# CHAPTER 3

## ~~SUSTAINABILITY~~OPERATIONS AND ~~QUALITY OF LIFE~~ MOBILITY

~~One of the most important issues to the Bainbridge Island community is the relationship between the transportation system elements and the character of the community, livability, public health, and the environment. This chapter discusses each of these elements to the transportation system, identifies how this Plan responds to these issues, and provides examples of transportation system features that illustrate these concepts.~~

~~Transportation plays a large role in the quality of life of Bainbridge Island residents. The ferry terminal to Seattle and the Agate Pass Bridge are the only two options for traveling off the island. Bainbridge is largely a bedroom community of Seattle and Kitsap County and many Islanders commute off-island by ferry or by bridge. Lengthy commute times by ferry or being stuck in traffic on SR305 mean spending hours away from family, friends, and activities. Speeding and cut-through traffic makes neighborhood streets feel unsafe. Reliable and efficient transportation on and off island is important to balance jobs and housing and maintaining the quality of life for Island residents.~~

~~Poor quality or non-existent bicycle and pedestrian facilities can be a deterrent to residents walking or bicycling for transportation, connecting to transit, traveling to schools and parks, as well as for recreational purposes. Non-motorized facility networks provide options for active modes of transportation allowing residents to make healthy lifestyle choices. Walkability and bikeablity are desirable characteristics of neighborhoods. An increasing number of Island residents are choosing to walk and bike to goods and services in the urban developed area of the Island and to work.~~

~~How people choose to travel is a key element of both environmental sustainability and quality of life. Transportation is a significant contributor to climate change, as it accounts for a high percentage of greenhouse gas emissions. The City's Comprehensive Plan focuses growth in urban areas such as Winslow and the Neighborhood Service Centers. With good planning and implementation of mixed use and higher densities within these urban areas, development can lead to a more sustainable growth pattern and preserve community character. Investments in infrastructure for active transportation modes and access to transit allow for reduced dependence on the automobile and present an opportunity for the Island to develop more sustainably and improve the quality of life for Island residents.~~

~~Transportation infrastructure and associated drainage have direct impacts on the environment. Storm water run-off can contribute to water pollution, flooding, and water temperature elevation. The road network right-of-way presents many opportunities to incorporate sustainable practices to provide positive contributions to environmental sustainability.~~

## Community Character

Community Character is a term used to identify the elements that define Bainbridge Island. The City of Bainbridge Island's Comprehensive Plan discusses the Island's character as "...forested areas, meadows, farms, marine views, and winding roads bordered by dense vegetation..." [Comprehensive Plan Framework Principles]

### *Relationship to Transportation*

For transportation, Community Character elements include the highway, major streets, neighborhood roadways, and pedestrian and bicycle facilities, as well as the natural and manmade features within the roadway right-of-way, such as trees and landscaping, drainage ditches, and street lighting. Each of these elements define the existing character of the City of Bainbridge Island. Some of these elements may be highly desired such as trees and plantings, while others such as the visual presence of street lighting may be less of a community priority.

Much of the character of the transportation system relates back to stages of the roadway's development. Roadways throughout the Island were originally constructed as logging, mill, or farm-to-market roads connecting the rural areas of the Island with areas of urban development such as Winslow and to transportation connections such as ferry docks. As the Island became more developed, major transportation features were added, including the Agate Passage Bridge, SR 305, and the Bainbridge Island ferry terminal. Island roadways were also improved over time -- pavement was added, roadways were widened, drainage was improved, and traffic controls were added to improve vehicle mobility and safety. Urban areas, mainly Winslow, saw a higher level of improvements including sidewalks and pedestrian paths, on-street parking spaces, street trees and landscaping, and street lighting. Recent improvements to the Winslow area include bicycle lanes and sidewalks, pedestrian crosswalks and refuge areas, bicycle and pedestrian paths, vehicle turn lanes, roundabouts, and other transportation features. New property developments are required to include transportation improvements along the property's frontage in accordance with the City's roadway design standards.

The City has followed the community's desires by making efforts to define and implement an appropriate look and feel for its roadway system. Emphasis throughout the City's planning activities has responded to the community's concerns about preserving the elements that define the character of the community.

- The adopted Winslow Master Plan emphasized the use of traffic calming to slow traffic speeds and promoted the development of pedestrian and sidewalk facilities within the Winslow Core.
- The City roadway standards use 10-foot wide travel lanes instead of the standard 12 feet, creating a narrower feel and less paved width. This helps to slow traffic and reduce storm water impacts of roads.
- The City developed a Non-Motorized Transportation Plan to provide better facilities for pedestrians and bicyclists throughout the Island.
- The City continues to explore and implement innovative traffic control options such as the roundabout at Madison Avenue and High School Road as an alternative to the installation of traffic signals.

### Community character transportation features

The IWTP is focused on identifying the improvements needed for improving the mobility and safety of vehicles using the transportation system. The Plan's alternatives and recommendations meet the Plan's goals for maintaining community character including:

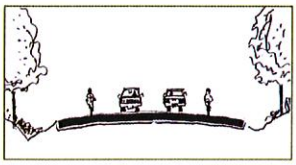
- ***Scenic resource protection*** – Focusing the development of the transportation system within existing and carefully chosen new travel corridors.
- ***Road development guidelines*** – Providing consistency with the adopted roadway standards that promote the retention of appropriate roadside vegetation and trees and follow the natural topography.
- ***Street design guidelines*** – Providing for and protecting the development of more urban features, such as parking, sidewalks, and bicycle facilities within prescribed urban areas, and less urban features, such as widened shoulders and separated paths, in less urban areas.
- ***Street lighting guidelines*** – Concentrating street lighting within Winslow and Island Town Centers and areas identified by safety or community planning needs.
- ***SR 305 scenic character*** – Retaining the scenic character of SR 305 by discouraging new access points, and maintaining vegetative buffers.

### Desired features of Community Character

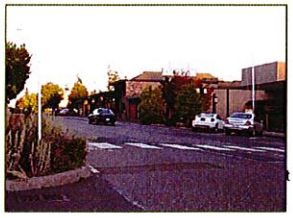
The photographs and sketches identify some of the key features that define the transportation character of Bainbridge Island.

*Following natural topography, roadside trees and vegetation, and minimized paved surfaces are desired in suburban areas*

*Crosswalks, parking, street lighting, and non-motorized facilities are desired features in urban areas*



*Integration of bicycles and non-motorized facilities are important features for the community*



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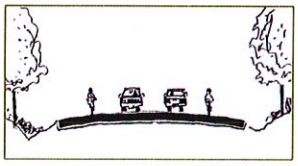


*Integration of bicycles, pedestirans, and non-motorized facilities are important features for the community*

## Livability and Health

The public is becoming more conscious of the environment in which they live and an increasing percentage of the population desires to live in places that are walkable and bikeable. Today prospective home buyers are presented with statistics such as walkability scores. More and more commuters choose active modes of transportation to commute to work. On Bainbridge Island, many residents commute by walking and bicycling to the Seattle ferry. Other commuters use Kitsap Transit or carpool and often walk to stops within their neighborhood.

### *Relationship to Transportation*

In order to achieve livability and promote public health, developing progressive standards and incremental investments in transportation infrastructure including non-motorized elements are essential.

- ***Roadway Standards*** – Pedestrian and bicycle facilities need to be specified that evolve the infrastructure in the community to be more livable and provide for active modes of transportation and recreation. Consider whether street lighting is appropriate for routes where residents are walking or cycling to school, work, or transit in the dark during fall and winter months. Recognizing that investments take time, consider interim measures to provide additional non-motorized safety through means such as reducing speed limits, providing wider shoulders, and installation of signage.
- ***Complete Streets*** – Investments in pedestrian and bicycle facilities within both urban and suburban areas over time will provide for greater connectivity. Many urban streets lack sufficient sidewalks and bike lanes. Many secondary arterial roadways in suburban locations lack shoulders and separated facilities.
- ***Multi use pathways*** – Investments in separated pathways with regional, inter-island, and local connectivity.

## Neighborhoods

Bainbridge Island is a residential community, and the protection of neighborhood areas and promotion of neighborhood transportation facilities, is an important concern for Island residents.

Urban neighborhoods, such as Winslow, need a high level of development with pedestrian and bicycle facilities, transit access, and a development of residential street character. In suburban areas, neighborhoods are concerned about the impacts of traffic flow, the development of non-motorized facilities and improving future connections and circulation.

### *Relationship to Transportation*

Residential areas need to provide a safe roadway system for adults and children walking, bicycling, playing, and driving. The City of Bainbridge Island has a limited transportation network and vehicle movements often depend on a single street. Because of this, as traffic levels increase on the arterial street system, adjacent and parallel streets will begin to experience factors such as "cut through" traffic, inappropriate vehicle speeds, and intersection congestion.

- ***Neighborhood traffic calming*** – The City's Public Works Department, in conjunction with the Police Department, review complaints about inappropriate speeding or cut-through traffic on neighborhood streets.
- ***Traffic enforcement*** – The City of Bainbridge Island Police Department responds to neighborhood requests about high traffic speeds through residential areas.
- ***Roadway standards*** – The City of Bainbridge Island has developed its roadway design standards to act as a traffic calming feature through the use of narrow travel lanes and non-motorized facilities.

### *Neighborhood Transportation Features*

The IWTP is focused on identifying the improvements needed for the mobility and safety of vehicles using the transportation system. The alternatives and recommendations meet the Plan's goals for maintaining the neighborhoods including:

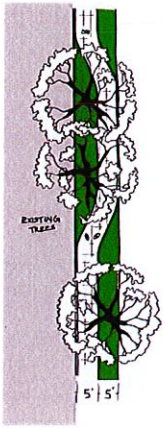
- ***Neighborhood cut-through traffic*** – Focusing the development of transportation system within primary travel corridors.
-
- ***Neighborhood circulation*** – Develop the transportation network to provide secondary roadway access, improve emergency access, increase neighborhood circulation, and improve pedestrian and bicycle mobility. Pedestrian and bicycle path short-cut connections through neighborhoods offer important connectivity to link neighborhoods and discourage unnecessary vehicle trips. City review of new development projects should look for opportunities to provide non-motorized connectivity between neighborhoods.
- ***Winslow street visualization plan*** – Promoting the design and character of each street within the Winslow area.

