have limited access and accommodate controlled intersections. Boulevards and arterials have been identified in the most current adopted version of the *City of Lacey Transportation Plan*. The City Traffic Engineer will classify all new roadways.

Collectors generally connect commercial, industrial, and residential projects to other collectors, arterials and boulevards and have a moderate level of access control. Minor collectors may be used if turn lanes are not required. If the collector connects to another collector or to an arterial, the roadway shall be a major collector. The City will determine if a collector is a major or a minor, type I or type II, based on a review of the development potential of all contributing properties, the existing right-of-way if it is an existing roadway, and the necessity of turn lanes. Auxiliary left turn lanes are desired when connecting to boulevards, arterials, and major collectors. Collectors are identified in the most current adopted version of the *City of Lacey Transportation Plan*. The City Engineer, in conjunction with the County Engineer, will classify all new roadways within the UGA.

Major and minor local residential streets shall interconnect with each other and with minor collectors and have a minimum level of access control. If the local residential street connects to a major collector or to an arterial, the street shall be a major local residential. Major local residential streets shall not transition into any other classification of roadway. Primary routes of travel shall be major local residential streets. High density, multi-family projects shall be served by a major local residential. In such developments, connectivity shall be a key design factor, although the internal flow shall be discontinuous to discourage cut-through traffic movement and excessive speed. Traffic calming techniques shall be designed into all residential subdivisions. The pedestrian network shall be paramount in the residential roadway network. Safety is always the major consideration when determining intersection locations and connectivity.

Minor local residential streets serve as land access from residences and generally connect with major local residential and minor collectors. Minor local residential streets are intended to serve low volumes and do not provide primary connectivity through the neighborhood.

Alleys in residential neighborhoods are encouraged. Alleys shall be limited to one block in length terminating with a public street on each end. Alleys shall parallel the adjacent public roads unless approved by the City.

4B.035 Traffic Impact Analysis

STANDARDIZED FORMAT FOR TRAFFIC IMPACT ANALYSIS

A. INTRODUCTION

A Traffic Impact Analysis (TIA) is a specialized study of the impacts that development will have on the transportation system. The traffic impact analysis is an integral part of the environmental review process and specifically analyzes the generation, distribution, and assignment of traffic to and from the proposed development.

The purpose of a TIA is:

- to determine the impacts of new development traffic on the existing and proposed street network;
- to determine the layout and design of the proposed roadway system;
- to determine if the new development can meet the concurrency aspects of the Growth Management Act;
- and to determine the appropriate traffic mitigation for the development.

"Development" means a subdivision, short subdivision, binding site plan, or conditional use permit proposal to substantially intensify the use of existing land or structures, or make additions to existing structures other than one or two family residential structures, or any proposed project requiring Site Plan Review pursuant to LMC 16.84. The term shall not include individual one or two family residential lots within plats as described in LMC 14.21.050.

These guidelines have been prepared to establish the requirements for a Traffic Impact Analysis. The Site Plan Review Committee (SPRC) and/or the Environmental Review Committee (ERC) under the review authority of LMC 14.21 are responsible under SEPA and City Ordinances for determining the need for a Traffic Impact Analysis. The Public Works Department will approve the scope of work, review the Traffic Impact Analysis and make recommendations to the SPRC and/or ERC.

All reports shall be submitted in a professional format that can be interpreted by all departments. Exhibits shall include a border with a title block identifying the project and a description with legible text clearly identifying all items. Exhibits shall be constructed with an approved graphical software.

B. WHEN REQUIRED

To adequately assess traffic impacts on the transportation system the Environmental Review Committee (ERC) may require a Traffic Generation Worksheet be prepared to determine if a Traffic Impact Analysis (TIA) or Traffic Mitigation is required.

A full or partial Traffic Impact Analysis may be required if any of the following conditions are met:

1. The "Development" lies within the Transportation Improvement Plan Area established in the Lacey Municipal Code Section 14.21.

2. The "Development" will generate more than 50 PM Peak Hour Trips.

3. The "Development" will generate more than 100 Peak Hour trips at a time other than PM Peak Hour.

4. The Public Works Department is unable to determine the Traffic Generation characteristics of the Development.

5. The Developer feels further traffic analysis may clarify questions about the identified traffic mitigation assessment for the project.

6. The "Development" access to the roadway network may create an impact as determined by the Public Works Department.

7. The “Development" impacts an area identified by the Public Works Department that cannot meet the concurrency requirements of the Growth Management Act.

8. The "Development" may potentially affect the implementation of the street system outlined in the Transportation element of the

Comprehensive Plan, the Transportation Improvement Program, or any other documented transportation project.

9. If modifications are required to the original TIA that is more than two years old, or where the increase in traffic volume as measured by ADT, peak hour, or peak hour of the critical movement is more than 10%.

10. The "Development" may have an impact to the roadway or transportation system as determined by the Public Works Department.

If the SPRC/ERC requires a TIA, the general guidelines for content and structure shall follow the format outlined herein.

C. QUALIFICATIONS FOR PREPARING TIA DOCUMENTS

The Traffic Scoping or the TIA shall be prepared and stamped by an engineer licensed to practice in the State of Washington with special training and experience in traffic engineering and who preferably is a member of the Institute of Transportation Engineers (ITE). The developer shall provide the Public Works Department the credentials of the individual(s) selected to perform the report.

D. SCOPING REPORT

If a Traffic Impact Analysis is required, the Engineer shall submit 5 copies of a Scoping Report to the Department of Community Development to assist the City of Lacey in the development of the scope of work for the TIA. The Scoping Report shall include all items in the following checklist:

- ☐ Traffic Scoping Information Worksheet (see following pages)
- ☐ Project Size in Square Feet and Acres
- ☐ General Location
- ☐ Proposed Use
- ☐ Number of Lots or Units
- ☐ Phasing Plan
- ☐ Trip Generation
- ☐ Daily Trips
- ☐ PM Peak Hour Trips
- ☐ Year of Occupancy (Horizon year of project)
- ☐ Land Use Code

- ☐ Ambient Growth (use 4%)
- ☐ Approved Development Projects in the Vicinity
- ☐ Intersections Impacted by 20 or more PM trips
- ☐ A reduced copy of the "Site Plan" showing the type of development, street system, right-of-way limits, proposed access points, and other features of significance in the Development. The "Site Plan" shall also include pertinent "off-site" information such as dimensioning to all existing intersections and driveways with the existing channelization, land use descriptions, street right-of-way limits with respect to the existing roadway and other features of significance. Exhibit "B" illustrates an example site plan for reference purposes.
- ☐ A graphical distribution map showing site generated PM peak hour traffic from the latest version of the Thurston Regional Planning Council's Traffic Model. Generally, traffic shall be distributed to one PM peak trip within the Transportation Plan Area. This map shall clearly identify all traffic movements and the percentage of site traffic. Include a copy of an approved link-node map or identify the Traffic Analysis Zone (TAZ) of the generic distribution used. Exhibits "E" and "F" illustrate examples of distribution maps. Exhibit "G" illustrates an example of the link-node map.
- ☐ Name, address and phone number of project developer and traffic consultant.
- ☐ If streets or intersections affected are in the neighboring jurisdictions of the City of Olympia, the City of Tumwater, Thurston County, or Washington State Department of Transportation, identify issues that may impact those jurisdictions.

The Scoping Report will be used to develop the scope of work for the Traffic Impact Analysis.

Traffic Scoping Information Worksheet (Include Site Plan)
Project Information

Project Title: _____
Project Description: _____
Parcel Number(s): _____
Trip Generation: _____

Quantity	Units	Land Use Code and Description	Daily Generation Rate	AM Generation Rate	PM Generation Rate	Proposed Pass-by Rate

Total PM Peak Hour Trips:

New PM Peak Hour Trips:

Total AM Peak Hour Trips:

Total Daily Trips:

Year of Occupancy (Horizon Year of Project):

Phasing Plan:

_____

Identify all intersections that are affected by more than 20 new PM Peak Hour Trips: Use additional sheets if necessary.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Include: Name, address, phone number and fax number of project developer and traffic consultant. Include site plan showing all existing roadways and driveways.

E. TRAFFIC IMPACT ANALYSIS

The level of detail and scope of work of a TIA may vary with the size, complexity, and location of the "Development". A TIA shall be a thorough review of the immediate and long-range effects of the "Development" on the transportation system.

1. Prospectus

a) Provide a “Vicinity Map” of the project area showing the transportation system to be impacted by the development. Exhibit “A” illustrates an example of a vicinity map.

b) Provide a reduced copy of the “Site Plan” showing the type of development, street system, right-of-way limits, proposed access points, and other features of significance in the Development. The “Site Plan” shall also include pertinent “off-site” information such as dimensioning to all existing intersections and driveways with the existing channelization, land use descriptions, and street right-of-way limits with respect to the existing roadway and other features of significance. Exhibit “B” illustrates an example site plan.

c) Discuss specific development characteristics such as type of development proposed (single-family, multi-family, retail, industrial), internal street network, proposed access locations, parking requirements, zoning, and other pertinent factors attributable to the "development".

d) Discuss project completion, phasing plan and occupancy schedule for the "development". Identify horizon years for traffic analysis purposes.

2. Existing Conditions

a) Discuss street characteristics including functional classification, number of traveled lanes, lane width, shoulder treatment, posted speed limit, bicycle path corridors, transit routes, transit accessibility and traffic control at study intersections. An Exhibit may be used to illustrate existing transportation facilities.

b) Identify approved nearby land development (planned or under construction) and associated traffic.

c) Identify safety and access issues including discussions on crash potential, sight distance restrictions, traffic control, and pedestrian conflicts.

d) Obtain all available traffic data from the City of Lacey and surrounding jurisdictions if applicable. If data is unavailable, the individual or firm

preparing the TIA shall collect the necessary data to support the discussions and analysis in the TIA.

e) Conduct manual peak hour turning movement counts at study intersections if traffic volume data is more than 2 years old unless otherwise directed by the Public Works Department. A copy of the reduced data shall be attached to the TIA when submitted.

f) An Exhibit shall be prepared showing existing average daily traffic (ADT) and peak hour traffic volumes on the adjacent streets and intersections in the study area. This Exhibit shall represent the "base-line" traffic volumes for analysis purposes. Complete turning movement volumes shall be illustrated as shown in Exhibits "C" and " D".

3. Development Traffic

This element of the TIA shall be conducted to identify the limits of the study area. The study area shall include all pertinent intersections and streets impacted by development traffic. The limits of the study area shall be representative of the specific conditions outlined in the "Scoping Process". The threshold requirement of development traffic is one vehicle in the peak hour on the adjacent streets and intersections. Each intersection and street impacted as described shall be included in the Plan Area for mitigation or analysis purposes.

4. Trip Generation

The methodology and procedures used in preparing the trip generation and trip distribution elements of the TIA are as follows:

Site-generated traffic from the "Development" shall be estimated using the latest edition of the ITE *Trip Generation Manual*. **Average trip rates shall be used for all land-use categories where applicable.** Trip rate equations will only be allowed for those land-uses without average rates. Table formats for trip generation shall not be interpolated. Generally, the consultant shall use individual rates for mixed-use developments.

Variations from the trip rates will be considered in the "scoping process". The consultant shall submit a letter explaining the reason for the variation and all supporting documentation. Trip generation studies shall follow standard ITE guidelines and shall be statistically valid for approval by the Public Works Department.

Site traffic shall be generated for daily A.M. and P.M. peak hour periods. A "passer-by" traffic volume discount for applicable commercial development shall be calculated based on the *Trip Generation Handbook*, most current edition, published by the Institute of Transportation Engineers (ITE). If a comparable use is not identified in the ITE *Trip Generation Handbook*, an independent study of a minimum three comparable uses shall be used. The comparable sites must be

approved by the City. Land uses not identified in the ITE *Trip GenerationHandbook* will typically have a "pass-by" rate between 0% and 25% maximum and shall be consistent with similar land uses approved by the City. If a minimum three comparable uses cannot be identified, the developer may use rates previously approved by the City for similar uses if available. "Pass-by" discounts will not be permitted for residential or office developments.

For multi-use and/or "phased" projects, a trip generation table shall be prepared showing proposed land-use, trip rates, and vehicle trips for daily and peak hour periods and appropriate traffic volume discounts if applicable.

5. Trip Distribution

The Trip Distribution shall be based on the Regional Traffic Model approved by the City Public Works Department. A generic trip distribution is available for each Traffic Analysis Zone within the Urban Growth Management Area. Projects that generate more than 250 PM peak hour trips may be required to generate a project specific distribution.

The City Public Works Department shall approve the trip distribution for a "development" during the formal "scoping process".

A graphical distribution map shall be submitted showing site generated PM peak hour traffic. Generally, traffic shall be distributed to one PM peak trip within the Transportation Plan Area if a generic distribution is not used (20 trips if a generic distribution is used). This map shall clearly identify all traffic movements and the percentage of site traffic. Include a copy of the link-node map or identify the Traffic Analysis Zone (TAZ) if the generic distribution is used. Exhibits "C" through "F" illustrate examples of the distribution maps. Exhibit "G" illustrates an example of the link-node map.

6. Future Traffic Conditions

Future traffic volumes shall be estimated by including a 4% annual growth rate to the existing (base-line) traffic volumes and include all traffic generated by anticipated nearby land development (projects with an approved traffic scope) when forecasting future traffic volumes. The future traffic volumes shall be representative of the year the project development shall be completed (horizon year).

The site-generated traffic shall be assigned to the street network in the study area based on the approved trip distribution. The site traffic shall be combined with the forecasted traffic volumes to show the total traffic conditions estimated at development completion. An Exhibit will be required showing daily and peak period turning movement volumes for each traffic study intersection. Exhibit "F" shows an example. In addition, an Exhibit shall be prepared showing the base-line volumes with site-

generated traffic added to the street network. This exhibit will represent site-specific traffic impacts to existing conditions.

7. Traffic Operations

The Level of Service (LOS) and capacity analysis shall be conducted for each pertinent intersection in the study area as determined by the Public Works Department. The methodology and procedures for conducting the capacity analysis shall follow the guidelines specified in the current version of the *Highway Capacity Manual-Special Report 209*. The individual or firm preparing the TIA shall calculate the intersection LOS for each of the following conditions:

- Existing peak hour traffic volumes (Exhibit required).
- Future traffic volumes not including site traffic (Exhibit required).
- Future traffic volumes including site traffic (Exhibit required).
- Level of Service results for each traffic volume scenario (Table required).

The Level of Service table shall include LOS results for the key peak periods if applicable. The table shall show LOS conditions with corresponding vehicle delays for signalized intersections and unsignalized intersections. The LOS conditions and average vehicle delay shall be provided for each approach and the intersection as a whole.

If the "development" will be completed in phases, the TIA shall conduct a LOS analysis for each separate development phase. The incremental increases in site traffic from each phase shall be included in the LOS analysis for each succeeding year of development completion. An Exhibit will be required for each horizon year of "phased" development.

The capacity analysis shall be conducted using computer software compatible with the Public Works Department's software package. The individual or firm preparing the TIA shall use the latest version of TEAPAC software package~~,~~ for capacity analysis of signalized intersections. SIDRA or latest version shall be used for analysis of modern roundabouts. Other computer software packages used for capacity analysis applications will not be accepted.

If the "development" impacts a traffic signal coordination system, the Public Works Department may require the TIA to include operational analysis of the system. Timing plans and proposed modifications to the coordination system may be required. The latest version of Passer II, Transyt-7F, or Syncro shall be used depending on the signal system. The Public Works Department will determine the appropriate software on a case-by-case basis.

The capacity analyses for each intersection shall be analyzed using the existing timing and phasing for both existing and future volumes. If the intersection runs

free during the analysis period, phasing shall remain the same and existing minimums shall not be violated. All traffic signal system operational data will be made available by the Public Works Department and adjacent jurisdictions if applicable.

Generally, default values identified in the *Highway Capacity Manual-Special Report 209* shall be used in the analysis. The following values shall be used:

- Peak Hour Factor (PHF) shall be calculated for each intersection. At no time shall the PHF be higher than 0.90, regardless of the calculated value.

- Right Turn On Red (RTOR) shall not be used unless the approach has an exclusive right turn lane. If the approach has a right turn lane the maximum value shall be 100 vehicles per hour, unless approved by the Public Works Department.

Include turning movement volumes in the report. The latest City counts shall be used if available. If not, an independent count must be submitted in graphical format similar to the City's format.

A disk of the analysis model and a hard copy explanation of the scenarios by filename or line number are required. The computer worksheets that identify the input and output data shall be included in a technical appendix along with an electronic version of the program data of each capacity analysis.

For unsignalized intersections, the *Highway Capacity Manual* methodology shall be used in the analysis. If the intersection or a particular movement fails, a signal warrant analysis shall be completed for the intersection.

8. Access Management

Requests for site access shall be addressed in the Traffic Impact Analysis. Recommendations shall include site access and transportation improvements needed to maintain traffic flow to, from, within, and past the site at an acceptable and safe level of service.

Areas to address include:

- Separate conflict areas. Reduce the number of access points or increase their spacing so conflict areas or maneuver areas do not overlap.
- Limit the type of conflict areas by preventing certain maneuvers.
- Remove turning vehicles or queues from through lanes
- Safety of a proposed access (sight distance both horizontally and vertically), including pedestrian features.

- Reduce the speed differential in through lanes between through vehicles and turning vehicles.
- Consider the impact of access points on adjacent or nearby properties on both sides of the roadway.

Improvements include such things as: relocation, restriction, or elimination of access point; roadway widening; turning lanes; traffic signals; modern roundabouts; and pedestrian facilities.

9. Traffic Calming

Internal traffic calming shall be incorporated into all developments to control cut through traffic and reduce speed within the development. The Traffic Impact Analysis shall identify and propose specific traffic calming measures and locations to be incorporated in the development. Traffic calming shall be aesthetically pleasing. Public transportation shall also be evaluated. The traffic-calming plan shall include an overall drawing of the development and identify specific locations and features to be included in the development. The proponent's Traffic Engineer shall work with the Public Works Department to develop a traffic-calming plan for the development.

10. Alternate Modes of Transportation

Identify deficiencies in other modes of travel and strategies to encourage these alternate modes. New developments are encouraged to implement Transportation Demand Management practices. An Exhibit should be prepared to identify existing transit routes and stops, bicycle lanes and sidewalks within the vicinity of the development. The Traffic Impact Analysis shall identify deficiencies in the system to be mitigated.

11. Mitigation

The Traffic Impact Analysis shall include a proposed mitigation plan. The mitigation may be either the construction or financial commitment of the necessary improvements, or contributions to the City for the "developments" proportionate share of the improvements.

The Level of Service standards shall be used as the threshold for determining appropriate mitigating measures in the study area. The adopted level of service standards are as follows:

1. Lacey Core Area -- LOS E
   The Lacey Core Area is defined as that area bounded by the northerly right-of-way line of Martin Way, the southerly right-of-way line of Lacey Boulevard, the westerly City limit line, and the easterly right-of-way line of Carpenter Road.

2. All areas other than the Lacey Core Area -- LOS D

The following guidelines shall be used to determine appropriate mitigating measures of traffic impacts generated by the development.

