Guemes Ferry Replacement Environmental Assessment

DRAFT | April 13, 2018

Prepared for:

Skagit County Planning & Development Services

Prepared by: BERK Consulting, Inc.

Fact Sheet

Title

Guemes Island Ferry Replacement

Description

Skagit County proposes to replace its current 21-vehicle, 100-passenger diesel ferry serving Guemes Island with an electric ferry serving up to 32 vehicles and 150 passengers per trip. There may also be minor modification of the ferry terminal itself (e.g. wing walls, dolphin fender heights, transfer span) to accommodate the new ferry and to facilitate concurrent passenger and auto loading, and to add a new electric power supply. See the Environmental Assessment for a more detailed description.

Location

The primary study area consists of the ferry service route between the Anacortes Terminal and the Guemes Island Terminal. A secondary study area consists of Guemes Island for the purposes of reviewing potential indirect and cumulative effects of growth. See the Environmental Assessment for maps.

Proponent

Skagit County Public Works

Tentative Date for Implementation

Ferry sizing determination 2018. Ferry construction and operation by 2020.

SEPA Lead Agency

Skagit County

Responsible Official

Hal Hart, AICP, Director
Skagit County Planning & Development Services Department
1800 Continental Place
Mount Vernon, WA. 98273

Contact Person

Paul Randall-Grutter, P.E.
County Engineer
Skagit County Public Works
1800 Continental Place
Mount Vernon, WA 98273
Phone: (360) 416-1400
paulrg@co.skagit.wa.us

Potential Licenses

Following is a list of licenses which the Proposal may require.

Law	Required Review or Permit	Lead Agency
State Environmental Policy Act	SEPA Checklist and Threshold Determination	Skagit County – Ferry and Guemes Terminal City of Anacortes – Terminal For terminal, consider joint agency agreement, or County assumes lead agency if city agrees; see WAC 197-11-942 and 944.
Washington Shoreline Management Act	City of Anacortes: Shoreline Substantial Development Permit. * Skagit County: In current SMP ferry terminals appear allowed in all environments except Natural. Proposed SMP Update not yet adopted.*	City of Anacortes – Anacortes Terminal Skagit County – Guemes terminal
Revised Code of Washington (RCW) 77.55 Construction Projects in State Waters	Hydraulic Project Approval*	Washington State Department of Fish and Wildlife
Chapter 79.105 RCW Aquatic Lands	Aquatic Lease Agreement	WA Dept. of Natural Resources
City of Anacortes Municipal Code Skagit County Code	Zoning District: E.g. within Anacortes, the terminal is zoned Light Industrial, which permits shipping and terminal facilities. Building Permit (e.g. onshore power) Floodplain development permit*	City of Anacortes – Anacortes terminal Skagit County – Guemes terminal
National Environmental Policy Act	Applies to federal actions, typically where a federal permit is required or federal funding is sought or secured.	FHWA/WSDOT Appears categorical exclusion 2, 29 and 30 apply per FHWA/WSDOT's LAG Manual Guidance.
The Clean Water Act of 1972	Section 401 Water Quality Certification* Section 404 may not apply if there is no placement of structures below the MHW line.	Washington Department of Ecology
Coastal Zone Management Act (CZMA) 1972	Coastal Zone Management Consistency (CZM) determination	Washington Department of Ecology
Rivers and Harbors Act of 1899	Work in Navigable Waters Section 10 permits*	U.S. Army Corps of Engineers
Endangered Species Act (ESA) of 1973	Section 7 Consultation	US Fish and Wildlife and/or National Marine Fisheries

Notes: *May be obtained through a Joint Aquatic Resource Permit Application (JARPA).

Authors and Principal Contributors

Environmental Assessment: BERK Consulting, Inc., 2200 Sixth Avenue, Suite 1000 Seattle, WA 98121

Date of Issue

Draft Environmental Assessment: April 13, 2018

Final: Pending May 2018

Date Comments are Due

4:30 pm, April 30, 2018

Email comments are preferred and must be sent to pdscomments@co.skagit.wa.us with the proposal name ("Replacement Guemes Ferry Proposal") in the subject line. Include your comments in the body of your email message rather than as attachments.

Paper comments must be printed on 8½x11 paper and mailed or delivered to:

Comments on proposed "Replacement Guemes Ferry Proposal"
Planning and Development Services
1800 Continental Place, Mount Vernon WA 98273

All comments must be received by the deadline and include your full name and mailing address.

Date of Final Action Scheduled

Ferry sizing determination 2018. Ferry construction and operation by 2020.

Type and Timing of Subsequent Environmental Review

NEPA will be conducted when the County secures construction funds, and has designed the terminal improvements to a 30% design stage — a comparable design level as the ferry boat replacement. The level of review would be a categorical exclusion, following NEPA rules implemented by Federal Highway Administration (FHWA) and the Washington State Department of Transportation (WSDOT).

Location of Prior Environmental Documents

See Contact Person.

Availability of Environmental Assessment

This document is available at the following website:
https://www.skagitcounty.net/ferryenviro

Table of Contents

Introduction

PURPOSE

The purpose of this Environmental Assessment is to examine the Proposal and to consider alternatives to inform Skagit County's decision regarding the Guemes Ferry Replacement Proposal. This Environmental Assessment together with a State Environmental Policy Act (SEPA) Checklist (Attachment A) support a threshold determination under SEPA. When issued, the Threshold Determination would allow a comment period. The County Board of Commissioners would consider comments and consider the action before it.

BACKGROUND

Skagit County has operated ferries to Guemes Island for decades, including:

- Guemes, 6 cars, operation 1917-1959
- Almar, 9 cars, operation1959-1979 (boat was built in approximately 1947)
- Guemes, 21 vehicles, 100 passengers, December 1979-present (Glosten, 2017)

The parking lots at both terminals were expanded between 2005 and 2006. The Anacortes terminal building was replaced in 2010, and the docks at both landings underwent refurbishment in 2011.

The County is proposing to replace the 21-car Guemes ferry due to ferry service outages and vessel maintenance costs that have escalated. The Elliot Bay Design Group report in 2013 found that it would be more economical to replace the ferry than to refurbish it. Skagit County began considering replacement options and commissioned a design of a replacement ferry by Glosten in 2017. (Glosten, 2017)

PUBLIC COMMENT OPPORTUNITIES

On January 25, 2018, Skagit County hosted a community meeting on Guemes Island to review the Ferry replacement concept design reports. On February 2, 2018 Skagit County provided a notice of public comment opportunity to solicit early public comment on the Environmental Assessment for the Ferry replacement proposal. This was a voluntary comment period, not required by SEPA, but helpful for the public review process.

Approximately 20 comments were received. Comments addressed several themes about considering other alternatives, concern about growth inducement, protection of the aquifer, consistency with County plans, and desire for the proposed ferry replacement proposal including size and electric power for reliability and environmental conservation.

Exhibit 1. Responses to Notice of Public Comment Opportunity

Theme Summary	Comment Summary
Consider other alternatives	▪ Reengineer current ferry and replace old engine with a more efficient one ▪ Select boat size based on year-round need and not peak season need ▪ Consider scheduling and staffing choices that may mitigate ridership needs ▪ Consider passenger ferries ▪ Provide routine maintenance and more efficient ticketing ▪ Do not provide a smaller ferry, and provide a larger ferry based on economic considerations
Larger ferry may result in growth, address consistency with County plans	▪ Potential for growth and development ▪ Loss of rural character ▪ Effect on parking ▪ Concern about tax increase, gentrification, housing costs ▪ Consider mitigation to limit growth per 2008 Environmental Assessment ▪ Balance growth with Guemes Island Subarea Plan ▪ Consider failed or overused septic systems, how larger ferry would spur growth that adds pollution; and County not limiting development; address in EIS ▪ Concern about traffic and growth; consider in an EIS
Effect of ferry spurring growth and affecting aquifer	▪ Lack of potable water ▪ Protect sole-source aquifer ▪ Concern about sea water intrusion ▪ Allow and encourage rainwater catchment ▪ Require permit for new well in critical areas regulations ▪ Develop data collection program and additional research ▪ Protect aquifer through regulations not ferry size
Create more reliable service with greater ferry size and alternative energy source	▪ Need a more reliable ferry to improve service and save time ▪ Prioritize reliability ▪ Favor increased vehicle capacity battery powered ferry, for reliability and lower maintenance costs ▪ Do not reduce evening runs ▪ Concern that experimental electric ferry could cost a lot of money ▪ Protect security of system. Provide equal or increased service and electric or electric hybrid. ▪ If ferry has larger capacity, perhaps do not increase runs. Maintain current schedule. ▪ Support larger ferry and electric power to help cost savings ▪ Support larger ferry with electric power; have experienced using such types of ferries and they are smooth ▪ Make ferry service reliable and cheap ▪ Support electric ferry to reduce noise and smoke

Theme Summary	Comment Summary
Ferry and transportation plans	▪ Larger ferry inconsistent with County transportation plans ▪ Develop ferry level of service per regional transportation plan ▪ Coordinate ferry system and transit on both sides of ferry terminals ▪ Avoid investing in electric ferry due to potential for breakdowns and difficulty in emergency evacuations; invest instead on shuttle even if only running on peak periods ▪ Route ferry traffic to avoid residential neighborhoods like Old Town

Source: BERK Consulting, Inc. 2018

In response to comments, this Environmental Assessment addresses a Reduced Ferry Size Alternative in comparison to the Proposal, a review of growth trends on the island, a review of public water and groundwater resources, and a review of County land use and transportation plans. Alternative energy sources are also considered per the Proposal design reports.

Proposal and Alternatives

DESCRIPTION OF THE PROPOSAL

Skagit County proposes to replace its current 21-vehicle, 100-passenger diesel ferry serving Guemes Island with an electric ferry serving up to 32 vehicles and 150 passengers per trip. There may also be minor modification of the ferry terminal itself (e.g. wing walls, dolphin fender heights, transfer span) to accommodate the new ferry and to facilitate concurrent passenger and auto loading, and to add a new electric power supply.

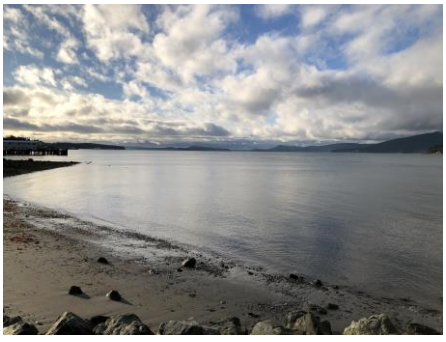
STUDY AREA

The primary study area consists of the ferry service route between the Anacortes Terminal and the Guemes Island Terminal.

A secondary study area consists of Guemes Island for the purposes of reviewing potential indirect and cumulative effects of growth.

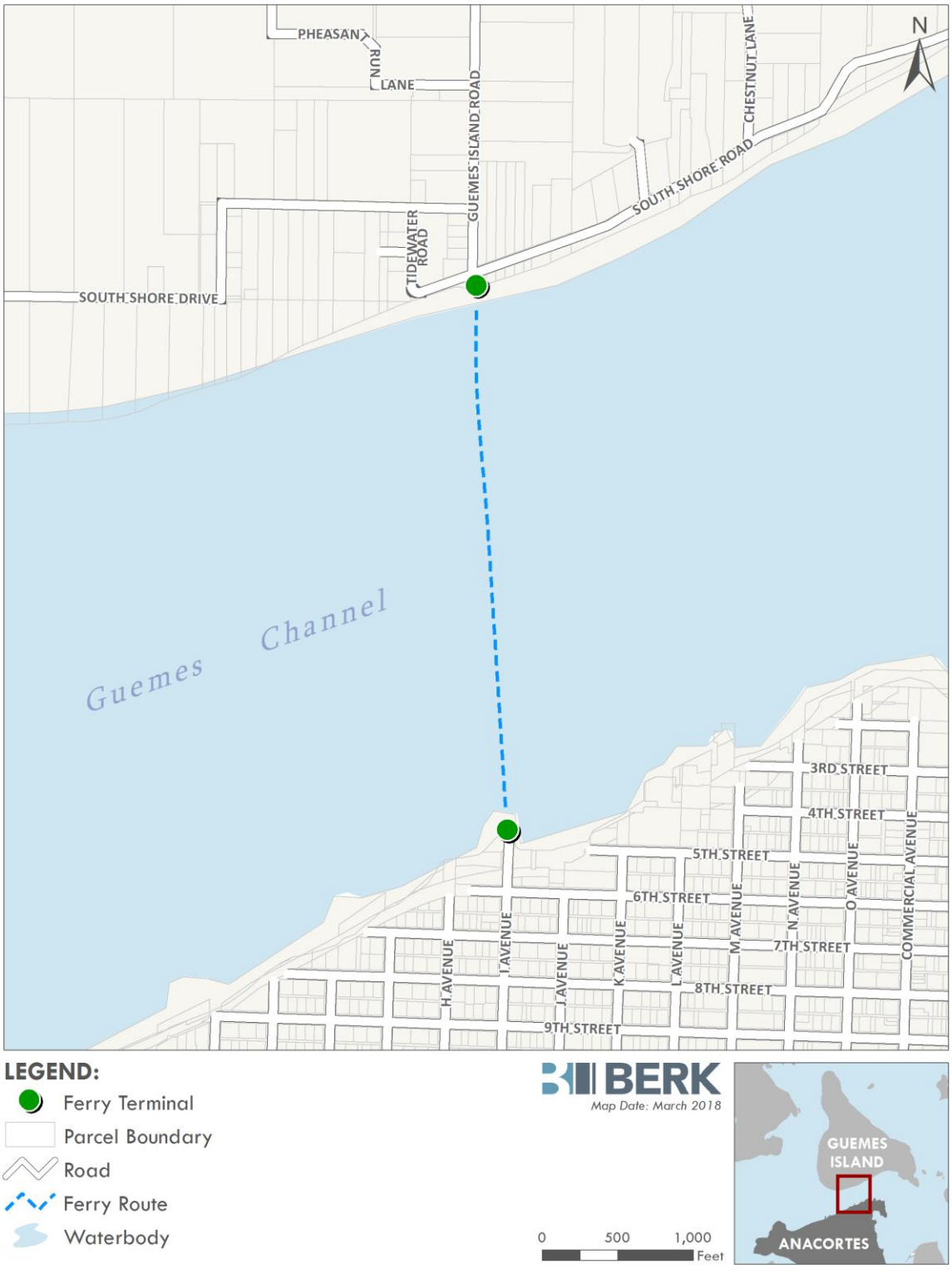
Anacortes Terminal

Beach West of Anacortes Terminal



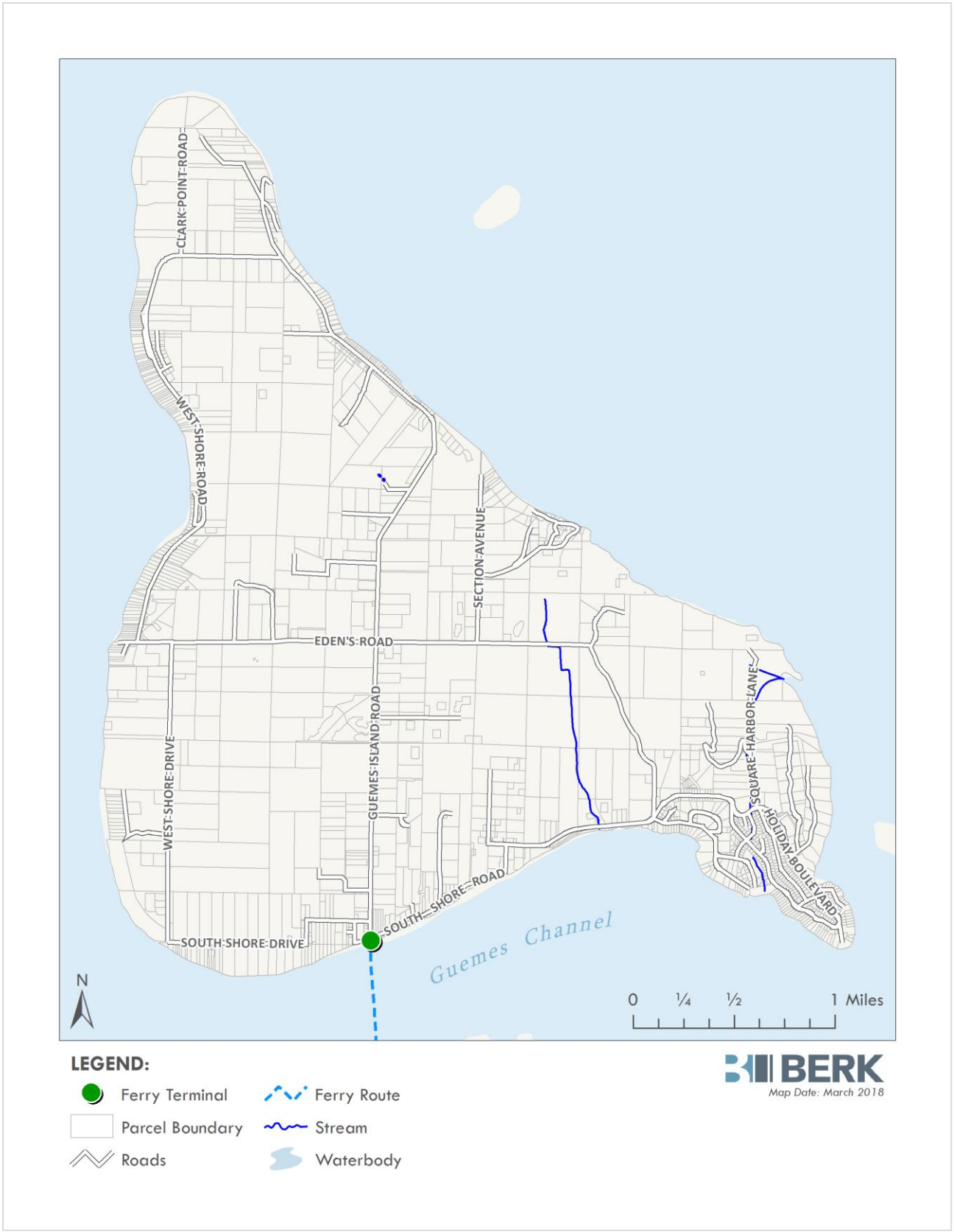
Source: BERK Consulting January 2018

Exhibit 2. Primary Study Area: Ferry Service Route between Anacortes and Guemes Island



Source: Skagit County 2018, BERK Consulting 2018

Exhibit 3. Secondary Study Area: Guemes Island



Source: Skagit County 2018, BERK Consulting 2018

ENVIRONMENTAL REVIEW PROCESS

State Environmental Policy Act

The purpose of this Environmental Assessment is to examine the proposal and alternatives to inform Skagit County's decision regarding the ferry replacement. This Environmental Assessment together with a SEPA Checklist are intended to support a threshold determination under SEPA.