### ~~Desired features for Neighborhoods~~

~~The photographs and sketches identify some of the key features that define the neighborhood goals for transportation.~~

*Neighborhoods should be enhanced by providing appropriate street width, sidewalks, and other facilities*

*The character and needs of Winslow streets will be part of a visual street plan*




*Streets need to reflect the special needs of pedestrians, bicyclists and traffic flow*

## ~~Environment~~

~~Maintaining a natural quality environment is very important to the Bainbridge Island community. Protection of the environment is a key consideration for all development projects, with the City, State, and Federal Government agencies all playing roles.~~

### ~~Relationship to Transportation~~

~~Bainbridge Island has a variety of environmental characteristics that affect the development of the transportation system. As an island, traffic is concentrated near the ferry terminalterminal in Winslow, and at the two-lane Agate PassPassage bridge at the north end of the Island. Its topography, soils and steep slopes have limited the development of roadways in many areas. The Island has many sensitive resources such as ravines, parklands, open spaces, and shoreline and wetland areas that require creative and environmentally sensitive approaches to roadway and non-motorized facility development.~~

~~Possible impacts to the environmentare a key consideration in the development of transportation projects. These include full consideration of impacts in the planning and design of a project on the environment. Steps in the project development and environmental review process include:~~

- ~~Transportation corridor studies that include public review~~
- ~~Environmental Impact Statements thatinclude public scoping and testimony~~
- ~~Environmental considerations in the engineering and design process~~
- ~~Departmental Plan review~~
- ~~Interagency review (where applicable)~~

## Environmental Transportation Features

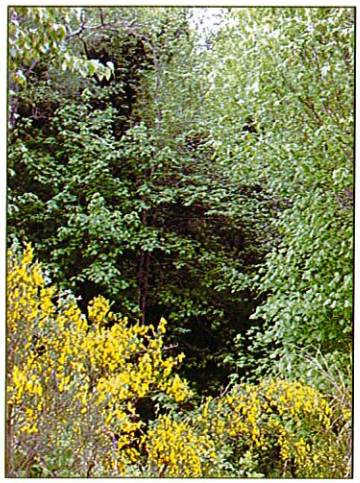
The following environmental aspects should be considered in addition to focuses improving mobility and safety for all modes of transportationidentified :

- ***Environmental sensitivity*** – Minimizing road construction within environmentally sensitive areas and encouraging the planting of low-maintenance, vegetated groundcover and trees along roadways. The Plan focuses the development of the transportation system within existing travel corridors.
- ***Utilities*** – Promoting the undergrounding of overhead utilities to reduce the need for removal and maintenance of roadside vegetation.
- ***Storm water management*** – Providing for environmentally-sensitive design of stormstrom water collection and detention facilities. Look for opportunities to combine traffic calming and storm water management goals through green infrastructure provisions within traffic calming features such as curb bulbs.
- ***Air Quality*** – Developing transportation plans and programs that improve traffic flow, encourage non-motorized and transit transportation alternatives to driving, and consider the impact to regional air quality.
- ***Wildlife corridors*** – Recognizing and promoting the maintenance of wildlife corridors.

## Desired features of Environment

Bainbridge Island has a variety of environmental characteristics that affect the development of the transportation system.

The photographs and sketches below identify some of the key features that define the environmental goals.



*Protection of environmental resources such as the Ravine*

## ~~Storm water Management and Green Infrastructure~~

*Undergrounding overhead utilities can reduce the need to remove or cut back roadside vegetation*

*Special stormwater containment features can control water runoff from roadway surfaces*

*Special stormwater containment features can control water runoff roadway*

- Storm water planters to control run off and improve water quality

*Protection of environmental resources such as the Ravine*

- Rain gardens to control storm water run-off and improve water quality

~~Developed landscapes including roadways are covered with impervious surfaces which can increase pollutant levels and increase stream flows degrading water quality. The Washington State Department of Ecology (DOE) establishes the storm water flow control and water quality requirements for roadway projects. As a municipality, the City of Bainbridge is required to meet the National Pollutant Discharge Elimination System (NPDES) permit obligations to discharge storm water to waters of the State of Washington and meet the NPDES permit requirements. With the implementation of the 2012 NPDES Permit, the City is implementing Low Impact Development (LID) requirements for both public and private development.~~

~~LID is an innovative storm water management approach that attempts to mimic the natural storm water hydrology of pre-development conditions. LID uses techniques that infiltrate, filter, detain, evaporate, and attenuate storm water run-off close to the source. Examples of "green" natural processes include, swales, bio retention, filter media, permeable pavement, and street trees. Streets that implement natural processes are commonly referred to as green streets. Green streets can serve multiple community goals by combining storm water infrastructure within traffic calming features such as curb, bulbs or by adding planting strip rain gardens that provide additional buffer from the sidewalk.the development of non-motorized facilities and The . Because of this, Police Department certain Develop the transportation network to provide ,increase improve~~

## ~~Balancing Community Needs~~

~~One of the more difficult aspects of improving a transportation system is finding the right balance between competing community needs and desires. For example it may be best to construct a sidewalk/ separated pathway on one side of the roadway rather than on both sides to reduce impacts to vegetation.For example, a community goal of minimizing impact to the natural environment can be at odds with a goal of providing safe facilities for bicycle and pedestrian use.~~

~~The evaluating the trade-offs and weighing the importance between community goals and design guidelines is an important function of the City of Bainbridge Island. Table 3-1 illustrates the issues that can arise for a variety of transportation improvements.~~

~~**Table 3-1: Competing Community Needs**~~

This chapter describes the traffic operations and current and future vehicle mobility for the City's roadway system. Mobility is the measure of how well vehicles can get around on the roadway system – the opposite of congestion. Island residents expect a high level of mobility to coincide with the character of their community. The high levels of congestion experienced during peak periods, especially on and around SR 305, is a common source of frustration for drivers.

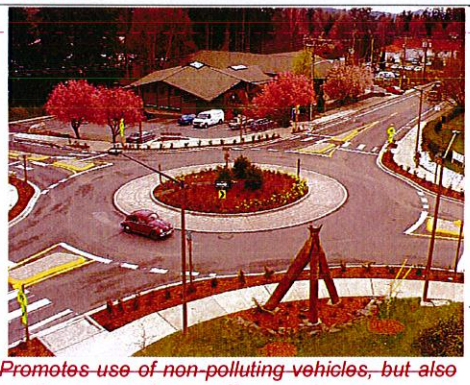
While the focus of this chapter is on motorized level of service, it is recognized that providing for level of service for all modes is an important for a viable transportation system. In some locations where constraints limit options, some modes may be favored over other modes. Transportation networks should provide for all modes of transportation as a system. For vehicular traffic transportation demand strategies may be an optimal approach.

Level of service standards are used to provide a basis for the mobility analysis. This Plan used planning and operational models developed by Transportation Solutions, Inc. in TransCAD and

Synchro software, respectively, to analyze current conditions (based on traffic counts and existing roadway network information) and to forecast future levels of service (based on traffic generated by forecasted land use and roadway network changes). The structure of the roadway network was analyzed by reviewing the roadway classification system, connectivity, access, and road standards.

## Existing Roadway System

The Plan of existing conditions provides an analysis of the current operating conditions and provides a baseline for future comparisons. The City of Bainbridge Island's transportation system is made up of a network of roadways, pedestrian facilities, bikeways, the ferry terminal, and formal and informal trails. Each of these elements is important to the mobility or movement of people and goods within and to destinations beyond the Island. This chapter focuses on the roadway system only; the non-motorized, bus transit, and ferry systems are described in Chapters 6 & 7.

| ~~Project Type~~ | ~~Community Character concerns~~ | ~~Environmental concerns~~ | ~~Neighborhood concerns~~ |
|---|---|---|---|
| ~~Widen roadway for bicycle lanes~~ | ~~*Increases paved width of roadways changing the road's look and feel*~~The roadway system is designed for the movement of people and goods throughout the community. Major regional transportation features of the Island include the Washington State Ferry Terminal, which connects Bainbridge Island to downtown Seattle; and State Route 305, which connects the Island to the Kitsap and Olympic Peninsula. State Route 305 is the Island's principal transportation corridor, providing an important north-south connection. |  ~~*Promotes use of non-polluting vehicles, but also can increase water runoff*~~ | ~~May slightly increase vehicle travel speeds on widened road corridorroads~~ |

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| | | | |
|---|---|---|---|
| ~~Installation of roundabout at an intersection~~ | ~~Roundabouts highly desired over traffic signals~~ | ~~May result in removal of trees near intersection~~ | ~~May reduce cut-through traffic in residential areas~~ |
| ~~Rebuilding roadway impacted by shoreline erosion~~ | ~~May result in a more structured and modern roadway facility~~ | ~~May have impacts to shoreline areas, loss of trees and foliage~~ | ~~Needed improvement for access to property~~ |
| ~~Installing pedestrian path or sidewalk~~ | ~~May affect the feel of a traditional neighborhood~~ | ~~Promotes use of non-polluting vehicles~~ | ~~Provides safe access for pedestrians~~ |

~~As illustrated in the table above, each of these examplesprojects could have competing concerns and sometimes, even within a single category. In other words, a highly desired project for one member of the community may be highly opposed by anotherthe other. In the end, these checks-and-balances can improve the planning and design of roadway projects by reflecting the needs and desires of the community.Public Works uses the community values in the Comprehensive Plan when developing project objectives. The City of Bainbridge is committed to the principals of context sensitive solutions. Public Works staff strives to facilitate public engagement when developing capital projects to evolve and refine the community's values as they relate to each project.~~The State system is supported by a City roadway system that connects residential areas to the highway and retail and employment areas. The City's arterial, collector, and residential street system provides roadway connections and access to properties within the City.

### *Travel Corridors*

The following important commuter, shopping, business, school, and freight/commercial corridors are identified for the Island:

- *Commute Corridors* – SR 305, Winslow Way, Wyatt Way, Ferncliff Avenue, High School Road, Day Road, Blakely Avenue, Eagle Harbor Drive, Baker Hill Road, Miller Road, and North Madison Avenue.
- *Shopping Corridors* – SR 305, Winslow Way, High School Road, Madison Avenue, Ericksen Avenue, Wyatt Way, Lynwood Center Road, and Valley Road.
- *School Corridors* – High School Road, New Brooklyn Road, Sportsman's Club Road, Madison Avenue, Day Road, North Madison Avenue, and Blakely Avenue
- *Freight Corridors* – SR 305, Day Road, Miller Road, Fletcher Bay Road, Sportsman's Club Road, High School Road, Madison Avenue, and Winslow Way.

### *Roadway Inventory*

The City's roadway system consists of approximately 140 miles of paved roads, and another 20 miles of unpaved roads. The City maintains a Geographic Information System (GIS) that includes the roadway system. The GIS database includes characteristics for each roadway segment, including length, pavement width, functional classification, posted speed, sidewalks, and transit and bicycle facilities. A spreadsheet is maintained that includes sign inventory information. The City periodically conducts an island-wide traffic counting and develops volume and traffic speed information for its major roadways. This Plan was updated in 2014 with TSI traffic counts.

## Roadway Classifications

Roadway functional classification is defined as "the process by which streets and highways are grouped into classes, or systems, according to the character of traffic service that they are intended to provide". The City divides Island roadways into four functional classifications: principal arterial, secondary arterial, collector, and local access roads. These classifications are described in Table 3-1.