A. To maintain the adopted Level of Service standard, the "development" shall provide a financial guarantee or construct improvements to maintain the level of service at or above the adopted standard. This improvement must be consistent with the City's *Transportation Comprehensive Plan* goals and policies.

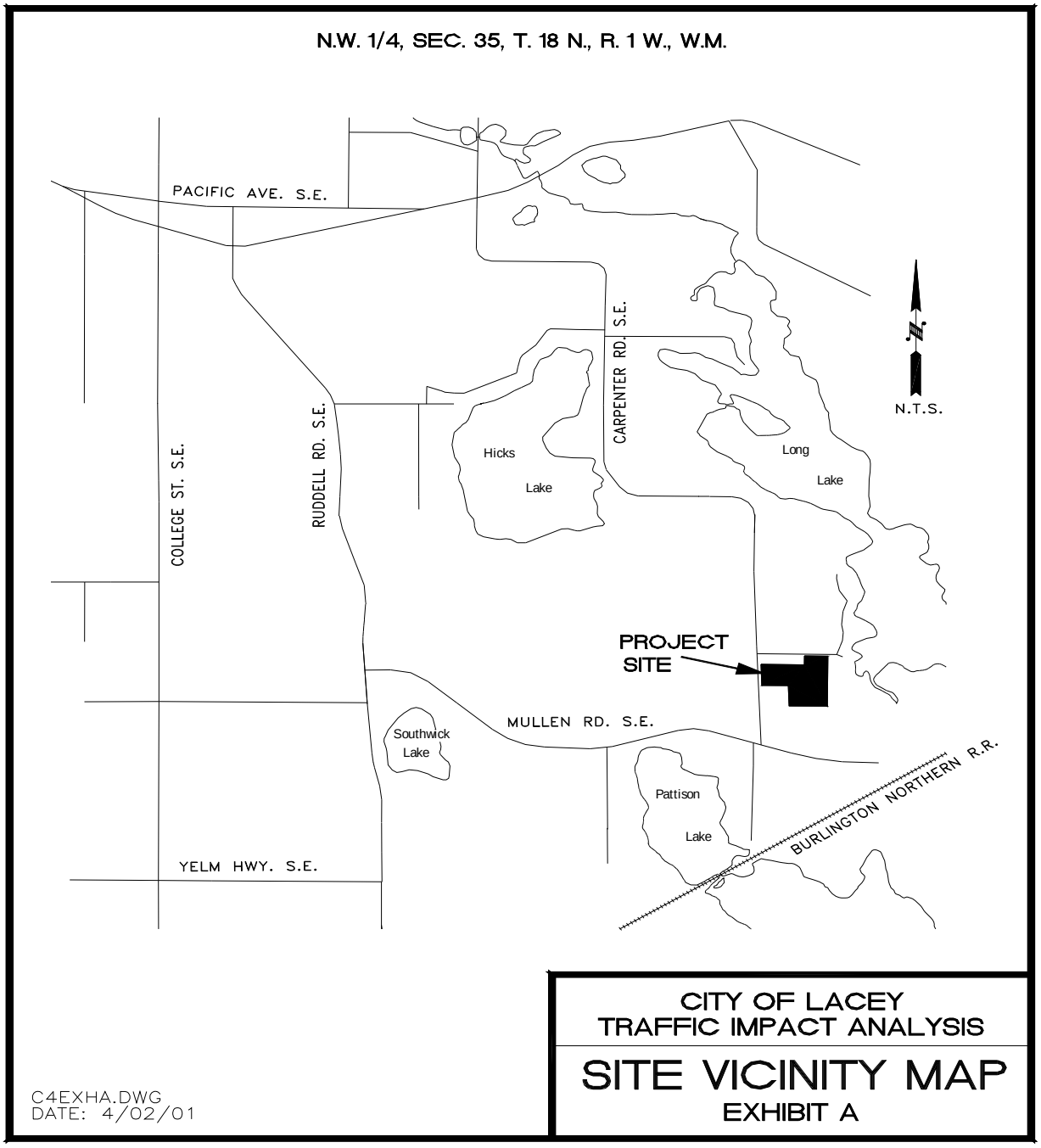
B. For affected transportation facilities identified in Lacey Municipal Code 14.21, the "development" will mitigate impacts by providing a proportionate share of the project cost on a per trip basis (LMC 14.21). The mitigation plan shall identify which payment option is proposed for the development. The Public Works Department will calculate the mitigation amount based on an approved distribution.

   Transportation facilities affecting neighboring jurisdictions shall mitigate the impacts based on a per trip methodology approved by the jurisdiction.

C. On transportation facilities where the existing Level of Service condition is less than the adopted LOS standard and where no improvements are programmed to improve capacity and traffic operations, the "development" shall mitigate the intersection to an acceptable Level of Service condition or wait until the improvements are implemented.

   If the analysis identifies a LOS deficiency for an unsignalized intersection that is not programmed for an improvement, alternate roadway connections or non-controlled intersection improvements approved by the Public Works Department shall be appropriate mitigating measures. A controlled intersection (traffic signal, modern roundabout) to alleviate a LOS deficiency is not required. If sufficient alternate routes exist as determined by the Public Works Department mitigation will not be required.

   If there are no alternatives to installation of a controlled intersection, and three or more traffic signal warrants, as outlined in the MUTCD *(Manual on Uniform Traffic Control Devices)* are satisfied within the horizon year of the development, a traffic signal or modern roundabout will be required as a mitigating measure for the "development".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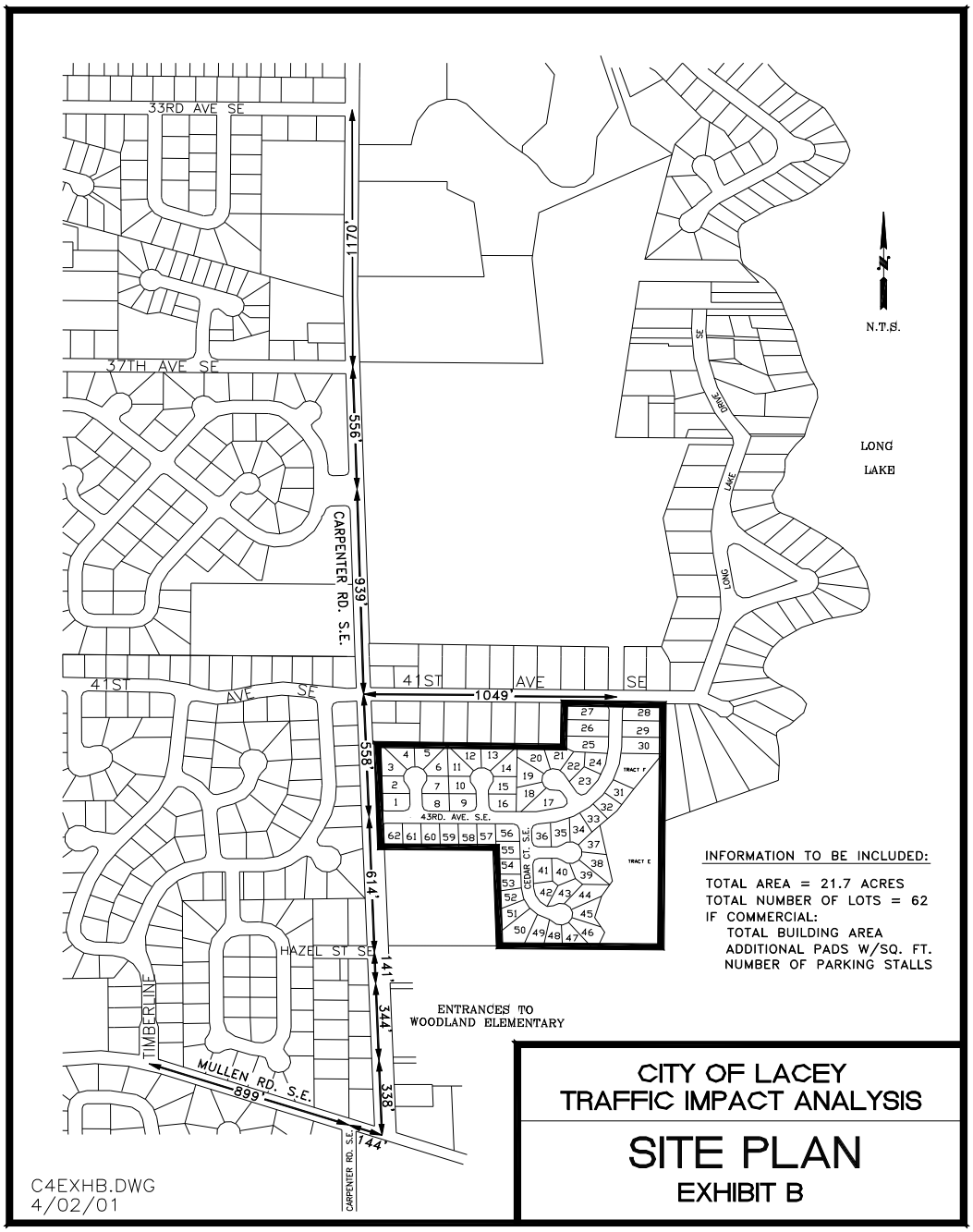
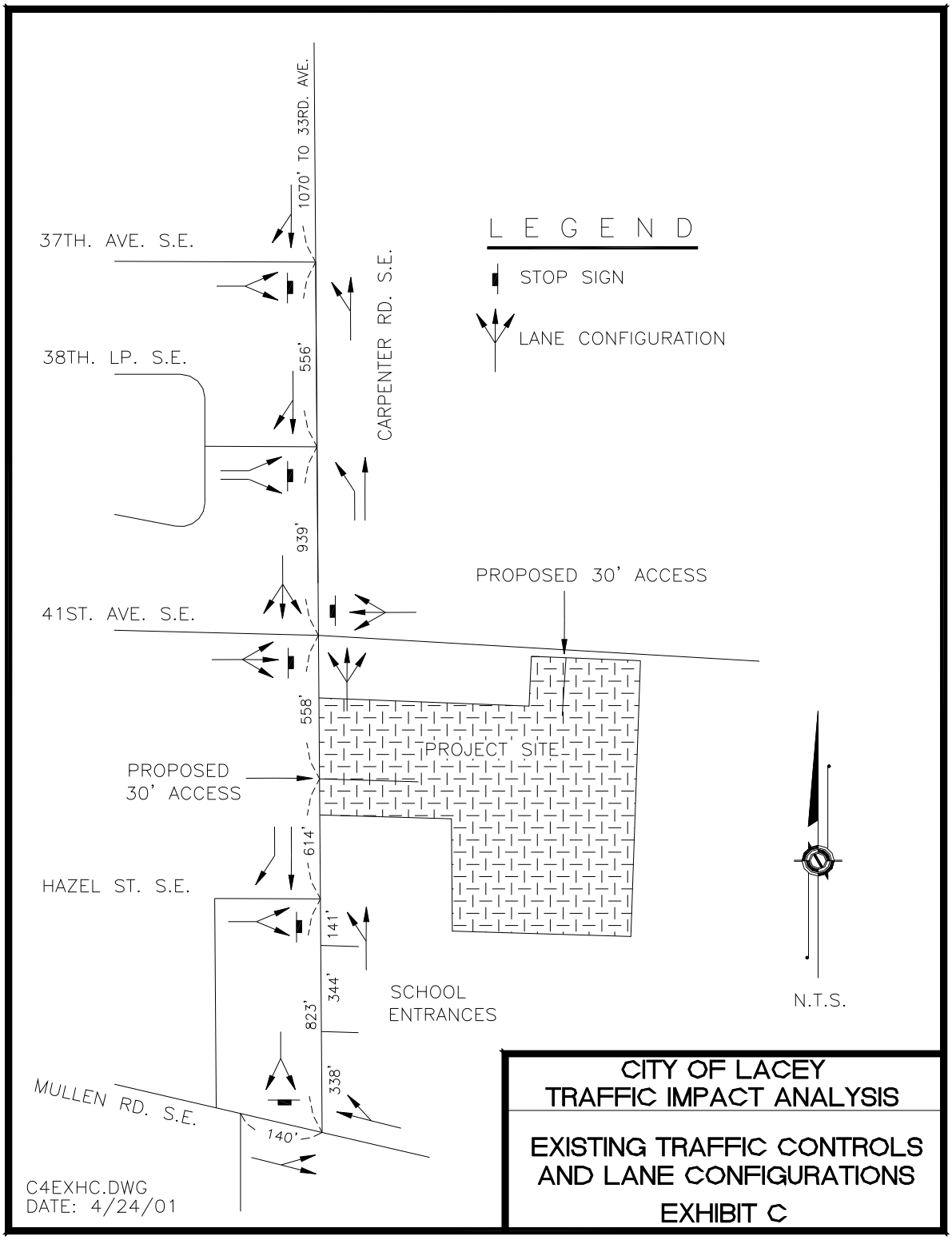
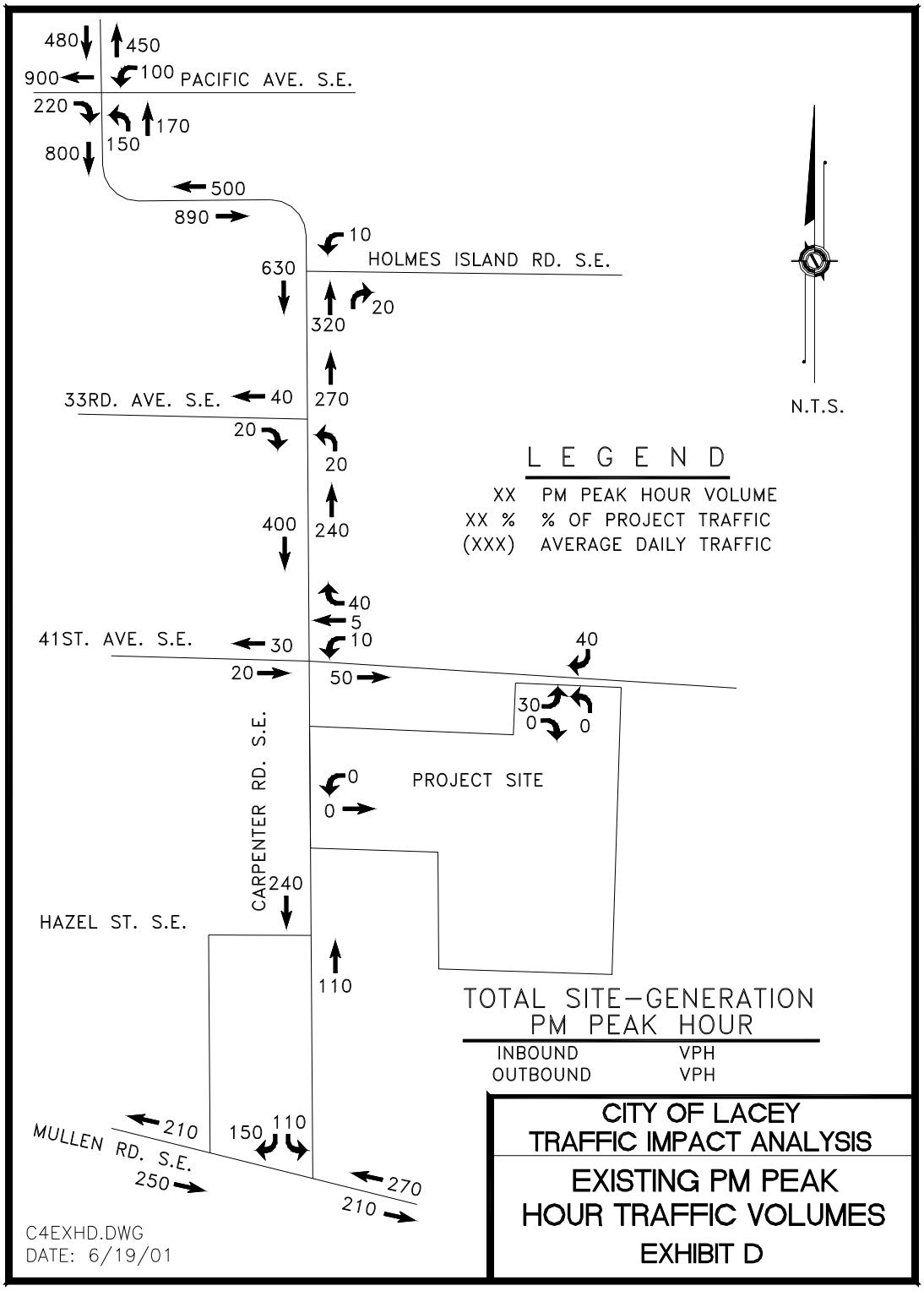
PACIFIC AVE. S.E.
COLLEGE ST. S.E.
RUDDELL RD. S.E.
CARPENTER RD. S.E.
Hicks
Lake
Long
Lake
N.T.S.
PROJECT
SITE
MULLEN RD. S.E.
Southwick
Lake
Pattison
Lake
BURLINGTON NORTHERN R.R.
YELM HWY. S.E.
C4EXHA.DWG
DATE: 4/02/01
CITY OF LACEY
TRAFFIC IMPACT ANALYSIS
SITE VICINITY MAP
EXHIBIT A


33RD AVE SE
37TH AVE SE
41ST AVE SE
41ST AVE SE
CARPENTER RD. S.E.
HAZEL ST SE
TIMBERLINE
MULLEN RD. S.E.
CARPENTER RD. S.E.
43RD. AVE. S.E.
CEDAR CT. S.E.
TRACT F
TRACT E
LONG LAKE DRIVE SE
1170'
556'
939'
1049'
558'
614'
141'
344'
338'
899'
144'
N.T.S.
LONG LAKE
ENTRANCES TO WOODLAND ELEMENTARY
INFORMATION TO BE INCLUDED:
TOTAL AREA = 21.7 ACRES
TOTAL NUMBER OF LOTS = 62
IF COMMERCIAL:
TOTAL BUILDING AREA
ADDITIONAL PADS W/SQ. FT.
NUMBER OF PARKING STALLS
C4EXHB.DWG
4/02/01
CITY OF LACEY
TRAFFIC IMPACT ANALYSIS
SITE PLAN
EXHIBIT B