Prior SEPA documents reviewed the ferry system:

- Guemes Island Ferry System Final EIS, January 1978, examining a larger ferry replacement from 9 cars to 21 cars and associated terminal improvements.
- Guemes Island Ferry Service Schedule Changes, Environmental Assessment and SEPA Non-Project Checklist, and Determination of Non-Significance, 2008.

Relevant information in these documents were considered in the preparation of this Ferry Replacement Environmental Assessment 2018.

Future NEPA Process

The National Environmental Policy Act (NEPA) provides environmental review of projects that receive federal funds or that require federal permits. The NEPA process is similar to SEPA, but will be conducted when the County secures construction funds, and has designed the terminal improvements to a 30% design stage – a comparable design level as the ferry boat replacement.

The level of review would be a categorical exclusion, following NEPA rules implemented by Federal Highway Administration (FHWA) and the Washington State Department of Transportation (WSDOT). Some of the analysis in this SEPA Environmental Assessment and Checklist may be useful to the future NEPA process. Likewise, past NEPA documentation for ferry terminal improvements has been considered in this SEPA Environmental Assessment and Checklist.

OBJECTIVES

The County has commissioned reports on the Guemes Ferry for several years. Studies have found that the condition of the boat is fair and that the ongoing and projected costs of maintenance and operations given the life of the present vessel are such that replacement is recommended. (Elliot Bay Design Group, 2013)

The purpose and need for the Guemes Ferry Replacement can be summarized in the following objectives:

- Reduce long-term maintenance and operations costs to Skagit County,
- Provide reliable service to the Guemes community,
- Make efficient use of capital funding resources, consider vessel life (about 40 years), and address current and future service needs to Guemes Island, and
- Provide ferry capacity and operations that are compatible with the vision and goals of the Skagit County Comprehensive Plan, and Guemes Subarea Plan to protect the rural character of the island.

These objectives serve as SEPA objectives for this Environmental Assessment.

ALTERNATIVES

Proposal

Ferry Size

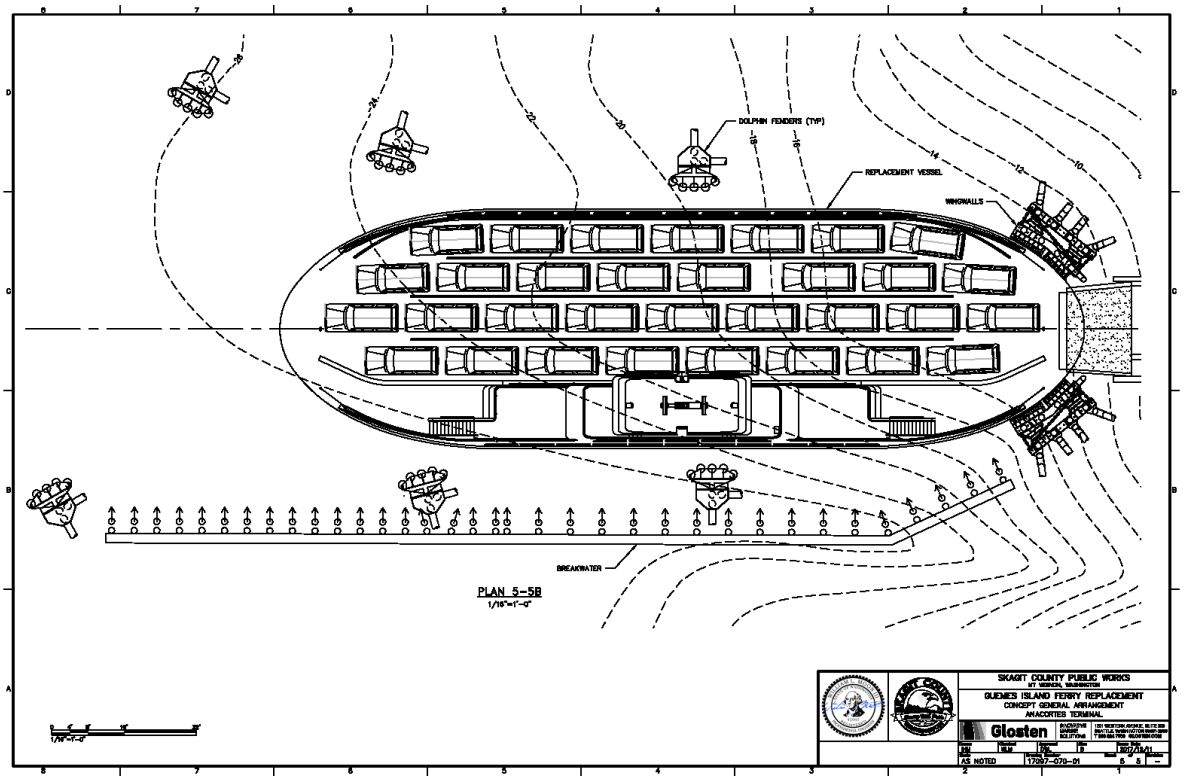
Based on a 30% design concept developed December 2017, Skagit County proposes to attain funds and construct a double-ended vehicle and passenger ferry, with a three-tiered deckhouse located to one side of the vessel (on the west side of the route). The design accommodates four lanes of vehicles, including highway-rated trucks and emergency vehicles. Capacity specifications are:

- Maximum length 180 feet – design 178 feet
- Vehicle Capacity: 32 cars, considering a 17' 9" automobile equivalent (AEQ) length per vehicle
- Passenger Capacity: 150 persons
  - Main deck seating: 40 seats
  - Upper deck seating: 20 seats

Exhibit 4. Proposed 32-Car Ferry Boat Concept

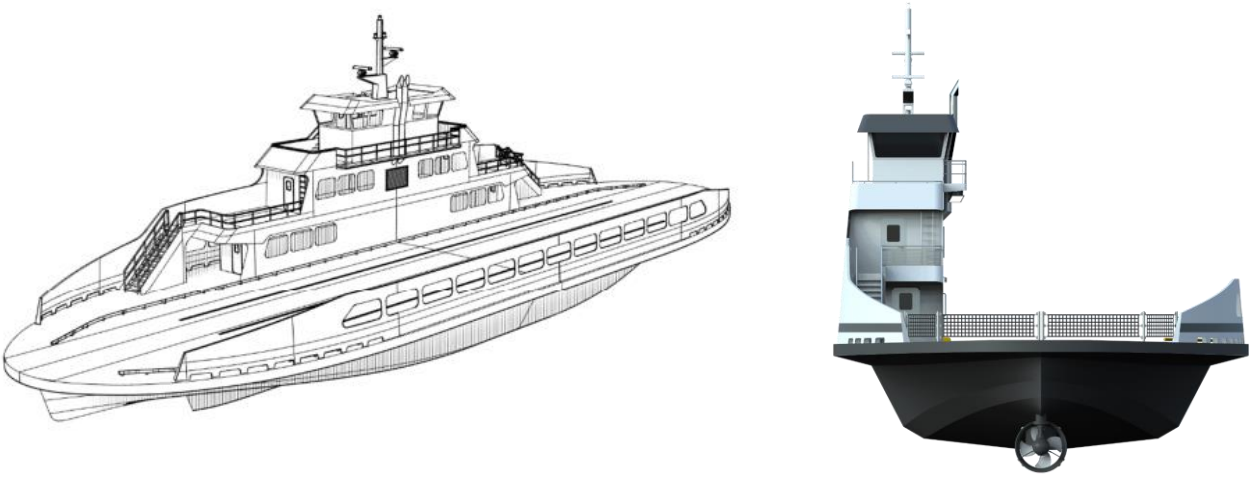
Source: Glosten 2017

Exhibit 5. Proposed 32-Car Ferry Boat Plan View



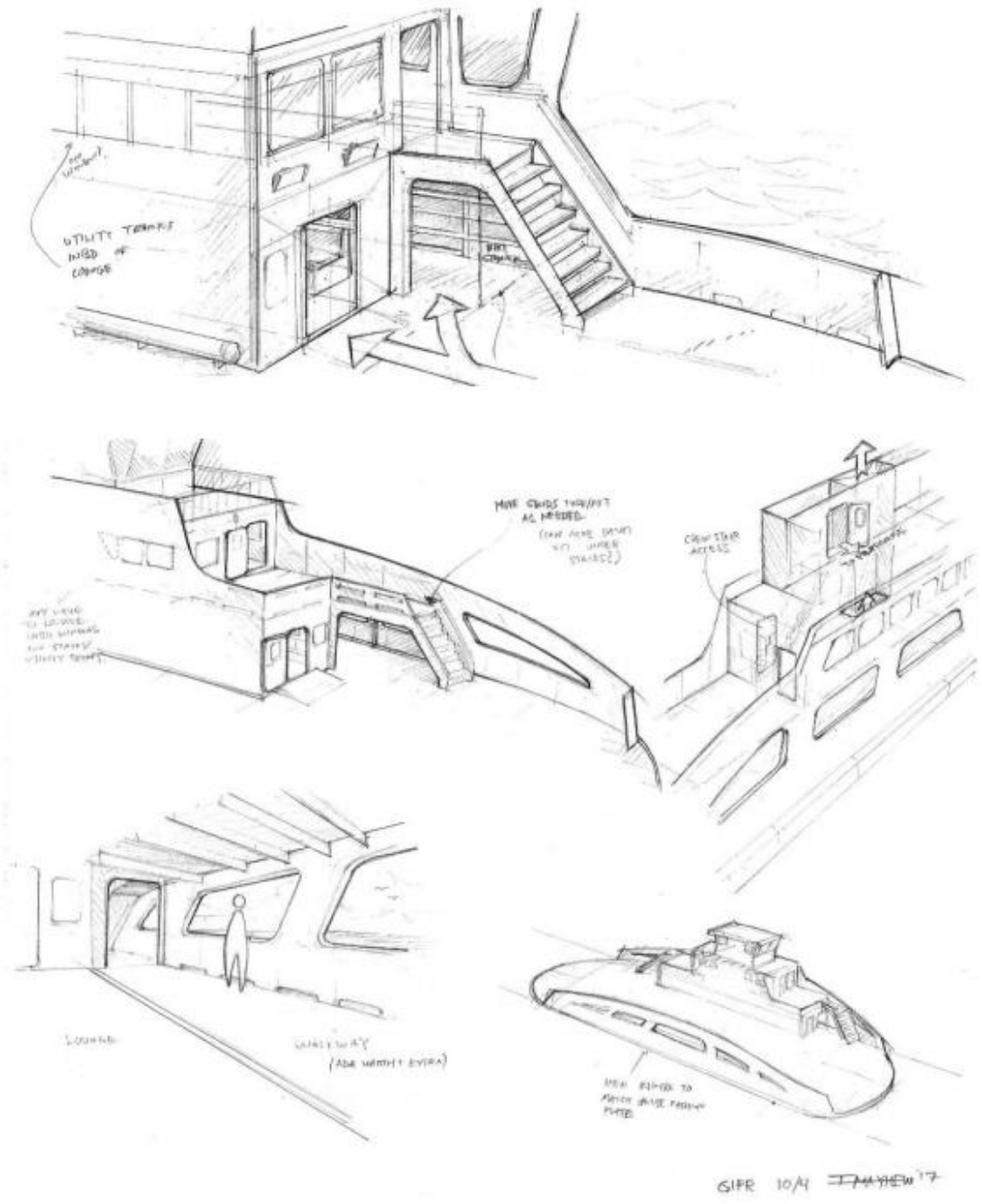
Source: Glosten 2017

Exhibit 6. Side and End Views of Proposed Ferry Vessel



Source: Glosten 2017

Exhibit 7. Passenger Access Pathways



Source: Glosten 2017

Propulsion System

Skagit County proposes to build an all-electric propulsion system that will operate with batteries as the primary source of power. The County has compared this all-electric propulsion system to a baseline (geared diesel) and three other alternate propulsion systems (diesel-electric, series hybrid, and plug-in hybrid). (Glosten, 2017) Both the All-Electric and Plug-In Hybrid options fall under this "electric" designation and for the purposes of this study, are the same.

- *The Baseline Propulsion System* is a geared diesel system, the current system in use on M/V Guemes. In a geared diesel propulsion system, also referred to as diesel-mechanical, propulsion diesel engines drive the vessel's propulsors directly though mechanical shafting and gears. In this arrangement, the diesel engine is a variable speed propulsion engine. Much like the system on the M/V Guemes, a geared diesel arrangement for the new vessel would consist of two identical propulsion systems, one at each end of the vessel, each consisting of a single propulsion diesel engine driving a single propeller though a Z-drive with integrated reduction gears. Separate ship service diesel generators (SSDGs) would provide ship service power in this arrangement.
- *A Diesel-Electric Propulsion System* uses diesel generator sets to produce propulsion power and electric propulsion motors to power the propeller shafts. In a diesel-electric system, the diesel engines drive the alternators to produce the electrical power that is sent to the main propulsion switchboard. Motor drives convert the power from the switchboard and send it to the propulsion motors.
- *A Series Hybrid Propulsion System* is essentially a diesel-electric propulsion plant with the addition of batteries. The system incorporates energy storage (batteries) to provide a more efficient load profile for the plant. During periods of low propulsion demand (i.e. pushing the dock in fair weather), the excess power available from the generators can be used to charge the batteries so that the batteries can be used to augment the diesel generators during periods of peak demand, often resulting in smaller generator sets. The overall effect is that load on the generator sets can be leveled and relatively constant. For the replacement vessel, smaller generator sets have not been assumed, to allow for extended operations in heavy weather and currents. The result of this is that the generator sets for the new vessel have been sized to provide the full propulsion load without additional power from the battery, making them the same size as for a diesel-electric plant. Similar to the diesel-electric system, a series hybrid system can be configured for an integrated electric plant where the propulsion generator sets also provide the ship service power.
- *Electric Propulsion: Two variations are under consideration for electric-propulsion, and are considered uniformly for environmental review purposes:*
    - *An All-Electric Propulsion System* uses electrical power for all propulsion and ship service electrical loads. No diesel engines are used. In this arrangement electrical power is provided to the main switchboard by two sets of battery banks. Electric motors are used to power the propeller shafts. The batteries are charged from shore-power while the vessel is at the terminal.
    - *A Plug-In Hybrid Propulsion System* uses electrical power to supply all propulsion and ship service electrical loads while providing diesel generator sets for use during high energy demand operation. Typical operation is identical to the all-electric propulsion system. A diesel generator provides additional power when energy loads become too high for the batteries, such as during maneuvering in heavy weather. The plug-in hybrid will reduce the load on the batteries and allows optimized sizing for charging apparatus and battery banks.

Terminal Improvements

Current improvements at the two terminals are described below based on the Concept Design Report: (Glosten, 2017)

> *Berths at each terminal are standard vehicular ferry slips with V-shaped wingwalls supported by a system of steel piles. Both terminals have outer (freestanding) fendered dolphins constructed of steel piles. The terminal on Guemes Island has two pairs of dolphins, one on each side of the slip. The terminal in Anacortes has three dolphins on the west side of the slip, and four dolphins on the east side of the slip. According to operators, a vessel of up to 53 feet in overall breadth (three feet wider than the existing vessel) would be capable of maneuvering between the dolphins. A vessel of up to about 200 feet in length would be capable of holding itself against the existing dolphins to maintain position in the slip.*
>
> *When not in use, the ferry is moored at the Anacortes slip. The Anacortes slip has a purposebuilt breakwater on the west side, and it takes advantage of Anchor Cove Marina's breakwater on the east side. With these two breakwaters, a vessel of up to about 200 feet in length would be reasonably well protected in the Anacortes slip. The Guemes slip has no breakwaters; while holding position in the slip there, the ferry must resist full exposure to wind, waves, and current.*

The existing terminals will receive minor modifications to accommodate the vessel design and operations, as follows: (Glosten, 2017)

- *Wing Wall and Dolphin Fender Heights:* Depending on the final replacement vessel design, it may be necessary to increase the height of the wing walls, and possibly the dolphin fenders, to ensure that the height of the replacement vessel guards never exceeds the wing wall and dolphin fender heights. At the very least, it will be necessary to increase the height of the fender liner material on the wing walls. …If the fender liners are replaced, it also may be desirable to change the material.
- *Concurrent Vehicle and Walk-On Passenger Loading, Transfer Span Aprons, Wing Walls, and Overnight Mooring Line:* Analysis of ferry loading and unloading operations revealed that the greatest single improvement to reduce round-trip time would be enabling vehicles and walk-on passengers to load at the same time. …PND Engineers performed the apron improvement feasibility and cost analysis. It was determined that widening the transfer span aprons is feasible, but it would require modification of the wing walls at both terminals. On the Anacortes side, it would also require modification to the overnight mooring line system, which is attached to the wing walls.
- *Design Loads – Dolphin Fenders and Wing Walls:* The replacement ferry is likely to be heavier and have more propulsive thrust than the existing ferry. For both these reasons, the loads the replacement ferry will impart to the terminals will be greater. Design loads on the dolphin fenders and wing walls and the allowable approach speeds of the replacement ferry were investigated by PND Engineers. Assuming a replacement vessel mass of 475-675 long tons, the maximum approach speed where minor damage is possible, compared to the existing ferry, decreases from about 1.6 knots to as little as 1.2 knots. Modifications could be made for about $1.2 million, which would increase the maximum approach speed to the original capacity of at least 1.6 knots. This improvement is recommended to protect the dolphin fender equipment and minimize potential out-of-service time.

Shore Power

If an all-electric or hybrid boat are pursued, shore power facilities would be constructed (Glosten, 2017):

- The existing shore power connection available at both terminals is 480V, 60A, 3-phase. This connection should be sufficient for a diesel-powered replacement vessel.
- Shore power infrastructure will be required for both electric ferry options (all-electric or plug-in hybrid), including a much larger shore power connection. The electric ferry options will use the primary voltage from the utility (12,400 Volts).
- The shore power building/container would be similar to a 20 foot or 40-foot intermodal container (ISO). It would be built on the existing dock and connected to power likely in the ferry loading and parking area. (William L. Moon III, PE, Glosten, 2018)

Ticketing

- Ticketing kiosks may be added at the terminal.