**Table 3-1. Functional Classifications**

| Classification | Definition |
|---|---|
| Principal Arterial | Carry the highest levels of traffic in the system at the greatest speed for the longest uninterrupted distance, often with some degree of access control. Used for through trips, and provide connections within the system. |
| Secondary Arterial | Carry high level of traffic at a moderate speed, sometimes for through trips. Often serve as access to high-intensity land uses such as major employers or larger commercial centers; provide connections within the system. |
| Collector | Connect traffic from residential roads to arterials at a lower speed, carrying lower levels of traffic than arterials. Serve neighborhood centers. |
| Local Access | Carry low levels of traffic at low speeds. Serve as access to residential and commercial areas and are not used for through trips. |

Streets and highways are assigned one of these classes, depending on the character of the traffic (i.e., local or long distance) and the degree of land access that they allow. Typically, a trip will use a combination of different road classes, with each classification having a specific function with regard to access and travel speed. Arterials provide a high degree of mobility and less access, while local access roads provide a high level of access and less mobility. Collectors provide a balance between access and mobility and connect the system.

Each roadway in the City's system has been assigned a functional classification, which reflects its operational characteristics including traffic volumes, surrounding land uses, and travel speeds. Figure 3-1 shows the functional classes of the arterials and collectors. Other roadways are local access.

The following changes to roadway classifications since 2004 are included in this update to the IWTP: Halls Hill Road from Blakely Hill to Rockaway Bluff from Local Access to Collector, Wallace Way from Madison Avenue to Ericksen Avenue from Local Access to Collector, and Upper Farms Road from Collector to Local Access.

## Road Standards

The City of Bainbridge Island has established its roadway street and design standards as part of its *Engineering Design and Construction Standards and Specifications*. These standards set the minimum requirements for constructing roadways and are applicable to all new roadway construction and modifications to existing roadways within the City of Bainbridge Island. The road

and street design standards follow the functional classification system described above and establish separate standards for urban and suburban areas of the Island.

The City has both urban and suburban standards. Urban standards are intended to apply within the urban center of Winslow, the urban town centers including Lynwood, Island Center, and Rolling Bay, and the Day Road industrial Center. Urban standards apply in all locations with R2.9 and greater zoning and/or effective density. The City may require urban standards to be applied in other areas in close proximity for system continuity.

The roadway standards were created in 1997 and an update is needed to better address non-motorized elements and low impact development. The roadway standards should be updated within two years of the adoption of the IWTP.

## Level of Service

This section describes the Level of Service (LOS) standards used in this document. LOS provides a method for measuring the performance of the transportation system. The City uses a minimum standard for LOS that is used to determine if adequate mobility is being provided on the roadway system. LOS standards and method of measurement have been coordinated with Washington State Department of Transportation, Washington State Ferries, Kitsap County, and Kitsap Transit to ensure that standards used in this document are consistent.

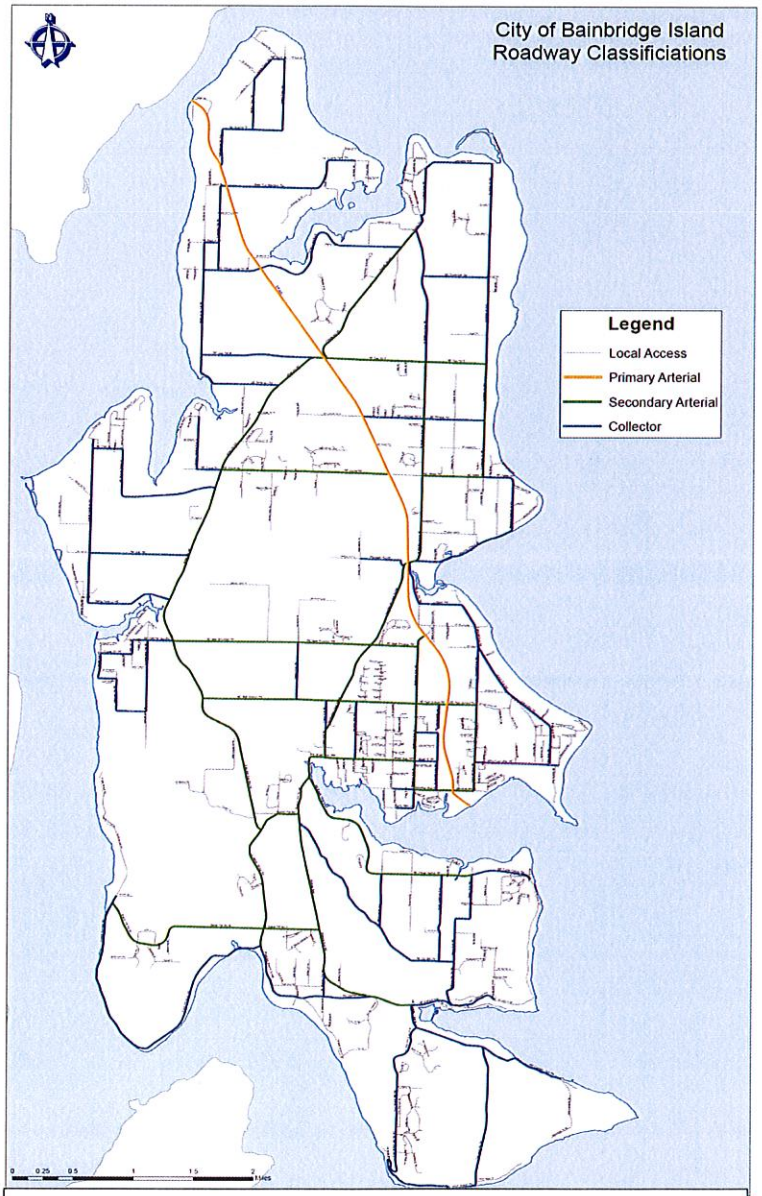



**Figure 3-1, Road Classifications**

### *LOS Defined*

LOS is a measurement used in transportation planning to assess the operating performance of the transportation system. For roadways, LOS measures the degree of traffic congestion along a roadway varying from LOS A (free-flow traffic with minimal delays) to LOS F (highly-constrained traffic with long delays).

The Highway Capacity Manual (HCM) (Transportation Research Board, Special Report 209) establishes quantitative methodologies for determining level of service for differing types of facilities. The methodologies vary for intersections, roadways, freeway, and highway, but all follow the LOS A - F classification and provide a consistent method of measuring the performance of the transportation system. Table 3-3 describes the operation of the transportation system at each LOS ranking.

**Table 3-3: Level of Service Descriptions**

| Level of Service | Description |
|---|---|
| LOS A | Free flow traffic conditions with very low delay at intersections. |
| LOS B | Reasonably unimpeded traffic operations with only short traffic delays at intersections. |
| LOS C | Stable operating conditions with average traffic delays at intersections |
| LOS D | Operating conditions result in lower travel speeds and higher delays at intersections. |
| LOS E | Travel speeds are substantially restricted with problems likely to occur at intersections. |
| LOS F | Roadway operations are over capacity with extreme delays likely at intersections. |

LOS is measured differently for roadways and intersections. For roadways, LOS is measured as a function of traffic volume and roadway capacity. For intersections, LOS is measured as a function of vehicle delay in clearing the intersection.

### *Roadway LOS Measurement*

Roadway LOS is measured by the relationship between traffic volume (V) and capacity (C) of the roadway. As the volume of traffic using the roadway approaches the capacity of the roadway (V/C approaching 1.0), the level of service deteriorates. Table 3-4 relates volume/capacity to LOS measurements for roadways.

**Table 3-4. Roadway Level of Service and Volume/Capacity Ratio**

| LOS | Volume/Capacity (V/C) Ratio |
|---|---|
| A | Less than 0.6 |
| B | 0.60 to less than 0.70 |
| C | 0.70 to less than 0.80 |
| D | 0.80 to less than 0.90 |
| E | 0.90 to less than 1.00 |
| F | More than 1.00 |

Traffic volumes can be counted or they can be calculated using the traffic model by analyzing land uses that are served by the roadway. Bainbridge Island roadway capacity policy is defined in the City Design and Construction Standards; see Table 3-5. No policy is currently defined for arterial roadway capacity. There is some inconsistency between the City's current capacity policy and an engineering-based approach to roadway capacity calculation which would typically consider the physical structure of the roadway, including the number of lanes, type of intersection controls, widths of lanes and shoulders, and design speed. The City's capacity standards should be reviewed and updated during the roadway design standard update process.

The roadway levels of service described in this Plan are based upon current capacity policy. In lieu of an arterial capacity policy, this Plan calculated arterial segment LOS based on an approach which is currently used by the City of Sammamish and which is consistent with the state of engineering practice.

**Table 3-5. Existing Roadway Capacity Policy**

| Functional Classification | Area Type | Capacity (ADT) |
|---|---|---|
| Secondary Arterial | Urban | > 3,000 |
| Secondary Arterial | Suburban | >2,000 |
| Collector | Urban | 2,000 to 3,000 |
| Collector | Suburban | 1,000 to 2,000 |
| Residential | Urban | < 2,000 |
| Residential | Suburban | < 1,000 |

To improve the LOS for a roadway, either the capacity must be increased or the volume of traffic using the road must be decreased. To increase the capacity, the City can look at several options such as roadway improvements ranging from adding signals or separated turn lanes to an intersection to roadway widening. To reduce traffic volumes, the City can explore options such as changing allowable land uses or modifying individual travel behavior. This section focuses on capacity improvements. Chapter 7 discusses other travel modes and methods of transportation demand management.

### *Intersection LOS measurement*

Intersection LOS is measured by the amount of delay experienced by a vehicle waiting to clear an intersection. Delay at a signalized intersection can be caused by waiting for the signal or waiting for the queue ahead to clear the signal. Delay at un-signalized intersections is caused by waiting for a break in traffic or waiting for a queue to clear the intersection. Table 3-6 shows the amount of delay used to determine LOS for signalized and un-signalized intersections. Roundabout-controlled intersections use the same LOS thresholds as signalized intersections.

**Table 3-6. Intersection LOS and Delay**

| LOS | Signalized Delay per Vehicle (sec/veh) | Unsignalized Delay per Vehicle (sec/veh) |
|---|---|---|
| A | 0-10 | 0-10 |
| B | >10-20 | >10-15 |
| C | >20-35 | >15-25 |
| D | >35-55 | >25-35 |
| E | >55-80 | >35-50 |
| F | >80 | >50 |

*Generally, speaking…*

*Roadways that are LOS E or F fail the standard.*

*LOS D is okay for certain arterials and collectors in urban areas*

*LOS A, B or C are within the standard for all arterials and collectors*

Different delay standards are used for signalized (stop light controlled) and unsignalized (stop sign controlled) intersections. For signalized and all-way stop controlled intersections, the LOS is the amount of delay per vehicle caused by control and is reported for the intersection as a whole. For un-signalized intersections, where there are controls only on the minor approaches, the LOS is estimated by the average delay per vehicle and is reported for only minor approaches to the intersection.