1070' TO 33RD. AVE.
37TH. AVE. S.E.
LEGEND
STOP SIGN
LANE CONFIGURATION
CARPENTER RD. S.E.
38TH. LP. S.E.
556'
939'
PROPOSED 30' ACCESS
41ST. AVE. S.E.
558'
PROJECT SITE
PROPOSED
30' ACCESS
614'
HAZEL ST. S.E.
141'
344'
823'
SCHOOL
ENTRANCES
N.T.S.
338'
MULLEN RD. S.E.
140'
C4EXHC.DWG
DATE: 4/24/01
CITY OF LACEY
TRAFFIC IMPACT ANALYSIS
EXISTING TRAFFIC CONTROLS
AND LANE CONFIGURATIONS
EXHIBIT C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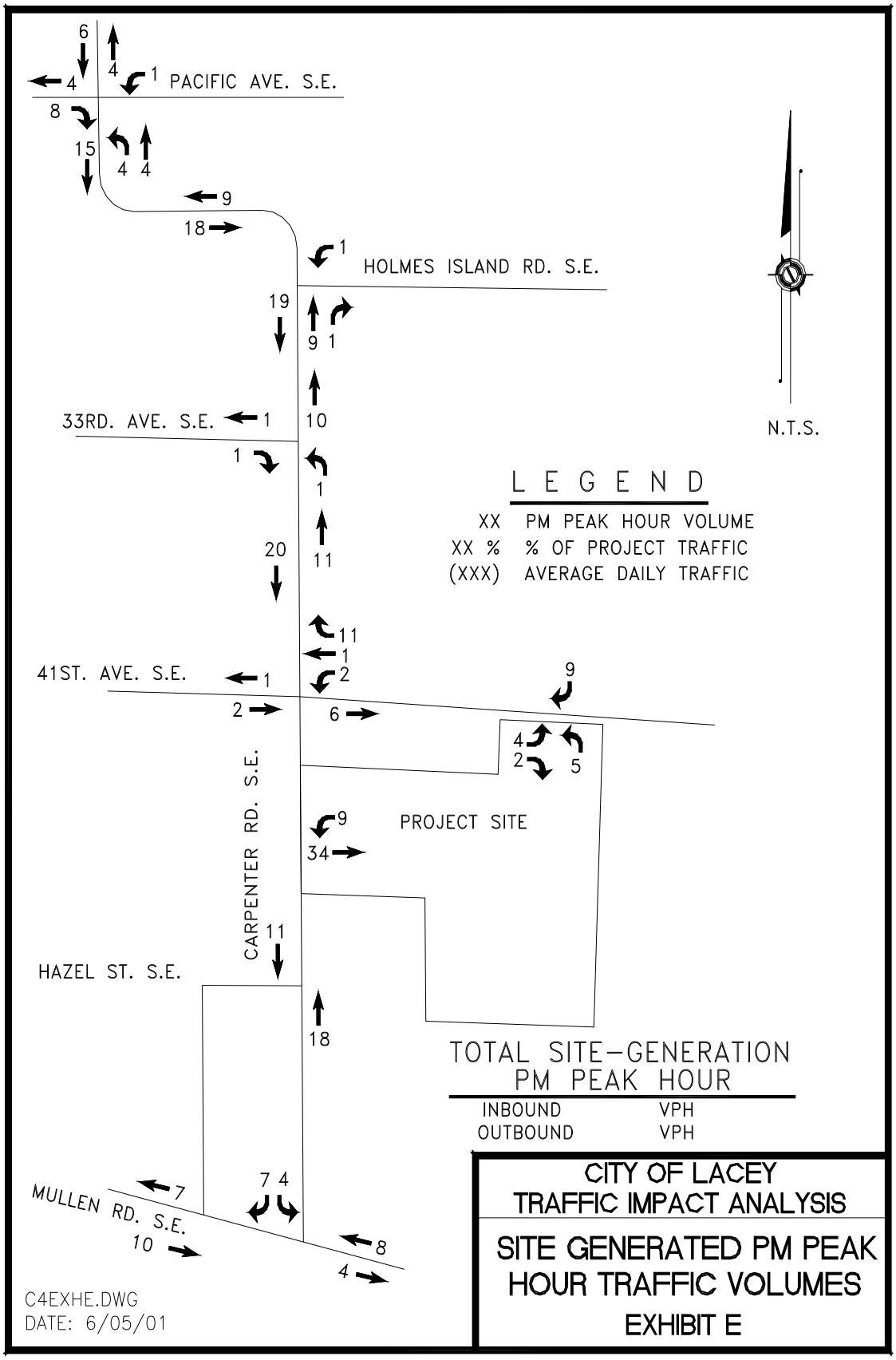
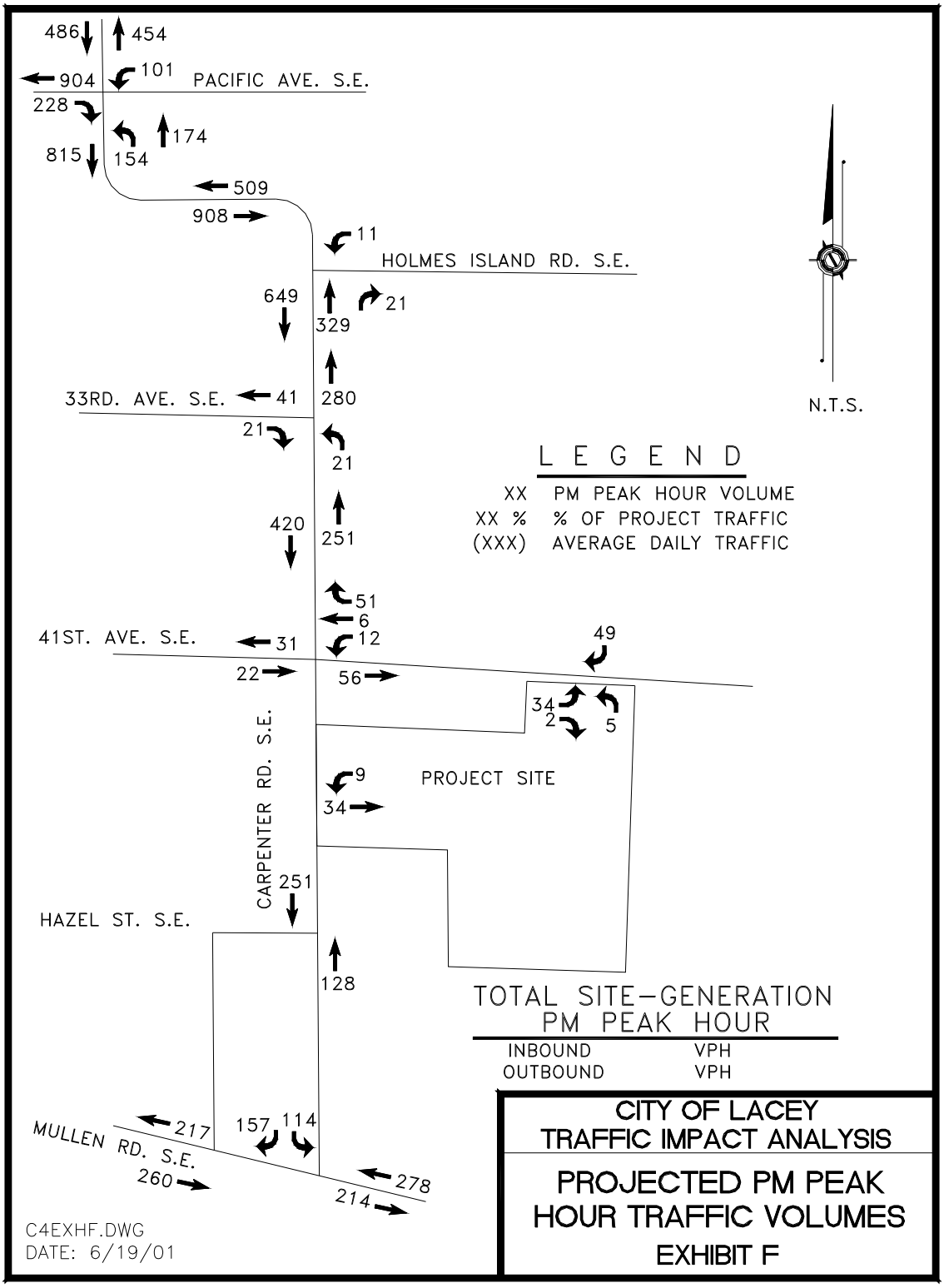
450
900
100
PACIFIC AVE. S.E.
220
170
150
800
500
890
10
HOLMES ISLAND RD. S.E.
630
320
20
33RD. AVE. S.E.
40
270
20
20
400
240
40
5
41ST. AVE. S.E.
30
10
40
20
50
30
0
0
CARPENTER RD. S.E.
0
PROJECT SITE
0
240
HAZEL ST. S.E.
110
MULLEN RD. S.E.
210
150
110
250
270
210
N.T.S.
LEGEND
XX PM PEAK HOUR VOLUME
XX % % OF PROJECT TRAFFIC
(XXX) AVERAGE DAILY TRAFFIC
TOTAL SITE-GENERATION
PM PEAK HOUR
INBOUND VPH
OUTBOUND VPH
C4EXHD.DWG
DATE: 6/19/01
CITY OF LACEY
TRAFFIC IMPACT ANALYSIS
EXISTING PM PEAK
HOUR TRAFFIC VOLUMES
EXHIBIT D

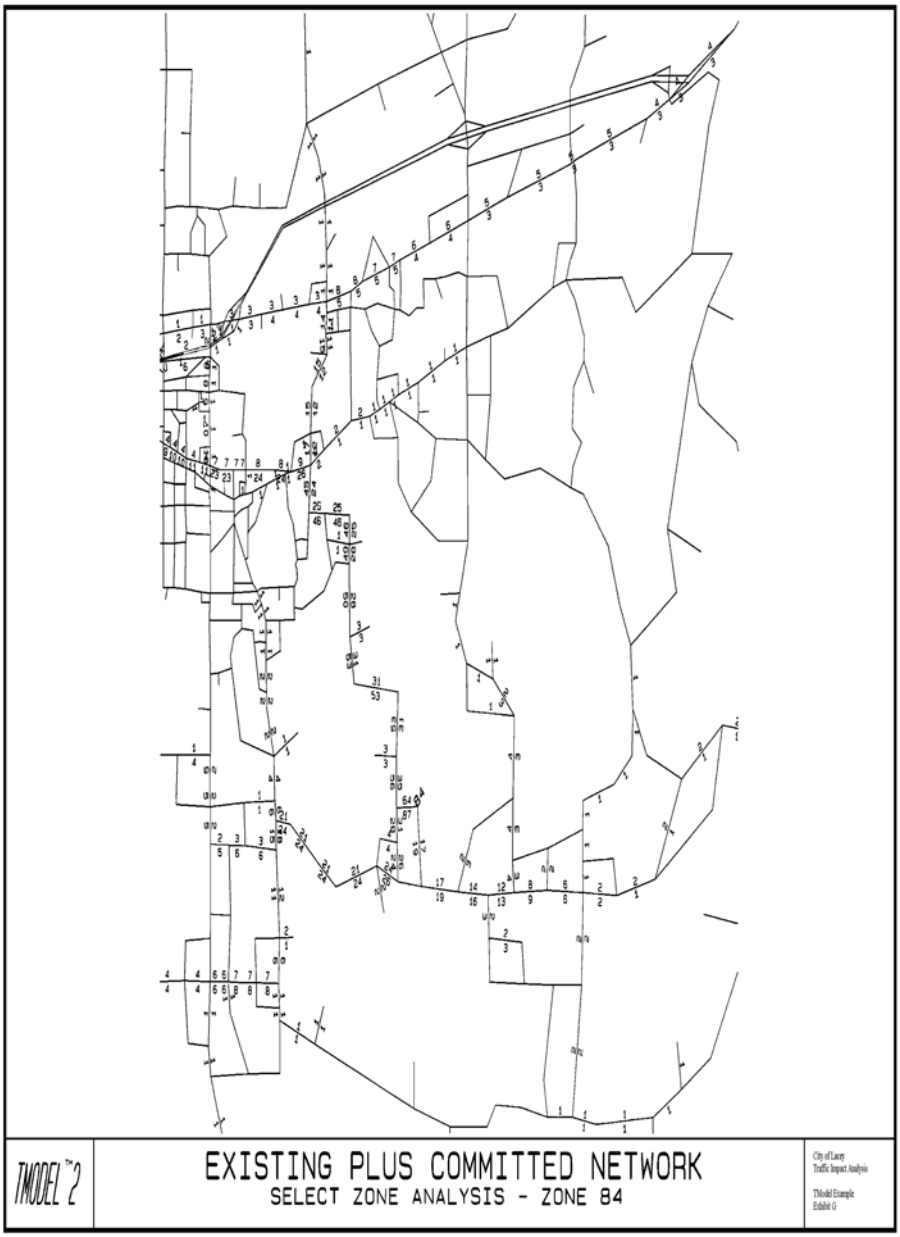


CITY OF LACEY
TRAFFIC IMPACT ANALYSIS

SITE GENERATED PM PEAK HOUR TRAFFIC VOLUMES

EXHIBIT E


486
454
904
101
PACIFIC AVE. S.E.
228
174
815
154
509
908
11
HOLMES ISLAND RD. S.E.
649
329
21
33RD. AVE. S.E.
41
280
21
21
N.T.S.
LEGEND
XX PM PEAK HOUR VOLUME
XX % % OF PROJECT TRAFFIC
(XXX) AVERAGE DAILY TRAFFIC
420
251
51
6
41ST. AVE. S.E.
31
12
49
22
56
34
2
5
CARPENTER RD. S.E.
9
PROJECT SITE
34
251
HAZEL ST. S.E.
128
TOTAL SITE-GENERATION
PM PEAK HOUR
INBOUND VPH
OUTBOUND VPH
MULLEN RD. S.E.
217
157
114
260
278
214
C4EXHF.DWG
DATE: 6/19/01
CITY OF LACEY
TRAFFIC IMPACT ANALYSIS
PROJECTED PM PEAK
HOUR TRAFFIC VOLUMES
EXHIBIT F


TMODEL™2
EXISTING PLUS COMMITTED NETWORK
SELECT ZONE ANALYSIS - ZONE 84
City of Lacey
Traffic Impact Analysis
TModel Example
Exhibit G

4B.040 Naming

Streets and roads shall be named according to specific criteria. Street names shall be limited to 12 characters including spaces but excluding the roadway designation and quadrant (SE, NE). All streets lying north of Martin Way are designated northeast (NE). The remainder of the streets in the City are designated southeast (SE). "Avenues" run east-west and are numbered with the exception of certain long-standing historical names. "Streets" run north-south and are named. "Drives" are irregular or diagonal streets over two grid blocks in length not conforming to the grid pattern. "Roads" shall be a lengthy irregular or diagonal arterial over ten grid blocks in length. Boulevards and Parkways may run north, south, east and west, or diagonally and shall be named. Boulevards and Parkways shall be functionally classed as a major collector or an arterial and shall contain a landscaped median. "Places" shall be a north-south street, parallel to but between streets and shall carry the name of the street immediately to the west. "Ways" shall be an east-west street parallel to and between avenues and shall carry the name of the street immediately to the north. "Courts" shall be a cul-de-sac which cannot be extended. Courts are to be named or numbered and carry the number of the preceding street or avenue. "Loops" shall be small loop-type streets to carry the name of the street from which they originate. "Lanes" shall be private streets. (LMC 12.04.040) Exemptions to street name convention may be allowed with the approval of the City.

An address number will be assigned to all new buildings at the time of final plat, Site Plan Review, or at the time the building permit is issued. It is the owner's responsibility to see that the house numbers are placed clearly and visibly at the main entrance to the property or at the principal place of ingress. (LMC 12.04.080)

The developer must check with the Building Official regarding the naming of streets. This should be done at the time the subdivision is submitted and again upon approval of the subdivision. The Building Official will insure the name assigned to a new street is consistent with policies of the City. (LMC 12.04.070)

4B.050 Signing

The developer or contractor is responsible for providing, installing, and maintaining all construction signs and temporary traffic control devices. These shall comply with the provisions as established by the US Department of Transportation *Manual on Uniform Traffic Control Devices* (MUTCD) and the *WSDOT/APWA Standard Plans For Road, Bridge and Municipal Construction*.

Street signs for public and private roadways, including poles and hardware, will be paid for by the developer but will be approved, furnished and installed by the City to establish uniformity. A written request must be submitted to the City Public Works Department at the time street construction begins and the developer will be billed upon completion.

All regulatory signs shall be high intensity reflectiveness grade. Street designation signs shall display street names and district destinations. (LMC 12.04.060) Street signs shall be U.S. Department of Transportation font series "B" meeting MUTCD standards.

When shortening roadway designations, the street suffixes shall meet U.S. Postal Service standards as shown in the following table.

Roadway Designation	USPS Approved Suffix
Avenue	AVE
Boulevard	BLVD
Court	CT
Drive	DR
Lane	LN
Loop	LOOP
Parkway	PKY
Place	PL
Road	RD
Street	ST
Way	WAY

4B.060 Right-of-Way

Right-of-way shall be dedicated for a subdivision, short subdivision, binding site plan, for a project that triggers Site Plan Review or for a conditional use permit. The requirement to dedicate right-of-way shall be determined by the City or Regional Transportation Plans, by a Traffic Impact Analysis, or as determined by Public Works. Although a right-of-way dedication may be required, frontage improvements may be deferred per chapter 4B.080 of the Development Guidelines.

Regardless of the frontage improvement requirements, right-of-way shall be dedicated in accordance with appropriate street standard identified in the Transportation Comprehensive Plan. Right-of-way dedication shall occur prior to civil plan approval or building permit issuance.

In order to construct improvements in the future, the City requires the right to make and maintain slopes for cuts or fills upon the property adjacent to the right-of-way being dedicated. This is necessary that streets may be graded to the proposed grade level in a reasonable and proper manner. This language shall be included within the right-of-way dedication deed.

Right-of-way is determined by the functional classification of a street. See details at the end of this chapter for specific right-of-way widths. See 4B.090 for radius requirements at cul-de-sac "bulb". Right-of-way at "bulb" shall be increased accordingly.

Right-of-way requirements may be increased if additional lanes, pockets, intersection treatments, transit lanes, bus loading zones, bus shelters, operational speed, bike lanes, meandering sidewalks, tree retention, utilities, schools or future planned improvements are required as determined by the Director of Public Works. The right-of-way boundaries at intersections shall be sufficient to contain all portions of the sidewalk, curb ramps, all signal and lighting appurtenances, and any other appurtenance associated with a public utility.

Right-of-way shall be conveyed to the City on a recorded subdivision or by a right-of-way dedication deed. If the dedication is by deed, the deed shall be submitted and approved before construction begins; before a building permit is issued; before a tenant improvement is issued; or prior to certificate of occupancy, whichever comes first.

When right-of-way is conveyed to the City by plat or by dedication deed, the right-of-way centerline or other appropriate control line shall be monumented by a Washington licensed Professional Land Surveyor. A monumentation plan shall be submitted to the Public Works Survey Division for approval prior to placement of the monument positions. See Appendix B for examples of acceptable right-of-way dedication deeds.

4B.065 Buffers

All residential projects, whether single or multi-family, which abut a boulevard, an arterial, or any class collector street shall be required to establish a buffer from such streets. The buffer must be a separate tract of land, 20 feet in width, within the subdivision and is to be maintained by the homeowners association or individual property owners.

The buffer shall be landscaped including trees, shrubs, and ground cover contiguously, up to the back of the sidewalk whether or not the sidewalk is within or contiguous to the buffer strip. Stormwater facilities may be located within the buffer area. An irrigation system must be installed to support the required landscaping. Existing native vegetation may be used if approved by Community Development. If native vegetation is utilized, an irrigation system will not be required.

A masonry, wood or other approved solid type fence must be installed behind the buffer. The buffer is to be located on the street side of the fence.