No Action Alternative

The No Action Alternative, required under SEPA, consists of the current 21-car vessel and existing terminals configurations.

Reduced Ferry Size Alternative

The purpose of studying more than one alternative is to provide the County with information about a range of choices prior to making a decision on the ferry replacement proposal, and to address community interest regarding the ferry replacement proposal.

SEPA promotes the consideration of reasonable alternatives that could feasibly attain or approximate a proposal's objectives, but at a lower environmental cost or decreased level of environmental degradation. The primary decision regarding the County's long-term ferry service is whether to replace the current 21-vehicle, 100-passenger diesel ferry that is nearing the end of its useful life with a boat sized for future needs over the long-term; this means an operational period of about 40 years.

Alternatives in this Environmental Assessment consider different boat sizes based on projections of ferry demand. While the studies project both passenger and vehicle capacities, it is vehicle capacity that is the primary factor in determining the boat size, and it is the focus of this comparison of alternatives.

- The County commissioned a vessel capacity study and concept design in 2017; these studies indicated a demand for a 32-car ferry by the year 2060. (Glosten, 2017)
- Preliminary studies of ferry replacement need and capacities in 2013 recommended a 26-car vessel for the year 2033. (Elliot Bay Design Group, 2013)
- BERK Consulting, Inc. examined three scenarios for future housing and population growth on Guemes Island to project potential impacts on ferry ridership and vehicle demand. Based on the analysis of Historic Trends Low, a Medium Forecast per the County's 2016 Comprehensive Plan, and Historic Trends High ferry demand could respectively require a vehicle capacity range of 20-22-25 cars in the year 2036 and 22-30-35 cars in the year 2060.

Considering mid-points of the 40-year ferry life, a 28-car ferry would fit within Glosten's medium-low forecast at 2050. A cost-estimate prepared for the 28-car ferry shows a 15% capital cost reduction over the 32-car ferry. (Glosten, 2018)

Based on design considerations and to study a range of ferry service demand, this Environmental Assessment studies a 28-car ferry as a Reduced Ferry Size Alternative.

Comprehensive Plan Policy 8A-5.3 suggests techniques to encourage alternative modes of travel to/from the ferry before adding ferry capacity or expanding the current schedule, such as encouraging carpooling and walk-on passengers:

> *policy 8A-5.3 To meet future increases in demand, increase service capacity of the Guemes Island Ferry by: (a) encouraging car-pooling and walk-on passengers; (b) increasing the frequency of ferry runs based on demand; (c) considering additional ferry capacity if the aforementioned procedures fail to accommodate demand; and (d) adding additional runs outside the current schedule.*

The Reduced Ferry Size Alternative would accommodate expected vehicles in the middle of the 40-year planning period, and together with demand management techniques promoted in County policies could continue to serve the community to the year 2060. These demand management and alternative mode techniques could include peak period pricing, or offering greater transit allowing more "walk-on" use.

The Reduced Ferry Size Alternative would also have a similar electric propulsion system as the Proposal. Shore power and ticketing kiosks installation would also be similar. It is possible that the Reduced Ferry Size Alternative may have similar or lesser needs for terminal improvements (e.g. design-load improvements).

A No Action Alternative considers no change to the 21-car ferry.

Comparison of Alternatives

This Environmental Assessment evaluates the following range of alternatives: 21 cars (No Action), 28 cars (Reduced Ferry Size Alternative), and 32 cars (Proposal). The County may select any of the alternatives, or something in the range, when considering the ferry replacement decision.

Exhibit 8. Range of Alternatives Studied in Environmental Assessment

Vehicle Capacity	Passenger Capacity	Propulsion System	Description
32 vehicles	150 persons	Electric	PROPOSAL: Proposed vessel design capacity based on a medium-low forecast of countywide growth by 2060. Lesser need to implement policy 8A-5.3 through 40-years.
28 vehicles	150 persons	Electric	REDUCED FERRY SIZE ALTERNATIVE: Proposed vessel subtracting ~18 ft. or one row of four vehicles. Assumes lower vehicle demand with alternative forecasts. Assumes implementation of policy 8A-5.3 by 20-years to address potential demand through 40-years.
21 vehicles	100 persons	Geared diesel system	NO ACTION: Current vessel and passenger capacity.

Source: BERK Consulting, Inc.

Other Alternatives Considered but Rejected

The No Action Alternative, Proposal, and Reduced Ferry Size Alternative assume two round trips per hour, which is today's frequency. No change in frequency is proposed now. The rate of demand for ferry service has grown at a slower pace from 2000-2017. In past trials of alternative schedules 2006-2008, the County found that added runs outside the present schedule were not required. The County wishes to retain the general frequency of service regardless of boat size.

Environmental Assessment of the Alternatives

Under SEPA, impacts are effects or consequences of actions. (WAC 197-11-752) Impacts are those that are probable or likely rather than speculative. (WAC 197-11-782) Both direct and indirect impacts should be considered, such as "effects resulting from growth caused by a proposal, as well as the likelihood that the present proposal will serve as a precedent for future actions." SEPA rules give some examples: "For example, adoption of a zoning ordinance will encourage or tend to cause particular types of projects or extension of sewer lines would tend to encourage development in previously unsewered areas." WAC 197-11-060(4))

Significant impacts are those that have a reasonable likelihood of more than a moderate impact on environmental quality, and may depend on magnitude and duration. (WAC 197-11-794) To reduce impacts to a less than significant level, mitigation measures may be proposed to avoid, minimize, reduce, compensate, or adaptively monitor and respond with corrective measures. (WAC 197-11-768)

DIRECT IMPACTS

Within the Primary Study Area, implementation of the Proposal or Reduced Ferry Size Alternative could result in physical changes to the terminals in the Guemes Channel, where there are state priority habitats and species, state species of concern, and federal threatened and endangered fish and wildlife species. When the terminal improvements are designed, a biological assessment and federal, state, and local permits would be required. Such assessments and permits would determine appropriate conditions of approval such as work windows and avoidance of protected habitat to reduce or avoid impacts.

The new ferry vessel under the Proposal or Reduced Ferry Size Alternative could reduce air quality impacts and reduce the potential for noise compared to the No Action Alternative given the proposed ferry design and use of electric power. Water quality impacts could be reduced where diesel fuel use is reduced under the Proposal or Reduced Ferry Size Alternative.

A detailed topic by topic analysis is provided in Attachment A SEPA Checklist. Where potential impacts of the Proposal or Reduced Ferry Size Alternative are identified, mitigation measures are proposed, and no significant adverse impacts are identified.

INDIRECT AND CUMULATIVE IMPACTS

This section summarizes current conditions and potential impacts regarding Land Use and Growth. The analysis evaluates whether a larger ferry vessel could make island living more attractive and induce growth. The analysis draws from information in Attachment D Guemes Ferry Replacement Growth Analysis Technical Memo and Technical Appendix on Land Capacity Estimation.

The potential effects of induced growth on the Natural Environment, particularly potable groundwater resources, is also considered in this section. The Secondary Study Area, Guemes Island, is the focus of the indirect or cumulative impacts analysis.

Existing Conditions

Population and Housing

Washington State Office of Financial Management (OFM) estimates there were 782 housing units on Guemes Island as of April 1, 2017. Year-round population was estimated at 774 persons per OFM selected island estimates.

Just under half of the units were occupied year-round in 2017. Seasonal population in the summer is higher using available summer homes (second homes, short-term rentals) as well as tourist accommodations on the island.

The compound annual growth rate (CAGR) in population and housing has been slightly higher for Guemes Island than for the county over 2000-2017, though post-recession the housing CAGR is a little lower for Guemes Island than for Skagit County.

Exhibit 9. Population and Housing Change 2000-2017: Guemes Island and Skagit County

	Guemes Island	Skagit County
Population 2000	563	102,979
Population 2010	667	116,901
Population 2017	774	124,100
Population Change 2000-17	37%	21%
Population CAGR 2000 - 2017	1.89%	1.10%
Population CAGR 2010 – 2017[a]	2.14%	0.86%
Housing Units 2000	587	42,681
Housing Units 2010	754	51,473
Housing Units 2017	782	53,517
Occupancy Rate 2017	47.4%	89%
Housing Unit Change 2000-17	33%	25%
Housing CAGR 2000 - 2017	1.70%	1.34%
Housing CAGR 2010 - 2017	0.52%	0.56%

[a] When interpreting these figures, it is important to consider that data on housing unit counts are fairly reliable and based on permit completions reported to OFM. Population estimates are based on assumptions about housing occupancy and household size informed by 5-year rolling estimates from the Census American Community Survey. Therefore, there is a greater degree of uncertainty about the population estimates.

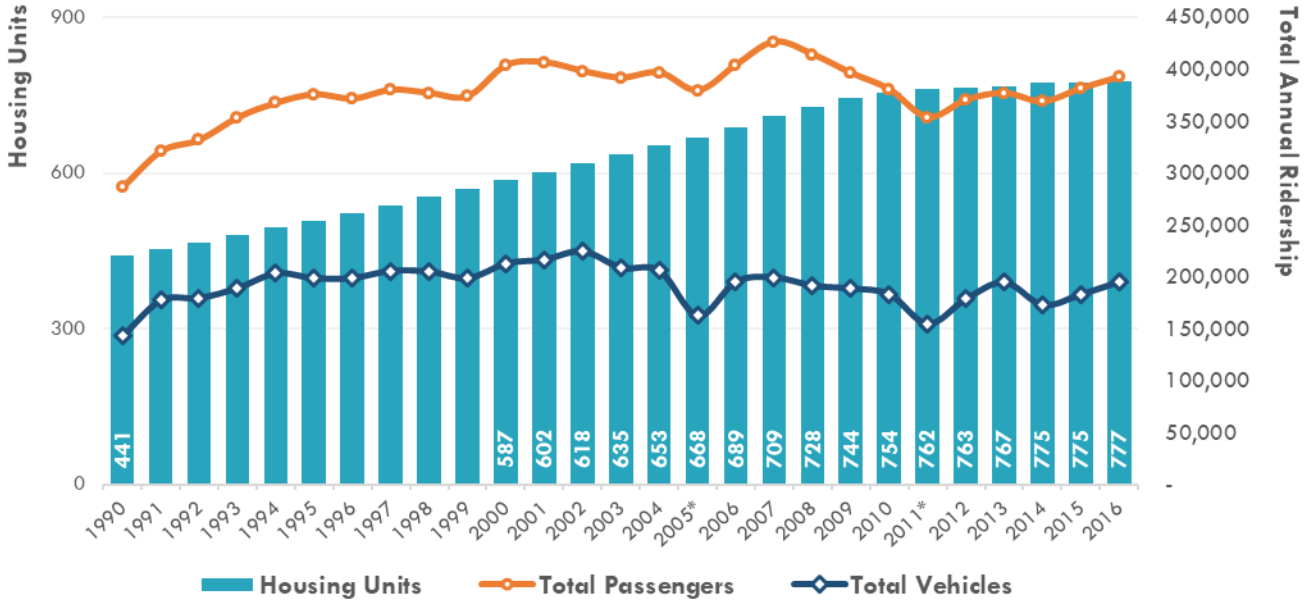
Source: Washington State Office of Financial Management 2017; BERK Consulting 2018

Trends in Ridership and Guemes Island Housing and Population Growth

Exhibit 10 presents 26 years of historic ridership data alongside the number of housing units on Guemes Island. The first decade shows a close relationship between ridership and housing. Then vehicle ridership

peaked in 2002 while passenger ridership peaked in 2007. Thereafter ridership begins to decline or fluctuate while housing growth continued slowly.

Exhibit 10 Housing Growth Compared to Ridership, 1990 - 2016



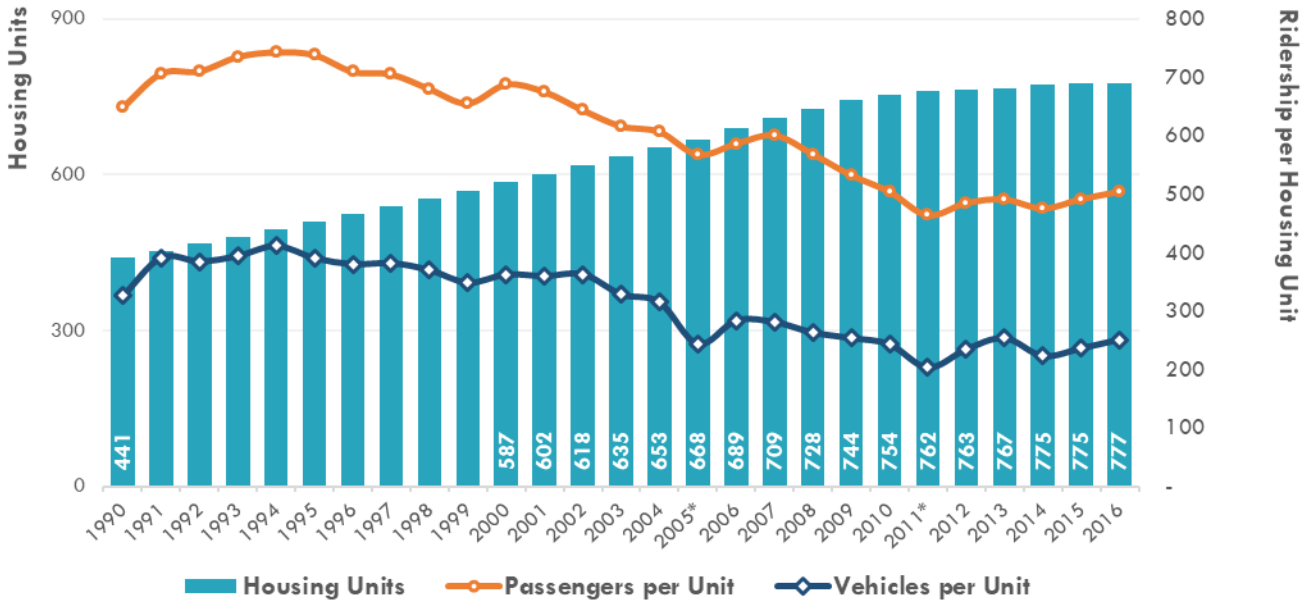
* In 2005 & 2011 there were extended ferry outages, with shorter maintenance outages in 2010, 2012, 2014, & 2015. No housing data exists for years 1991-1999, so linear growth is assumed.
Source: Skagit County, 2018; OFM, 2018; BERK, 2018.

To develop reasonable assumptions about the relationship between housing growth on Guemes and future impacts on ferry ridership demand, it is important to consider factors that may have contributed to ridership trends in more recent years. Glosten's Vessel Capacity Study evaluated trends with a statistical model and found that ticket prices and parking had a larger impact on ridership than the recession did. (Glosten, 2017) This period closely matches the overall passenger decline shown in the data, as well as a more gradual decline in vehicles. Since 2012, ridership counts begin to slowly climb again. Another factor is ferry outages. In 2005 and 2011, there were extended ferry outages, which show up at dips in the annual totals. An analysis of monthly ridership indicates these years were more typical of the surrounding years during the non-outage periods. Similarly, there were shorter maintenance outages in 2010, 2012, 2014, and 2015. Finally, there was an interim test schedule change that occurred during the years 2006 and 2007 which added sailing between 6:05pm and 10:00pm Monday through Thursday. Then, in 2008, the schedule as finally adopted partially contracted to remove all sailings after 8:30pm Monday through Thursday.

A clearer way to show the historic relationship between housing production and ferry ridership is measuring passengers and vehicles per housing unit on an annual basis, as presented in Exhibit 11. During most of this period, there was an overall pattern of declining annual passenger and vehicle counts per housing unit. This decline could be due to a slow decline in population per housing unit between 1990 and 2010 found in Census data due to declines in both household size and the percentage of homes that are occupied full time. For many years, the majority of housing units on Guemes were used only occasionally as recreational or vacation homes. The 1970 Census records showed an occupancy rate of 42% (Skagit County, 1977), and this rate has fluctuated only slightly in years since. In the year 2000, 46.6% of units were occupied full time (U.S. Census, 2000). In 2010 this rate dropped to 40.2% (U.S. Census, 2010).

According to the most recent American Community Survey, this rate has climbed back to 42.2% (U.S. Census, 2016). OFM's population estimates for Guemes Island reflect this slight increase in occupancy following 2010 (OFM, 2017), from 46.2% in 2010 to 47.4% in 2017. These estimates are consistent with a change in ridership trends that is evident following 2011 whereby both passengers and vehicles per housing unit increases slowly.

Exhibit 11. Ridership per Housing Unit, 1990 - 2016

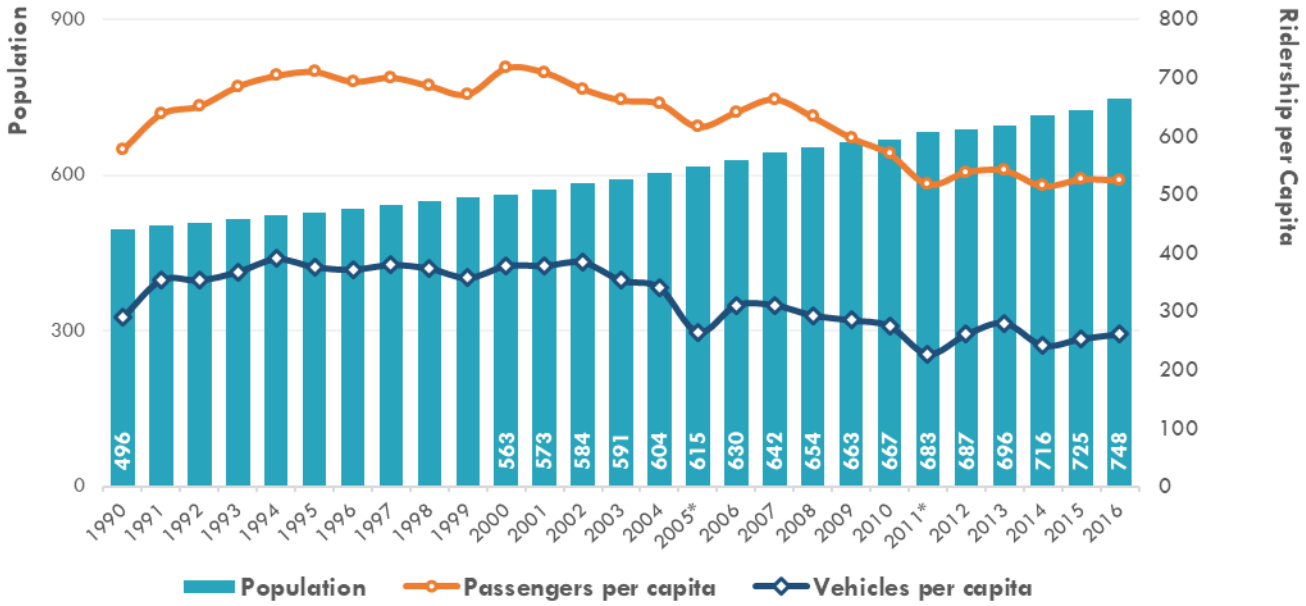


* In 2005 & 2011 there were extended ferry outages, with shorter maintenance outages in 2010, 2012, 2014, & 2015. No housing data exists for years 1991-1999, so linear growth is assumed.