### *City LOS Standard*

The City of Bainbridge Island's LOS standard designates the minimum operational performance of the roadway system that must be maintained. If traffic volumes cause a roadway to fall below the minimum LOS standard, improvements or other mitigation must be made to bring the facility back to the designated LOS standard. Level of service standards are normally prescribed for the p.m. peak hour (most congested hour) of the traffic system, which typically occurs between 4:45 and 5:45 in the evening on Bainbridge Island.

The recommended minimum LOS standard uses the City's roadway classification system, and four zones that reflect the differences in the Island's character: Urban, Sub-Urban, Neighborhood Services Centers, and the SR 305 Corridor. Within each of these categories, individual minimum LOS standards were established for secondary arterials, collectors, and residential roadways. These are shown in Figure 3-2 and described below.

***Urban Zone – (applies to roadways and intersections in the most developed areas of the City, mainly the greater Winslow area)***

- Secondary Arterial – LOS D

- Collector – LOS D
- Local Access – LOS C

***Neighborhood Service Centers (NSC) Zone – (applies to roadways and intersections within the City-defined Centers of Rolling Bay, Island Center, and Lynwood Center)***

- Secondary Arterial – LOS D
- Collector – LOS C
- Local Access – LOS C

***Sub-Urban Zone – (applies to roadways and intersections in areas outside of the Winslow core and the NSC – the remainder of the Island)***

- Secondary Arterial – LOS C
- Collector – LOS C
- Local Access – LOS B

***SR 305 Corridor – (applies to state highways and is established by the State)***

- All Roadways– LOS D

## *Non-Motorized LOS Standard*

The facility types and associated level of service for non-motorized transportation elements for secondary arterial and high volume collector (ADT 1500 or greater) roadways are established in Chapter 6, "Non-Motorized Systems" of this plan. The minimum Bicycle Level of Service (BLOS) and Pedestrian Level of Service (PLOS) for development in urban areas is level of service C. The minimum BLOS and PLOS for development in suburban areas is level of service D.

## *SR-305 LOS Standard*

The LOS standard for state facilities is set by the Washington State Department of Transportation as a Highway of Statewide Significance (HSS) under RCW 47.06.140. The HSS designation requires that SR-305 be evaluated using a LOS Standard designated by WSDOT. While WSDOT internally evaluates roadways using its own methodology, WSDOT has assigned a level of service standard for SR-305 as LOS D-mitigate for City planning purposes. This standard requires that congestion be mitigated when the peak period operation of the state facility falls below LOS D.

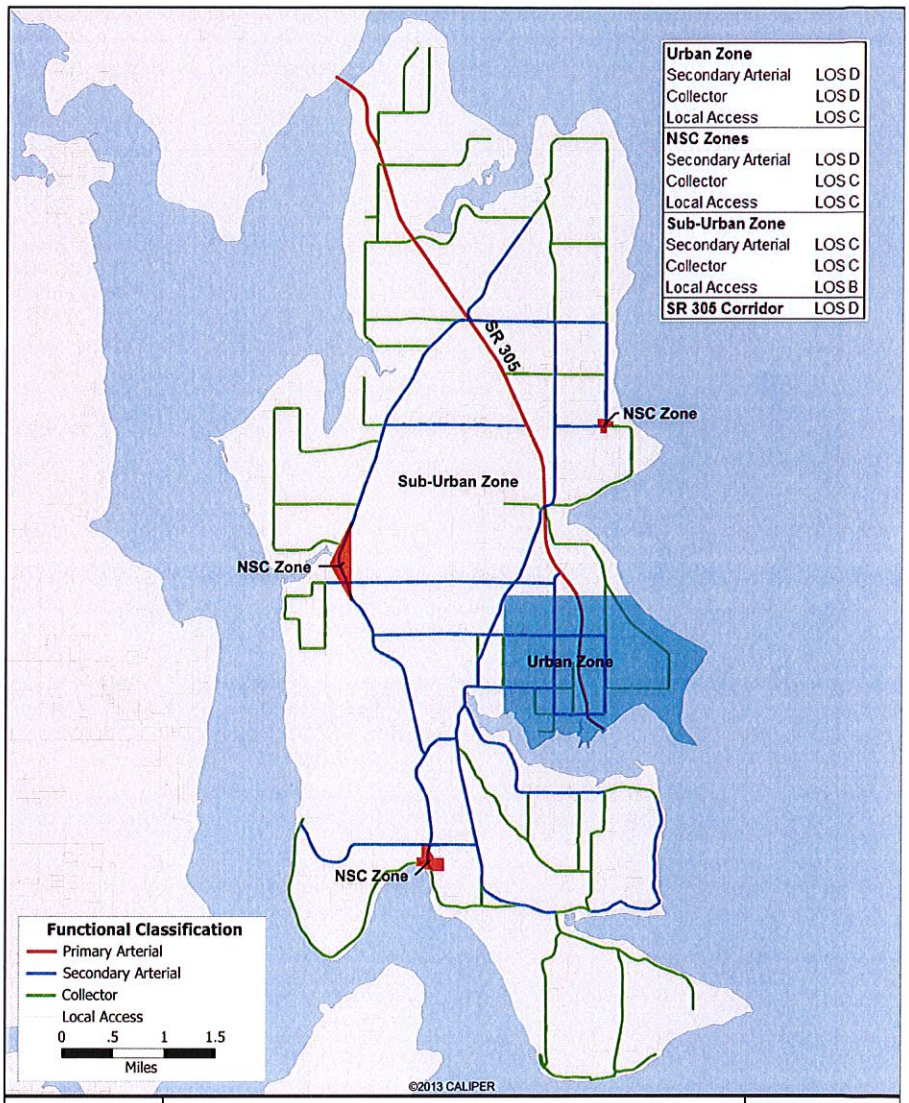



**Figure 3-2**

**Recommended Level of Service Standards**

## Existing Traffic Conditions

This section describes the traffic conditions for the 2014 Plan year. The Plan is based on traffic data collected for roadway segments in 2012 and intersection counts in 2014.

### *Transportation Model*

A consultant, Transportation Solutions, Inc. (TSI) developed a citywide transportation model to estimate existing travel demand and to provide a tool for forecasting future travel demand on City roadways. Current and future travel demand were used as inputs to a citywide operational model, developed using Synchro software, to evaluate current and forecasted PM peak hour levels of service throughout the city's roadway network. The demand model is based upon the concept of vehicle trips; pedestrians and cyclist demand is not forecasted. Similarly, carpool, vanpool, or transit users are represented by single vehicles in the model.

For analysis of existing conditions, the TransCAD-based model used existing land use data from Kitsap County and Puget Sound Regional Council (PSRC), roadway information from the City, and TSI traffic counts to reproduce existing trips and their paths, from origin to destination, through the citywide roadway network.

Land use was collected from Kitsap County at the individual parcel level and aggregated to create 241 transportation analysis zones (TAZs) which covered the entirety of the City. Two external zones were created to represent travel demand at the ferry terminal and at the north end of the Island.

Trip generation was based upon existing land use and trip generation rates established by the *Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition* and calibrated based on knowledge of local conditions and travel patterns. It was observed during calibration, for example, that single-family trip generation rates on Bainbridge Island were lower than the nationally-calibrated averages published by ITE. This reduced single family trip rate may be associated with a growing percentage of retirees living on the Island. Peak hour ferry trip generation rates were estimated from the WSDOT Ferries Division *2013 Origin-Destination Travel Survey Report*.

Trips were distributed through the TAZ network using a doubly-constrained gravity model, which assumes that trips produced at a given origin and attracted to a given destination are proportional to the total trip productions at the origin and the total trip attractions at the destination. Trip impedance was calculated free flow travel time as input to a gamma function with calibration parameters adjusted based on local knowledge and relationships established in other regional models, including the Kitsap County travel demand model.

The last step of the demand modeling process was to assign trips from origin to destination zones via the roadway network. Roadway information including width, number of lanes by direction, and presence of non-motorized facilities were used to estimate roadway capacity. TransCAD's stochastic user equilibrium assignment process iteratively loads the roadway network until a travel time equilibrium solution is found.

For operational analysis, a citywide traffic model was developed in Synchro software, using roadway information obtained from the City, satellite and street-level imagery collected from Google Earth, and traffic counts collected in 2014 by TSI. Relevant roadway information for operational analysis included number of lanes, intersection channelization, traffic control devices,

speed limits, and lane width. Observed PM peak hour traffic volumes were applied to the roadway network to calculate intersection levels of service.

**Peak Hour Traffic Volumes**

The City of Bainbridge Island collects traffic count data on a periodic basis to assess changes in traffic patterns, to collect information for its concurrency program, and to track the operational characteristics of the Island. In 2012, the City contracted an update of Island-wide traffic counts and travel speeds. In 2014, the City contracted intersection counts. This information was utilized in the traffic model developed by TSI. The data is included in Appendix E of this report.

**WSDOT Ferry Travel Survey**

Washington State Department of Transportation (WSDOT) conducts origin-destination (OD) surveys every six to seven years as a way to accurately capture and measure the travel patterns of ferry passengers. Passengers were asked about their typical routes, how they get to and from ferry terminals, and the purpose of their trips. The most recent survey was conducted in October 2013 and results were published in August 2014.

Surveys were administered to ferry riders during weekdays and Saturdays in October 2013. Over 17,000 survey questionnaires were collected system-wide, with 92 percent of collected surveys sufficiently complete for analysis. Survey responses were used to develop a database of ferry user characteristics, including trip origin and destination patterns. TSI reviewed and processed survey results for the Seattle-Bainbridge route and used them as inputs to the citywide travel demand and traffic operations models.