The lots within the subdivision may go right up to the inside of the fence. The setback for the buildings on these lots is measured from their property line and does not include the buffer.

The Site Plan Review committee may delete, revise, or modify buffers as necessary to accommodate zoning or site specific conditions.

4B.070 Private Streets

A private street provides vehicular access to serve property that is privately owned and maintained.

A. Private streets may be allowed to serve the following types of properties:

1. No more than nine lots (short subdivision).

2. A planned residential development (PRD). PRDs may have public or private roadways.

3. A gated community. Gated communities must meet the criteria outlined below and specified in 4B.075.

4. Businesses or multiple dwelling units situated on one parcel. The residential private street standard is not required for apartment or condominium complexes. Also, the private street standard for commercial and industrial applications may be modified by the Site Plan Review committee to accommodate site and use specific conditions.

Private street standards are not to be applied in subdivisions greater than nine lots to avoid the use of public streets.

B. Private streets must meet all of the following conditions:

1. Private streets will be permanently established by tract or easement which provides legal access to serve private property and includes provisions for future use by adjacent property owners when applicable.

2. Private residential streets will have a minimum roadway standard of a major or minor local residential street. See Chapter 4B.030 for more information on functional classes of residential streets. See Details for typical roadway sections.

3. Private streets will be accessible at all times for emergency and public service vehicle use.

4. Private streets will not landlock present or future parcels nor obstruct public street circulation. If there is the ability for a future roadway connection, a private street will not be allowed.

5. Covenants will be verified and approved by the City and recorded with the county. The owner or homeowners association or other legal entity's covenants will specifically provide for maintenance of private streets and associated parking areas.

6. The design and construction of sidewalks along private streets shall meet all applicable standards as for sidewalks along public roadways as specified in Chapter 4C.030.

C. Access, Structural Road Section, and Redevelopment

Driveway cuts may be used for access from public roadways onto private streets. See Chapter 4B.140, Driveways, for more information.

New structural roadway sections must meet current standards per Chapter 4B.160. The developer is responsible for roadway testing per Chapter 4B.200.

Private streets located on parcels being redeveloped may continue to exist as private streets if they meet the criteria outlined in Chapter 4B.070.B above.

D. Private Street Lighting

Short subdivisions of 4 lots or less are not required to provide internal street lighting. However, a street light may be required at the intersection with the public street as determined by the Public Works Department. An intersection street light, if required, shall meet the same standards as public street lighting.

On private streets in a subdivision of 5 lots or more, street lighting shall be required. The average maintained horizontal illumination coverage shall be the same as specified in Chapter 4E.020 for a residential street. Lighting on private streets shall remain private and shall be the homeowners association's or other legal entity's responsibility to operate and maintain.

E. Acceptance as Public Streets.

Acceptance of private streets as public streets will be considered only if the street(s) meet all applicable public street and utility standards.

F. Private Street Exemption.

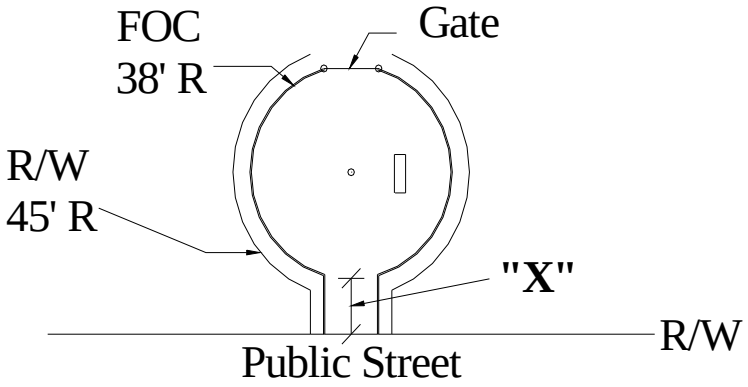
Under unusual circumstances the Site Plan Review Committee may relieve short subdivisions of 9 lots or less from some or all private street standards. At the time of preliminary short subdivision approval, the Site Plan Review Committee shall determine appropriate improvements. Each site will be reviewed in conjunction with adjacent properties and existing and potential future improvements.

A private street is not required for short plats of 2 lots or fewer.

4B.075 Gated Residential Access

Gates to neighborhoods or gated communities shall be allowed only on private streets. Private streets shall meet all the conditions as set forth in Chapter 4B.070. In addition, the following conditions shall apply:

A. A minimum stacking distance as depicted by the drawing and shown in the table below shall be required.



For Site Plan Review Projects

Intersecting Public Street Classification	**"X" Distance**
Arterial Boulevard and Arterial	If only one access use 5 feet per PM peak hour trip. Minimum "x" distance shall be 100.
Major and Minor Collector	1 foot per PM peak hour trip. Minimum "x" distance shall be 20 feet.
Major and Minor Local Residential and private	0.5 foot per PM peak hour trip. Minimum "x" distance shall be 10 feet.

B. A turn around shall be provided on the public right-of-way side of the gate. See example above.

C. Mailboxes meeting U.S. Postal standards shall be located on the public side of the gate. See Chapter 4G.070.

D. Gates shall be equipped with an emergency preemption system capable of operating from the public side of the gate to facilitate immediate entry of emergency vehicles into the development. Such system shall be a priority control system employing data-encoded infrared communication to identify the emergency response vehicle. The type of system shall be compatible with

the traffic signal priority control system used by the City. This system must be maintained in proper working order by the owners of the development or the proper homeowners or business owners association, whichever shall be the case. LMC 14.17.020. A copy of the access key, code, or combination shall be provided to the City to facilitate access by the Water/Wastewater Departments.

4B.076 Gated Commercial Access

Gated access to commercial or industrial projects shall follow the standards as set forth in 4B.075 except, a cul-de-sac is not required. The stacking distance shall be based on vehicle length, access street classification, and entering volumes in the PM peak hour. A Traffic Impact Analysis shall be used to determine an appropriate stacking distance.

4B.080 Street Frontage Improvements

A. All commercial and residential (including multi-family) development, subdivisions, short subdivisions and binding site plans shall install street frontage improvements at the time of construction as required by the Department of Public Works. Projects within the City limits or outside of the City limits and within the City of Lacey's UGA boundary, shall install frontage improvements per this Chapter regardless of whether the City is the water or sewer purveyor.

For new proposals, if Site Plan Review approval is necessary, frontage improvements shall be required. If an existing use is being altered or improved, frontage improvements shall be required if the project meets all of the following conditions:

1. The project requires binding site plan, conditional use permit, or SPR approval per LMC 16.84, and,

2. The site has more than 100 feet of total frontage, and,

3. The project meets the threshold requirements as determined by all applicable LMCs.

Regardless of frontage improvements being required, right-of-way shall be dedicated in accordance with appropriate street standard identified in the Transportation Comprehensive Plan.

Per the Site Plan Review approval, such improvements include but are not limited to: curb and gutter; sidewalk; roadway; street storm drainage; street lighting system; holiday lighting features; traffic signal modification, utility conduit, traffic control devices, signal interconnect, relocation or installation; public transit amenities; street signing; utility relocation; planter strips; landscaping and irrigation; and street widening all per these Standards. Plans shall be prepared and signed by a licensed civil engineer registered in the State of Washington.

B. All frontage improvements shall be made across full frontage of property from centerline to right-of-way line. Widening and/or overlays shall have a minimum new pavement width of one lane to the centerline of a 2-lane road or to the lane line of a multi-laned road. Off project site frontage improvements may be required if determined by the City for public safety.

C. Utility relocations shall follow the requirements as outlined in Chapter 3.100, Utility Locations, in these Guidelines.

D. If contiguous properties are under the same ownership, frontage improvements shall be required if the project meets all of the following conditions:

1. The project requires binding site plan, conditional use permit, or SPR approval per LMC 16.84, and,

2. The contiguous sites have more than 100 lineal feet of combined frontage, and,

3. The project meets the threshold requirements as determined by all applicable LMCs.

E. Exceptions. When the Director of Public Works deems the above such improvements cannot be accomplished, frontage improvements may be deferred, modified or waived. These exceptions shall be made a condition of Site Plan Review Approval or as a condition of subdivision, short subdivision, binding site plan, and conditional use permit approval.

Improvements may be deferred by signing a Waiver of Protest for a Local Improvement District (L.I.D.); by signing a Deferral of Frontage Improvements Agreement; or by paying a fee in lieu of constructing the improvements. If a fee in lieu of is paid, it shall be based on the engineer's estimate and the City will be responsible for constructing said facilities at a later date.

If the frontage improvements are deferred, all necessary right-of-way must be dedicated as a condition of approval. If additional right-of-way is required and the side slopes exceed 7:1 slope, then a 10 foot slope easement shall also be required to facilitate construction of future improvements. Methods of deferral, and components thereof, must be in place, signed, collected, and/or processed prior to the project scheduling a preconstruction meeting.

4B.090 Cul-de-sac

Streets designed to have one end permanently closed shall typically be no longer than 400 feet as measured from the intersecting right-of-way line extended, to the center of the cul-de-sac. At the closed end, there shall be a widened "bulb" having a minimum paved traveled radius as shown in the Minimum Street Design Standards Table. See Chapter 4B.100 for dead end requirements. (LMC 15.10.020)

With the exception of cases where geographical, topographic or environmental conditions preclude interconnection, cul-de-sacs shall be discouraged. When these conditions preclude street connections, continuous non-vehicular connections shall be attempted. Cul-de-sacs may be allowed with the approval of the Director of Public Works.

Cul-de-sacs shall be required for short subdivisions bordered on 3 sides by properties developed to their maximum use.

Dead ends or a shared access may be required for subdivisions where the potential for future connectivity exists due to the proximity of underdeveloped properties.

Cul-de-sacs shall be sloped at a minimum 2% from center-to-edge to facilitate drainage.

4B.100 Dead End Roadways

Where a street is temporarily dead ended, turn around provisions and a red and white barricade the full width of the roadway must be provided where the road serves more than one lot (see details). Hammerheads will not be allowed on a dead end in a residential area. Hammerheads may be allowed in commercial or industrial areas. Permanent dead ends shall be properly signed per section 3C-4 of the MUTCD.

At the end of a sidewalk to be extended in the future if there is a slope greater than 4 percent, a red and white type II barricade the full width of a sidewalk is required. See Chapter 4C.030 (G) for interim requirements at a dead-end sidewalk.

4B.110 Half Street

A half street is an otherwise acceptable roadway section modified to conform to limited right-of-way on the boundary of property subject to development. See definition in Chapter 3.025. (LMC 15.10.020)

A. A half street may be permitted subject to approval by the Director of Public Works when:

1. Right-of-way from the adjoining property suitable for future completion of a full-section roadway must be obtained prior to considering a half street improvement, and

2. Such alignment is consistent with or will establish a circulation pattern, and

3. The right-of-way width of the half street is not less than one-half of the proposed total width of the right-of-way and may be required to be greater than one-half the total proposed width to accommodate adequate driving lanes until the other half of the street is constructed , and

4. The traveled way shall be surfaced the same as the designated street classification, and

5. The half street shall be graded consistent with the centerline of the ultimate roadway section on the property line, and

6. The roadway section meets the ultimate roadway section and all applicable stormwater requirements, and

7. Property line edge of street shall be finished with permanent curb and gutter to insure proper drainage, bank stability and traffic safety.

4B.115 Fire Access Roads

This chapter applies to Fire Access Roads outside of the public right-of-way. Fire Department access roads shall be designed and installed per the most current adopted edition of the Fire Code as adopted and amended by the Lacey Municipal Code.

4B.125 Landscape/Planter Areas

Landscape and planter area widths shall be as shown on details at the end of this chapter. Landscaping methods shall be in compliance with section 8-02 of the *WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction*.

Landscape and planter areas shall be prepared in the following order: scarify the native soil; install the root barriers; install the irrigation system; add the topsoil; install the landscaping; add a top-dressing if applicable. See Chapter 6.210 for irrigation system requirements.

Excavate the area to be landscaped to the depth below finished grade as shown in the table below. Scarify or aerate the subgrade by tilling, disking, harrowing, or other method as approved by the City. Fracture and incorporate glacial till or other hardpans within 4 feet of the top of the finished grade. Remove debris and stones from the surface that are larger than 1 inch in any dimension. Backfill the excavated area with topsoil to the depth shown in the table below. (Work on Language) Remove all rocks, sticks, and other debris 1 inch and larger. The finished grade of topsoil at the curb shall be 1 inch below the top of curb.

	Initial Excavation Depth	**Topsoil Depth**
Medians and Islands	19 inch	18 inch
Perennial Planter Strip	13 inch	12 inch
Grass/Lawn Planter Strip	7 inch	6 inch

See Chapter 4G.100, Street Trees, for specific information on tree species, size, location, and spacing. Trees located in tree wells shall be installed per detail.

Trees located in planter strips, medians, or islands shall be installed per detail and placed in pits prepared as follows. Excavate pits 12 inches **deeper and three times the diameter** of the rootball. Thoroughly scarify the bottom of the pit by shovel cutting to a depth of 12 inches. Shovel cut pit sides to help root penetration. Only non-amended, native soil shall be used immediately below the rootball for purposes of establishing plant depth. After the proper depth of the plant material has been established, place the rootball in the center of the hole flush 1 to 2 inches above the

finished grade. Release the root covering; spread roots to a natural spread and distribution. Backfill, working the soil around the roots, with topsoil. Firm the backfilled soils to eliminate air pockets (do not compact) the backfill and provide a slight depression and watering saucer. Take care to not injure the root system while backfilling.

Topsoil

Topsoil shall be composed of sandy loam, loam, or loamy sand mixed with composted organic materials. The topsoil shall be 70 percent topsoil and 30 percent composted materials by volume and shall be thoroughly mixed. A soil test shall be provided for all topsoil imported to the site.

The compost shall be a weed free, well decomposed, humus-like material derived from the decomposition of grass clippings, leaves, branches, wood and other organic materials. Composts containing shavings, cedar sawdust, or straw will not be permitted. Compost shall be produced at a permitted solid waste composting facility.

All medians shall have a one foot concrete safety landing adjacent to the curbing (all sides) to aid in maintenance of the median.

Maintenance

The property owner, lessee, homeowner's or lot owner's association will be responsible for mowing, weeding, watering, tree replacement (replaced due to death, damage or disease after approval by a City representative) and tree maintenance within the respective right-of-way and common areas. See Chapter 6.210 for installation and maintenance of irrigation systems.

4B.126 Traffic Control

The contractor shall be responsible for all traffic control in accordance with the *WSDOT/APWA Standard "K" Plans for Road, Bridge and Municipal Construction*, and the *Manual on Uniform Traffic Control Devices* (MUTCD). Prior to the disruption of any traffic, a traffic control plan shall be prepared and submitted to the City for approval. At no time shall a roadway be blocked without the approval of the Director of Public Works. No work shall commence until the City has approved the plan and the traffic control is in place.

There shall be no restrictions or interruptions to traffic on Saturdays, Sundays, or Holidays. In addition, there shall be no restrictions or interruptions to traffic after 12:00 noon on the day prior to a holiday or holiday weekend unless approved by the Director of Public Works.

There shall be no restrictions or interruptions to traffic on arterial roadways during the peak traffic hours of 7:00 a.m. to 9:00 a.m. and from 3:30 p.m. to 6:00 p.m., Monday through Friday, except when deemed necessary by the City. If the City determines the peak hours differ from those specified, the contractor will be required to adjust his working hours accordingly.

No work shall be allowed in or adjacent to a residential zone between the hours of 9:00 p.m. and 7:00 a.m. A waiver to this ordinance will not be allowed except in the case of an emergency or where operations are necessary during such hours in order to promote the safety of the traveling public (Ordinance 837).

The City may require roadway work to commence at night when it is in the best interest of the public.

Two-way traffic shall be maintained at all times unless specifically approved in the traffic control plan. Flaggers shall be shown on the traffic control plan except for emergency situations. The developer is responsible for traffic control signing per Chapter 4B.050, Signing.

All lane restrictions shall be held to a minimum time and length. Lane closures shall comply with the traffic control plans, these specifications, the *MUTCD*, and the *WSDOT Standard Plans*. If the City determines that lane restrictions are causing congestion, the contractor will be required to open any lanes, as determined by the City, until the congestion is eliminated.

There shall be no delay to school buses, U.S. Postal Service or medical, fire, police, and other emergency vehicles with flashing lights or sirens.

The contractor shall maintain pedestrian access through or around the project site at all times without having pedestrians enter the travel lane.

Flaggers shall possess a current flagging card issued by the State of Washington prior to performing any traffic control work on a project. Workers engaged in flagging shall wear reflective clothing and hard hats in accordance with the *WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction*. Flagger's paddles shall meet MUTCD standards.

4B.130 Intersections

An intersection may be any access point, whether a public street or a public or private driveway, onto a public street. See Chapter 4B.025 for Access Management criteria and 4B.030 for intersections as they relate to Functional Classification. See Chapter 4B.140 for driveway access issues. See Chapter 4B.150 for sight obstruction criteria.

A. Street intersections shall be laid out so as to intersect as nearly as possible at right angles. All intersections shall be designed so as not to create a safety problem. Sharp angled intersections shall be avoided. If through traffic is not desired on the minor legs, a "T" intersection (three-legged) is preferable to the crossroad (four-legged) intersection. For safe design, the following types of intersection features shall be avoided unless approved by the City Traffic Engineer:

    1. Intersections with more than four intersecting streets;

    2. "Y" type intersections where streets meet at acute angles;

3. Intersections adjacent to bridges and other sight obstructions.

B. On sloping approaches at an intersection, landings shall be provided with grade not to exceed 3 percent slope for a distance of 30 feet approaching any arterial or 20 feet approaching a collector or local access street, measured from nearest right-of-way line (extended) of the intersecting street.

4B.140 Driveways

A driveway is defined as an access from a public or private right-of-way or access easement onto private property whether constructed as a curb cut or a curb return. See Chapter

4B.145 Access Management for additional access information and spacing requirements.

Details of driveway sections are located at the end of this Chapter. All abandoned driveway areas along the frontage of redeveloped property shall be removed and the curbing, planter strip, sidewalk; or shoulder and ditch section shall be properly restored. All driveway approaches shall be constructed of Commercial Concrete and shall be subject to the same testing and inspection requirements as curb, gutter, and sidewalk construction.

Joint-use driveways serving two adjacent parcels are encouraged whenever feasible. A joint-use driveway serving two adjacent parcels is required if contiguous property is under the same ownership. An easement and a maintenance agreement shall be recorded for both parcels specifying maintenance and joint usage in perpetuity.

A. Residential Driveways

Residential driveways shall be those driveways constructed on private property to serve a single-family residential structure or a duplex. Residential driveways shall always be constructed as a driveway cut through the sidewalk. Formed curb returns for residential driveways shall not be permitted.

1. Residential access to a public street shall be limited to one driveway for each tract of property separately owned.

2. In new construction, residential driveways shall not be permitted to access arterials, major collectors, or minor collectors unless the property has no other reasonable access to the general street system.

3. If an existing residential parcel abuts an arterial, major collector, or minor collector, no residential access shall be allowed to those streets within 150 feet of the nearest right-of-way line of an intersecting street. The driveway shall access the roadway with the lower functional classification.