Source: Skagit County, 2018; OFM, 2018; BERK, 2018.

Exhibit 12 accounts for estimates changes in population by showing ridership per capita. This chart shows a fairly steady relationship between population and ridership with the exception of years with ferry service outages and the economic recession and recovery, also influenced by parking and ferry prices, from 2008 through 2011. The most recent period of 2012 through 2016 shows a steady number of passengers and vehicles per capita, although reduced from the pre-recession period.

Exhibit 12. Ridership per Capita, 1990 - 2016



* In 2005 & 2011 there were extended ferry outages, with shorter maintenance outages in 2010, 2012, 2014, & 2015. No population data exists for years 1991-1999, so linear growth is assumed.

Source: Skagit County, 2018; OFM, 2018; BERK, 2018.

Exhibit 13 summarizes average annual ridership per housing unit and per capita for the 2012 through 2016 period. Ridership per housing unit has increased at a modest rate during this period. Passengers per capita declined slightly during this period, while vehicles per capita remained steady.[1]

Exhibit 13. Ridership per Housing Unit and per Capita Summary, 2012 – 2016

	Average Annual 2012 – 2016 (excluding 2014*)
Passenger Round Trips per housing unit	247
Vehicle Round Trips per housing unit	122
Passenger Round Trips per capita	267
Vehicle Round Trips per capita	132

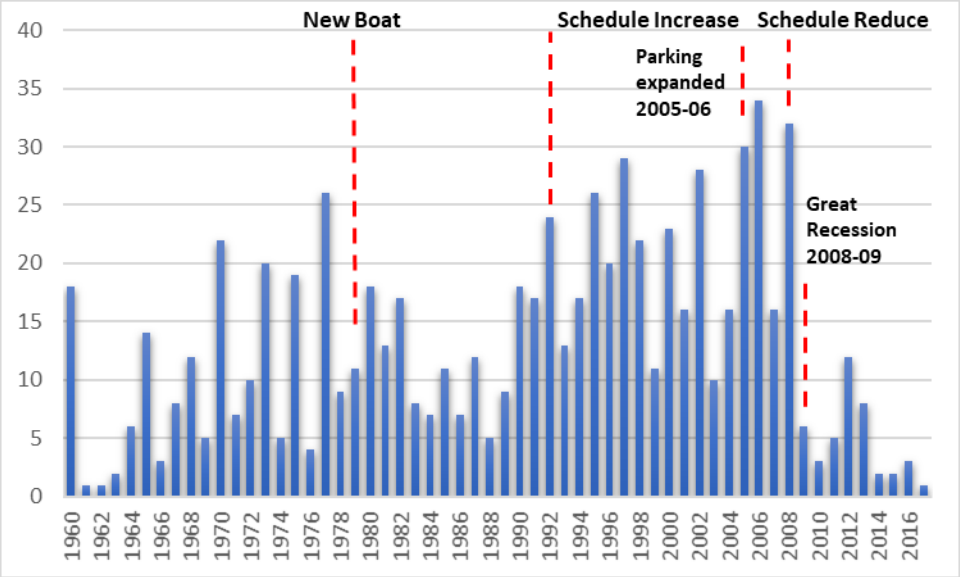
* In 2014 there was an approximately one-month ferry outage during which time a contract passenger ferry ran. This reduced ridership compared to trends. Therefore, BERK removed 2014 in average annual calculations.
Source: BERK, 2018.

Ferry Changes and Guemes Island Building Activity

Considering the level of construction activity over time on Guemes Island (year built of structures, all types, primarily residential), there appears to be greater building activity following ferry schedule changes in 1992 and 2006 compared with activity following the 1980 implementation of a 21-car boat replacing a 9-car boat. However, other broader economic and social factors are driving growth as described above; for example, following the Great Recession, there has been less activity in construction.

[1] When interpreting these figures, it is important to consider that data on housing unit counts are fairly reliable and based on permit completions reported to OFM. Population estimates are based on assumptions about housing occupancy and household size informed by 5-year rolling estimates from the Census American Community Survey. Therefore, there is a greater degree of uncertainty about the population estimates.

Exhibit 14. Number of Structures Built by Year 1960-2016



Source: Skagit County Assessor, 2017; BERK Consulting, Inc. 2018

On an annual average basis, the number of buildings changed or added by different time periods is shown below. The period 1992-2008 saw more activity than the periods prior to or since. Year built data show structures built per Assessor records; the vast majority of building and construction is residential.

Exhibit 15. Average Annual Structures by Year Built

Year Range		Annual Average Buildings (Assessor Year Built)	Condition
1960	1979	10.15	Prior to 21-car boat
1980	1991	11.83	New 21-car boat
1992	2005	20.36	Schedule Change 1992
2006	2008	27.33	Schedule Change 2006 Increase and 2008 Small Decrease; expand parking.
2009	2017	4.67	Post Schedule Change, Recession, and Recovery
2012	2017	4.67	Post Economic Recovery

Source: Skagit County Assessor, 2017; BERK Consulting, Inc. 2018

Land Use and Growth Impacts

Capacity for Growth

The Guemes Island Subarea Plan (2010) estimated the capacity for growth on vacant lands and partially developed lands. For the purposes of this Environmental Assessment, a capacity analysis was conducted considering parcels with unique identification numbers (Scenario A) and consolidating parcels with side-by-side ownership (Scenario B).

Based on the approach conducted to date, the net development results of Scenario A (unique parcels) are similar to that included in the January 2011 adopted Guemes Island Subarea Plan. Scenario B (consolidated ownership) is lower.

Exhibit 16. Land Capacity Scenarios A and B compared to Guemes Island Subarea Plan

Zone	Estimated Housing Units 2017	Subarea Plan 2010 Capacity	Existing + Subarea Plan Capacity	Scenario A 2018 Capacity Net (Unique Parcels)	Existing + Scenario A Capacity	Scenario B 2018 Capacity (Consolidated Ownership)	Existing + Scenario B Capacity
Rural Intermediate	509	475	984	425	934	211	720
Rural Reserve	254	380	634	342	596	224	478
Rural Resource	1	6	7	11	12	8	9
Totals	**764**	**861**	**1,625**	**779**	**1,543**	**443**	**1,207**

Notes:
It is likely that Subarea Plan capacity is overstated due to building activity from 2010-2017. Based on Year Built information, about 36 dwellings may have been added, which would reduce the capacity to 1,589.
Scenario A and B estimates include the assumption that Washington DNR school trust lands could accommodate 3 housing units under the current zoning of Rural Resource. Development is unlikely; over the long-term if these parcels do not have natural resource based revenue-producing activities they could be surplused. The possibility is remote. The small number of potential units adds to a conservative analysis of capacity.
Five housing units have been added to capacity under Rural Reserve for Scenario A and B because the San Juan Preservation Trusts estimates 5 housing units could be built on the properties on which they hold conservation easements; however, it is unlikely the properties would develop given the property owners have agreed to conservation easements. This small number of units is included for a conservative capacity estimate.
Source: Skagit County 2011; BERK, 2018.

This information indicates the potential maximum number of dwelling units that may be constructed in the future but not the rate. The rate of growth is considered below.

Rate of Growth

Due to the uncertainty regarding how much growth may occur on Guemes in years to come, this assessment presents three different growth scenarios that use different growth rate assumptions, as shown in Exhibit 17. Growth Scenarios 1 and 3 are both projections based on historic growth trends. The Low projection assumes that the slower rate of growth seen on the Island since 2010 will continue. The High projection assumes that the average annual growth rate will return to the historic average from the years 2000 through 2017. Scenario 2 assumes Guemes will grow at the same rate as OFM's Medium population projection for Skagit County, released in 2012. This is the countywide rate of growth that was adopted in the Skagit County Comprehensive Plan (BERK Consulting, 2016). The County has adopted the Medium OFM rate for their own countywide projections in 2012. This OFM Medium rate falls between the Low and High historic trends scenarios for Guemes Island.

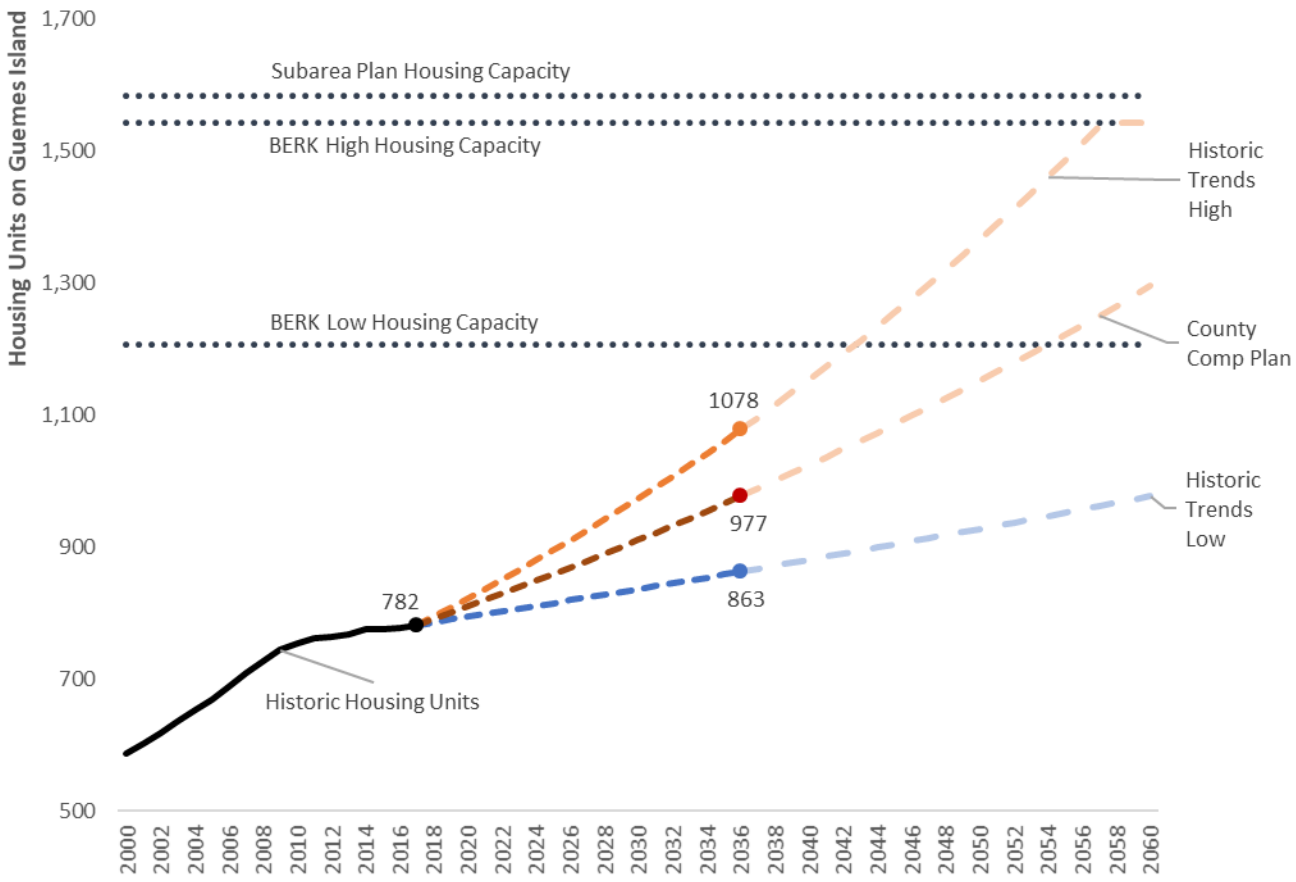
Exhibit 17. Growth Scenarios Considered in this Analysis

Scenario	Growth Rate	Net New Housing Units, 2017-2036	Projected Housing Units, 2036	Growth Assumptions
1. Historic Trends Low	0.52%	81	863	Matches the rate of growth observed on Guemes Island between 2010 and 2017.
2. County Comprehensive Plan (Medium)	1.18%	195	997	This is the medium (most likely) population growth projection for Skagit County released by OFM in 2012. The County adopted this rate of growth in their 2016 Comprehensive Plan. (BERK Consulting, 2016)
3. Historic Trends High	1.7%	296	1,078	Matches the rate of growth observed on Guemes Island between 2000 and 2017.

Source: OFM, 2012 and BERK, 2018

Exhibit 17 compares the three scenarios to three estimates of potential capacity for new housing growth on Guemes Island. Housing capacity estimates are based on analysis described above and in Attachment D. The third capacity estimate is based on analysis in the Guemes Island Subarea Plan (Skagit County, 2010). This comparison shows projected growth through the target year of 2036 as well as onward to the year 2060 to reflect conditions that could potentially occur during the 40 years lifespan of the new ferry. None of the Growth Scenarios are projected to reach the low estimate of housing capacity before the year 2036. However, Scenario 2 (County Comprehensive Plan) is projected to surpass that capacity around 2050, and Scenario 3 (Historic Trends High) is projected to exceed all three capacity estimates before 2060. The projections limit Scenario 3 housing growth by this assessment's high estimate of total housing capacity (Scenario A unique parcels).

Exhibit 18. Comparison of Growth Scenarios



Source: Skagit County, 2010; OFM, 2018; BERK, 2018.

Projected Ridership Demand

Exhibit 19 shows projections of annual vehicle and passenger round trips in 2036 based on the projected number of housing units. These projections assume the historic average annual ridership per housing unit (presented in Exhibit 13) remains constant in years to come.

Exhibit 20 presents the same information for the year 2060.

Exhibit 19. Potential Ferry Ridership Demand, 2036

Scenario	Projected Housing Units	Annual Vehicle Round Trips	Annual Passenger Round Trips
1. Historic Trends Low	863	105,272	212,870
2. County Comprehensive Plan (Medium)	977	119,218	241,069
3. Historic Trends High	1,078	131,497	265,898

Source: BERK, 2018.

Exhibit 20. Potential Ferry Ridership Demand, 2060

Scenario	Projected Housing Units	Annual Vehicle Round Trips	Annual Passenger Round Trips
1. Historic Trends Low	977	119,218	241,070
2. County Comprehensive Plan (Medium)	1,295	157,984	319,458
3. Historic Trends High	1,543	188,269	380,697

Source: BERK, 2018.

Based on the ridership demand estimates above, and applying a similar unit of capacity as the Proposal, the potential ferry vehicle capacity that would accommodate the growth ranges from:

- The current boat size if Historic Trends Low is considered,
- A ferry size that is similar to the Reduced Ferry Size Alternative with the Medium forecast, and
- A ferry sized greater than the Proposal under Historic Trends High.

Exhibit 21. Comparison of Round Trip Ridership Estimates and Ferry Car Capacity Needed Based on Historic Per Capita Rates Applied to Range of Growth Rates – BERK 2018

Scenario	Vehicle Ridership Round Trip 2036	Vehicle Capacity Needed 2036	Vehicle Ridership Round Trip 2060	Vehicle Capacity Needed 2060
Historic Trends High	131,000	25	188,000	35
Glosten Vessel Capacity Study 2017			*170,000*	32
County Comp Plan Medium	119,000	22	158,000	30
Historic Trends Low	105,000	20	119,000	22

Note: Vehicle capacity is based on the Proposal estimate of ridership in 2060 at 170,000 and a 32-car boat, for a unit of capacity approximately at 5,313.
Legend: RT = Round Trip
Source: BERK, 2018.

Potential for Induced Growth

The Proposal and Reduced Ferry Size Alternative do not change the Comprehensive Plan policies or zoning and use allowances on Guemes Island. Growth capacity would not change. Growth capacity appears to be similar to or less than the Subarea Plan estimates if accounting for consolidated ownerships.

Growth patterns illustrated in Exhibit 14 and Exhibit 15 appear to support the 1978 EIS conclusions that changes in ferry sizing would not have a significant effect on population, housing, and land use.

Overall ridership has been declining per unit or per capita since 1990 and since the peak in 2007; there have been modest steady ridership rates since 2012 though less than the peak of 2007. The average annual structure activity (by year built information) has slowed since 2010.

The 2008 Environmental Assessment indicated 2006-2008 schedule changes were responding to growth rather than driving it. The document did indicate that if there was a large excess carrying capacity, the

rate and timing of new residential growth and development on the island might in theory occur more rapidly, though in any case growth would be required to fit the County's Comprehensive Plan.

By 2060, growth trends illustrate a range of potential demand for ferry use that would include the Proposal ferry vessel size and the Reduced Ferry Size Alternative. The vessel sizes are based on different forecasts of demand, and are not meant to provide excess carrying capacity; they are meant to match capacity to demand considering past trends and growth rates.

Consistency with Adopted Land Use Plans & Regulations

The Skagit County Comprehensive Plan adopts the Guemes Island Subarea Plan, approved in 2011, and it also identifies the following ferry-related policies:

> *Goal 8A-5 Work to maintain county and state ferry services as an important element of the transportation network.*
>
> *policy 8A-5.1 Encourage the provision of adequate street, highway, and road facilities to accommodate traffic to the ferry terminals in Anacortes.*
>
> *policy 8A-5.2 Work with the City of Anacortes, property owners, and residents on Guemes Island to develop and maintain adequate parking areas.*
>
> *policy 8A-5.3 To meet future increases in demand, increase service capacity of the Guemes Island Ferry by: (a) encouraging car-pooling and walk-on passengers; (b) increasing the frequency of ferry runs based on demand; (c) considering additional ferry capacity if the aforementioned procedures fail to accommodate demand; and (d) adding additional runs outside the current schedule.*
>
> *policy 8A-5.4 In making all decisions related to the Guemes Island Ferry, balance the needs of the Island residents, the non-resident property owners, and the County citizenry as a whole. Decisions that would have significant service or financial impacts should be made after providing ample opportunities for public review and comment.*
>
> *policy 8A-5.5 Continue to provide safe and adequate ferry service between Anacortes and Guemes Island, and a fare structure designed to recover operating costs similar to the Washington State Ferries model.*

The Proposal would meet Goal 8A-5 to maintain County ferry services, as would the Reduced Ferry Size Alternative.