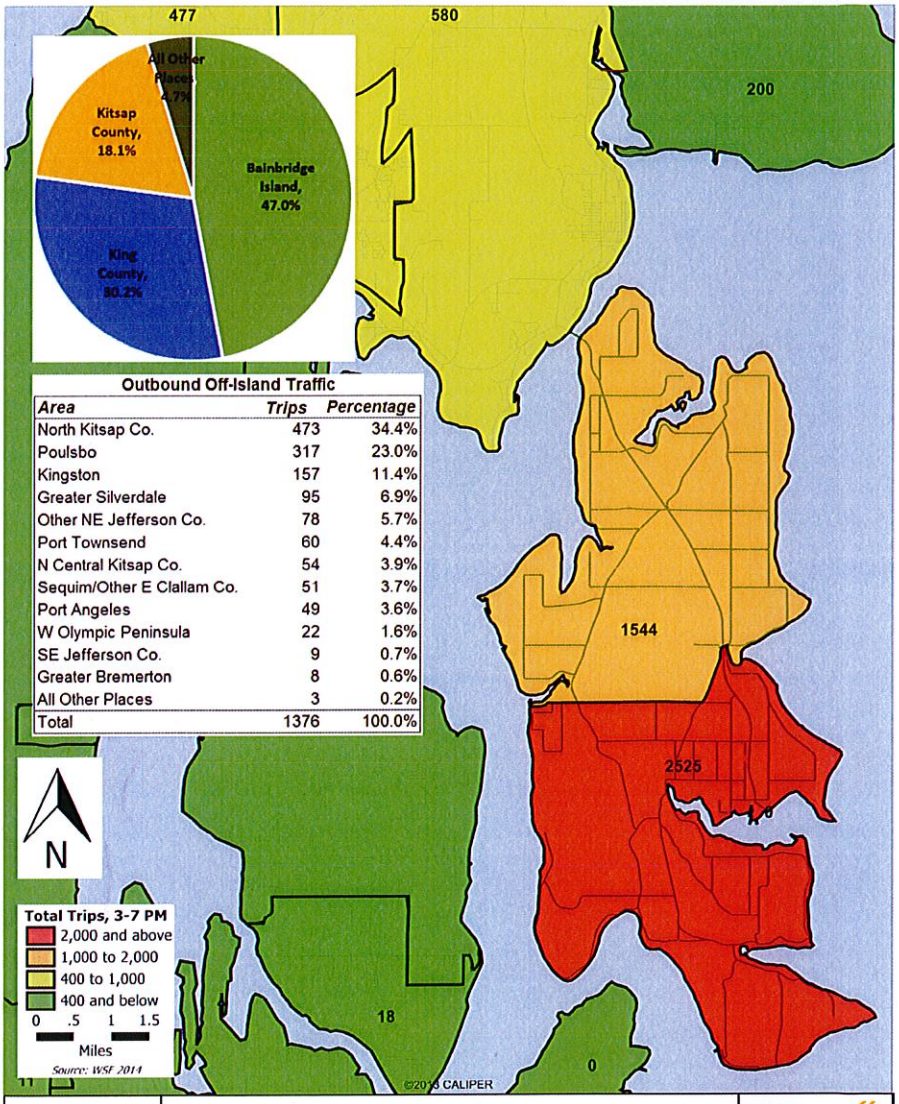
Figure 4-3 summarizes survey findings for the Seattle-Bainbridge Island ferry.

Highlights of the survey results are summarized below:

- Ferry ridership has declined slightly since 2006, with approximately 17,000 riders per day in 2013 compared to 18,000 riders per day in 2006. Vehicle boardings decreased by 7 percent during that period.
- The Seattle-Bainbridge route has shown an aging ridership, with the number of passengers over age 64 increasing from 8 percent in 2006 to 17 percent in 2013. System-wide, average passenger age increased from 42 in 1993 to 48 in 2006 and 49 in 2013. Currently 18 percent of riders are retired and another 14 percent are planning to retire in the next five years.
- Approximately 25 percent of weekday riders telecommute at least one day per week, up from 20 percent in 2006.
- The proportion of work- and school-related trips decreased and the proportion of recreation and shopping trips increased between 2006 and 2013.
- Of the 6,070 total (eastbound and westbound) ferry trips during the 3:00 to 7:00 PM weekday peak period, 67 percent had an origin or destination on Bainbridge Island, while the remaining 33 percent had off-Island trip ends. This indicates the WSF terminal's regional nature, with one in three travelers originating or destined for off-Island locations.
- The City of Poulsbo and other North Kitsap County locations accounted for 57% of the off-Island destinations. Other primary destinations included the cities of Kingston, Silverdale, Port Townsend, and Sequim. The results indicate that while much of off-Island traffic is

coming from areas adjacent to Bainbridge Island, as many as 40% of off-Island drivers could take advantage of new or improved service to downtown Seattle from Kingston or Bremerton.

- Nearly 70 percent of total weekday PM peak period ferry trips are destined westbound, with the other 30 percent of trips destined primarily for locations within Seattle.




**Outbound Off-Island Traffic**

| *Area* | *Trips* | *Percentage* |
|---|---|---|
| North Kitsap Co. | 473 | 34.4% |
| Poulsbo | 317 | 23.0% |
| Kingston | 157 | 11.4% |
| Greater Silverdale | 95 | 6.9% |
| Other NE Jefferson Co. | 78 | 5.7% |
| Port Townsend | 60 | 4.4% |
| N Central Kitsap Co. | 54 | 3.9% |
| Sequim/Other E Clallam Co. | 51 | 3.7% |
| Port Angeles | 49 | 3.6% |
| W Olympic Peninsula | 22 | 1.6% |
| SE Jefferson Co. | 9 | 0.7% |
| Greater Bremerton | 8 | 0.6% |
| All Other Places | 3 | 0.2% |
| Total | 1376 | 100.0% |

**Figure 3-3**
**Ferry Terminal Person Trips, 2013 PM Peak Period (3-7 PM)**

TSI Transportation Solutions, Inc.

## Existing LOS

The travel demand model was calibrated using a process that compares the counted roadway volumes to modeled flows which are based on land use and roadway network data. The calibrated TransCAD model and Synchro intersection analysis software were used to determine the 2014 LOS for the intersections in the study area.

Figures 3-4 shows the 2014 LOS for the Island as a whole and for the Winslow area. The LOS for each intersection is shown by approach in Table 3-7. All intersections modeled on SR305 north of High School Road currently do not meet minimum LOS standards with the exception of the signal at Day Road. Day Road however is close to exceeding the standard. In urban areas, the Madison/Wyatt intersection currently fails the minimum LOS standard but will be improved to LOS A upon completion of a planned roundabout.

There are currently no roadway level of service failures.

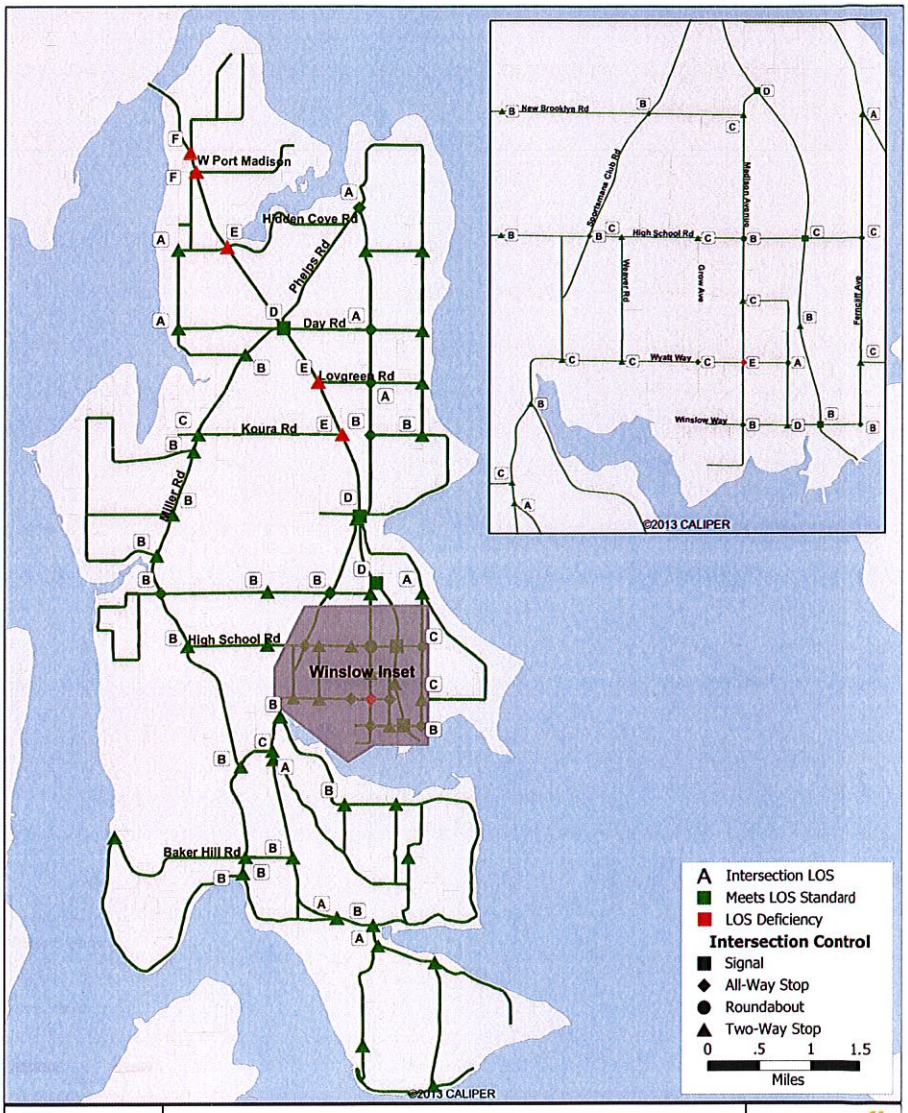



**Figure 3-4**
**2015 Level of Service**

TSI Transportation Solutions, Inc.

**Table 3-7. Intersections PM Peak Hour LOS Deficiencies – 2014 Baseline**

| Intersection | Control Type[1] | Delay[2] (s/veh) | LOS |
|---|---|---|---|
| Madison Ave N / Wyatt | AWSC | 38.5 | E |
| SR 305 / Koura Rd | TWSC | 37.3 | E |
| SR 305 / Lovgreen Rd | TWSC | 38.9 | E |
| SR 305 / NE Hidden Cove Rd | TWSC | 48.3 | E |
| SR 305 / Port Madison | TWSC | >180 | F |
| SR 305 / Agatewood Rd | TWSC | >180 | F |

[1]TWSC = Two-Way Stop Control; AWSC = All-Way Stop Control; RAB = Roundabout; Signal = Signalized
[2]Average control delay for all movements. For TWSC, delay is reported for the movement with the highest delay.

## Future Traffic Conditions

This section identifies the land use forecast methodology and results used to identify the future needs and deficiencies of the transportation system. Two time periods were studied: 2021, representing the six-year short-term planning period, and 2035, representing the 20 year long-term planning period. 2035 matches the long term planning horizon of Puget Sound Regional Council (PSRC), the region's major planning entity.

### *Land Use Forecast*

The transportation model used PSRC and Kitsap County land use forecasts to determine future PM peak hour trip growth by transportation analysis zone (TAZ). Trip growth forecasts were distributed and assigned to the future roadway network to generate expected future traffic growth citywide.

#### Determination of Base Year Land Use

Base year land use was provided by Kitsap County in the form of GIS-based tax parcel data. This data was cleaned and refined based on recent satellite and street-level photography, then categorized according to the following modeled land use types:

- Single-Family Housing
- Multi-Family Housing
- Senior/Assisted/Retirement Housing
- Retail
- General Office
- Industrial and Manufacturing
- Warehouse/Utility/Storage
- Hotel
- Hospital/Nursing Home
- Park and Ride
- School
- Recreation/Entertainment
- Church

Land use data was subsequently aggregated to create 241 transportation analysis zones (TAZs), with each TAZ representing a distinct geographical trip generating unit in the travel demand

model. Table 3-8 describes the modeled 2014 land use quantities. The base year travel demand model was calibrated using 2014 traffic counts to establish a tool that reflects vehicle traffic and travel patterns for each of the TAZs.