4. All residential driveway accesses shall meet the sight distance requirements of Chapter 4B.150.

5. The maximum residential driveway width onto an arterial or collector shall be 24 feet. The maximum residential driveway width onto any other roadway classification shall be 20 feet.

6. The minimum driveway length shall be 20 feet from the residential structure to the back of walk.

7. Grade breaks, including the tie to the roadway, shall be constructed as smooth vertical curves. The maximum change in driveway grade shall be 8 percent within any 10 feet of distance on a crest and 12 percent within any 10 feet of distance in a sag vertical curve.

If the above standards cannot be met, the proponent will have to hire a traffic engineer to design the most appropriate access with safety being the primary design criteria.

B. Public Driveways

Public Driveways shall be those driveways constructed on private property to serve commercial, industrial, and multi-family projects. For the purpose of this Chapter, private streets serving single-family residential units are also considered a public driveway. Also see the private street standards in Chapter 4B.070.

Public driveways shall be curb cuts. A traffic engineer shall design public driveways with safety being the primary design criteria. The City Traffic Engineer shall determine if a formed curb and gutter will be allowed based on the vehicle type, ADA requirements, the use, the roadway it is accessing, and the Traffic Impact Analysis. Private streets constructed as part of a Planned Residential Development (PRD) shall meet the private street standards in Chapter 4B.070. The following criteria shall apply to all Public Driveways.

1. Access to a public street shall be limited to one public driveway connected to the lowest classified roadway for each tract of property separately owned. Property fronting more than one public street may be permitted an access to each public street if the Traffic Impact Analysis supports multiple accesses. Two or more public driveways accessing a public street will only be allowed with the approval of the City Traffic Engineer. Properties contiguous to each other and owned by the same person are considered to be one tract.

2. Commercial properties shall provide internal connections between neighboring properties. Developments must give priority to internal access before access to the public roadway system is permitted. Cross access allows vehicles to circulate between commercial properties without having to re-enter the public street system.

3. If all other access management techniques have been exhausted, the City will permit public driveways utilizing the following minimum corner clearance requirements. Corner clearance is the distance between a private access and the nearest cross road intersection and is applicable to

all roadway classifications. Corner clearance is necessary to provide adequate perception-reaction time to reduce potential downstream conflicts and is aimed at preventing the location of driveways within the functional area of an intersection. Minimum driveway setback and corner clearance requirements shall meet the most current ITE standard. The minimum corner clearance setbacks are shown in the following table.

Minimum Corner Clearance

85th Percentile Speed (mph)	Distance (in feet) from Near Side of Street to Near Side of Access Driveway	
	Major Traffic Generator	Minor Traffic Generator
30	200	150
35	260	215
40	330	260
45	395	310
50	460	345

Reference: *Traffic Engineering Handbook*

Major traffic generators are developments that require or would be required to complete a Traffic Impact Analysis per section 4B.035.

4. Public driveways shall meet the sight distance requirement of Chapter 4B.150.

5. No public driveway shall be approved where backing onto the sidewalk or street will occur.

6. Parking lot circulation and signing shall be met on site. The public right-of-way shall not be utilized as part of the parking lot flow.

7. The landing on all public driveways shall meet the criteria in Chapter 4B.130B.

8. The maximum driveway width for a two-way, public driveway with curb cuts shall be 24 feet for multi-family residential, 30 feet for commercial uses, and 45 feet for industrial uses.

9. The maximum driveway width for a two-way, public driveway with curb returns shall be the same as listed for curb cuts. A wider public driveway may be approved by the City Traffic Engineer where a substantial percentage of oversized vehicle traffic exists, where divisional islands are desired, or where multiple exit or entrance lanes are needed.

10. The maximum one-way public driveway width for a curb cut or a driveway with curb return shall be 14 feet for multi-family residential, and 20 feet for commercial and industrial uses.

11. The storage length of a driveway must be adequate to prevent vehicles from waiting in through lanes to enter the site or causing unsafe conflicts with on-site circulation and parking. General standards appear below but these requirements will vary according to the projected volume of the individual driveway. The length shall be measured from the face of curb.

Adequate Driveway Storage Lengths	
Development Type	Minimum Driveway Throat Length*
Shopping Center > 150,000 GLA**	200 feet
Smaller Project < 150,000 GLA**	75 - 95 feet
Signalized Driveway	Based on operational analysis for 95% queue

** Gross Leasable Area

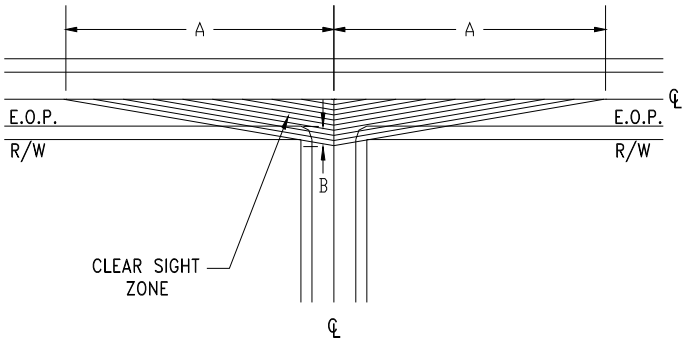
12. Road approaches and/or ingress and egress tapers may be required in industrial and commercially zoned areas as directed by the City Traffic Engineer. Tapers shall be designed per the ITE (Institute of Transportation Engineers) publication, *Transportation and Land Development*, latest edition.

4B.150 Sight Obstruction

The criteria in this chapter shall be used as a reference for streetscape amenities such as signs, trees, fences, bus shelters, etc. Use AASHTO Design Standards to determine sight distance criteria for all road and intersection designs. Intersections may include public and private driveways and pedestrian crossings. See Chapter 4B.130 for intersection definition.

The area within the sight distance triangle shall be subject to restrictions to maintain a clear view on the intersection approach. The ultimate roadway width (number of lanes) per the most current version of the City's Transportation Plan shall be used to calculate the dimensions of the sight distance triangle. Plant size at maturity must be accounted for when designing landscapes within the sight distance triangle.

STOP OR YIELD CONTROLLED INTERSECTIONS



The centerline of the road is the actual physical centerline regardless of the number of lanes. Sight distance B is 15 feet measured from the near edge of pavement to the eye of the driver on the minor road. The following table shall apply to both vertical and horizontal sight distance.

Design Speed (mph)	**Minimum Distance 'A'** (in feet)*							**Multiplier**
	20	**25**	**30**	**35**	**40**	**45**	**50**	
Collector Streets	200	250	300	350	400	450	500	10
Arterials and Boulevards	240	300	360	420	480	540	600	12

***based on Sight of Distance per 10 mph for Design Vehicle "P" Crossing Arterial**

If your speed is not shown above, use the following formula for distance A:

multiplier * design speed = sight distance A

On roadways with 5 or more lanes or roadways with medians more than 20 feet wide, use AASHTO Design Standards.

The vertical clearance area within the sight distance triangle shall be free from obstructions to a motor vehicle operator's view between a height of 3 feet and 10 feet above the existing surface of the street.

Exclusions. Sight obstructions that may be excluded from these requirements include: fences in conformance with this chapter, utility poles, regulatory signs, trees trimmed from the base to a height of 10 feet above the street, places where the contour of the ground is such that there can be no cross visibility at the intersection, saplings or plant species of open growth habits and not in the form of a hedge which are so planted and trimmed as to leave at all seasons a clear and unobstructed cross view, buildings constructed in conformance with the provisions of appropriate zoning regulations and preexisting buildings.

4B.160 Surfacing Requirements

The following are the surfacing requirements for each application listed. These designs are based on Washington stabilometer subgrade R-value of 5. Alternate structures will be accepted based on soil tests to determine the actual Washington stabilometer R-value and completion of worksheet 4-6.2 in the drawing section at the end of this Chapter. Soil tests and a completed worksheet for each road classification shall accompany plans submitted if structures other than those shown below are used.

One soil sample per each 500 lineal feet of centerline with 3 minimum per project representative of the roadway subgrade shall be taken to determine a statistical representation of the existing soil conditions.

Soil tests shall be performed by an engineering firm specializing in soils analysis.

The soils report, signed and stamped by a soils engineer licensed by the State of Washington, shall be based on actual soils tests and submitted with the plans. All depths indicated are a minimum compacted depth.

Refer to Details for Pavement Design structures. For Hawks Prairie Business Park roadways, the primary east-west arterial shall be built to a major collector standard. The connecting collectors and interior roadways shall be built to a minor collector standard.

Fire access road structures shall meet the standards as required for a minor local residential roadway. Alternate materials, e.g. paving tiles or gravel may be approved provided the structure is designed to support fire apparatus vehicles.

A. Sidewalks

Surfacing:	4 inches Commercial Concrete
Base:	1 inch Crushed Surfacing Top Course or well graded sand
Surfacing:	Asphalt sidewalks will not be permitted unless otherwise approved by the Director of Public Works. (LMC 12.24.060)

B. Driveway

Surfacing:	6 inches Commercial Concrete
Base:	1 inch Crushed Surfacing Top Course or well graded sand

C. Class I Bikepath

Surfacing:	4 inches Commercial Concrete
Base:	1 inch Crushed Surfacing Top Course
Alternate:	
Surfacing:	2-1/2 inches Hotmix Asphalt Pavement

Base: 4 inches Ballast

Ballast shall consist of crushed, partially crushed, or naturally occurring granular material from approved sources and shall meet the *WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction* ballast specification 9-03.9(1) for grading and quality. The City Engineer or his/her representative will determine the exact point of acceptance.

The application of any asphalt to the roadway shall be restricted to the following conditions:

- The ground temperature for paving is based on the course location (surface or sub-surface) and depth of paving. Use *WSDOT Standard Specification* 5-04.3(16) to determine temperature limitations.
- Asphalt shall not be applied to wet material. Asphalt shall not be applied during rainfall, sand or dust storms, or before any imminent storms that might damage the construction. The City will have the discretion as to whether the surface and materials are dry enough to proceed with construction.
- No asphalt shall be applied which cannot be covered one hour before darkness. The City may require the Contractor to delay application of asphalt until the atmospheric and roadway conditions are satisfactory.
- Hot Mix Asphalt in accordance with *WSDOT Standard Specification 5-04* shall be utilized. The nominal compacted depth of the wearing surface shall not exceed two inches.

4B.165 Pavement Markings.

Channelization and pavement markings shall be as shown on the details at the end of this chapter. All markings shall meet federal metric standards. Pavement markings shall comply with these Guidelines and all applicable MUTCD, AASHTO, and WAC standards and regulations. When striping is required, a Channelization Plan complying with the Plan Checklist shall be submitted. See Chapter 3.040 for Checklist details.

Controlled intersections shall have appropriate pavement markings. Stop bars shall be a 24 inch wide thermoplastic stripe.

If required, pigmented stamped concrete crosswalks shall be Bomanite or approved equal, with 12 inch white plastic borders. The stamped concrete pattern shall be Basketweave Used Brick. The base color shall be Brick Red. The release agent color shall be Brick Red. The full depth of concrete shall be pigmented with base color. Powdered release agent shall then be applied to give the highlights desired. The release agent shall be heavy-duty quality as recommended by the manufacturer of the stamping pattern. Concrete shall be stamped with inconsistencies in the pattern and hand finished. After a curing period of 4 days, the concrete shall be pressure washed to remove the remaining release agent. A weatherproofing sealer with moss control shall be applied to the finished surface.

In cases where crosswalks are not pigmented stamped concrete, they shall be high emphasis 24 inches wide thermoplastic.

Hash marks shall use 8 inch plastic stripes, 5 feet on center. Raised pavement markers shall be used to highlight the border of a hashed area. All "C" curbs shall be painted "traffic yellow".

Striping shall be required on all roadways. Striping, either with thermoplastic or raised pavement markers, in residentially zoned areas is generally not required except in the following circumstances:

- Stop bars or crosswalks may be required if a stop sign is required.
- Striping may be required in conjunction with roundabouts, traffic calming devices, radii and at neighborhood entrances.
- Striping shall be required to delineate bulb-out parking except when concrete valley gutters are present.

The thermoplastic material used to form pavement markings shall be preformed thermoplastic material ~~as listed on the most current version of the WSDOT Qualified Products List.~~

4B.170 Temporary Street Patching

All excavations of streets and driveways, or failure of the existing pavement which will be exposed to traffic shall be temporarily patched by the end of the working day, or as directed by the City. The patch shall be constructed of 2 inches of Hot Mix Asphalt or steel plates.

Asphalt Treated Base (ATB) used for temporary restoration may be dumped directly into the trench, bladed and rolled. After rolling, the trench must be filled flush with asphalt concrete pavement to provide a smooth riding surface.

The contractor shall maintain all temporary patches until such time as the permanent pavement is in place. If, after reasonable notification, the contractor is unable to maintain a patch for whatever reason, the City will patch it at the contractor's expense, and charge a mobilization fee of $1000.00. The City reserves the right to perform emergency repairs as deemed necessary without contractor notification. In such cases, the contractor will still be liable for costs as noted above.

4B.180 Trench Backfill and Restoration

Trench restoration shall be by a patch or overlay as required by the City.

A. All trench and pavement cuts shall be made by sawcuts.

B. All trenching shall be backfilled as shown in the appropriate trench restoration detail at the end of this chapter. The trench shall be compacted to 95 percent minimum density, as described in Section 2-03 of the *WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction.*

C. If, when trenching, cement concrete is encountered, cement concrete shall be used to restore the patch. When cement concrete is anticipated or encountered, a trench restoration detail shall be designed by a Geotechnical Engineer and submitted to the City for review and approval. The Geotechnical Engineer shall address existing and proposed joint location, load transfer, and joint pinning, if applicable.

D. Asphalt concrete pavement shall be placed on the prepared surface by an approved paving machine and shall be in accordance with the applicable requirements of Section 5-04 of the *WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction.* Fine and coarse aggregate shall be in accordance with Section 9-03.8 of the *WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction*.

   Surface smoothness shall be per Section 5-04.3(13) of the *WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction*. The paving shall be corrected by removal and repaving of the trench.

E. When trenching within the roadway shoulder(s), the shoulder shall be restored to its original or better condition.

F. The final patch shall be completed as soon as possible and shall be completed within 5 days after first opening the trench. This time frame may be adjusted if delays are due to inclement paving weather, or other adverse conditions that may exist. See 4B.160 for inclement weather constraints. Delaying of final patch of overlay work is allowable only subject to the City Engineer's approval. The City Engineer may deem it necessary to complete the work within the 5 day time frame and not allow any time extension. If this occurs, the Contractor shall perform the necessary work as directed by the City Engineer.

4B.190 Staking

All surveying and staking shall be performed by an engineering or surveying firm capable of performing such work. The surveyor directing such work shall be licensed as a Professional Land Surveyor by the State of Washington.

A pre-construction meeting shall be held with the City prior to commencing staking. All construction staking shall be inspected by the City prior to construction.

The minimum staking of streets shall be as directed by the City Engineer or as follows:

A. Stake centerline every 50 feet in tangent sections and 25 feet in curved sections plus grade breaks, PVC's, PVT's, high points and low points, with cut and/or fill to subgrade.

B. Stake top of ballast and top of crushed surfacing at centerline and edge of pavement at the above-described intervals.

C. Stake top back of curb at a minimum 3 foot offset at the above-described intervals with cut or fill to finished grade.

4B.200 Testing

Testing shall be required at the developers or contractors expense. The testing shall be ordered by the City construction inspector from a testing lab approved by the City. Testing shall be done on all materials and construction as specified in the *WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction* and with frequency as specified in Sampling and Testing Frequency Guide located in section 9-5.7 of the *WSDOT Construction Manual*.

In addition, the City shall be notified before each phase that street construction commences (i.e. staking, grading, subgrade, ballast, base, top course, and surfacing).

4C SIDEWALKS, CURBS AND GUTTERS

4C.010 General

All properties within commercial zones of the City, properties abutting arterial streets or collector streets and properties upon which there are to be public buildings, shall, in conjunction with new construction on such properties or alterations or improvements to existing structures on such properties where the estimated cost of the alterations or improvements constitute 25 percent or more of the value of the existing structures on the property, have sidewalks constructed along abutting streets (LMC 12.24.010). Curbs and gutters must also be constructed along the abutting street when the Director of Public Works determines that the conditions of drainage require curbs and gutters (LMC 12.24.020).

In cases where a sidewalk exists adjacent to the curb, the sidewalk must be moved back to accommodate a new planter strip as required in accordance with 4B.080 of this document.

Although sidewalk construction may be deferred, the necessary right-of-way shall be granted to facilitate future construction of the sidewalk. See Chapter 4B.060 for right-of-way requirements. See Chapter 4B.080 for standards regarding deferral of street frontage improvements.

Sidewalks shall be located within the right-of-way. Sidewalks may be located within an easement with the approval of the Director of Public Works.

Sidewalks shall conform to the Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way standards.

Building footings shall not be located under a public sidewalk. Footings may be located under a sidewalk if the sidewalk is in an easement and not in the public right-of-way. If building footings are to be located under a sidewalk located within an easement, all the private utilities located within that easement and under that sidewalk shall be located within conduit.

4C.020 Design Standards

The City has set forth minimum standards as outlined in Chapter 3.040 which must be met in the design and construction of sidewalks, curbs and gutters. Because these are minimum standards, they may be modified by the Director of Public Works should the Director feel circumstances require increased or decreased widths (LMC 12.24.070). Plans for the construction of sidewalks, curbs and gutters are to be submitted as part of the street plans when applicable.

4C.030 Sidewalks

All public streets shall have sidewalks on both sides of the street as shown on the roadway details at the end of this chapter. See Chapter 4B.070 for sidewalk requirements on Private Streets. For specific driveway requirements, see Chapter 4B.140. For applicable bike path information, see Chapter 4D.

The design and construction of all sidewalks, curbs, gutters and walkways shall meet the following minimum standards:

1. Sidewalks shall be constructed of Commercial Concrete a minimum of 4 inches thick. When a portion of the sidewalk functions as a driveway, the sidewalk shall be a minimum 6 inches thick through the driveway section.

2. The width of sidewalks shall be as shown in the roadway details at the end of this chapter. When the sidewalk, curb and gutter are contiguous, the width of the sidewalk shall be measured from back of curb and gutter to back of sidewalk.

3. If sidewalk widening is required, it shall be accomplished with a monolithic width pour. This shall require removal of the existing sidewalk.

4. When existing sidewalks are removed, repairs shall be taken to the nearest expansion joint or as directed by the City.

5. The Director of Public Works may reduce the sidewalk width for sidewalks over 6 feet wide if the Public Works Department does not anticipate probable pedestrian traffic through the horizon year indicated by the traffic analysis. If the width of the sidewalk is reduced, the right-of-way width shall not be reduced. Instead, the planter width shall be increased accordingly.

6. To accommodate bicycles on sidewalks, a minimum design speed of 20 mph shall be used; however, when the grade exceeds 4 percent, a design speed of not less than 30 mph shall be used unless otherwise approved by the Director of Public Works.