A vessel sized for a projected growth rate at a medium or lower level, or for the mid-point of the 2060 planning horizon, could reflect the following trends and uncertainties:

- Declining rates of ridership,
- Changing nature of vehicle travel (e.g. driverless cars, car sharing), and
- Potential for additional demand management measures (ferry ticket pricing and parking supply (Glosten, 2017)) and transit support.

It could also match policy 8A-5.3 which takes a graduated approach to changes in the ferry system and service to extend the life of the County's investment in the system.

The County has solicited community input on the ferry replacement decision per Policy 8A-5.4. Funding for the ferry replacement is part of the community conversation per Policy 8A-5.5.

The Guemes Island Subarea Plan includes a policy suggesting limiting new building permits to protect groundwater resources and support the County's ability to maintain ferry service commensurate with the rural character of the island.

> *Policy 2.9: Skagit County should consider limiting the total number of building permits for new residential dwellings, for additions exceeding 25 percent of the existing square footage and for ADU's to twenty per year. This recommendation is based on a maximum build-out in fifty years. It is intended to ensure that the rate of growth on the island conserves and protects groundwater resources and the County's ability to maintain adequate capital facilities and ferry service commensurate with the rural character of the island.*

Without permit metering, growth trends show far less than 20 permits per year based on year built information tracked by the County Assessor; the activity has been about 4.7 annual average buildings from 2009 to 2017.[2]

The above ridership analysis accounts for historic trends in demand. The County is considering future demand based on trends and needs, and sizing the vessel accordingly. A discussion of growth and groundwater resources is presented below.

Potable Water Resources

Existing Conditions

A 1995 study of the Guemes Island aquifers found that the groundwater resource of Guemes Island provides all of the freshwater used by island residents and visitors. About 70% of the water use was for domestic wells, 28% by public water supplies, and 2% for livestock. A water budget indicated that of 21-29 inches of precipitation, about 0-4 inches runs off, 12-22 inches evaopotranspires, and 2-10 inches recharges the groundwater system, and only 0.1-0.3 inches of recharge is withdrawn. The 1992 withdrawals though small were considered critical in terms of location and density of pumping wells. Over-pumping near shore can move the freshwater-seawater interface landward and increase seawater intrusion. Variations in chloride concentration were seasonal and were thought to be caused by shifting of the freshwater-seawater interface. (US Geological Survey, 1995)

Because of reliance on the aquifer for potable water, the US Environmental Protection Agency designated the island as a sole-source aquifer in December 1997. (Environmental Protection Agency, 1997)

As described above, public water systems make up less than one-third of groundwater use. Current public water systems are listed in Exhibit 22 along with calculated connections and approved connections. The water systems are mapped in Exhibit 22.

There appear to be remaining public water system connections in some locations, particularly in the southeast part of the island in Holiday Hideaway.

Cluster developments called Conservation and Reserve Development (CaRD) subdivisions may only be allowed on the island if there is a public water system whose source is outside the designated area or

[2] Based on year built date of structures, primarily residential development.

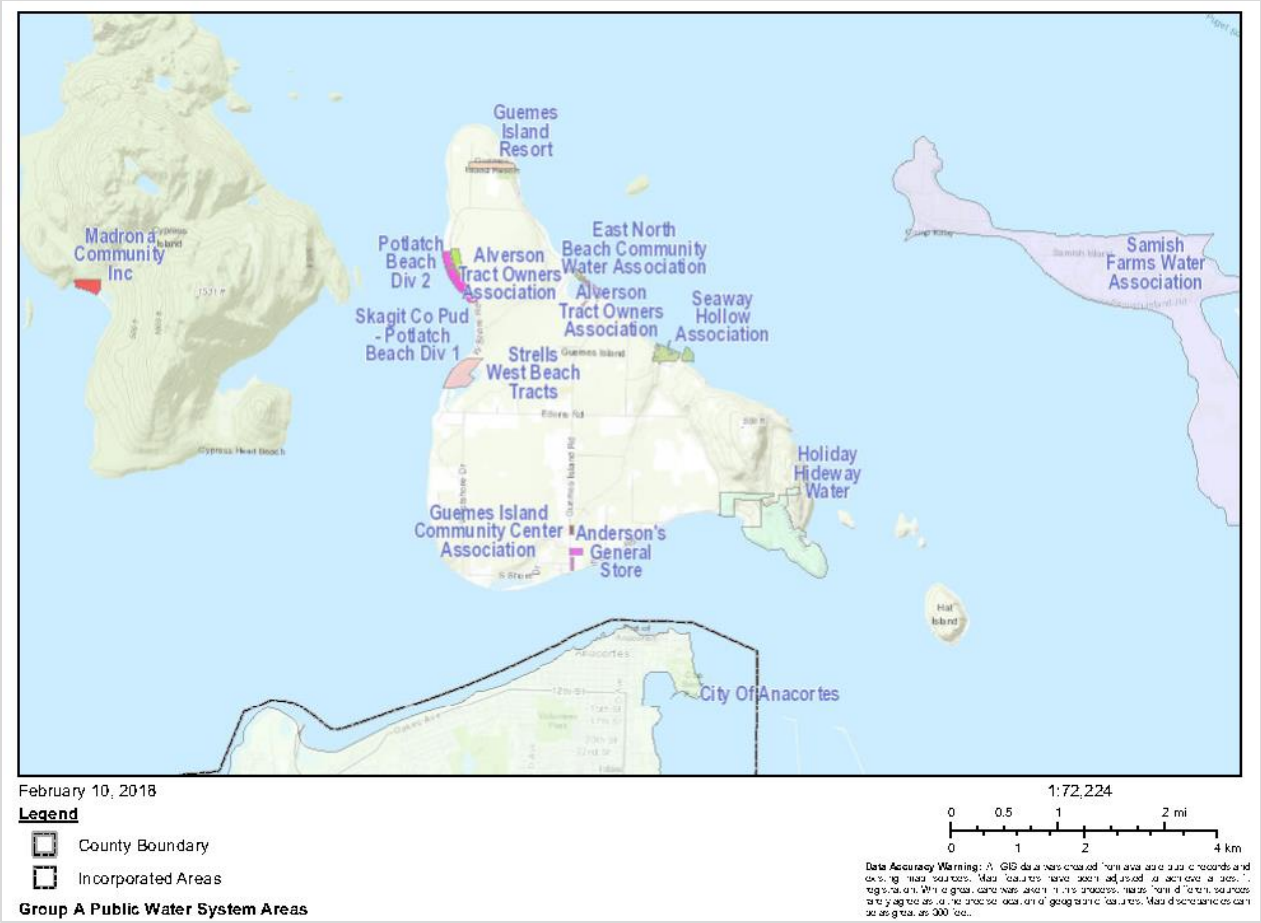
from an approved alternative water system; a density bonus with a CaRD is not allowed on the island. An example of an alternative water system could be a reverse osmosis system using seawater. In 1998, the Skagit PUD acquired and provides a reverse osmosis water source to a public water system at Potlach Beach. The PUD 2007 Water System Plan shows a physical capacity for up to 182 equivalent residential units (ERU's). (Public Utility District No. 1 of Skagit County , 2008) A later 2014 PUD plan does not provide data separately for this system; it is part of the cumulative number of PUD customers. (Public Utility District No. 1 of Skagit County, 2014, 2014)

Exhibit 22. Group A Public Water Systems

Name	Total Calculated Connections	Total Approved Connections
Alverson Tract Owners Assn	15	18
Dog Island Goods	2	2
East North Beach Comm Water Assn	18	
East North Beach Comm Water Assn	18	
Guemes Island Comm Center Assn	2	2
Guemes Island Resort	13	27
Holiday Hideaway	161	249
Potlatch Beach-Division II*	22	25
Seaway Hollow Association	19	
Strells West Beach Tracts	16	

Note: PUD 2007 Water System Plan shows a physical capacity for up to 182 ERU's; A 2014 PUD plan does not provide data separate for this system; it is part of the cumulative number of PUD customers. (Public Utility District No. 1 of Skagit County, 2014, 2014)
Source: Washington State Department of Health 2018

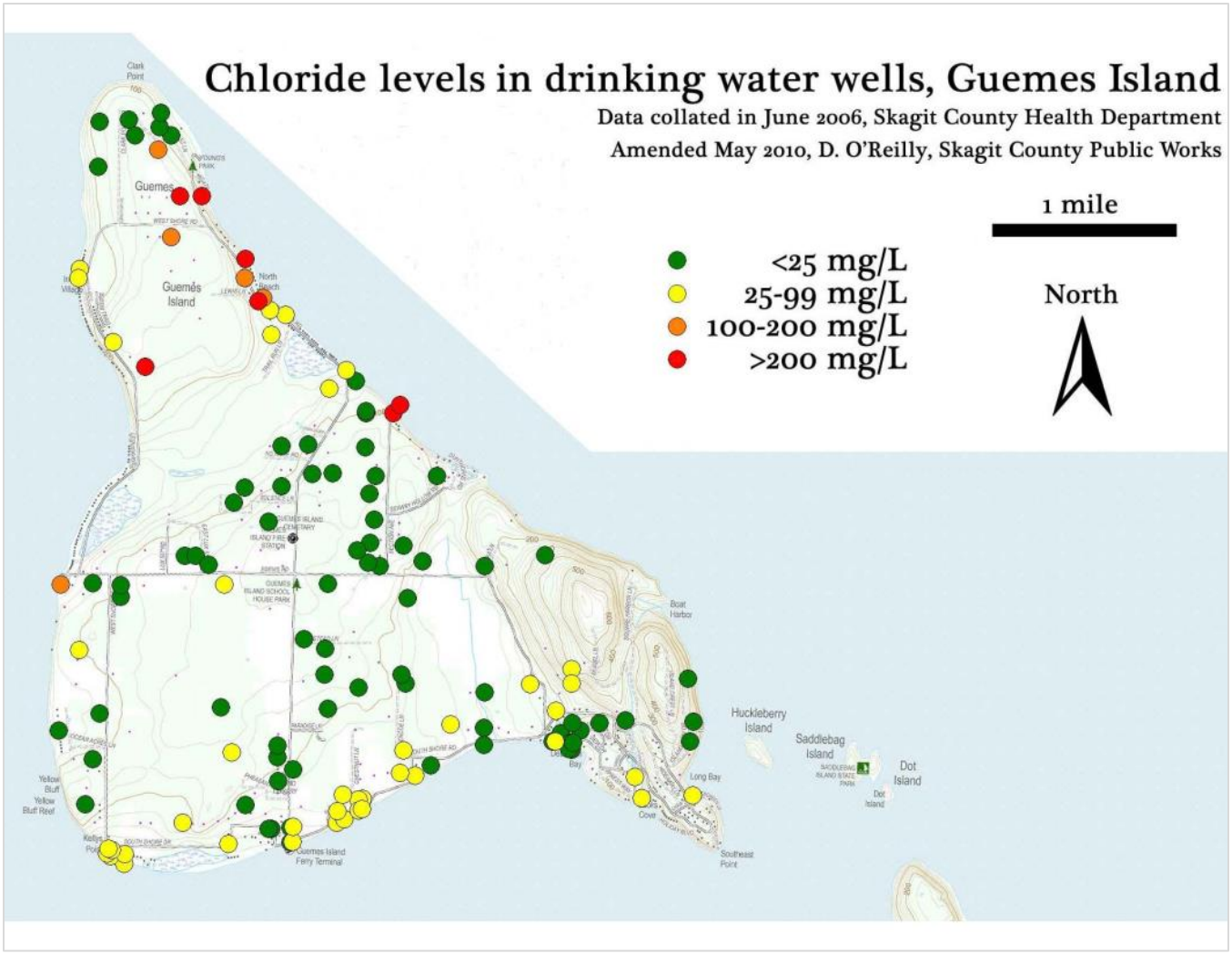
Exhibit 23. Water System Map



Source: Skagit County iMap 2018

As described in the USGS study of the aquifer (US Geological Survey, 1995), chloride levels may indicate seawater intrusion. A 2010 map identifies chloride levels in wells, illustrating higher concentrations on the northeast and southern shorelines. Skagit County Code 14.16.360 prohibits new ADUs where the water source contains more than 25 ppm of chloride.

Exhibit 24. Wells and Chloride Levels



Source: Skagit County Public Works, 2010

County Implementation of Subarea Plan Groundwater Protection Policies

The Guemes Island Subarea Plan (Skagit County, 2010) includes several policies and statements regarding aquifer protection, several of which have been implemented:

- Policy 2.8: Requirements for ADUs regulated under SCC 14.16.710 should be amended (based on the current Seawater Intrusion Policy or Code) to prohibit ADUs on Guemes Island in areas where the water source is 25 ppm or more chlorides and the well capacity must meet current quantity requirements as specified in SCC 12.48. These recommended changes should be considered in the next update for the County Seawater Intrusion Policy or Code and should be consistent with SCC 12.48 Drinking Water Code.
  - Adopted 2016: SCC 14.16.360.
- Policy 4.2: Potential prime aquifer recharge areas on the island need to be identified and evaluated.

- Policy 4.3: The Skagit County Interim Seawater Intrusion Policy, adopted by the Board of Commissioners/ Health by Resolution #15570, should be updated and codified, if necessary, by the Skagit County Department of Health with guidance from the County Hydrogeologist.
    - Adopted 2016: SCC 14.24.380
- Policy 4.4: The preliminary groundwater budget, as presented by the USGS in the 1995 report entitled Hydrogeology and Quantity of Ground Water on Guemes Island, Skagit County, WA, should be further evaluated by the County Hydrogeologist, and the issue of groundwater availability needs to be addressed.
- Policy 4.20: Sole Source Aquifer Mitigation. There shall be no density bonus for CaRD developments in areas designated as a "sole source aquifer," except where the source of water is from a public water system whose source is outside the designated area or from an approved alternative water system pursuant to Chapter 12.48 SCC.
    - Adopted 2000 and amended since: SCC 14.18.310.
- Education: Guemes Island residents should be strongly encouraged not to water their lawns and gardens with well water. Rainwater catchment systems provide a viable alternative. People shall be encouraged to install water meters in order to track their water usage and detect leaks when the usage rises above the norm.
    - Adopted 2016: SCC 14.24.380 and SCC 15.04.020 (8) Uniform Green Plumbing and Mechanical Code Supplement 2012 Appendix B for potable rainwater catchment systems.

Potential Impacts of Future Growth on Groundwater

The ferry replacement Proposal and Reduced Ferry Size Alternative would not create direct impacts to ground water resources on Guemes Island. They would not alter the growth capacity under the Comprehensive Plan and zoning. The ferry size alternatives are designed to provide capacity to accommodate projected growth within the range of historic population and dwelling unit growth rates; indirect and cumulative ground water impacts are not likely to occur because of the Proposal or Reduced Ferry Size Alternative. Further, the County has recently implemented code regarding several land use and aquifer protection measures as described above, which would mitigate the effects of housing development.

Strategies to Further Reduce the Potential for Impacts

This analysis of Land Use and Growth Impacts and impacts to Potable Water Resources indicates that historically, a change in ferry sizing appears not to have influenced growth, and that the Proposal would not alter the zoned capacity for growth. A ridership analysis projected forward shows that the Proposal would offer a ferry size that would fit within a continuation of historic growth rates. The Reduced Ferry Size Alternative would also fit within those projected growth rates. The ferry would be sized to meet expected growth by 2060.

Sizing the boat for a mid-point of the planning period or selecting a ferry size based on a medium or lower forecast could match Comprehensive Plan Policy 8A-5.3.

No mitigation measures are required as a significant adverse impact is not identified. Optionally, the County could consider other ways to reduce demand for ferry service through growth management. The

Subarea Plan suggests the County annually limit the permits of new residences. Recent trends show such a permit metering program is not needed now as growth has occurred at a lower rate than the Policy 2.9 suggests. The County could monitor and adaptively manage based on future trends and revisit Policy 2.9 as needed.

Other potential measures regarding growth management considered in the 2008 Environmental Assessment, but not required as mitigation include:

- 2008 Environmental Assessment: Consider further downzones or lot consolidation requirements.
  - Analysis 2018: It should be noted that the County's Comprehensive Plan includes land use and zoning designations that are at a lower density than when the current 21-car ferry was instituted per the 1979 EIS. (Skagit County, 1977) Regarding lot consolidation, the lower range growth capacity estimate prepared for this Environmental Assessment shows the potential capacity if some of the parcels are not considered lots of record or if ownerships are consolidated.
- 2008 Environmental Assessment: Consider prohibiting accessory dwelling units.
  - Analysis 2018: There have been approximately 16 ADU permits from 2007 to 2017, or about 0.8 per year. The County has adopted regulations in 2016 that limit ADUs in areas where chloride levels in wells exceed a certain amount.
- 2008 Environmental Assessment: Delay implementing a permanently expanded ferry schedule.
  - Analysis 2018: The 2008 action by Skagit County instituted less than the maximum ferry schedule tested. See the discussion of alternatives considered and rejected. Ridership trends do not support more frequent ferry service or extended hours of operation.

CONCLUSION & THRESHOLD DETERMINATION RECOMMENDATION

Project level impacts can be avoided based on designs (e.g. reduced air quality emissions, reduced noise due to electric power) or mitigated by federal, state, and local codes and permit conditions (e.g. work windows and other conditions regarding plant and animal habitat and species). Growth trends do not support the idea that a ferry size induces growth. Growth trends and ridership analysis do support considering an alternative in the range that accommodates growth in the middle of the planning period or for a medium or lower historic rate paired with demand management and transit measures. Following the voluntary comment period on the Draft Environmental Assessment a Threshold Determination will be issued. See Fact Sheet.

Attachment A: SEPA Checklist

WAC 197-11-960 Environmental checklist.

ENVIRONMENTAL CHECKLIST

Purpose of checklist:

The State Environmental Policy Act (SEPA), chapter 43.21C RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An environmental impact statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to help you and the agency identify impacts from your proposal (and to reduce or avoid impacts from the proposal, if it can be done) and to help the agency decide whether an EIS is required.

Instructions for applicants:

This environmental checklist asks you to describe some basic information about your proposal. Governmental agencies use this checklist to determine whether the environmental impacts of your proposal are significant, requiring preparation of an EIS. Answer the questions briefly, with the most precise information known, or give the best description you can.

You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If you really do not know the answer, or if a question does not apply to your proposal, write "do not know" or "does not apply." Complete answers to the questions now may avoid unnecessary delays later.