**Table 3-8. 2014 Land Use**

| Land Use Category | Quantity | Units |
|---|---|---|
| Single-Family Housing | 8,517 | Dwelling Units |
| Multi-Family Housing | 1,311 | Dwelling Units |
| Senior/Assisted/Retirement Housing | 212 | Dwelling Units |
| Retail | 589 | KSF |
| General Office | 316 | KSF |
| Industrial and Manufacturing | 163 | KSF |
| Warehouse/Utility/Storage | 226 | KSF |
| Hotel | 96 | Rooms |
| Hospital/Nursing Home | 69 | KSF |
| Park and Ride | 841 | Stalls |
| School | 3,355 | Students |
| Recreation/Entertainment | 207 | KSF |
| Church | 121 | KSF |

**Land Use Forecasts (2021 and 2035)**

The next step in the transportation modeling process was to incorporate land use forecasts to the calibrated base year travel demand model in order to establish 2021 and 2035 traffic forecasts.

The year 2035 transportation model horizon matches the land use forecasting horizon used by PSRC and Kitsap County. In order to convert regional 2035 land use forecasts to the level of detail required by the citywide transportation model, housing and employment growth forecasts were geographically distributed to the TAZ level according to zoning and estimated land capacity. Employment growth forecasts were converted to gross floor area or equivalent modeled units using relationships established by the Institute of Transportation Engineers, U.S. Department of Energy, and San Diego Association of Governments.

Table 3-9 shows the citywide residential and employment forecasts used in this Plan.

**Table 3-9. 2021 and 2035 Forecasts**

| | Households | % Change from Base | Employees | % Change from Base |
|---|---|---|---|---|
| 2014 Base Year | 10,152 | -- | 8,600 | -- |
| 2021 Forecast | 11,346 | 12% | 9,321 | 8% |
| 2035 Forecast | 13,248 | 30% | 10,587 | 23% |

Growth in households is assumed to occur at an annual rate of approximately 1.3 percent per year during the planning period. Employment growth is expected at 1.7 percent per year. The 2035 forecasts assigned a moderate rate of growth throughout the Island with the greatest commercial growth in the designated Neighborhood Service Centers, industrial growth focused in areas currently zoned business/industrial, and residential housing growth occurring in areas where the greatest potential for new housing under the existing zoning could occur. The 2021 forecasts were based on a straight-line interpolation of growth for each TAZ, with the assumption that the distribution of employment and housing would be proportionate to the 2035 scenario.

## Future Traffic Operations

This section describes the future traffic conditions on the City's roadway system for 2021 and 2035. Future traffic conditions were estimated for 2021 and 2035 using the results of the land use and employment forecasts, roadway network information, and the calibrated travel demand model (including calibrated trip generation, distribution, and traffic assignment submodels).

### *2021 Traffic Forecast*

The 2021 traffic forecast was developed by applying a linear interpolation of forecasted 2035 land use growth to the calibrated base year planning model. Forecasted traffic growth was then applied to the Synchro traffic operations model to analyze 2021 levels of service. Where LOS was shown to fall below the minimum LOS threshold by 2021, mitigating improvements were added to the road network. This section describes the results of the 2021 analysis.

#### 2021 LOS

The traffic model produces a forecast of 2021 traffic conditions, which are shown in Figure 3-5. Results of the 2021 forecast show continued heavy congestion and poor level of service along SR305. At location other than SR305, there are only a few minor LOS deficiencies.

### *Roadway LOS*

Roadway Segment LOS at sections of Eagle Harbor Drive and Miller Road are expected to decline. Shoulder widening project are included in the City's short term (6 year) capital improvement plan for these locations.

Along the SR305 corridor, north of Sportsman's Club Rd., roadway capacity, in addition to poor intersection operation, is predicted to become an impediment to traffic flow and contribute to congestion.

### *Intersection LOS*

The traffic model was used to identify locations where intersections may be the cause of poor operations. Table 3-10 shows the results of the 2021 Plan year intersection LOS analysis. Without mitigation, one intersection in the Urban Zone – Madison Avenue N / Wyatt Way NE – fails to meet the minimum LOS standards. The intersection of Winslow Way/ Ericksen Ave. is forecasted to decline to LOS D. The poor operation of the highway, if not addressed, will be a barrier to cross-Island traffic, impacting operations of the City's roadway system as a whole.

On SR 305, the intersections at Agatewood Road, Seabold Road, Hidden Cove Road, Lovegreen Road, and Koura Road all fail to meet the minimum standard. By the 2021 forecast year, SR 305 corridor congestion continues to deteriorate with the intersection at Hidden Cove Rd falling from LOS E to LOS F. The intersection at Day Road is anticipated fail at LOS E. The poor operation of the highway intersections, if not addressed, will increasingly be a barrier to cross-Island traffic, impacting operations of the City's roadway system as a whole.

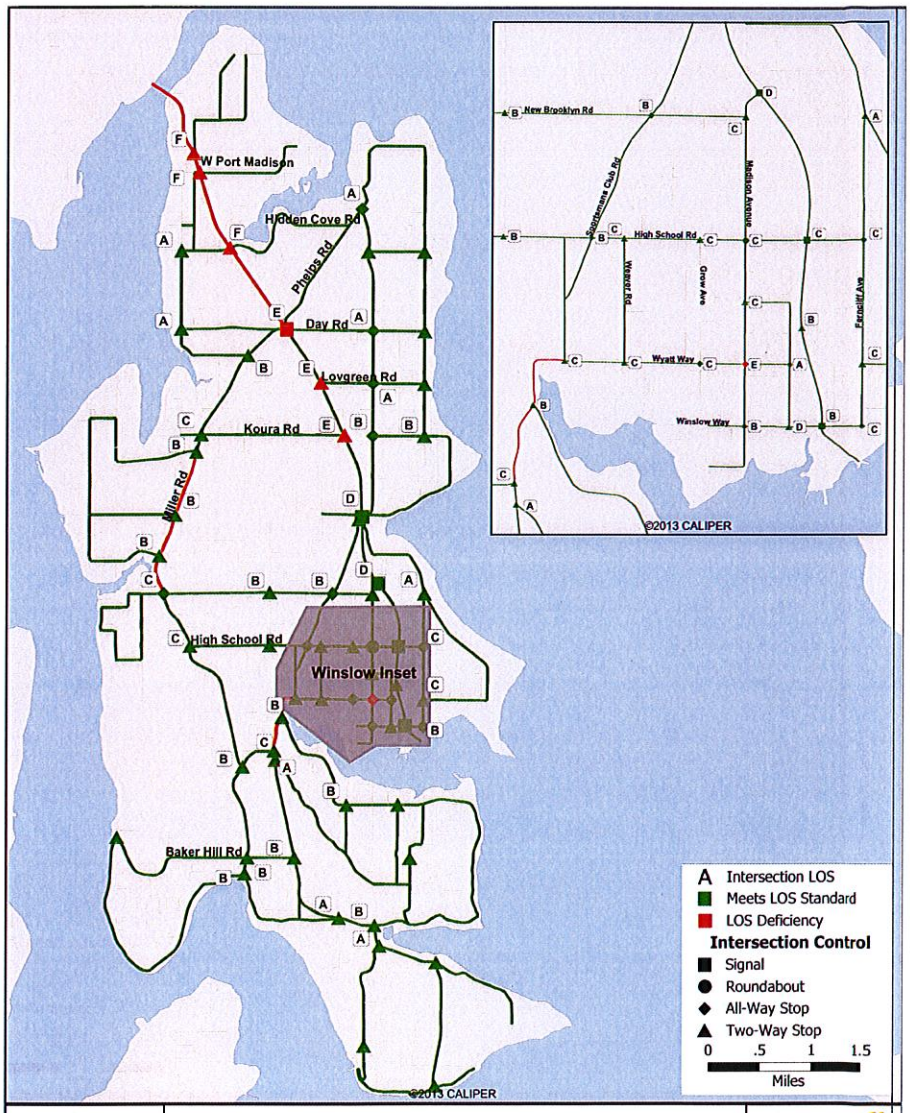



**Figure 3-5**
**2021 Level of Service**

## 2016-2021 Mitigation

Each intersection and roadway segment identified as below the minimum LOS standard in 2021 was studied to see if mitigation actions could improve the intersection LOS to the minimum standard. Targeted roadway improvements can correct an intersection or roadway that fails to meet the minimum LOS standard.

*City Mitigation*

For intersections in the City's roadway system where the expected LOS is below the minimum standard, the following mitigation is proposed:

- *Madison Avenue/ Wyatt Way* – An intersection control improvement such as a signal or a roundabout would improve the intersection to LOS B. The intersection will be studied to determine what specific improvement should be constructed. A round-about may be one alternative. An improvement project is currently programed in the City's CIP for Wyatt Way, including the intersection.
- Eagle Harbor Drive from Wyatt to Blakely - Shoulder improvements for non-motorized users are recommended. An improvement project is currently programed in the City's CIP from Tolo to Peterson Hill.
- *Miller Road from New Brooklyn to Arrow Point* – Shoulder improvements for non-motorized users are recommended. An improvement project is currently programed in the City's CIP for this segment.

*WSDOT Mitigation*

Six SR 305 intersections and roadway segments north of Day Road currently fail to meet LOS and will continue to deteriorate. Table 3-10 describes improvements that could mitigate LOS failures, such as adding turning lanes or signalization. Refer to chapter 5 of this Plan for recommendations.

**Table 3-10a. Intersections PM Peak Hour LOS Deficiencies – 2021 Forecast**

| Intersection | Control Type[1] | 2021 Delay[2] (s/veh) | 2021 LOS | Possible Mitigation |
|---|---|---|---|---|
| Madison Ave N / Wyatt | AWSC | 44.2 | E | Roundabout or signal |
| SR 305 / Koura Rd | TWSC | 43.5 | E | SR 305 Corridor Improvements |
| SR 305 / Lovgreen Rd | TWSC | 39.4 | E | |
| SR 305 / Day Rd | Signal | 60.1 | E | |
| SR 305 / Hidden Cove Rd | TWSC | >180 | F | |
| SR 305 / Port Madison | TWSC | >180 | F | |
| SR 305 / Agatewood Rd | TWSC | >180 | F | |

[1]TWSC = Two-Way Stop Control; AWSC = All-Way Stop Control; RAB = Roundabout; Signal = Signalized
[2]Average control delay for all movements. For TWSC, delay is reported for the movement with the highest delay.

Table 3-10b. Street Segment PM Peak Hour LOS Deficiencies – 2021 Forecast

| Segment | From | To | V/C | LOS |
|---|---|---|---|---|
| SR305 | Day Rd | Hidden Cove Rd | 0.94 | E |
| SR305 | Hidden Cove Rd | Seabold Church Rd | 0.96 | E |
| SR305 | Seabold Church Rd | Seabold/W Port Madison | 0.93 | E |
| SR305 | Seabold/W Port Madison | Agatewood Rd | 0.99 | E |
| SR305 | Agatewood Rd | Reitan Rd | 0.98 | E |
| Bucklin Hill Rd | Blakely Ave | Eagle Harbor Dr | 0.84 | D |
| Miller Rd | New Brooklyn Rd | Battle Point Dr | 0.99 | E |
| Miller Rd | Battle Point Dr | Tolo Rd | 0.84 | D |
| Miller Rd | Tolo Rd | Arrow Point Dr | 0.85 | D |
| Eagle Harbor Dr | Bucklin Hill Rd | Finch Rd | 0.84 | D |

**2035 Traffic Forecast**

The analysis of 2035 traffic conditions provides a long-range view of how the roadway system will operate on the Island. The 2035 traffic forecast considers housing and employment growth forecasted by PSRC and by Kitsap County, as well as any roadway network changes that would impact traffic operations. This section describes the results of the 2035 analysis.