7. All sidewalks must be constructed to provide for curb ramps in accordance with the standards of the ADA and state law. See Chapter 4B.070 for curb ramp requirements on private streets.

8. Form and subgrade inspection by the City are required before sidewalk is poured. Forms shall be the same height as the thickness of the sidewalk, curb and gutter, or driveway.

9. Monolithic pour of curb, gutter and sidewalk will not be allowed.

10. Sidewalks that dead-end at the project property line shall have a minimum 5 foot wide pavement ramp constructed, at a maximum 12:1 slope that abuts the sidewalk and joins to the edge of the roadway. A barricade may be required per Chapter 4B.100. When the sidewalk is extended in the future, these interim measures shall be removed.

4C.040 Curb and Gutter

Commercial concrete curb and gutter per the detail at the end of this chapter shall be used for all street edges unless otherwise approved by the Director of Public Works. See Chapter 4B.090 for curb requirements around cul-de-sacs.

Form and subgrade inspection by the City are required before curb and gutter are poured.

The face or top of all new curbs shall be embossed to denote the location of water and sewer services crossings. Water services shall be marked 1/4 inch into concrete with a "W" and side sewers shall be marked with an "S".

4C.060 Staking

All surveying and staking shall be performed by an engineering or surveying firm capable of performing such work. The surveyor directing such work shall be licensed as a Professional Land Surveyor by the State of Washington.

A preconstruction meeting shall be held with the City prior to commencing staking. All construction staking shall be inspected by the City prior to construction.

The minimum staking of curb, gutter and sidewalk shall be as directed by the City Engineer or as follows:

1. Stake top back of curb at a minimum 3 foot offset every 50 feet in tangent sections and 25 feet in curved sections plus grade breaks, PVC's, PVT's, high point and low points, with cut or fill to finished grade.

4C.070 Testing

Testing shall be required per Chapter 4B.200.

In addition, the City shall be notified before each phase of sidewalk, curb and gutter construction commences.

4D BICYCLE FACILITIES

4D.010 General

Bikeway or Urban Trail construction is required in conjunction with any new development or redevelopment where the estimated cost of improvements on such properties exceeds 25 percent of the value of the existing structures, or subdivision or short subdivision approval, when the need for such a bikeway is indicated in the Lacey Urban Trails Plan and the Lacey Transportation Plan.. See details at the end of this chapter for bikeway classifications. (LMC 12.24.010)

Bikeways located outside of the public right-of-way may be located within an easement or dedicated as a separate tract of land to the City of Lacey for public use. The easement or tract shall be 20 feet wide.

4D.020 Design Standards

The design of bicycle paths shall depend upon their type and usage. Bikepath surfacing shall be as outlined in Chapter 4B.160. Bike lanes and shared roadways shall be surfaced the same as the adjacent motor vehicle roadway.

All minimum design standards as set forth in Chapter 3.040 shall apply.

4D.030 Bikeway Lighting

Bikeway lighting for bike lanes, bike routes and shared roadways, shall meet the adjacent roadway lighting standards. When a class I bike path is constructed, the average maintained horizontal illumination level of 0.5 foot-candle (5 lux) to 2 foot-candles (22 lux) shall be met.

4D.040 Signing and Marking

In general, all bikeway facilities shall be signed per the MUTCD or as specified herein. The bike lane stripes and pavement markings shall be as shown on the details at the end of this chapter.

Bike lane signing at intersections shall be as shown on detail. See detail for bike lane striping at right-turn lanes.

Bicycle actuation at signalized intersections may be required if warranted.

4D.060 Staking and Testing

Staking and testing shall be done in accordance with street staking and testing as outlined in Chapter 4B.190 and 4B.200.

4E ILLUMINATION

4E.010 General

All new commercial or residential subdivisions, short subdivisions or property development requiring review by the Site Plan Review Committee shall provide street lights in accordance with the standards for such improvements of the City and they shall be owned and operated by the City. (LMC 12.24.080)

All projects outside the City limits but within the City of Lacey's Urban Growth Area boundary (UGA) shall provide street lights in accordance with the standards herein. The maintenance of street lights installed by projects within the UGA boundary shall be the responsibility of the owners or Homeowners Association until such time as annexation occurs. Upon annexation, the City shall assume responsibility for maintenance of ~~the~~ public street lighting. Prior to annexation, any connections to the street lighting service (i.e. irrigation systems) shall be removed and an alternative power source provided by the Homeowner's Association.

Pedestrian scale lighting is required within all residential subdivisions, short subdivisions, Urban Villages, PRD's, and developments within the Woodland Planning District. Pedestrian scale lighting is also allowed when desired by the developer. Additionally, pedestrian scale lighting is to be installed as required in areas zoned Urban Villages or as required through Site Plan Review approval. See 4E.025.

Roadway lighting is required on Arterials and Collectors not located within the development.

4E.020 Design Standards

A street lighting plan submitted by the applicant and approved by the Public Works Director shall be required for all street light installations. Type of installation shall be as set forth in *WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction* and as directed by the City except where noted herein.

All public street light designs shall be prepared by an engineering firm capable of performing such work. The engineer shall be licensed by the State of Washington. All developments shall submit the lighting plan on a separate sheet. See the Plan Checklist in Chapter 3.040 for lighting plan and report components. After system is completed and approved, a set of "as-built" drawings per Chapter 3.065 shall be submitted to the City as a permanent record.

Lights shall be located in accordance with the Illumination Standards Table and the roadway details at the end of this chapter. In addition, intersections shall be illuminated to 1.5 times the highest foot candle requirement of the streets surrounding the intersection. Poles shall be opposite across the roadway or on one side of the roadway except for pedestrian scale light poles which shall be staggered. All residential intersections that require pedestrian scale lights shall have two poles on opposite legs of the intersection. Street lighting and holiday lighting must be connected to a metered service disconnect.

For the purposes of this chapter, area classes are determined by zoning as follows:

Commercial

Business Park
Cemetery
Central Business Districts
Community Commercial District
General Commercial
Hawks Prairie Business and Commercial District
Hawks Prairie Commercial District
Light Industrial/Commercial
Mixed Use High Density Corridor
Mixed Use Moderate Density Corridor
Office commercial
Woodland District

Industrial

Light Industrial
Mineral Extraction

Residential

High Density Residential
Lacey Historic Neighborhood
Limited Business
Low Density Residential
McAllister Geologically Sensitive Area
Moderate Density Residential
Neighborhood Commercial
Open Space Institutional

As new zones are created, they will be classified by the City Traffic Engineer. If road widths differ from those in the Illuminations Standards table, other—spacing will be determined by the project engineer and reviewed and approved by the City Traffic Engineer using the following criteria:

AVERAGE MAINTAINED HORIZONTAL ILLUMINATION (FOOT CANDLES)

	AREA CLASS			
Road Classification	Residential	Industrial	Commercial	Foot Candles
Residential/Private	0.4	N/A	N/A	0.40
Minor Collectors	0.6	1.0	1.2	0.50
Major Collector				0.90
Arterials	0.8	1.4	1.6	1.40
Boulevards	0.8	1.4	1.6	1.40

Uniformity ratio:

6:1 average: minimum for residential and private
4:1 average: minimum for collectors
3:1 average: minimum for arterial and boulevard

Dirt Factor = 0.85, lLamp lumen depreciation factor = 0.730.85

Min. Weak Point Light = 0.2fc except residential street

Average illumination at intersections shall be 1.5 times higher than the illumination average foot candles required on the more highly illuminated street.

400 Watt initial lamp lumens = 50,000
200 Watt initial lamp lumens = 22,000
100 Watt initial lamp lumens = 9,500

Pedestrian scale lighting shall be designed to provide a presence of light within the residential neighborhoods with particular emphasis at intersections.

Pedestrian scale lighting shall supplement the required roadway lighting with dual functional poles in the Woodland Planning District, and collectors within commercial and residential areas.

Line loss calculations shall show that no more than five percent voltage drop occurs in any circuit. Lamp Load factor shall equal 1.2.

A maximum of three circuits shall be associated per conduit. The minimum conduit size shall be two inch for typical installation and two to four inch for roadway crossings at intersections. Size all conduits to a maximum 26 percent conductor fill. The separate City Communications spare conduit shall not be used for lighting purposes.

Provide junction boxes at each end of a roadway crossing, or where the conduit changes size. All junction boxes shall be located outside of the paved areas. Junction boxes are not to be placed in the pedestrian curb ramp of a sidewalk or where it will impact the ADA requirements. The maximum conduit capacities for various types of junction boxes are shown in the WSDOT Standard Plans. with the exception of a Type 1 junction box which may have a maximum capacity conduit diameter of ten inches.

Pole foundations shall be per details depending on the type of pole used. Pole foundations shall not be located within the clear zone. The roadway clear zone, which is typically 1.5 feet behind the face of curb, or 6.0 feet at intersections, shall be evaluated by an engineer using the guidelines set forth in the latest edition of the *AASHTO Roadside Design Guide.* No break-away foundations shall be provided for poles within the urban area, or where the City determines break-away poles would be a hazard to pedestrians~~ or building occupants~~.

General, Light Poles:

Poles shall meet the following minimum specifications as manufactured by General Electric, Hap~~C~~co, ~~Valmount~~Valmont, Lumec or Lexington or as otherwise approved by the City Traffic Engineer. In existing developed areas, the City may require the use of other poles to establish uniformity within the developed area. After installation and before acceptance by the City, all poles shall be free of dents and marks.

Shaft:

The shaft shall be a seamless, round tapered tube of aluminum alloy 6063 per ASTM B221 and shall be full-length heat-treated after welding on the base flange to produce T6 temper.

Poles shall include a hand hole centered above the bottom of the shaft for anchor base poles. The hand hole shall be reinforced with a cast frame of aluminum alloy. Hand holes shall be located 90 degrees clockwise from the plane of the bracket arm as viewed from the top. An aluminum cover with stainless steel attachment screws shall be provided for the hand hole.

Surface Finish:

Roadway poles shall have a satin finish accomplished by mechanical rotary grinding or polishing.

Pedestrian poles and dual functional poles shall have a textured black powder coated finish.

Base Flange:

The base flange for the attachment of the shaft to the foundation shall be a one-piece cast socket of aluminum alloy 356 per ASTM B26 or B108. The flange shall be joined to the shaft by means of complete circumferential welds, externally at the top of the flange and internally at the bottom of the shaft tube.

Hardware:

All nuts, bolts and washers used in the fabrication of the pole shall be Grade 18-8 stainless steel per ASTM A193 Class 1 Grade B8 except for anchorage hardware.

Anchorage Hardware:

Anchorage bolts shall be hot-dipped galvanized steel per ASTM A576, Grade 1021-1046 and shall have minimum yield strength of 50,000 psi. The top 6 inches of each bolt shall have rolled or cut threads (before galvanizing) per ASTM A307. The bolts shall be hot-dipped galvanized per ASTM A153 at the treaded end. The bolts shall include a 4 inch right angle hook at the unthreaded end. The nut, washer, and lock washer shall be fully galvanized per ASTM A153.

Grounding:

Each pole shaft shall contain an internal lug with a 3/8 inch diameter hole for the purpose of attaching a grounding connector.

Shaft Cap:

Each pole shall be provided with a shaft cap of aluminum alloy. The cap shall be fastened to the shaft by means of stainless steel screws.

Bracket Arm:

Single member tapered arms (not davit or trussed) are required for arms 6 feet to 8 feet in length.

Light Pole Type	Nominal Mounting Height (ft)	Wall Thickness (in)	Pole Cross Section	Arm Shape	Pole Material	Base	Pole Finish	Arm Length (ft)	Bottom Shaft (in)	Top Shaft (in)	Bolt Circle	Anchor Bolts
Pedestrian Scale	15	0.125	Round	Post mount	Aluminum	Decorative	Black Texture	n/a	15	4	10 3/4-13	3/4 x 20
Dual Functional	40	0.219	Round	Tapered Elliptic	Aluminum	* Decorative	Black Powder	6-8	8	4.5	11-12	1 x 36
Dual Functional	30	0.219	Round	Tapered Elliptic	Aluminum	* Decorative	Black Powder	6-8	7	4.5	11-12	1 x 36
Dual Functional	25	0.219	Round	Tapered Elliptic	Aluminum	* Decorative	Black Powder	6-8	7	4.5	11-12	1 x 36
Roadway Single Arm	40	0.188	Round	Tapered Elliptic	Aluminum	Plain	Satin Ground	6-8	8	4.5	11-12	1 x 36
Roadway Single Arm	30	0.188	Round	Tapered Elliptic	Aluminum	Plain	Satin Ground	6-8	7	4.5	11-12	1 x 36
Roadway Single Arm	25	0.188	Round	Tapered Elliptic	Aluminum	Plain	Satin Ground	6-8	7	4.5	11-12	1 x 36
Roadway Twin Arm	40	0.219	Round	Tapered Elliptic	Aluminum	Plain	Satin Ground	8	10	6	14-15	1 x 48
Roadway Twin Arm	30	0.219	Round	Tapered Elliptic	Aluminum	Plain	Satin Ground	8	10	6	14-15	1 x 48

*Olympic Decorative Base FG2546~~3548~~BK Clam Shell

Luminaires:

Pedestrian scale luminaires shall be Lumec ~~LED~~ L80 style lantern style decorative head and shall be equipped with a LED 35 watt fixture.~~as follows:~~

~~70 watt equivalent~~ Phillips Lumec ~~LED~~ fixture with a LED 35 watt fixture~~for dual functional poles,~~
~~100 watt equivalent Phillips Lumec LED fixture for pedestrian poles,~~

~~S~~E3 Asymmetrical median cutoff optics,
240 volts,

SFS Adapter, and
Textured Black powder coating.

Catalog No. L80-35WLED4K-T-PC-CS-LE3-277-FAWS-SFS-BKTX~~All roadway style luminaires shall be:~~

Roadway luminaires 35, 72 ~~200~~ and ~~400~~180 Watt Phillips Lumec luminaires ~~shall be: Phillips Lumec LED equivalent~~ with natural aluminum or black finish to match the ~~as~~ required pole type, powered by 240 volts, ~~and shall utilize a flexible wattage selection~~ with tool access for driver change out. The fixture shall have type III asymmetrical distribution, full cut off with 4000K color band to exceed 70,000 hours of operational life. Fixtures shall have built-in bubble level.

Catalog No. RFS-35W16LED4K-T-R3M-UNIV-DMG-RCD
Catalog No. RFM-72W32LED4K-T-R3M-UNIV-DMG-RCD
Catalog No. RFL-180W80LED4K-R3M-UNIV-DMG-RCD

All street light electrical installations including wiring conduit and power connections shall be located underground.

The General Notes on the following page need to be included on any plans dealing with street design in addition to all applicable requirements as set forth in Chapter 3.040.

Illumination Standards

ROAD CLASS	STREET WIDTH (Feet)	LUMINAIRE (Watt)	MOUNTING HEIGHT (Feet)	ARM TYPE	ARM LENGTH (Feet)	CURB OVERHANG (Feet)	MAXIMUM SPACING (Feet)	POLE CONFIGURATION	POLE TYPE
RESIDENTIAL / PRIVATE									
All	20-32	~~100 LED~~34	15	Post	0	-3	100	Staggered	Pedestrian
MINOR COLLECTOR									
~~**With Parking & 3-Foot Bike Lanes**~~									
~~Residential~~	~~44~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~190~~	~~One Side Only~~	~~Dual Function~~
~~Industrial~~	~~44~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~180~~	~~One Side Only~~	~~Roadway~~
~~Commercial~~	~~44~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~180~~	~~One Side Only~~	~~Dual Function~~
~~**With Parking & 5-Foot Bike Lanes**~~									
~~Residential~~	~~48~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~190~~	~~One Side Only~~	~~Dual Function~~
~~Industrial~~	~~48~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~180~~	~~One Side Only~~	~~Roadway~~
~~Commercial~~	~~48~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~180~~	~~One Side Only~~	~~Dual Function~~
~~**Without Parking & 3-Foot Bike Lanes**~~									
~~Residential~~	~~28~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~190~~	~~One Side Only~~	~~Dual Function~~
~~Industrial~~	~~28~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~180~~	~~One Side Only~~	~~Roadway~~
~~Commercial~~	~~28~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~180~~	~~One Side Only~~	~~Dual Function~~
~~**Without Parking & 5-Foot Bike Lanes**~~									
~~Residential~~	~~32~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~190~~	~~One Side Only~~	~~Dual Function~~
~~Industrial~~	~~32~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~180~~	~~One Side Only~~	~~Roadway~~
~~Commercial~~	~~32~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~180~~	~~One Side Only~~	~~Dual Function~~
All	32-48	72	30	Single	6	5	180	One Side Only	Dual Function
MAJOR COLLECTOR									
~~**With Parking & 3-Foot Bike Lanes**~~									
~~Residential~~	~~22/12/22~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~180~~	~~Both Sides Opposite~~	~~Dual Function~~
~~Industrial~~	~~22/12/22~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~180~~	~~Both Sides Opposite~~	~~Roadway~~
~~Commercial~~	~~22/12/22~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~180~~	~~Both Sides Opposite~~	~~Dual Function~~
~~**With Parking & 5-Foot Bike Lanes**~~									
~~Residential~~	~~24/12/24~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~180~~	~~Both Sides Opposite~~	~~Dual Function~~
~~Industrial~~	~~24/12/24~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~180~~	~~Both Sides Opposite~~	~~Roadway~~
~~Commercial~~	~~24/12/24~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~180~~	~~Both Sides Opposite~~	~~Dual Function~~
~~**Without Parking & 3-Foot Bike Lanes**~~									
~~Residential~~	~~14/12/14~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~180~~	~~Both Sides Opposite~~	~~Dual Function~~
~~Industrial~~	~~14/12/14~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~180~~	~~Both Sides Opposite~~	~~Roadway~~
~~Commercial~~	~~14/12/14~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~180~~	~~Both Sides Opposite~~	~~Dual Function~~
~~**Without Parking & 5-Foot Bike Lanes**~~									
~~Residential~~	~~16/12/16~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~180~~	~~Both Sides Opposite~~	~~Dual Function~~
~~Industrial~~	~~16/12/16~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~180~~	~~Both Sides Opposite~~	~~Roadway~~
~~Commercial~~	~~16/12/16~~	~~200 LED~~	~~30~~	~~Single~~	~~6~~	~~5~~	~~180~~	~~Both Sides Opposite~~	~~Dual Function~~
Industrial	44-60	72	30	Single	6	5	180	Both Sides Opposite	Roadway
All Other	44-6-	72	30	Single	6	5	180	Both Sides Opposite	Dual Function
ARTERIAL									
~~Residential~~Industrial	~~27/12/27~~66	~~400 LED~~180	40	Single	6	5	240	Both Sides Opposite	Roadway Dual Function
~~Industrial~~Martin Way	~~27/12/27~~66	~~400 LED~~-180	40	Single	~~6~~8	5	240	Both Sides Opposite	Roadway
~~Commercial~~All Other	~~27/12/27~~66	~~400 LED~~180	40	Single	6	5	240	Both Sides Opposite	Dual Function ~~Function"~~
~~Martin Way~~		~~400 LED~~	~~40~~	~~Single~~	~~8~~	~~5~~	~~240~~	~~Both Sides Opposite~~	~~Roadway~~
BOULEVARD									
All	~~27/14/27~~66	~~400 LED~~180	40	Twin/Single	8	1	240	Opposite Across/Median	Roadway
HAWKS PRAIRIE ROADWAYS									
Arterial	~~25/14/25~~66	~~400 LED~~180	40	Twin/Single	6/8	5/1	~~240~~220	Opposite Across/Median	Dual Function
Minor Collector ~~Without Parking~~	~~14/14/14~~42-58	~~200 LED~~72	~~40~~30	Twin/Single	6/8	5/1	18~~6~~0	Opposite Across/Median	Dual Function
~~Collector With Parking~~	~~22/14/22~~	~~200 LED~~	~~40~~	~~Twin~~	~~6/8~~	~~5/1~~	~~180~~	~~Opposite Across/Median~~	~~Dual Function~~

Retail Area Minor Collector	28	~~100 LED~~34	25	Single	6	5	120~~180~~	Both Sides Opposite	Dual Function

GENERAL NOTES (Street Light Construction)

1. Electrical permits and inspections are required for all street lighting installations. The Contractor is responsible for obtaining said permits prior to any type of actual construction.