Some questions ask about governmental regulations, such as zoning, shoreline, and landmark designations. Answer these questions if you can. If you have problems, the governmental agencies can assist you.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Use of checklist for nonproject proposals:

For nonproject proposals complete this checklist and the supplemental sheet for nonproject actions (Part D). The lead agency may exclude any question for the environmental elements (Part B) which they determine do not contribute meaningfully to the analysis of the proposal.

For nonproject actions, the references in the checklist to the words "project," "applicant," and "property or site" should be read as "proposal," "proposer," and "affected geographic area," respectively.

A. BACKGROUND

1. Name of proposed project, if applicable:

Guemes Island Ferry Replacement

2. Name of applicant:

Skagit County, Ferry Operations Division, Skagit County Public Works

3. Address and phone number of applicant and contact person:

Paul Randall-Grutter, P.E.
County Engineer
Skagit County Public Works
1800 Continental Place
Mount Vernon, WA 98273
Phone: (360) 416-1400
paulrg@co.skagit.wa.us

4. Date checklist prepared:

April 10, 2018

5. Agency requesting checklist:

Skagit County

6. Proposed timing or schedule (including phasing, if applicable):

Schedule is dependent on funding. After a ferry replacement decision by the Board of County Commissioners anticipated in 2018, and with funding secured, the construction would be permitted and completed, and the earliest service date would be late 2020.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

No.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

Project documents prepared for the concept design and ferry sizing have relevant environmental information, and were all prepared under the firm Glosten in 2017, and available at the project website, https://www.skagitcounty.net/departments/publicworksferryreplacement:

- *Concept Design Report*
- *Concept Design Drawing - General Arrangement*
- *Concept Design Drawings - Structure*
- *Vessel Capacity Study*
- *Transportation System Assessment*
- *Engineers Cost Estimate*

A more recent 2018 cost estimate of a 28-car ferry has also been developed by Glosten. (Glosten, 2018)

Past SEPA Documents and Determinations have been considered in the preparation of this Checklist:

- *Guemes Island Ferry System Final EIS, January 1978, examining a larger ferry replacement from 9 cars to 21 cars and associated terminal improvements.*
- *Guemes Island Ferry Service Schedule Changes, Environmental Assessment and SEPA Non-Project Checklist, and Determination of Non-Significance, 2008.*

As part of the National Environmental Policy Act (NEPA) review of past ferry terminal projects, categorical exclusions and other supporting materials such as biological assessments have been prepared, and have been considered in this Checklist:

- *Anacortes Ferry Terminal Rehabilitation project 2010*
- *Guemes Ferry Breakwater Replacement Section Biological Evaluation 2015*
- *Guemes Island Ferry Terminal Maintenance Program (2014-2018)*

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

NEPA provides environmental review of projects that receive federal funds or that require federal permits. The NEPA process is similar to SEPA, but will be conducted when the County secures construction funds, and has designed the terminal improvements to a 30% design stage a comparable design level as the ferry boat replacement. The level of review would be a categorical exclusion, following NEPA rules implemented by Federal Highway Administration (FHWA) and the Washington State Department of Transportation (WSDOT).

Some of the analysis in this SEPA Environmental Assessment and Checklist may be useful to the future NEPA process. In association with the NEPA Process and the next phase of design, future permits would be needed as listed in Question 10.

10. List any government approvals or permits that will be needed for your proposal, if known.

The table below lists potential clearances and permits. The immediate required governmental permit in 2018 is conducting SEPA on the County's ferry replacement proposal. As described in Question 9, the NEPA process and associated permits for the funding of the ferry and terminal improvements would occur when there is a 30% design of the terminal changes and construction funds are secured.

Potential Federal and State Environmental Review Laws and Permits

Law	Required Review or Permit	Lead Agency	Ferry Boat Replacement	Ferry Terminal Improvements
State Environmental Policy Act	SEPA Checklist and Threshold Determination While terminal improvements appear to be exempt per WAC 197-11-800 (3), the ferry replacement would not be exempt. Exempt and non-exempt activities should be considered together per WAC 197-11-060(3)(b).	Skagit County – Ferry and Guemes Terminal City of Anacortes – Terminal For terminal, consider joint agency agreement, or County assumes lead agency if city agrees; see WAC 197-11-942 and 944.	X	X
Washington Shoreline Management Act	City of Anacortes: Shoreline Substantial Development Permit. * Skagit County: In current SMP ferry terminals appear allowed in all environments except Natural. Proposed SMP Update not yet adopted. *	City of Anacortes – Anacortes Terminal Skagit County – Guemes terminal		X
Revised Code of Washington (RCW) 77.55 Construction Projects in State Waters	Hydraulic Project Approval*	Washington State Department of Fish and Wildlife		X
Chapter 79.105 RCW Aquatic Lands	Aquatic Lease Agreement	WA Dept. of Natural Resources		X
City of Anacortes Municipal Code Skagit County Code	Zoning District: E.g. within Anacortes, the terminal is zoned Light Industrial, which permits shipping and terminal facilities. Building Permit (e.g. onshore power) Floodplain development permit*	City of Anacortes – Anacortes terminal Skagit County – Guemes terminal		X
National Environmental Policy Act	Applies to federal actions, typically where a federal permit is required or federal funding is sought or secured. Acton includes: "A highway or transit project proposed for FHWA or FTA funding. It also includes activities such as joint and multiple use permits, changes in access control, etc., which may or may not involve a commitment of Federal funds."	FHWA/WSDOT Appears categorical exclusion 2, 29 and 30 apply per FHWA/WSDOT's LAG Manual Guidance.	X	X
The Clean Water Act of 1972	Section 401 Water Quality Certification* Section 404 may not apply if there is no placement of structures below the MHW line.	Washington Department of Ecology		X
Coastal Zone Management Act (CZMA) 1972	Coastal Zone Management Consistency (CZM) determination	Washington Department of Ecology		X

Law	Required Review or Permit	Lead Agency	Ferry Boat Replacement	Ferry Terminal Improvements
Rivers and Harbors Act of 1899	Work in Navigable Waters Section 10 permits*	U.S. Army Corps of Engineers		X
Endangered Species Act (ESA) of 1973	Section 7 Consultation	US Fish and Wildlife and/or National Marine Fisheries	**	X

Notes: *May be obtained through a Joint Aquatic Resource Permit Application (JARPA).
** CE form questions on effects to species is based on whether there is "construction" – assume this applies to terminals.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

Skagit County proposes to replace its current 21-vehicle, 100-passenger diesel ferry serving Guemes Island with an electric ferry serving up to 32 vehicles and 150 passengers per trip. There may also be minor modification of the ferry terminal itself (e.g. wing walls, dolphin fender heights, transfer span) to accommodate the new ferry and to facilitate concurrent passenger and auto loading, and to add a new electric power supply. See the Environmental Assessment for a more detailed description.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The primary study area consists of the ferry service route between the Anacortes Terminal and the Guemes Island Terminal. A secondary study area consists of Guemes Island for the purposes of reviewing potential indirect and cumulative effects of growth. See the Environmental Assessment for maps.

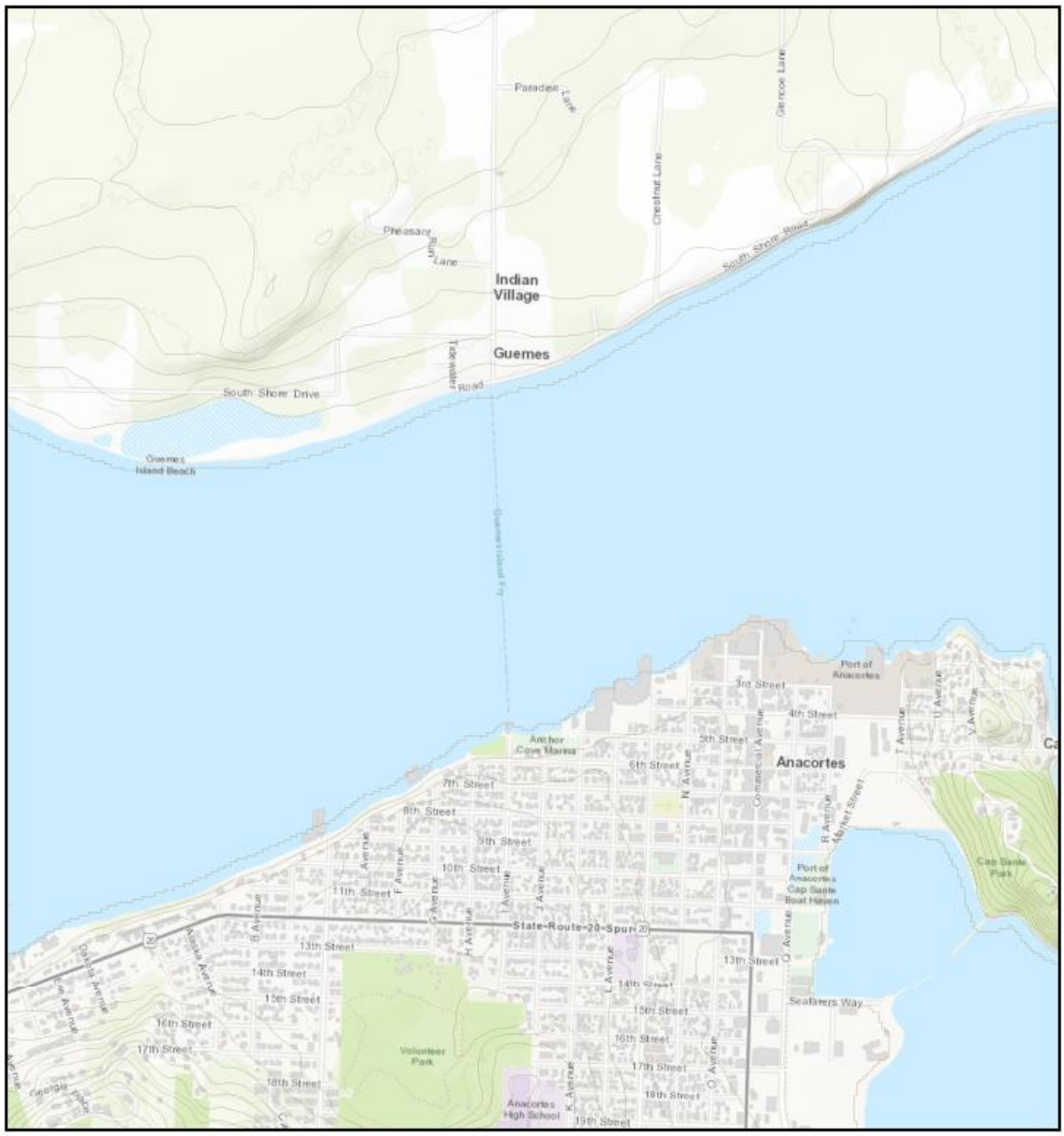
B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site (circle one): Flat, rolling, hilly, steep slopes, mountainous, other.....

Primary Study Area: Generally flat. See topographic map in Exhibit 25.

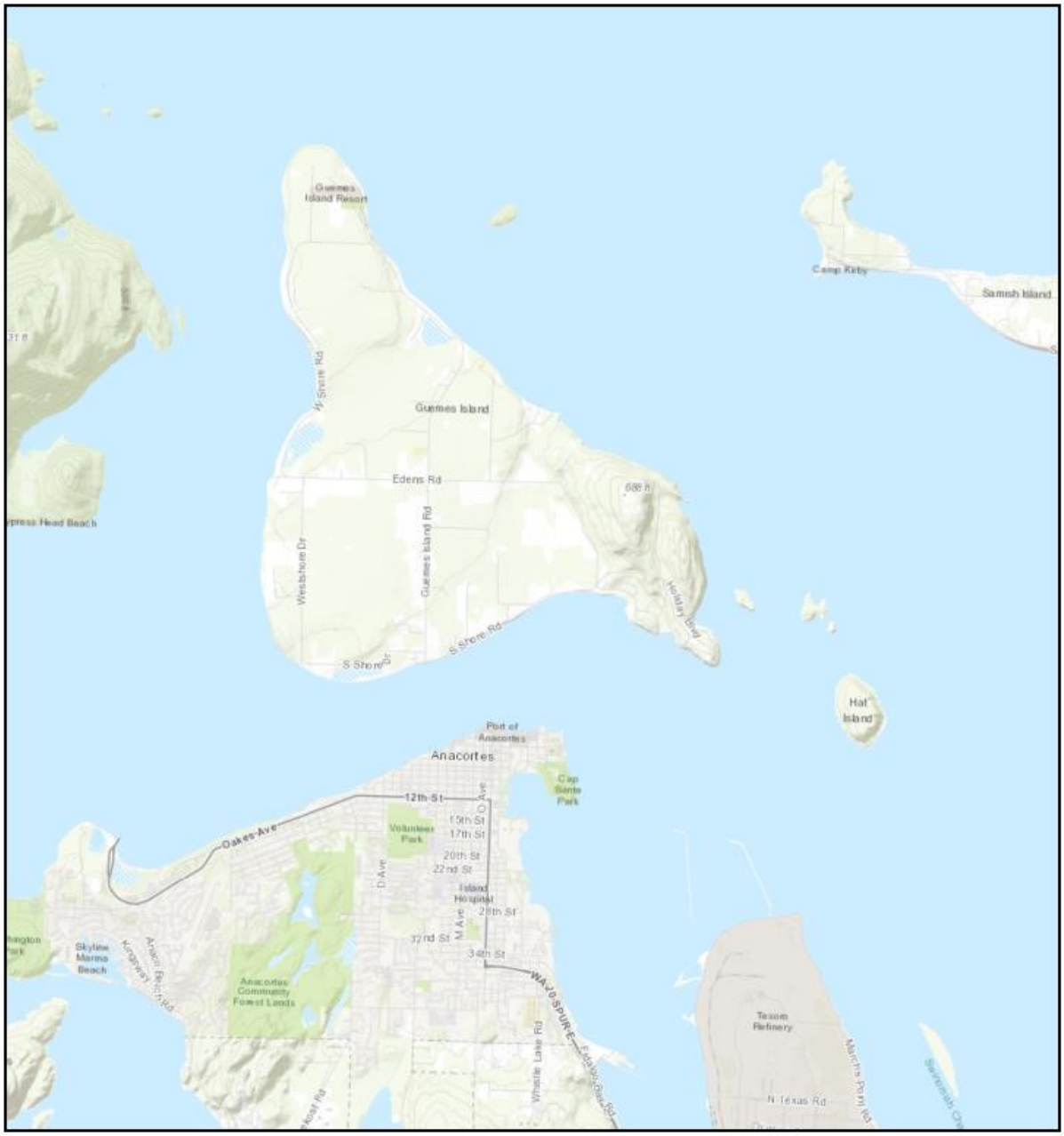
Exhibit 25. Primary Study Area: Topographic Map



Source: Skagit County IMAP 2018

Secondary Study Area: Guemes Island contains a range of topography from flat plain to rolling headlands and shoreline bluffs. (Skagit County, 2010) *See topographic map in Exhibit 26.*

Exhibit 26. Secondary Study Area Topographic Map



Source: Skagit County IMAP 2018

b. What is the steepest slope on the site (approximate percent slope)?

Primary Study Area: The steepest slope on ferry terminal property is 12%. (Skagit County, 2008)

Secondary Study Area: Most of the island is relatively flat. However, there are some steep marine bluffs that exceed 40% slope along portions of the southern, western, and northern shorelines. A few very small areas of the rocky headlands in the eastern part of the island exceed 75% slope. (Skagit County, 2010)

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

Primary Study Area: No lands are designated of long-term commercial significance, and there are no prime farmland soils. Soils consist of Clallam gravelly loam on the Guemes terminal side and Clallam-Urban Land complex on the Anacortes terminal side. See Exhibit 27

Secondary Study Area: There are no prime farmland soils on the island. Soils are characterized as primarily sandy and clayey. (Skagit County, 2010) *No lands are designated of long-term commercial significance for agriculture.*

Exhibit 27. Primary Study Area Soils

Source: NRCS 2018, BERK CONSULTING 2018

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

Primary Study Area: No – there are no indications of unstable soils in proximity to the ferry terminal locations. (Skagit County, 2008)

Secondary Study Area: Unstable or geologically hazardous soils in the area are very limited (most prevalent in unstable feeder bluffs, especially along portions of the south shore). (Skagit County, 2010)

Under either study area, development within geologically hazardous areas would be subject to County or City critical areas regulations.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

Primary Study Area: The proposed changes to the ferry terminals to accommodate the new ferry are not anticipated to require filling, excavation, or grading as the work would occur in the developed footprint of the terminal locations. At this conceptual stage of planning, the in-water work is anticipated to avoid dredging.

Secondary Study Area: No change is proposed to development allowances or regulations. Future development allowed under County land use designations and zoning could result in filling, excavation, or grading and would be subject to County regulations and permit review and requirements.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Primary Study Area: Ferry terminal changes are anticipated to occur within the same footprint as the existing terminal.

Secondary Study Area: No change is proposed to development allowances or regulations. Future development allowed under County land use designations and zoning could result in soil disturbance that could result in erosion.

Under either study area, County or City building and construction codes, stormwater management requirements, and other standards would limit the potential for erosion.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

Primary Study Area: Not applicable. The terminal work is anticipated to occur within the existing developed impervious area of the dock and parking areas.

Secondary Study Area: No change is proposed to development allowances or regulations. Future development allowed under County land use designations and zoning districts would be subject to County zoning standards for building size, landscaping, etc.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

All study areas: County and City codes and standards for building, construction, stormwater management, geologic hazards/critical areas would apply.

2. Air

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.