**2021-2035 Model Forecast Improvements**

Few projects have been programmed into the traffic model to be constructed between 2021 and 2035. The City's traffic plan has not been updated since 2004 and was not formally adopted. The State has recently begun longer term planning for the SR305 and other corridors. Because only a few improvements have been included in planning documents beyond the six-year period for either City or State facilities in the study area.

The following improvements are assumed to be in place by 2035:

- *SR305 / Suquamish* – A roundabout is planned for this intersection. This intersection is outside the study are for this Plan and is not evaluated in the traffic model.

**2035 LOS**

The traffic model produces a forecast of 2035 traffic conditions, which are shown in Figure 3-6. Results of the 2035 forecast show continued heavy congestion and poor level of service along SR305 and some minor intersection problems in the Urban Zone around Winslow.

*Roadway LOS*

Analysis of the expected traffic in 2035 shows that most of the City's roadway system would continue to meet the minimum LOS standards with the roadway system in Winslow, including SR 305 intersections, generally operating acceptably. Based on the City's existing capacity policy, some roadway LOS failures would still exist on Eagle Harbor Drive and Miller Road.

For the 2035 forecast year, LOS on SR305 from Day Road to the north end of the Island is expected to continue to decline, if roadway segment capacity improvements, in addition to intersection operation improvements, are not addressed.

*Intersection LOS*

The intersection analysis results from the 2035 Plan year are shown in Table 3-11. Assuming the identified short term planning horizon improvements are provided in the urban zone, further intersection improvements are needed or anticipated. Except, at the intersection of Winslow Way and Erickson restricted turning movements are advised to maintain LOS.

By 2035, the increase in traffic on SR 305 is expected to result in continued deterioration of intersection operations. Excessive delay would occur at nearly all of the intersections north of Day Road. The intersections at SR 305 and Koura Road would further deteriorate from LOS E to LOS F. The poor operation of the highway, if not addressed, will continue to be a barrier to cross-Island traffic, impacting operations of the City's roadway system as a whole.

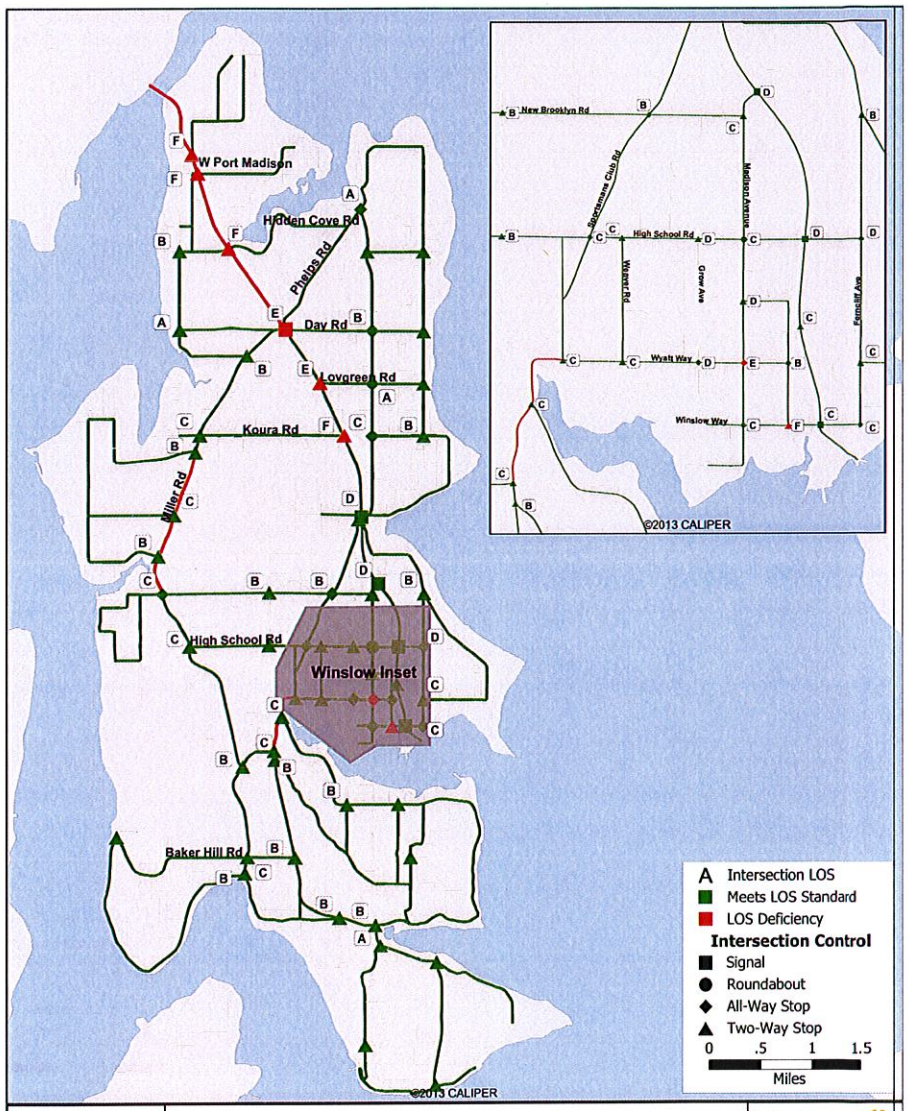



**Figure 3-6**

**2035 Level of Service**

**Table 3-11a. Intersections PM Peak Hour LOS Analysis – 2035 Forecast**

| Intersection | Control Type[1] | 2035 Delay[2] (s/veh) | 2035 LOS | Possible Mitigation |
|---|---|---|---|---|
| Madison Ave N / Wyatt | AWSC | 42.9 | E | Roundabout or signal |
| Winslow Way / Erickson Ave | TWSC | 64.4 | F | Access restrictions / RIRO |
| SR 305 / Koura Rd* | TWSC | 51.2 | F | SR 305 Corridor Improvements[3] |
| SR 305 / Lovgreen Rd[4] | TWSC | 45.1 | E | |
| SR 305 / Day Rd | Signal | 78.7 | E | |
| SR 305 / Hidden Cove Rd[4] | TWSC | >180 | F | |
| SR 305 / Port Madison | TWSC | >180 | F | |
| SR 305 / Agatewood Rd | TWSC | >180 | F | |

[1]TWSC = Two-Way Stop Control; AWSC = All-Way Stop Control; RAB = Roundabout; Signal = Signalized
[2]Average control delay for all movements. For TWSC, delay is reported for the movement with the highest delay.
[3]Specific corridor improvements identified below
[4]Alternative access to SR 305 is provided for locations w/RIRO access during PM peak hour:
-Koura Rd access via Miller Rd
-Lovgreen Rd access via N Madison Ave or Miller Rd
-Hidden Cove access via Phelps Rd, Seabold Rd or Day Rd

**Table 3-11b. Street Segment PM Peak Hour LOS Analysis – 2035 Forecast**

| Segment | From | To | V/C | LOS |
|---|---|---|---|---|
| SR305 | Day Rd | Hidden Cove Rd | 0.95 | E |
| SR305 | Hidden Cove Rd | Seabold Church Rd | 1.03 | F |
| SR305 | Seabold Church Rd | Seabold/W Port Madison | 1.01 | F |
| SR305 | Seabold/W Port Madison | Agatewood Rd | 1.05 | F |
| SR305 | Agatewood Rd | Reitan Rd | 1.04 | F |
| Bucklin Hill Rd | Blakely Ave | Eagle Harbor Dr | 0.86 | D |
| Miller Rd | New Brooklyn Rd | Battle Point Dr | 0.97 | E |
| Miller Rd | Battle Point Dr | Tolo Rd | 0.81 | D |
| Miller Rd | Tolo Rd | Arrow Point Dr | 0.82 | D |
| Eagle Harbor Dr | Bucklin Hill Rd | Finch Rd | 0.85 | D |

**2021-2035 Mitigation**

Mitigating the LOS for the City intersections would require minor improvements which can be programmed into the City's future transportation improvements program. The increased traffic volume expected to use SR 305 in 2035 would overwhelm the existing facility, resulting in a situation that cannot easily be mitigated.

*City Mitigation*

Improvement to intersection channelization and/or intersection control can mitigate the substandard LOS at all of the City intersections. The following projects are proposed to improve LOS at the four identified substandard intersections:

- *Erickson Avenue at Winslow Way* – An intersection control improvement such as prohibiting left turns during peak traffic hours is recommended.

*WSDOT Mitigation*

Roadway segments along the seven-mile SR 305 corridor within the study area will operate at LOS F. This problem is based on lack of roadway capacity that affects the intersection operation as well, making it extremely difficult to mitigate individual locations. Any mitigation that is proposed would need to be examined on a corridor basis, and would need to be consistent with WSDOT operational objectives, as well as City's goals and objectives with regard to traffic operations, environmental and community character concerns. An individual solution for each problem location would not provide an adequate assessment of the corridor-wide issues that are present on the highway.

There are a number of possible solutions that could be proposed to mitigate the corridor. In order to adequately explore possible solutions, a special study was performed for this corridor. The results of the study are explained in Chapter 5.

## Other Mobility Issues

There other issues that affect the mobility of traffic on the roadway network. These issues include factors that influence how traffic operates and connects to the City's roadway system. The three areas discussed in this section includes the connectivity of the roadway system, access management, and special study areas identified by the Steering Committee.

### *Connectivity*

Connectivity is defined as the level of connections between roadways in a transportation system. In concept, connectivity describes the efficiency of travel between any two points on the roadway system. A high level of connectivity is characterized by a well-developed street network, available alternative routes, quick response times for emergency vehicles, good mobility for pedestrians and bicyclists, and an efficient use of the roadway system. A low level of connectivity is characterized by numerous dead-end streets, cul-de-sacs, and roadways that do not connect, resulting in poor response times for emergency vehicles, circuitous routing of pedestrian and bicycle travel, and inefficiencies in traffic flow. Low connectivity can also result in interrupted access to areas in the event of a road closure such as a traffic accident or landslide, which can result in the loss of development opportunities for some properties if they aren't served by the public roadway system, and can cause a high level of congestion and bypass traffic on the available streets.

On Bainbridge Island, an example of an area with relatively high connectivity is the Winslow subarea, where the street network is more developed and few streets end in dead-ends or cul-de-sacs. However; there are areas in Winslow where there are "super blocks" which inhibit

connectivity. Many of the sub-urban areas have low connectivity with few alternate connections and wide street spacing, requiring difficult routing between areas.