2. A pre-construction meeting shall be held with the City of Lacey Construction and Electrical Inspectors prior to the start of construction.

3. Prior to installation of any materials the Electrical Contractor shall submit for approval by the City three bound, categorized copies of material catalog cuts, specifications, shop drawings and/or wiring diagrams. Any materials purchased or labor performed prior to such approval shall be at the Contractor's risk. Mounting heights, arm length, power source, luminaire type and bolt patterns shall follow City of Lacey Development Guidelines Chapter 4E.020. Modifications of any portion of the lighting system will not be allowed without prior approval by the City. Submittals shall include project name, name of electrical contractor, date and vendor name.

4. A 500 volt megger test will be performed by the City on each circuit between conductor and ground prior to acceptance of the lighting system. The insulation resistance shall not be less than 6 megaohms to ground for runs over 2,500 feet nor less than 8 megaohms for runs under 2,500 feet. A functional test will be performed by the City in which it is demonstrated that each and every part of the system functions as specified or intended herein. (*WSDOT Standard Specifications for Road, Bridge and Municipal Construction* 8-20.3(11).

5. All lighting poles shall be as specified in Chapter 4E.020 of the Development Guidelines. The Sonotube form shall be removed to below ground level. Pole bases shall be grouted and all luminaire heads shall be plumb and level.

6. Cement concrete bases shall follow City of Lacey Development Guidelines Luminaire Foundation detail.

7. Any modification to approved lighting plans shall be reviewed and approved by the City prior to installation. Any approved modifications shall be shown on a mylar as-built supplied to the City after the lighting installation is completed and before final acceptance. It shall be the responsibility of the Electrical Contractor to ensure these as-builts are provided to the City.

8. Private utilities require a 10 foot “clear zone” from the street light to the private utility located above ground on private utility poles. The “clear zone” separation shall be incorporated into the street lighting design to assure the required separation is provided.

9. A maximum of three circuits shall be associated per conduit. The minimum conduit size shall be two inch for typical installation and four inch for roadway crossings at intersections. Size all conduits to a maximum 26 percent conductor fill. The separate City communications spare conduit shall not be used for lighting purposes.

10. Provide junction boxes at each end of a roadway crossing, or where the conduit changes size. All junction boxes shall be located outside of the paved areas. Junction boxes are not to be placed in the pedestrian curb ramp of a sidewalk or where it will impact the ADA requirements. All junction boxes shall satisfy WSDOT Standards constructed with galvanized steel locking lids. The maximum conduit capacities for various types of junction boxes are shown in the WSDOT Standard Plans with the exception of a Type 1 junction box which may have a maximum capacity conduit diameter of 10 inches.

11. On roads classified as arterials, boulevards or collectors, the street lighting shall be separated into two circuits. There shall be a separate circuit for the right and left side of the road. Separate circuits shall be provided for street lighting internal to the subdivision from collectors and arterials.

Revised 03/2014

4E.030 Holiday Lighting

Provisions to facilitate holiday lighting shall be provided by properties fronting the following roadways:

Sleater-Kinney Road from I-5 south to Pacific Avenue,

Pacific Avenue from Sleater-Kinney Road west to the City limits,

6th Avenue SE from Sleater-Kinney Road to College Street.

The Hawks Prairie Business District.

All roundabouts and pocket parks throughout the City and the UGA.

Developers are required to provide receptacles, conduit, and miscellaneous appurtenances to facilitate holiday lighting. Conduit shall be extended through the property to permit continuity for the area above. See detail for additional information.

4E.035 Fiber Optic Conduit

~~Along with street lighting conduit, an additional 2 inch conduit with separate J boxes from the street lighting shall be installed for all projects requiring Public Works approval. Conduit shall be the same material and spacing utilized for street lighting improvements. This requirement will apply to all public streets.~~

All projects requiring Public Works approval shall install a communication conduit for future fiber optics on public streets. Minimum conduit size shall be two inch for typical installation and four inch for roadway crossings at intersections. Fiber Optic conduit shall be installed parallel to the street lighting conduit. Pull boxes shall be WSDOT approved for fiber optics and installed at a maximum of 500 foot spacing and at each end of a roadway crossing, or where the conduit changes size. All pull boxes shall be located outside of the paved areas, and are not to be placed in the pedestrian curb ramp of a sidewalk or where it will impact the ADA requirements

4E.040 Staking

All surveying and staking shall be performed by an engineering or surveying firm capable of performing such work. The surveyor directing such work shall be licensed as a Professional Land Surveyor by the State of Washington.

A preconstruction meeting shall be held with the City prior to commencing staking. All construction staking shall be inspected by the City prior to construction.

The minimum staking of luminaries shall be as follows:

1. Location and elevation to the center of every pole base.

2. Location and elevation of each service disconnect.

4E.050 Testing

All illumination systems shall be subject to an electrical inspection which shall include megger testing and a functional test. Lamp, photocell and fixture shall be under warranty for a period of one year.

4E.060 Private Utility Separation

Private utilities require a 10 foot "clear zone" from the street light to the private utility located above ground on private utility poles. The "clear zone" separation shall be incorporated into the street lighting design to assure the required separation is provided.

4F TRAFFIC CONTROL DEVICES

4F.010 General

Traffic control devices shall be installed per the requirements set forth herein. This work shall consist of furnishing and installing a complete and functional traffic control system meeting current City of Lacey standards.

Due to the complexity of coordinating the City's existing traffic control environment with any proposed traffic control device(s), the design and analysis of signals and other traffic control devices shall be coordinated under the direct supervision of the City Traffic Engineer. This is necessary to retain a uniformity of traffic control devices throughout the City.

Traffic control devices may include, but are not limited to; signals, traffic islands, modern roundabouts, stop or yield control devices, crosswalks or traffic calming features.

4F.020 Design Standards

If a traffic control device (including signage) is required, then the developer shall be required to pay the cost for the City's on-call, contracted traffic services, or, if the City's schedule allows, shall pay for the City to design the traffic control device. The City shall retain the right to determine the appropriate traffic control device based on an approved Traffic Impact Analysis. Design of appropriate traffic control devices may be allowed by a City approved design consultant.

Traffic control devices shall be designed in accordance with the specifications as set forth by the City of Lacey, ITE, AASHTO, FHWA and WSDOT. The *WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction* shall be used unless otherwise authorized by the City. Electrical permits are required for all electrical traffic control devices. The contractor is responsible for obtaining all permits prior to construction.

All applicable design requirements set forth in Chapter 3.040 and listed on the Plan Checklist shall be included. When analyzing intersections for traffic control devices, impacts to the entire roadway corridor shall be considered.

All specifications and material samples shall be submitted to the City for review and approval prior to installation.

4F.030 Pedestrian Crossings

The City will consider the installation of marked crosswalks at uncontrolled intersections and mid-block locations as part of public project design, general roadway evaluation and/or review of land use applications. An engineering study will be performed before a marked crosswalk is approved for a specific location or corridor. The engineering study will consider existing and projected pedestrian volumes, vehicular volumes, vehicular speeds, collisions, location characteristics, proximity to existing marked crosswalks, transit stops, existing and future adjacent land uses, adopted sub-area plans and WSDOT, FHWA, ITE, NATCO and MUTCD standards. All marked crosswalks shall be consistent with the City's Pedestrian Crossing Policy.

4F.040 Staking

All surveying and staking shall be performed by an engineering or surveying firm capable of performing such work. The surveyor directing such work shall be licensed as a Professional Land Surveyor by the State of Washington.

A preconstruction meeting shall be held with the City prior to commencing staking. All construction staking shall be inspected by the City prior to construction.

The minimum staking of signals shall be as follows:

A. Location, with cut or fill to center of all pole bases.

B. Location of all corners of controller base.

C. Location of service disconnect.

4F.050 Testing

All traffic control devices shall be subject to any necessary electrical inspections as well as requirements as set forth in Chapter 4B.200.

A signal system shall not be approved or accepted by the City until the signal has performed correctly to the City's satisfaction for a 30 day "check-out" period as outlined below.

Controller and cabinet testing shall be required by a WSDOT laboratory and/or the City of Lacey prior to being installed.

4F.060 Functional Testing

Field testing of illumination, traffic signal systems, and electrical for traffic control systems shall be per Section 8-20 of the *WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction* with the following exceptions.

The insulation resistance shall not be less than 50 megaohms between the conductor and ground on all circuits of any length.

A functional test shall be made to demonstrate that each and every part of the system functions as specified.

The contractor shall perform in the presence of the City, frequency response and noise tests between each controller cabinet. The same test shall also be performed on all unused (spare) pairs between the master controller and the most distant cable termination cabinet served by the pair.

The Contractor shall perform continuity checks from all wires to ground, to the satisfaction of the City.

The functional test for the traffic signal system shall consist of not less than five days of continuous, satisfactory operation. If unsatisfactory performance of the system develops, the condition shall be corrected and the test shall be repeated until the five days of continuous, satisfactory operation is obtained.

Before initial turn-on, the signal system shall be placed in flashing operation for at least two full working days but no more than five calendar days. The initial turn-on shall be made between 9:00 am and 2:00 pm on a Tuesday, Wednesday, or Thursday as approved by the City. Prior to turn on, all equipment as shown on the plans shall be installed and operable. This includes pedestrian signals, pedestrian pushbuttons, vehicle detectors, and roadway lighting. All louvers, visors, and signal heads shall be directed to provide maximum visibility.

Turn on of new or modified traffic signal systems shall be made only after all traffic signal circuits have been thoroughly tested as specified above. Functional tests shall start on any working day except Friday, Monday, or the day preceding or following a legal holiday.

A shutdown of the electrical system resulting from damage caused by public traffic, from a power interruption, or from unsatisfactory performance of City furnished materials may not constitute discontinuity of the functional test.

Turn-on of the new traffic control shall be accomplished by qualified factory signal technicians with three days advance notice to the City. The contractor shall not turn on any signal system or part thereof visible to any traveled roadway without the accompaniment of the City. The temporary and permanent signing and pavement marking shall be installed in accordance with the plans and specifications or as approved by the City before the new traffic controls are turned on.

Traffic signals shall be maintained by the developer until such time as final Public Works approval is given.

4G ROADSIDE FEATURES

4G.010 General

Miscellaneous features included herein shall be developed and constructed to encourage the uniform development and use of roadside features wherever possible.

4G.020 Design Standards

The design and placement of roadside features included herein shall adhere to the specific requirements as listed for each feature, and, when applicable, to the appropriate standards as set forth in Chapter 3.010 and 3.040.

4G.030 Staking

All surveying and staking shall be performed by an engineering or surveying firm capable of performing such work. The surveyor directing such work shall be licensed as a Professional Land Surveyor by the State of Washington.

A preconstruction meeting shall be held with the City prior to commencing staking. All construction shall be inspected by the City prior to construction.

4G.040 Testing

Testing shall be required per Chapter 4B.200.

4G.050 Survey Monuments

A. All existing survey control monuments which will be disturbed or destroyed during construction shall be referenced prior to construction and replaced after construction by a Professional Land Surveyor licensed by the State of Washington. All applicable RCW's and WAC's will be complied with, including but not limited to, WAC 332-120, WAC 332-130, RCW 58.09, and RCW 58.24.040. The monuments shall be replaced with the proper type as outlined below at the expense of the responsible builder or developer.

B. Street type: Boulevards; Arterials; Major Collectors; and, at the option of the City Survey Department, Bus Routes and Truck Routes.

   A pre-cast concrete monument with cast iron monument case and cover installed per City of Lacey standards is required.

   The monument case shall be installed after the final course on surfacing has been placed.

C. Street type: Minor Collectors; Major and Minor Local Residential, Private, and those streets not specifically outlined in 4G.050B above.

   A poured-in-place concrete surface monument per City of Lacey standards is required.

D. Monument Locations

Appropriate inner-visible monuments shall be placed:

1. At all street intersections. At intersections when streets listed in 4G.050C intersect with boulevards, arterials or major collectors, the monuments shall be placed at the intersection of the centerline of the minor streets (listed in 4G.050C) with the right-of-way line of a boulevard, arterial or major collector.

2. At the PC and PT's of all horizontal curves or at the PI if it lies in the traveled roadway.

3. At all DLC corners, section corners, quarter corners and sixteenth corners that fall within the subdivision. Where these points fall outside of the pavement or sidewalks, a poured-in-place monument per City of Lacey standards shall be set so that the top of the monument is one-foot below the surface of the ground.

4G.060 Bus Pads, Shelters and Amenities

Different population densities dictate the number and placement of bus stops. The location of Intercity Transit and/or North Thurston Public Schools (NTPS) bus pads, shelters, or amenities will be evaluated on a case-by-case basis for each project. Intercity Transit and NTPS shall make every effort to coordinate the location of bus stops and shall work with the City Transportation section to determine the best location for the required amenity.

The first consideration in locating any bus stop or amenity shall be safety. The following considerations shall also be considered in determining a bus stop or amenity: operational efficiency, and minimizing impacts to adjacent property. Bus pullouts may be required if road geometry requires, such as determined by the City, Intercity Transit, and NTPS.

When constructed by a private developer, Intercity Transit pull out areas shall be constructed with reinforced concrete a minimum of 18 inches in thickness. This section shall be placed for the area of the pull out. If a utility decides to cut the concrete section, the entire bus pull out area must be removed and replaced.

Shelters, pavement markings and signs shall be provided by the developer and installed by Intercity Transit. Installation shall be at the developer's expense. Shelters can be purchased directly from Intercity Transit at cost plus labor to install. More details may be accessed at:

~~http://www.intercitytransit.com/newsandinfo/publications/Documents/It_Bus_Stop_Spces_2010_Web.pdf~~

http://www.intercitytransit.com/SiteCollectionDocuments/BusStopSpecs.pdf

Intercity Transit shelters shall be maintained by Intercity Transit. School bus stop shelters shall be maintained by the subdivision's Homeowner's Association or apartment owner, whichever is appropriate.

Developments enclosed by walls or fences shall provide openings or gates for walkways to provide direct access between developments and bus facilities.

The City and North Thurston Public Schools will use the following criteria in placement and design of school bus stops:

1. A school bus stop shall be required for each new residential subdivision or apartment complex where school children are to be boarding or deboarding unless it is determined by the North Thurston Public Schools that a new bus stop is not required because adjacent facilities already exist for the site.

2. School bus facilities shall meet the same design standards as specified for Intercity Transit except that the contractor shall install the required school bus amenities (see details).

3. Placement shall be determined by North Thurston Public Schools and the City.

4G.070 Mailboxes

A. During construction, existing mailboxes shall be accessible for the delivery of mail or, if necessary, moved to a temporary location. Temporary relocation shall be coordinated with the US Postal Service. The mailboxes shall be reinstalled at the original location or, if construction has made it impossible, to a location as outlined below and approved by the U.S. Postal Service.

B. Mailboxes in new developments shall be clustered. Cluster mailboxes are prohibited on collectors and arterials. Mailbox locations shall be coordinated between the City and the U.S. Postal Service.

C. Individual Mailboxes shall be set on posts strong enough to give firm support but not to exceed 4 x 4 inch wood or one 1-1/2 inch diameter pipe, or material and design with comparable breakaway characteristics. See detail for clearance requirements.

4G.090 Retaining Walls

Rock, brick, concrete building block, or other approved material may be used for erosion protection of cut or fill embankments, for structurally retaining embankments, or as desired for aesthetic purposes. Retaining walls may be subject to design review.

The height of a retaining wall is that distance as measured from the bottom of the footing, regardless of whether the footing is buried or exposed, to the top of the wall. Structural walls on private property require the issuance of a Building Permit prior to construction.

Retaining walls on private property shall meet the requirements of the adopted Building Code. Retaining walls located on private property shall be set back from any public right-of-way line a distance at least equal to the height of the wall unless otherwise approved by the Director of Public Works. Retaining walls located on private property where the public right-of-way line is closer than the height of the wall shall not exceed 4 feet in height unless the wall is designed by a Washington State Licensed Professional Engineer and the wall meets all the requirements of the adopted Building Code. Walls meeting these criteria must be approved by the Director of Public Works and the Building Official.

Retaining walls over 4 feet in height located on a public right-of-way shall meet or exceed WSDOT design standards and be designed by a Washington State Licensed Professional Engineer.

4G.100 Street Trees

All public streets within the City and the City's UGA boundary will be planted with trees to create a distinct and pleasant character for those roadways. The street trees on the following table shall be required in or along the public right-of-way, including medians. Contact the City for specific street and accent trees on arterial and collector streets. These have been specified in the current version of the Lacey Urban Forest Management Plan.

See Chapter 4B.125, Landscape/Planter Areas, for specific site preparation requirements.

A. Planting theme

1. Street tree plantings shall be in accordance with the Lacey Urban Forest Management Plan.

2. Species: See following table.

B. Planting size: Trees, 2 to 3 inch caliper, measured 6 inches above the base.

C. Location: Trees shall be as shown on the applicable roadway details. Trees shall be spaced 35 to 50 feet on center (as directed by the City of Lacey) starting 10 to 15 feet from the property line. Also, trees shall not be planted within 50 feet of the intersection measured from the curb radius. Exceptions may be made when there are existing sidewalks. Street trees may then be planted 3 to 5 feet behind the sidewalk. Tree spacing may be adjusted slightly to allow a minimum 10 foot spacing on either side of a driveway.

D. Maintenance: All projects, regardless of type or zoning, required to plant street trees will also be required to maintain the trees in perpetuity, regardless of ownership. Trees shall be maintained per the current version of ANSI A300, Standard Practices for Trees, Shrubs and other Woody Plant Maintenance.

The City will be responsible for pruning all street trees located in the right-of-way along arterials and collectors. The owner/homeowner's association is responsible for mowing, weeding, watering, replacement (replaced due to death, damage or disease after approval by a City representative) and any other tree maintenance within the respective right-of-way and common areas. See Chapter 6.210 for installation and maintenance of irrigation systems. At the time of plat or site plan review approval, the City will determine responsibility for maintenance of medians.