Primary Study Area: During ferry terminal construction, there may be emissions from construction equipment or vehicles. Preparation of a construction management plan can identify opportunities to minimize equipment or vehicle idling to reduce emissions. During operation under either the Proposal or Reduced Ferry Size Alternative, the ferry replacement vessel is anticipated to reduce air pollution over the No Action Alternative. Following is the analysis included in the Transportation System Assessment regarding the Proposal (Glosten, 2017)

> *Air pollution is a concern to the future stakeholders of a replacement Guemes Island ferry. Diesel particulate matter (DPM) was used as a proxy for local vessel air emissions as it presents greater localized health risks than other diesel exhaust pollutants such as nitrogen oxides (NOx) and sulfur oxides (SOx). The tradeoffs of DPM emissions from different propulsion systems are discussed in the Concept Design Report (Reference 1), a summary of which is presented in Table 6.*

Transportation System Assessment Table 6 Engine diesel particulate matter (DPM) emissions, annually

	Gear Diesel	Diesel Electric	Series Hybrid	All-Electric	Plug-in Hybrid
Engine DPM - 1000hp (g/bkWh)	0.04	-	-	-	-
Generator DPM - 550 kW (g/bkWh)	-	0.27	0.27	-	0.27
Generator DPM - 66 kW (g/bkWh)	0.27	-	-	-	-
Total DPM (kg/yr)	107.5	339.6	124.7	-	5.6

Secondary Study Area: The Proposal and Reduced Ferry Size Alternative would not change growth allowances on the island. Future development allowed under current regulations could result in wood smoke, blown dust and automobile exhaust. There are no industrial activities on the island that emit significant air emissions. (Skagit County, 2010)

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

The March Point refineries (located across the Guemes Channel and Padilla Bay) emit air emissions and odors that can adversely affect the island's air quality, especially in winter. (Skagit County, 2010)

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

Primary Study Area: At the time of ferry terminal construction, require implementation of a construction management plan designed to reduce emissions from construction activities including vehicles and equipment.

Secondary Study Area: The Northwest Clean Air Agency enforcement of burn bans on wood heating, and state outdoor burning and agricultural burning rules, would help reduce potential impacts.

3. Water

a. Surface:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

Primary Study Area: The terminals lie in the marine nearshore of Guemes Channel. The route itself crosses Guemes Channel near its narrowest point, and is approximately 0.5 nm in length. Water depth is at least 60 ft. for the majority of the route, and at least 14 ft. at each terminal. (Glosten, 2017)

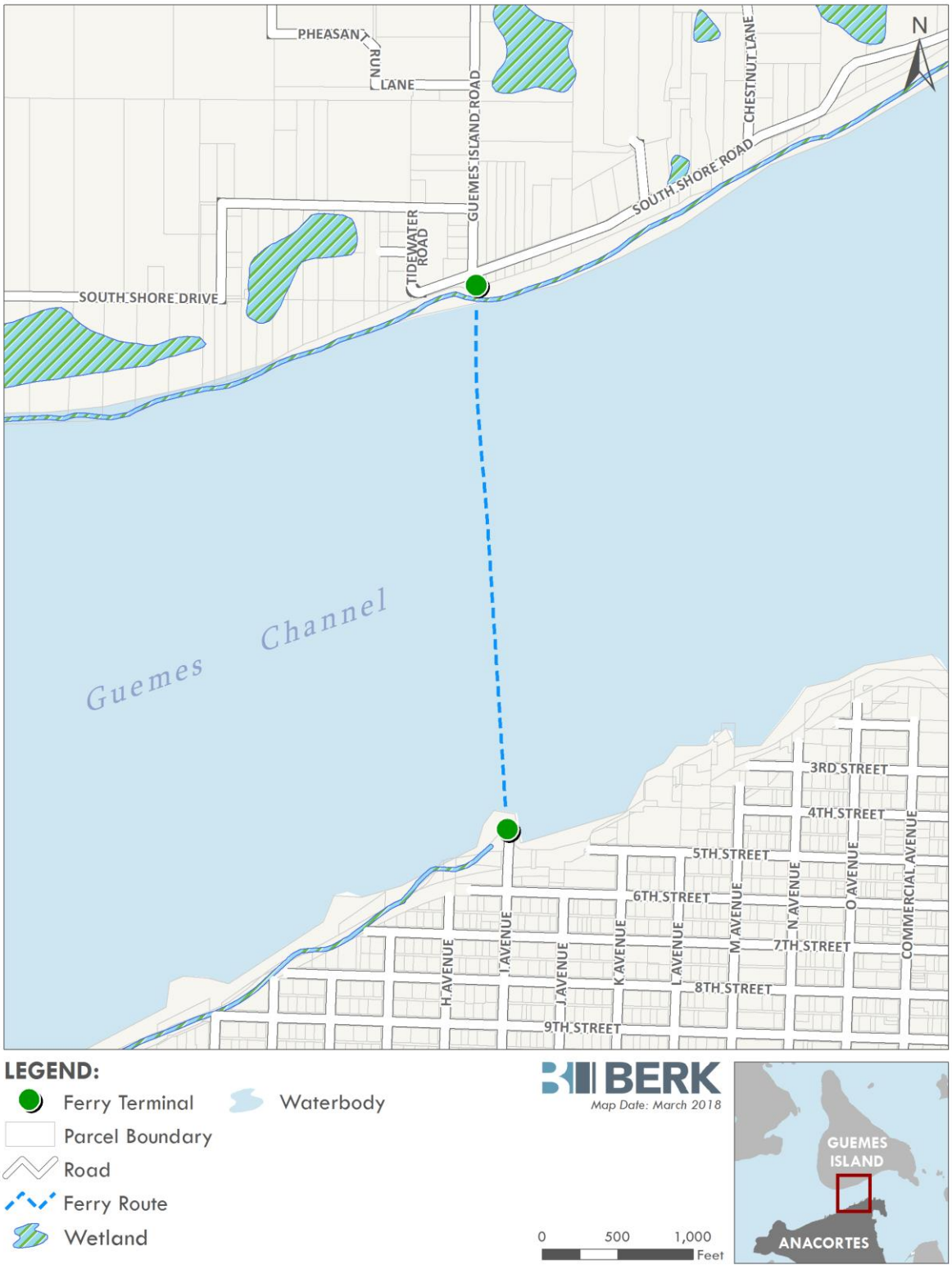
Based on a 2015 Biological Evaluation prepared for a breakwater section replacement, wetlands in the vicinity of the terminals and on southern Guemes Island have been characterized:

> *The National Wetlands Inventory shows a freshwater emergent and freshwater forested/shrub wetland approximately 0.6 miles east of the project site near Cap Sante marina, and a freshwater emergent and freshwater forested/shrub wetland approximately 0.6 miles south of the project site in Volunteer Park. The next-closest wetlands are freshwater emergent and freshwater forested/shrub wetlands across Guemes Channel on Guemes Island.* (Hart Crowser, 2015)

A map of the channel and upland wetlands is shown following the text below. See Exhibit 28.

Secondary Study Area: Guemes Island is entirely surrounded by the marine waters of Puget Sound. Guemes Island also includes limited wetland areas. An extensive wetland complex is found in the valley near the eastern end of Edens Road. It serves to regulate stormwater runoff through seasonal Cayou Creek into the Guemes Channel. Other wetlands include Veal Pond just north of the western end of Edens Road and the wetland at North Beach. (Skagit County, 2010)

Exhibit 28. Primary Study Area: Mapped Wetlands and Waterbodies



Source: U.S. Fish & Wildlife Service, National Wetlands Inventory 2017; BERK Consulting 2018

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

Primary Study Area: Within and over the Guemes Channel, there may be changes to wing walls, dolphin fender heights, and the transfer span accommodate the new ferry and to facilitate concurrent passenger and auto loading, and to add a new electric power supply. Plans have not been drafted but are conceptually described in the Concept Design Report for the Guemes Ferry Replacement. (Glosten, 2017)

Secondary Study Area: Future growth and development would occur under present land use designations and zoning, and the Shoreline Master Program in place at the time of the application. If in-water work is proposed it would be designed to meet applicable codes and standards and required permits.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

Primary Study Area: Fill and dredging are not anticipated as part of the minor ferry terminal changes. As design progresses, if there is disturbance, appropriate federal, state, and local permits would be obtained and impacts minimized.

Secondary Study Area: Future growth and development would occur under present land use designations and zoning, and the Shoreline Master Program in place at the time of the application. If in-water work is proposed it would be designed to meet applicable codes and standards and required permits.

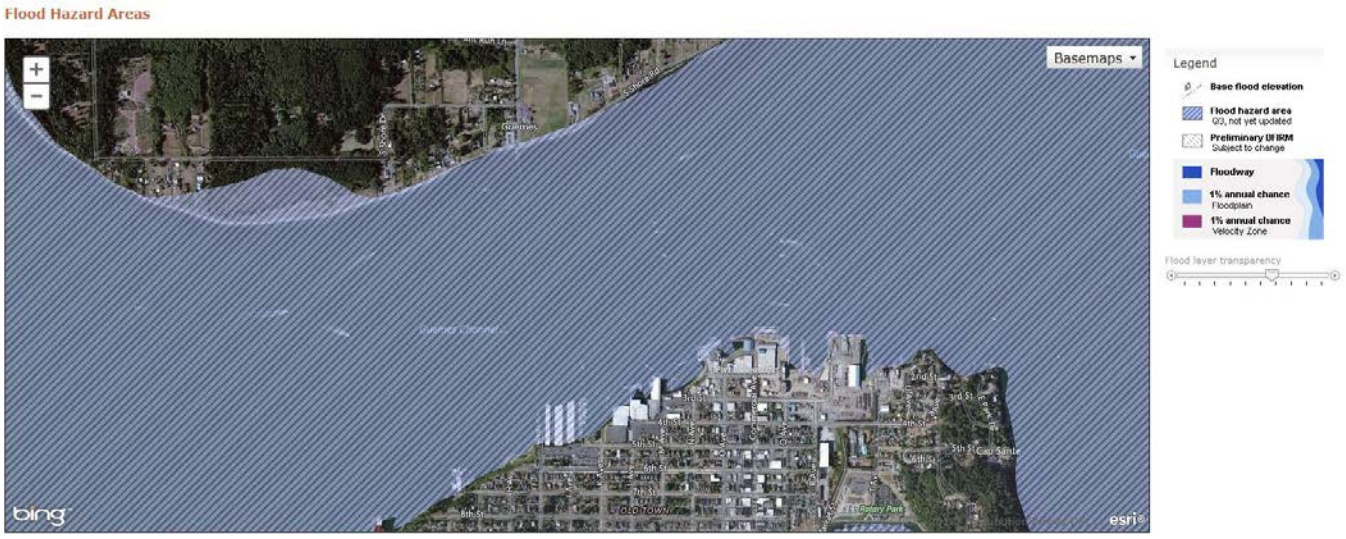
4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

Not Applicable.

5) Does the proposal lie within a 100-year flood plain? If so, note location on the site plan.

Primary Study Area: The Guemes Channel is considered in a flood hazard area based on the Washington State Coastal Atlas Map. See Exhibit 29.

Exhibit 29. Flood Hazard Areas Coastal Atlas Map



Source: Washington State Department of Ecology 2018

Secondary Study Area: See above regarding the Guemes Channel. Portions of the areas west of Veal Pond and the North Beach area are susceptible to coastal flooding from wave action during winter storm events, especially when combined with high tides. (Skagit County, 2010)

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

Primary Study Area: There is a potential for discharge of fuel or waste, but risk is minimized based on standard operating procedures for maintenance currently; potential impacts would be further minimized with the Proposal's use of electric power and some of the other propulsion options that would reduce use of diesel fuel: (Glosten, 2017)

- *Refueling: The existing ferry is refueled by truck every two weeks during the midday lunch break. The fuel truck drives onboard M/V Guemes and usually transfers between 2,000 and 2,500 gallons of diesel fuel. There are no dock-side refueling options at the Anacortes or Guemes Island terminals. If the Proposal is implemented with all-electric power, this would minimize local need for fossil fuel transfer at the shoreline.*
- *Waste Removal: The Anacortes and Guemes Island terminals are not outfitted with connections for offloading sewage, waste oil, and oily water. Waste oil and oily water are pumped out via a vacuum pump out truck when required. Future sewage pump-out, if required for the replacement vessel, could be accommodated via vacuum pump-out truck. The existing waste removal operations are anticipated to be adequate for the replacement ferry.*

Secondary Study Area: Not applicable. No specific projects are proposed. Future development would meet federal, state, and local standards for waste handling and water quality.

b. Ground:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well? Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

Primary Study Area: Not applicable.

Secondary Study Area: No changes are proposed to the Guemes Island Subarea Plan or countywide Comprehensive Plan or code. Future development allowed under current land use designations and zoning would be subject to the County's groundwater policies and aquifer protection codes that would reduce potential impacts of increased groundwater withdrawal.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals…; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

Primary Study Area: Not applicable. No change to wastewater facilities at the terminals are proposed.

Secondary Study Area: Same as B.1.

c. Water runoff (including stormwater):

1) Describe the source of runoff (including stormwater) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

Primary Study Area: Current impervious areas at the terminals are a source of potential runoff. No changes to the footprint of impervious area is proposed with the terminal improvement concepts.

Secondary Study Area: Where new impervious area is created with new homes, driveways, and roads, these could result in runoff; however, County zoning and stormwater standards would apply.

2) Could waste materials enter ground or surface waters? If so, generally describe.

Primary Study Area: See 3.a.6), focused on surface water. Groundwater is not anticipated to be affected at Ferry Terminals.

Secondary Study Area: See 3.a.6) and 3.b.1).

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

Primary Study Area: Changes to drainage patterns are not anticipated since the terminal work would be within the current footprint of development.

Secondary Study Area: See 3.c.1).

d. Proposed measures to reduce or control surface, ground, runoff water, and drainage pattern impacts, if any:

Regarding indirect growth in the Secondary Study Area, several Guemes Subarea Plan policies have been implemented with Skagit County Code requirements to protect the sole source aquifer:

- *Limitation on density bonuses in CaRDs: There shall be no density bonus for CaRD developments in areas designated as a "sole source aquifer," except where the source of water is from a public water system whose source is outside the designated area or from an approved alternative water system pursuant to Chapter 12.48 SCC.*
- *Prohibition of Accessory Dwelling Units (ADUs) if water source exceeds certain standards for chlorides: SCC 14.16.360.*
- *Seawater Intrusion Area Regulations: SCC 14.24.380.*
- *Adopt minimum standards for private reverse osmosis systems: SCC 14.24.380.*

4. Plants

a. Check the types of vegetation found on the site:

— Deciduous tree: Alder, maple, aspen, other

— Evergreen tree: Fir, cedar, pine, other

— Shrubs

— Grass

— Pasture

— Crop or grain

— Orchards, vineyards or other permanent crops.

— Wet soil plants: Cattail, buttercup, bullrush, skunk cabbage, other

— Water plants: Water lily, eelgrass, milfoil, other

— Other types of vegetation

Primary Study Area: There is minimal vegetation at the Anacortes or Guemes terminals. Beaches within the project area are void of vegetation; however, eelgrass is present within the intertidal zone of the aquatic portion the two terminals. (Skagit County Public Works Department, 2010)

Abutting the Anacortes terminal, Guemes Ferry Kiwanis Park has undisturbed grass meadow and shrub habitat. Vegetation within the park consists of Himalayan blackberry (Rubus armeniacus), orchard grass (Dactylis glomenata), American dune grass (Elymus mollis), willows (Salix sp.), oceanspray (Holodiscus discolor), California wax myrtle (Morella californica), salmonberry (Rubus spectabilis), Nootka rose (Rosa nutkana), and hardhack (Spiraea douglasii). (Hart Crowser, 2015)

The backshore west of the ferry terminal is a natural beach with large wood accumulations. (Hart Crowser, 2015)

See 3.a.1) regarding wetlands.

Secondary Study Area: All categories of vegetation are found on the island. (Skagit County, 2010)

b. What kind and amount of vegetation will be removed or altered?

Primary Study Area: In upland areas, terminal work would be within the current footprint of development and changes to vegetation are not anticipated. In-water work may occur in the vicinity of eelgrass beds. It is anticipated that a biological assessment will be prepared following terminal design at a 30% stage. Likely conditions of project approval would include eelgrass avoidance and an in-water work window.

Secondary Study Area: No changes are proposed to the Guemes Island Subarea Plan or countywide Comprehensive Plan or code. Future development allowed under current land use designations and zoning would be subject to the County's landscaping, critical areas and shoreline management policies and codes that would reduce potential impacts to plants and animals.

c. List threatened and endangered species known to be on or near the site.

Threatened and endangered upland plant species are not known to be within the Primary and Secondary Study Areas. Some plant species such as eelgrass support listed fish species. See Section B.5.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Application of Chapter 14.24 Critical Areas Ordinance and SCC 14.16.830 Landscaping requirements in unincorporated areas. Application of similar ordinances would occur in the City of Anacortes.

e. List all noxious weeds and invasive species known to be on or near the site.

Primary Study Area: Specific noxious and invasive species have not been documented in prior biological assessments at the terminals.

Secondary Study Area: The Guemes Island Subarea Plan adopted in 2010 includes a description of noxious weeds:

The following state-designated noxious weeds are of interest on Guemes Island because they have a limited distribution on the island and can still be eradicated: spartina, tansy ragwort, hawkweed, and purple loosestrife. The loosestrife has been successfully limited by biological controls. Spartina was found in one beach location. Other species, such as poison hemlock and Scotch broom, are more widely distributed on the island.

The Skagit County Noxious Weed Control Board provides lists of noxious weeds and helps enforce state laws regarding control of such species.

5. Animals

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site. Examples include:

Birds: Hawk, heron, eagle, songbirds, other:

Mammals: Deer, bear, elk, beaver, other:

Fish: Bass, salmon, trout, herring, shellfish, other:

Primary Study Area: Birds, mammals, and fish are present in the vicinity of the terminals in upland and aquatic areas of the Guemes Channel. Priority Habitats and Species that are mapped by the Washington State Department of Fish and Wildlife include:

- *Pinto abalone (Haliotis kamtschatkana)*
- *Dungeness Crab (Metacarcinus magister or Cancer magister)*
- *Yuma myotis bats (Myotis yumanensis)*

A map of priority habitat and species location follows this text. See Exhibit 30.

Secondary Study Area: All general categories of birds, mammals and fish were identified as occurring on the island. (Skagit County, 2010)

Exhibit 30. Priority Habitats and Species Map – Primary Study Area

Source: Washington State Department of Fish and Wildlife 2018; BERK Consulting 2018

b. List any threatened and endangered species known to be on or near the site.

Primary Study Area: Within the vicinity of the terminals and within the Guemes Channel, several federally listed species are present or have critical habitat: Puget Sound Chinook salmon, Puget Sound steelhead trout, Coastal-Puget Sound bull trout, bocaccio, canary rockfish, yelloweye rockfish, humpback whale, southern resident killer whale, and marbled murrelet (Hart Crowser, 2015)

Secondary Study Area: Bald eagles nest on the island. Juvenile Chinook salmon reside in the island's extensive eel grass beds. Local bird watchers indicate that several species, including the Brandt's comorant, merlin, pileated woodpecker, Vaux's swift and western grebes are present on the island and are listed as State Candidate Species. (Skagit County, 2010)

All study areas: See also Attachment B for a list of State Priority Habitats and Species including State Species of Concern and Federal Status for Skagit County.

c. Is the site part of a migration route? If so, explain.