Connectivity improvements are usually undertaken to solve potential safety problems or to improve traffic flow. New connections can be constructed to provide access to undeveloped properties, or alternative access in areas where there is only one roadway serving many homes or businesses, where the existing road is unstable due to steep slopes or erosion, or where an alternative route is needed to provide relief to an overly congested route.

Seventeen connectivity projects have been identified across the Island to be developed as traffic and other needs dictate. These are shown in Figure 3-10 (general area of connection shown with star) and described in Figure 3-11. The potential connections shown are recommended for development by the Steering Committee. The recommendations were developed by looking at the needs of schools, fire and emergency medical response, and other public facilities, as well as access to landlocked properties. Each potential connection will be considered separately as traffic patterns and emergency response times warrant, will be studied to identify potential impacts, and will include discussions with affected property owners. Connections will be included with other nearby projects if possible. Connectivity improvements are not included in this Plan's 2035 traffic model.

### *Access Management*

Access management is the control of the number and location of access points along a roadway, in order to provide access to property, maximize safety for all roadway users, and optimize roadway operations. Access management is especially important on arterial roadways and highways where there is or may be high travel speeds and traffic volumes are desired.

Access management is generally implemented on roadways for three reasons: to improve roadway operations, to improve safety, and to improve access to properties. Roadways operate best when all vehicles travel in a straight line. Conflict points occur when the path of one vehicle crosses the path of another. These can be at intersections, driveways, or at other locations where vehicles turn. Vehicles that slow to make turning movements, accommodate merging traffic, or allow crossing traffic flows all contribute to the reduction in the number of cars that can travel through a corridor. Reducing conflict point's increases capacity and traffic speeds.

Multiple conflict points not only slow traffic and reduce roadway capacity, but also increase the potential for accidents. Rear-end and turning vehicle collisions can be minimized through the use of access management strategies that reduce conflict points. Too many conflict points can also interfere with access to properties by making it difficult for vehicles to turn across traffic, or by restricting turning movements. Access management can also improve access to individual properties by organizing driveways at locations where turning movements are safer and easier.

On Bainbridge Island, access is a major issue along SR-305 corridor, particularly north of Hidden Cove Road. Along this stretch of the highway there are multiple driveways and streets where the only access to properties is via the State Highway.

Techniques that can be applied to increase the mobility and safety of a travel corridor vary from development of shared access points to the installation of medians or other turning restrictions.

The objective of an access management program is to provide access to a property while limiting negative impacts to the property.

Control techniques fall into two categories: driveway access and roadway operation. Driveway access controls prescribe the number and location of driveways for properties along a roadway segment. Roadway operation controls provide for access to properties and cross streets. The following list identifies the techniques included in each category:

*Driveway Access Controls:*

- internal circulation between parcels
- shared driveways
- limits on number, spacing, and size of driveways
- consolidation of access for adjacent parcels
- use of one-way driveways
- right-in/right-out (RIRO) access
- development of access driveways on minor streets

*Roadway Operation Controls:*

- refuge lanes or two-way continuous left turn lanes
- turning movement limitations through signage and channelization
- construction of deceleration lanes
- raised medians that limit left turns
- traffic signals at high volume locations
- provisions for U-turns

The State of Washington supports the use of access management strategies to protect its key roadways and travel corridors. RCW 47.50.010 requires that access be managed along all state facilities:

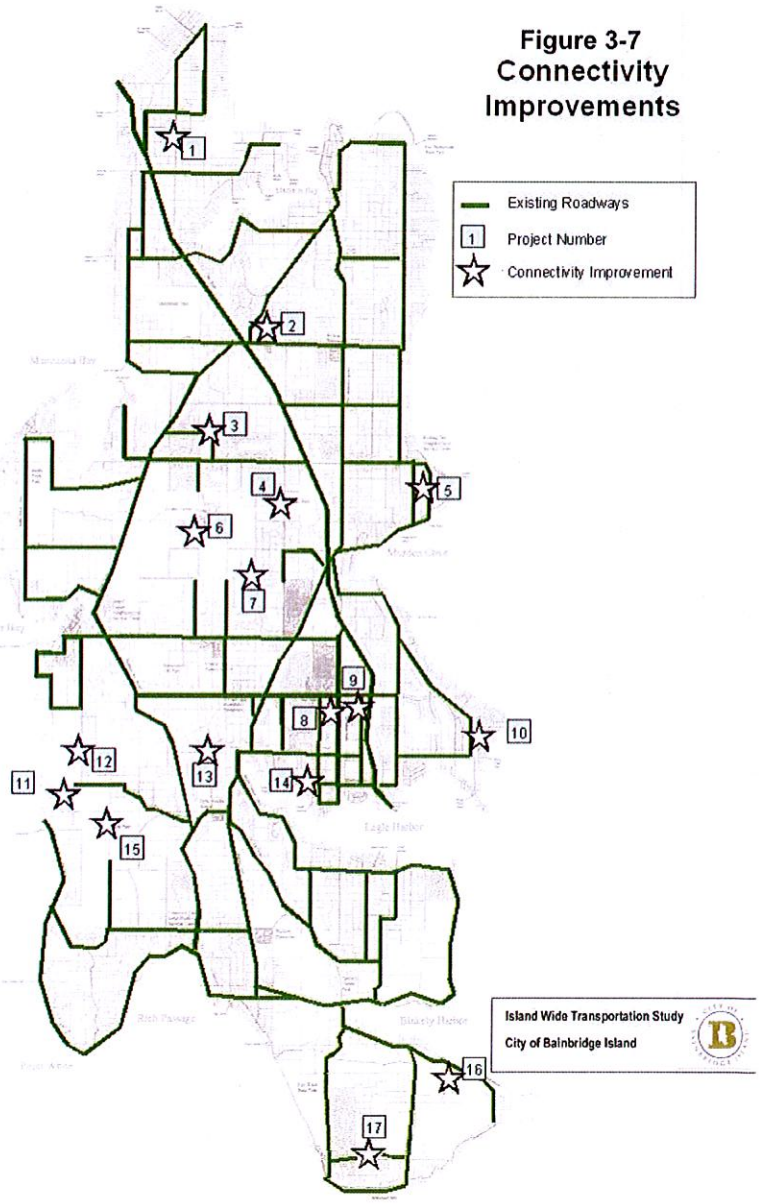
*"Regulation of access to the state highway system is necessary in order to protect the public health, safety, and welfare, to preserve the functional integrity of the state highway system, and to promote the safe and efficient movement of people and goods within the state."*

While the institution of access management may not solve the corridor's congestion problems, adoption of access management strategies and practices will increase the efficiency and safety of the corridor while minimizing the impacts on existing property owners.

The City of Bainbridge Island does not currently have a formal access management program. Some aspects of access management, such as number and location of driveways and internal parcel circulation, are monitored by the Public Works Department during the site plan review process.

WSDOT manages access on state highways, including SR 305 as it crosses the Island. This highway is classified as *Partial Access Control,* which has the following definition: "Access approaches are permitted for selected public streets, roads, some crossings, and existing private driveways. No commercial approaches are permitted and no direct access if Public Street or road access is available."

**Figure 3-7**
**Connectivity Improvements**



## Figure 3-8
## Guide To Potential Connectivity Improvements

1. **Agate Pass Road** – The extension of Agate Pass Road between Dolphin Road and W. Port Madison Road would provide a secondary access to the area and lessen traffic impacts and delay at the intersection of Agatewood Road/SR 305.

2. **Phelps Road** – The realignment of Phelps Road, east of current intersection with Day Road would improve the intersection's geometrics and intersection spacing from Day Road/SR 305.

3. **Fieldstone/Bayhill Road** – The extension of Bay Hill Road to Fieldstone Lane would in improve neighborhood circulation.

4. **Wardwell Road** – The connection between Wardwell Road and Koura Road would improve the circulation opportunities in the central Island area, provide a secondary access to the Wardwell Road area, and provide access to undeveloped parcels. One alternative may be to provide non-motorized through access and limit motorized use.

5. **Manitou Beach Road** – This proposed segment would provide a connection between upper Manitou Beach Road and Falk Road providing a secondary access to the area where shoreline erosion problems threaten sections of Manitou Beach Road.

6. **Mandus Olson Road** – The connection of north and south portions of Mandus Olson Road would provide better circulation throughout the area, a through connection between the two existing street segments, and access to undeveloped parcels. There is currently an unimproved gravel path at this location limited to non-motorized use. One alternative may be to limit this route to non-motorized use.

7. **Paulanna Road** – The extension of Paulanna Road to Bucsit Lane would provide secondary access to the area and could connect north to Wardwell Road.

8. **Ihland Way** – The connection of Ihland Way through to Madison Avenue would break up the superblock between Wyatt Way and High School Road.

9. **Ericksen Avenue** – The connection between Ericksen Avenue and Hildebrand Lane would eliminate the existing connection through the bank parking lot and improve the mobility of the transportation system.

10. **Dingley/Alder/Fairview** – This project would connect segments between these dead-end roadways to improve neighborhood connectivity.

11. **Marshall Road** – The extension of Marshall Road west to Crystal Springs Road would be an important link in developing a system of streets in the largely undeveloped southwest area of the Island. The current roadway is a long dead-end with a single access point.

12. **Springridge Road** – The extension of Springridge Road south to Marshall Road extension (see #11) would be part of the circulation improvements to the southwest portion of the Island. This roadway would also provide access to undeveloped parcels.

13. **Wyatt Way/Fletcher Bay** – Develop a western extension of Wyatt Way between Bucklin Hill Road and Fletcher Bay Road to provide secondary access to south Island locations and provide access to undeveloped parcels.

14. **Shepard Way** – This connection between Grow Avenue and Nicholson Place would create a secondary access and better circulation in the area for motorized and non-motorized users. There is currently an unimproved gravel path at this location limited to non-motorized use.

15. **Deerpath Lane** – The extension of Deerpath Lane north to NE Marshall Road would increase the connectivity in this south Island area. The current roadway is a long dead-end with a single access point.

16. **Country Club Road** – The connection between Country Club Road and Toe Jam Hill Road would provide an access around a potential shoreline erosion area.

17. **Darden Lane** – The project would connect Fort Ward Hill Road and Toe Jam Hill Road by developing a roadway segment connecting Evergreen Avenue and Darden Lane.

18. **Reitan Road** - Providing an access on both sides of the highway is recommended to maintain reliable access to the neighborhood as the only access is from SR305. This improvement would allow limited access for a section of SR305.

19. **Agate Beach Lane** - Providing a frontage road to link this and other properties fronting SR305 is recommended to maintain reliable access. This improvement would allow limited access for a section of SR305. This improvement would also provide an alternative route to SR305 for non-motorized users.

20. **Lovgreen Road** – A connection to Miller Road would provide alternative access to SR305, maintaining reliable access to the neighborhood and to SR305 via Miller Road.