E. Exceptions to the planting theme may be made by the Director of Public Works. Exceptions include but are not limited to; screening industrial areas; planting around historical sites; incorporation of drought resistant techniques, maintaining natural vegetation that better serves as street landscaping or beautification.

Reference: City of Lacey Urban Beautification Project Plan and Resolution 633.

GENERAL TREE LIST FOR LACEY

COMMON NAME	BOTANICAL NAME	CULTIVAR	MATURE HEIGHT	CROWN SPREAD	SPACING
Large >50' Tall					40-50'
Northern Red Oak	*Quercus rubra*		70'	45'	
Tuliptree	*Liriodendron tulipfera*		70'	35'	
Autumn Purple Ash	*Fraxinus americana*	Autumn Purple	50'	35'	
Sugar Maple	*Acer saccharum*	Commemoration/ Bonfire	60'	35'	
European Beech	*Fagus sylvatica*		50'	35'	
Scarlet Oak	*Quercus coccinea*		60'	40'	
Medium-Narrow Crowns 40-50' Tall					25-35'
Columnar Tuliptree	*Liriodendron tulipfera*	Fastigiatum	50'	15'	
Armstrong Red Maple	*Acer rubrum*	Armstrong	45'	15'	
Bowhall Red Maple	*Acer rubrum*	Bowhall	40'	15'	
Parkway Maple	*Acer platanoides*	Columnar-broad	40'	25'	
Skyrocket Oak	*Quercus robur*	Fastigiata	45'	15'	
Medium – Wider Crowns 40-50' Tall					35-40'

COMMON NAME	BOTANICAL NAME	CULTIVAR	MATURE HEIGHT	CROWN SPREAD	SPACING
Littleleaf Linden	*Tilia cordata*	Greenspire	40’	30’	
Summit Ash	*Fraxinus pennsylvanica*	Summit	45’	25’	
Patmore Ash	*Fraxinus pennsylvanica*	Patmore	45’	35’	
Norway Maple	*Acer platanoides*	Emerald Queen	45’	40’	
Red Sunset Maple	*Acer rubrum*	Red Sunset	45’	35’	
October Glory Red Maple	*Acer rubrum*	October Glory	45’	35’	
Honeylocust	*Gleditsia triacanthos*	Shademaster	45’	35’	
Katsura Tree	*Cercidiphyllum japonicum*		40’	40’	
Red Horsechestnut	*Aesculus x carnea*	Briotti	30’	35’	
Autumn Gold Ginkgo	*Ginkgo biloba*	Autumn Gold			
Small Trees <35’ Tall					25-40’
Norwegian Sunset Maple	*Acer truncatum x A. platanoides*	Keithsform	35’	25’	
Pacific Sunset Maple	*Acer truncatum x A. platanoides*	Warrenred	30’	25’	
Crimson Sentry Maple	*Acer platanoides*	Crimson Sentry	25’	15’	30-40’
Japanese Stewartia	*Stewartia pseudocamellia*		30’	20’	
Snowgoose Cherry	*Prunus spp.*	Snowgoose	20’	20’	
Spire Cherry	*Prunus x hillieri*	Spire	30’	10’	
Flowering Crabapple	*Malus spp.*	Snowdrift, Red Baron, Prairiefire	20’	20’	
Japanese Snowbell	*Styrax japonicus*		25’	25’	
Black Tupelo	*Nyssa sylvatica*		35’	20’	
Goldenrain Tree	*Koelreuteria paniculata*		30’	30’	
Rocky Mt. Maple	*Acer grandidentatum*	Schmidt	25’	15’	
Galaxy Magnolia	*Magnolia spp.*	Galaxy	30’	15’	
Rustica Rubra Saucer Magnolia	*Magnolia soulangiana*	Rustica Rubra	20’	20’	
Golden Desert Ash	*Fraxinus oxycarpa*	Aureafolia	20’	18’	

COMMON NAME	BOTANICAL NAME	CULTIVAR	MATURE HEIGHT	CROWN SPREAD	SPACING
Chinese Kousa Dogwood	*Cornus kousa*	Chinensis	20’	20’	
Pink Flowering Dogwood	*Cornus florida*	Rubra	20’	20’	
Flowering Plum	*Prunus cerasifera*	Thunder-Cloud	20’	20’	
Paperbark Maple	*Acer griseum*		25’	20’	
Tatarian Maple	*Acer tatarian*		25’	20’	
Trident Maple	*Acer buergeranum*		20’	20’	
David’s maple	*Acer davidii*		30’	25’	
Flame Maple	*Acer ginnala*	Flame	20’	20’	
Sargent Cherry	*Prunus sargentii*		30’	30’	
Amur Maple	*Acer ginnala*	Flame	20’	20’	
Black Tupelo	*Nyssa sylvatica*		30’	20’	
Small Trees – Narrow <35’ Tall					25-30’
Redmond Linden	*Tilia americana*	Redmond	35’	25’	
Pyramidal European Hornbeam	*Carpinus betulus*	Fastigiate	35’	25’	
Hedge Maple	*Acer campestre*	Evelyn	35’	30’	
Callery Pear	*Pyrus calleryana*	Redspire or Cleveland Select	35’	25’	
Ivory Silk Japanese Tree Lilac	*Syringa reticulata*	Ivory Silk	20’	15’	
Red Cascade Mt. Ash	*Sorbus americana*	Dwarfcrown	18’	8’	
Dwarf Korean Tree Lilac	*Syringa meyeri*	Palibin	7’	5’	

**Other species or cultivars may be appropriate but must be approved by the City of Lacey.*

Appropriate conifers:

Western red cedar (*Thuja plicata*)
Mt. Hemlock (*Tsuga mertensiana*)
Douglas-fir (*Pseudotsuga menziesii*)
Canada Hemlock (*Tsuga canadensis*)
Western Hemlock (*Tsuga heterophylla*)
Giant sequoia (*Sequoia gigantea*)
Alaska Yellow Cedar (*Chamaecyparis nootkatensis* and ‘Pendula’)
Austrian pine (*Pinus nigra*)
Deodar Cedar (*Cedrus deodara*)

Shore Pine (*Pinus contorta* var. contorta)
Western white pine (*Pinus monticola*-blister rust resistant cultivars)

Table 3. 'Street Tree Themes' for all major and minor arterials and collectors.

STREET	SEGMENT		PRIMARY TREE	SECONDARY TREE	ACCENT TREE	UTILITY TREE
	FROM	TO				
Sleater-Kinney Rd.	Martin Way	14th Ave.	Autumn Purple Ash	Northern Red Oak	Flowering plum	Snowdrift Crabapple
Sleater-Kinney Rd.	14th Ave.	Chambers Lk. Rd.	Emerald Queen Norway Maple	Parkway Maple Redmond Linden	Prairiefire Crabapple	Prairiefire Crabapple
Golf Club Rd.	I-5	Chambers Lk. Rd.	Patmore Ash	Rustica Rubra Saucer Magnolia	Japanese Snowbell	Prairiefire Crabapple
Judd St.	Ruddell Rd.	28th Ave.	Japanese Stewartia	Rustica Rubra Saucer Magnolia	Kousa Dogwood	Trident Maple
Clearbrook Dr.	Lacey Blvd.	To End	Northern Red Oak	Emerald Queen Norway Maple	Rustica Rubra Saucer Magnolia	Galaxy Magnolia
College St.	15th Ave.	Pacific Ave.	Northern Red Oak	Shademaster Honeylocust	Galaxy Magnolia	Trident Maple
College St.	Pacific Ave.	32nd Lane	Norwegian Sunset Maple	Shademaster Honeylocust	Prairiefire Crabapple	Desert Ash
College St.	32nd Lane	Yelm Hwy.	Patmore Ash	Norwegian Sunset Maple	Snowdrift Fl. Crab	Pacific Sunset Maple
Rainier Rd.	Yelm Hwy.	City Limits	Greenspire Linden	Emerald Queen Norway Maple	Rustica Rubra Saucer Magnolia	Trident Maple
Ruddell Rd.	Pacific Ave.	Yelm Hwy.	Summit Ash	Tuliptree	Japanese Snowbell	Pacific Sunset Maple
Ruddell Rd. Extension	Yelm Hwy	66th Ave.	Summit Ash	Tuliptree	Snowgoose Cherry	Pacific Sunset Maple
Carpenter Rd.	Hawks Pr. Rd.	Pacific Ave.	Tuliptree	Rustica Rubra Saucer Magnolia-	Japanese Snowbell	Pacific Sunset Maple
Carpenter Rd.	Pacific Ave.	Mullen Rd.	Sugar Maple	Emerald Queen Norway Maple	Kousa Dogwood	Hedge Maple

STREET	SEGMENT		PRIMARY TREE	SECONDARY TREE	ACCENT TREE	UTILITY TREE
	FROM	TO				
Kinwood St.	Martin Way	Pacific Ave.	Shademaster Honeylocust	Patmore Ash	Flowering Plum	Pacific Sunset Maple
Hensley, Ranger, School St.	14th Ave. NE	Pacific Ave.	Red Horsechest-nut	Redmond Linden	Rustica Rubra Saucer Magnolia	Amur Maple
Union Mills Rd.	Pacific Ave.	Marvin Rd.	Scarlet Oak	Shademaster Honeylocust	Amur Maple	Undergrou nd
Kagy Rd.	Mullen Rd.	58th Ave.	Sugar Maple	Norwegian Sunset Maple	Flowering Dogwood	Rocky Mt. Maple
Marvin Rd.	44th Ave. NE	Martin Way	Northern Red Oak	Emerald Queen Norway Maple	Flowering Plum	Galaxy Magnolia
Marvin Rd.	Martin Way	Pacific Ave.	Scarlet Oak	Shademaster Honeylocust	Snowgoose Cherry	Red Cascade Mt. Ash
Marvin Rd.	Pacific Ave.	Mullen Rd.	Norwegian Sunset Maple	Red Maple	Rocky Mt. Maple	Rocky Mt. Maple
Hogum Bay Rd.	Willamette Dr.	Marvin Rd.	Summit Ash	Callary Pear	Kousa Dogwood	Amur Maple
Willamette Dr.	Marvin Rd.	Hogum Bay Rd.	Purple Autumn Ash	Patmore Ash	Kousa Dogwood	Rocky Mt. Maple
Hoh St.	Martin Way	Steilacoom Rd.	Scarlet Oak	Shademaster Honeylocust	Prairiefire Fl. Crab	Golden Desert Ash
Meridian Rd.	46th Ave. NE	Martin Way	Tuliptree	Patmore Ash	Black Tupelo	Rocky Mt. Maple
Meridian Rd.	Pacific Ave.	Yelm Hwy.	Katsura Tree	Pacific Sunset Maple	Snowgoose Cherry	Flowering Dogwood
Dutterow/ Deerbrush Dr.	Martin Way	Pacific Ave.	Katsura Tree	Norwegian Sunset Maple	Rocky Mt. Maple	Trident maple
Hawks Prairie Rd.	Carpenter Rd.	Hogum Bay Rd.	Norwegian Sunset Maple	Tuliptree	Sargent Cherry	Flowering Plum
31st. Ave. NE	Marvin Rd.	Meridian Rd.	Emerald Queen Norway Maple	Red Sunset Maple	Flowering Plum	Golden Desert Ash
Britton Parkway	Carpenter Rd.	Hogum Bay Rd.	Sugar Maple	Autumn Purple Ash	Sargent Cherry	Japanese Snowbell
Orion Drive	Willamette Dr.	Meridian Rd.	Northern Red Oak	Sugar Maple	Snowgoose Cherry	Amur Maple
Martin Way	College St.	Kinwood St.	Autumn Purple Ash	Rustica Rubra Saucer Magnolia	Amur Maple	Kousa Dogwood
Martin Way	Kinwood St.	Ranger Dr.	Scarlet Oak	Norwegian Sunset Maple	Black Tupelo	Japanese Snowbell
Martin Way	Ranger Dr.	Marvin Rd.	Shademaster Honeylocust	Scarlet Oak	Snowgoose Cherry	Flowering Plum
Steilacoom	Pacific	City Limits	Katsura Tree	Pacific Sunset	Snowgoose	Flowering

STREET	SEGMENT		PRIMARY TREE	SECONDARY TREE	ACCENT TREE	UTILITY TREE
	FROM	TO				
Rd.	Ave.			Maple	Cherry	Dogwood
Pacific Ave.	West City Limits	Carpenter Rd.	Patmore Ash	Autumn Purple Ash	Kousa Dogwood	Amur Maple
Pacific Ave.	Carpenter Rd.	Marvin Rd.	Tuliptree	Greenspire Linden	Black Tupelo	Japanese Snowbell
Pacific Ave.	Marvin Rd.	Urban Growth Limits	Greenspire Linden	Tuliptree	Flowering Plum	Golden Desert Ash
14th Ave.	Carpenter Rd.	Union Mills	Norwegian Sunset Maple	Parkway Maple	Red Cascade Mt. Ash	Amur Maple
Lacey Blvd.	Sleater-Kinney Rd.	Pacific Ave.	Patmore Ash	Autumn Purple Ash	Paperbark Maple	Golden Desert Ash
21st Ave.	Chambers Lk. Dr.	Golf Club Rd.	Red Maple	Pacific Sunset Maple	Photinia Tree	Galaxy Magnolia
22nd Ave.	Golf Club Rd.	Shady Lane	Redmond Linden	Scarlet Oak	Galaxy Magnolia	Japanese Snowbell
Shady Lane	Lilac St.	Carpenter Rd.	Sargent Cherry	Flowering Plum	Paperbark Maple	Tree Lilac
25th Ave.	Ruddell Rd.	Lilac St.	Redmond Linden	Sargent Cherry	Goldenrain Tree	Kousa Dogwood
Mullen Rd.	West City Limits	Ruddell Rd.	Red Horsechest-nut	Black Tupelo	Japanese Snowbell	Amur Maple
Mullen Rd.	Ruddell Rd.	Carpenter Rd.	Tuliptree	Black Tupelo	Snowgoose Cherry	Amur Maple
Mullen Rd.	Carpenter Rd.	Meridian Rd.	Sugar Maple	Northern Red Oak	Sargent Cherry	Japanese Snowbell
54th Ave.	East of Ruddell Rd.	To End	Redspire Callery Pear	Scarlet Oak	Flowering Plum	Galaxy Magnolia
58th Ave.	Kagy Rd.	Meridian Rd.	Greenspire Linden	Black Tupelo	Rocky Mt. Maple	Trident Maple
Yelm Hwy.	West City Limits	Ruddell Rd.	Norwegian Sunset Maple	Flowering Plum	David's Maple	Red Cascade Mt. Ash
Yelm Hwy.	Ruddell Rd.	Fair Oaks Rd.	Sugar Maple	Northern Red Oak	Tree Lilac	Trident Maple
Yelm Hwy.	Fair Oaks Rd.	Meridian Rd.	Autumn Purple Ash	Pacific Sunset Maple	Paperbark Maple	Japanese hornbeam
Balustrade Blvd.	Rainier Rd.	Yelm Hwy.	Greenspire Linden	European Beech	Tatarian Maple	Tree Lilac

4G.110 Planter Strip Landscaping

All public streets within the City and the City's UGA boundary will be planted with landscaping materials to create a distinct and pleasant character for those roadways. The shrubs and groundcovers on the following table shall be required in or along the public right-of-way, including medians.

See Chapter 4B.125, Landscape/Planter Areas, for specific site preparation requirements.

A. Planting theme: Landscaping materials shall be installed in accordance with the landscaping shown on the approved civil drawings.

B. Planting size: Ground cover (i.e., kinnikinnick), 4 inch pot spaced 18 to 20 inches on center or 1 gallon pots at 20 inches on center. Low growth shrubs (i.e., Oregon grape), 1 gallon pots at 3 feet on center. Shrubs (i.e., rhododendron), 18 to 24 inches in height at 5 feet on center or 3 gallon pot at 5 feet on center.

C. Location: Shrubs and groundcover shall be as shown on the applicable roadway sheets. Shrubs and groundcover shall be incorporated into planter strip and median areas. Sight distance requirements shall be incorporated into the civil design.

D. Maintenance: All projects, regardless of type or zoning, required to plant shrubs and groundcover will also be required to maintain them in perpetuity, regardless of ownership. Landscaping shall be maintained per ANSI A300, Standard Practices for Trees, Shrubs and other Woody Plant Maintenance.

   The owner/homeowner's association is responsible for mowing, pruning, weeding, watering, replacement (replaced due to death, damage or disease after approval by a City representative) and any other shrub and groundcover maintenance within the respective right-of-way and common areas. See Chapter 6.210 for installation and maintenance of irrigation systems. At the time of plat or site plan review approval, the City will determine responsibility for maintenance of medians.

Suitable Shrubs:

Common Name	Botanical Name
Barberry	*Berberis thunbergii*
Dwarf Hinoki Cypress	*Chamaecyparis obtusus* 'Nana'
Rockrose	*Cystis spp.*
Salal	*Gaultheria shallon*
Mountain Laurel	*Kalmia spp.*
Oregongrape	*Mahonia aquifolium*
Andromeda	*Pieris spp.*
Rhododendron	*Rhododendron spp.*
Winged Euonymus	*Euonymus alata*
Otto Luyken	*Prunus laurocerasus* 'Otto Luyken'
Viburnum	*Viburnum davidii*
Savin Juniper	*Juniperus sabina*
Blue Star Juniper	*Juniperus squamata* 'Blue Star'
Pfitzer Juniper	*Juniperus Chinensis* 'Pfitzer'

Suitable Groundcovers:

Common Name	Botanical Name
Bunchberry	*Cornus canadensis*
Kinnikinnick	*Arctostaphylos uva-ursi*
Bar Harbor Juniper	*Juniperus horizontalis* 'Bar Harbor'
Turf*	

***Turf shall be permitted in applications as approved by the City of Lacey.**

4G.120 Parking Lots

The construction of parking lots within the City shall be governed by the Community Development Department. Access and drainage issues are governed by the Public Works Department. Contact the City of Lacey Planning Department to determine if the parking lot requires a Site Plan Review process. The configuration of the stalls shall be as outlined in the appropriate detail at the end of this Chapter.

The Public Works Department may require plans for the access. Access points to parking lots shall meet all the criteria as outlined in Chapters 4B.025, Access Management, and 4B.140, Driveways.

Plans and specifications as required in Chapter 5, Storm Drainage, shall be required to be submitted for review and approval by the City with respect to storm drainage discharge and on site retention or detention, matching street and/or sidewalk

grades, access locations, parking layout, and to check for future street improvement conformity and City zoning regulations. (LMC 14.19.020)

Parking lot surfacing materials shall satisfy the requirement for a permanent all-weather surface. Asphalt concrete pavement and cement concrete pavement satisfy this requirement and are approved materials. Gravel surfaces are not acceptable or approved surface material types. Combination grass/paving systems are approved surface material types, however, their use requires submittal of an overall parking lot paving plan showing the limits of the grass/paving systems and a description of how the systems will be irrigated and maintained. If the City Engineer determines the grass/paving system is not appropriate for the specific application, alternate approved surfacing materials shall be utilized. (LMC 14.19.030)