Both Study Areas: Salmon migrate throughout Puget Sound including the waters immediately adjacent to Guemes Island. (Skagit County, 2010) *Humpback whales may be present in the aquatic zone of the action area during the spring and Summer.* (Hart Crowser, 2015) *As is the case with nearly all of the lowland areas of Western Washington, the ferry terminals and crossing lie within the Pacific Flyway.* (Skagit County, 2008)

d. Proposed measures to preserve or enhance wildlife, if any:

Primary Study Area: Ferry Terminals modifications would be subject to federal, state, and local laws protecting listed species, as well as protecting fish and wildlife habitat conservation areas. The Proposal or Reduced Ferry Size Alternative include a design to minimize excess underwater noise that could benefit marine wildlife: (Glosten, 2017)

> *Underwater noise emitted by ferries and other marine vessels has received increased attention in recent years due growing scientific evidence of the harm that underwater noise can cause to marine wildlife. Effort should therefore be made to minimize the underwater radiated noise of the replacement ferry, to the extent possible.*
>
> Most underwater noise emitted by marine vessels is from propellers, especially from the cavitation that can occur with highly loaded propellers and the pressure pulses from passing propeller blades. Propellers and the associated thruster components can be designed to minimize excess noise. This approach is recommended for the replacement ferry.

Secondary Study Area: The County's Critical Areas Regulations apply to new development on the island, and are designed to protect fish and wildlife habitat conservation areas. Future activities would also be subject to federal and state laws protecting listed species.

e. List any invasive animal species known to be on or near the site.

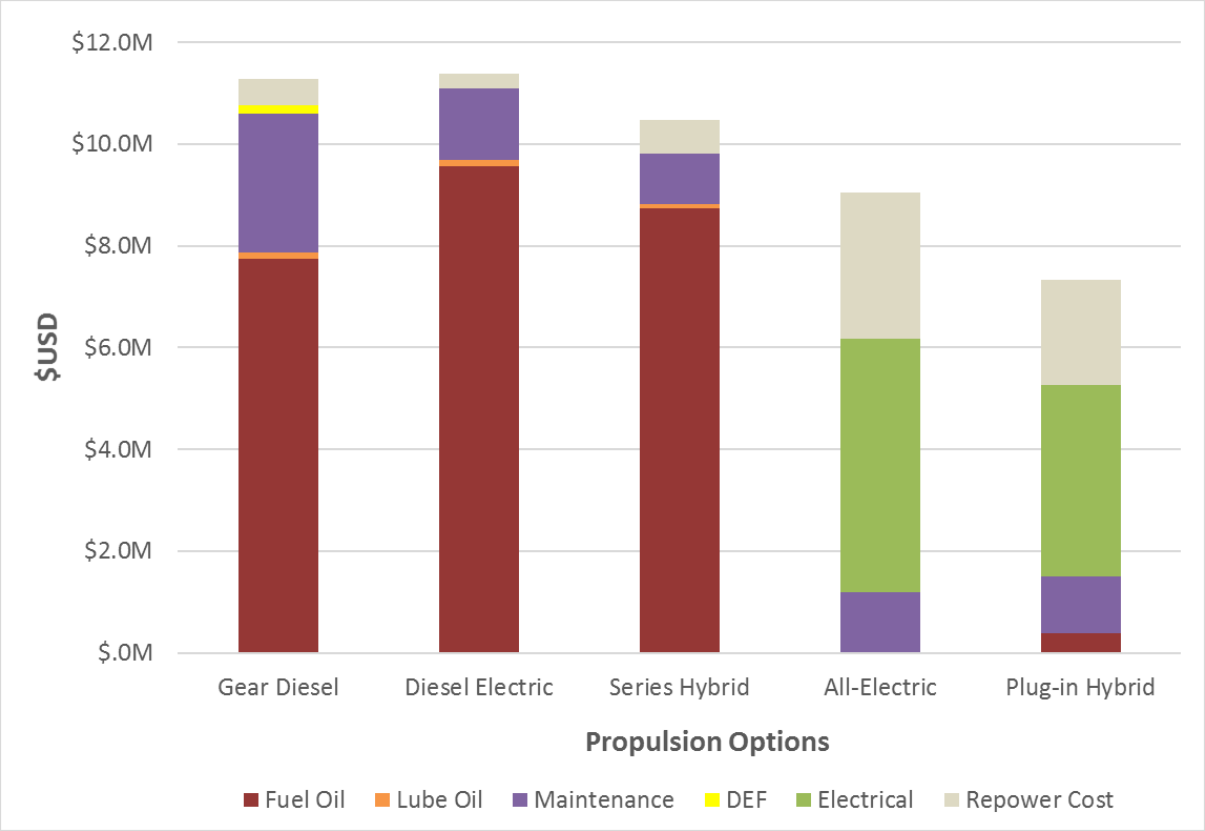
In general, Washington State Department of Fish and Wildlife indicates several examples of invasive species in inland marine waters of Puget Sound, including tunicates, oyster drills, varnish or dark mahogany clams, and cordgrasses. (Washington State Department of Fish and Wildlife, 2018)

6. Energy and natural resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Primary Study Area: The ferry replacement propulsion system would rely on electric power. Other propulsion systems are proposed that could rely on diesel or hybrid power. The relative operating costs for all-electric and plug-in hybrid shows reduced fossil fuel use: See Exhibit 31.

Exhibit 31. Operating Cost – Propulsion System



Source: (Glosten, 2017)

Description:

- *Consumables: Annual consumption of Fuel, DEF, Electrical, and Lube Oil*
- *Maintenance: Includes oil changes to engine overhauls*
- *Repower: Mid-life engine repower; 8-year battery replacement*

Secondary Study Area: No changes are proposed to County plans or codes. Development would occur under current allowances and may use electric, wood, or solar sources, largely for heating.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

Not applicable.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

Primary Study Area: See 6a.

Secondary Study Area: Residences and other new construction built under County plans and zoning are subject to the County's adopted International Energy Conservation Code, 2015 Edition.

7. Environmental health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

Primary Study Area: With an all-electric design, with fuel completely removed from the vessel, there is no risk associated with bunkering or transferring fuel. (Glosten, 2017) *A plug-in hybrid provides diesel generator sets for use during high energy demand operation, but less diesel fuel would be used and would reduce risk over other diesel propulsion systems.*

Secondary Study Area: Not applicable.

1) Describe any known or possible contamination at the site from present or past uses.

Primary Study Area: A review of Confirmed and Suspected Contaminated Sites Data maintained by the Washington Department of Ecology does not include the terminals.

Secondary Study Area: Not applicable.

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

All Study Areas: Not applicable. Reviewing the Skagit County Pipeline Transmission Systems Map (Skagit County iMap), there are no mapped natural gas or fuel pipelines.

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

Primary Study Area: See 3.a.6), Any use of toxic or hazardous materials would require conformance with county, state, and federal regulations.

Secondary Study Area: Not applicable.

4) Describe special emergency services that might be required.

Primary Study Area: The existing Guemes Island ferry provides a critical emergency service link to the mainland for the residents and visitors of Guemes Island. Diesel-power propulsion would be able to continue the same readiness. If the replacement vessel is all-electric, an on-shore generator and battery bank could be installed to allow for rapid charging of the vessel even in the event of a power grid failure. Alternatively, an onboard generator(s) could be installed to provide propulsion power. (Glosten, 2017)

Secondary Study Area: Additional growth may occur under current plans and codes. Island residents may require emergency services provided by the proposed ferry replacement.

5) Proposed measures to reduce or control environmental health hazards, if any:

No known contaminants are in the Primary Study Area. If there are such contaminants found, the State Model Toxics Control Act (MTCA) sets standards for cleanup of lower levels of contaminants that are incorporated into new development and redevelopment parcels noted to have contamination potential. The County and City of Anacortes apply relevant standards regarding hazardous materials handling in the International Fire Code and Zoning Codes.

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

Primary Study Area: Anacortes Terminal – The existing noise environment in the project action area is characteristic of an urban setting surrounding a ferry terminal. The ferry terminal has vehicles embarking and disembarking the ferry approximately every 30 minutes until 8:30 p.m. Sunday through Thursday and until 11 p.m. Friday and Saturday. In addition, since the Guemes Channel is a marine waterway that supports industrial and commercial shipping, there is noise from shipping. The Guemes Channel has continuous water traffic, including recreational traffic from the adjacent marina. (Hart Crowser, 2015)

Under current ferry operational rules, the ferry's slip whistle is not used except at the Anacortes terminal where vessel traffic warrants its use. (Skagit County, 2008)

Guemes Terminal: The Guemes Island side of the project area is in a busy, congested area of the island. The existing noise environment in the area is characteristic of congested rural setting with the parking lot, a general store, and the two main roads of the island. (Skagit County Public Works Department, 2010)

Secondary Study Area: Noise sources on the Island include vehicles on roadways.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

Primary Study Area: Construction: Ferry terminal modifications would result in noise during construction.

Operations: Noise is expected to be reduced comparing the Proposal or Reduced Ferry Size Alternative to the No Action Alternative:

> *There are no city ordinances limiting the noise produced by the replacement ferry. However, it was reported to Glosten that noise complaints have been reported. It is recommended that the noise produced by the replacement ferry be reduced from the current level for this reason. It is reasonable to expect that the replacement ferry can meet this goal, given the likelihood that the engines will be placed below the main deck (the main engines of M/V Guemes are located on the main deck), and that new engines can be outfitted with higher attenuation (i.e. quieter) silencers.* (Glosten, 2017)
>
> *Underwater noise emitted by ferries and other marine vessels has received increased attention in recent years due growing scientific evidence of the harm that underwater noise can cause to marine wildlife. Effort should therefore be made to minimize the underwater radiated noise of the replacement ferry, to the extent possible.* (Glosten, 2017)
>
> *Most underwater noise emitted by marine vessels is from propellers, especially from the cavitation that can occur with highly loaded propellers and the pressure pulses from passing propeller blades. Propellers and the associated thruster components can be designed to minimize excess noise. This approach is recommended for the replacement ferry.* (Glosten, 2017)
>
> *With no diesel engine noise, vessel operation is much quieter.* (Glosten, 2017)

Secondary Study Area: The project will not change the level of growth planned under the Comprehensive Plan or zoning. New growth would contribute to temporary construction noise and vehicle use.

3) Proposed measures to reduce or control noise impacts, if any:

Primary Study Area: The Proposal design would reduce noise Per 7.b.2).

Additionally, the Proposal design studies indicated the following airborne noise limitations are proposed for when the vessel is operating at full speed with all auxiliaries operating, including HVAC systems:

- *75 dB(A) at any location on exterior decks accessible to passengers.*

- *65 dB(A) at any location within the enclosed passenger spaces.*
- *65 dB(A) within the Pilothouse(s) and other enclosed crew-only spaces above the Main Deck (mechanical rooms not included).*

Secondary Study Area: Skagit County applies Chapter 9.50 Noise Control. Anacortes likewise applies AMC 17.54.010 Noise

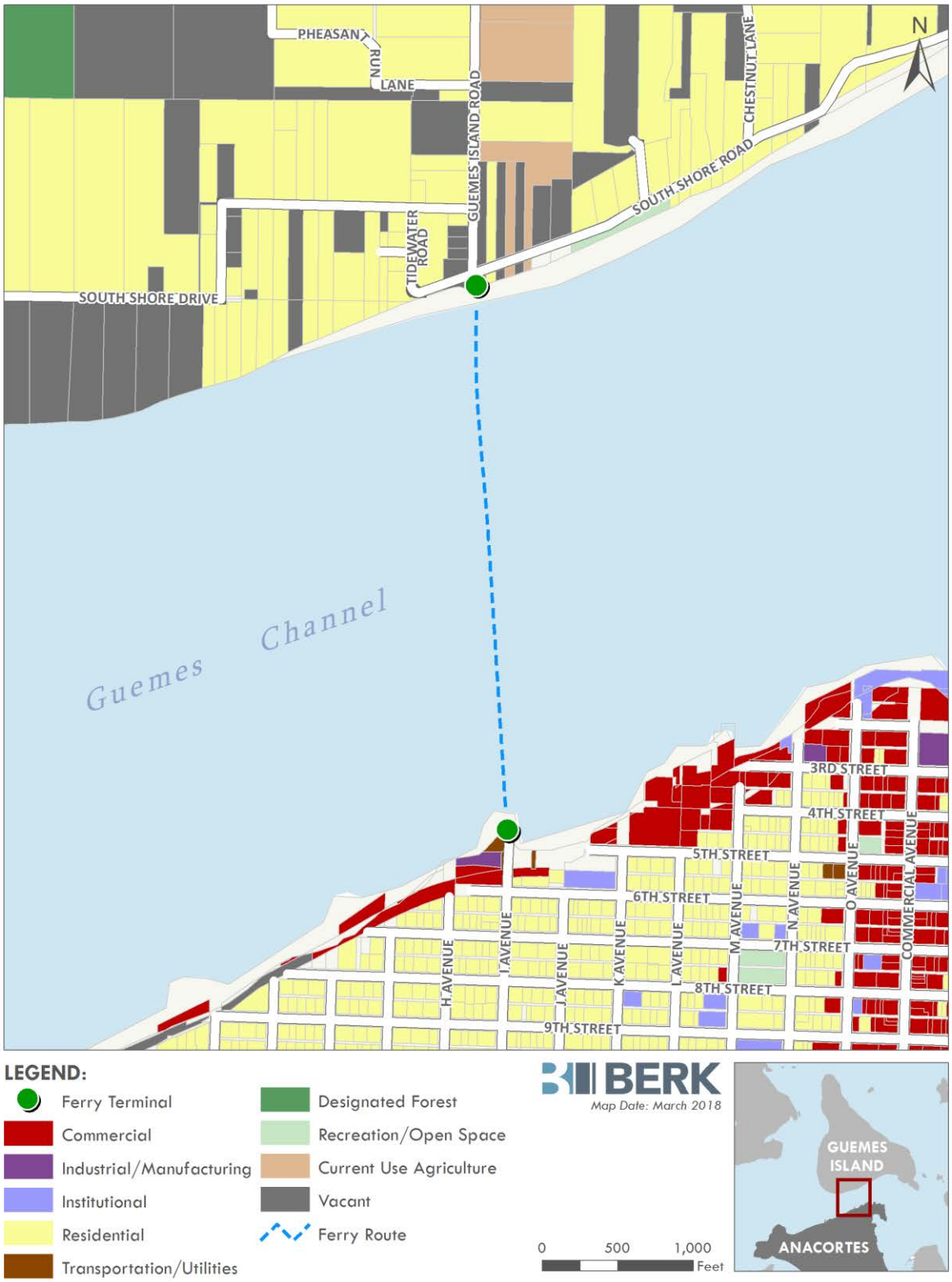
8. Land and shoreline use

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.

Primary Study Area: The Anacortes terminal is in the vicinity of historic Anacortes that contains urban uses, including a residential, commercial, industrial, and institutional uses. The Guemes terminal is near residential, agricultural, and vacant lands. See Exhibit 32 following this text.

Secondary Study Area: The island is generally characterized by rural residential, isolated rural commercial uses and small-scale agriculture activities. (Skagit County, 2010)

Exhibit 32. Current Land Use – Primary Study Area



Source: Skagit County Assessor 2018; BERK Consulting 2018

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

Primary Study Area: Not applicable. Both terminals are on developed sites and do not abut farmlands or forestlands. On Guemes Island some lands near the terminal are in current use agricultural taxation, but no such lands would be converted to non-agricultural uses. Terminal work would occur in the current footprint of developed area.

Secondary Study Area: Portions of the island are used for small-scale hobby farming and animal husbandry. (Skagit County, 2010) *No changes to land use or zoning allowances would be made, and no impacts are anticipated.*

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:

All Study Areas: Not applicable.

c. Describe any structures on the site.

Primary Study Area: Ferry terminals at Anacortes and Guemes Islands.

Secondary Study Area: Houses, barns, small-scale stores and cottage industries. (Skagit County, 2010)

d. Will any structures be demolished? If so, what?

Primary Study Area: No structures are proposed for demolishment at the terminals. The M/V Guemes would be retired.

Secondary Study Area: Not applicable.

e. What is the current zoning classification of the site?

Primary Study Area: The zoning at the Anacortes terminal is Light Manufacturing. The zoning at the Guemes terminal is Rural Intermediate. See Exhibit 34.

Secondary Study Area: Most of the Island is zoned as Rural Reserve. No changes to zoning are proposed. See Exhibit 33.

Exhibit 33. Guemes Island Zoning Acres

Zone	Total Assessor Acres
Rural Intermediate	776
Rural Reserve	3,871
Rural Resource	492
Totals	**5,139**

Source: Skagit County Assessor 2018, BERK Consulting 2018

Exhibit 34. Current Zoning – Primary Study Area

Source: Skagit County, Anacortes, 2018: BERK Consulting 2018

f. What is the current comprehensive plan designation of the site?

Primary Study Area: The Anacortes terminal is designated Light Manufacturing. Guemes terminal is designated Rural Intermediate.

Secondary Study Area: Same as "e".

g. If applicable, what is the current shoreline master program designation of the site?

Primary Study Area: The City's Shoreline Master Program applies to the Anacortes terminal, and the County's Shoreline Master Program to the Guemes terminal. Designations and permit allowances are listed below:

- *Anacortes terminal: Urban Maritime and Aquatic Shoreline Environments: Transportation Facilities Water-Dependent (e.g. ferry terminal) Permitted in each environment.*
- *Guemes terminal: In current SMP ferry terminals appear allowed in all environments except Natural. SMP Update has not yet been adopted.*

Secondary Study Area: Existing shoreline environment designations include Aquatic, Natural, Rural and Rural Residential.

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.

Primary Study Area: The Guemes Channel is regulated as a fish and wildlife habitat conservation area. See Sections B.3, B.4, and B.5.

Secondary Study Area: Critical areas include wetlands, frequently flooded areas, critical aquifer recharge areas, geologically hazardous areas and fish and wildlife habitat conservation areas.

i. Approximately how many people would reside or work in the completed project?

Primary Study Area: No change is anticipated to ferry staffing with the replacement ferry.

Secondary Study Area: Not applicable. Future growth could occur consistent with the Comprehensive Plan and zoning.

j. Approximately how many people would the completed project displace?

Not applicable.

k. Proposed measures to avoid or reduce displacement impacts, if any:

Not applicable.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

Application of shoreline and zoning standards.

m. Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any:

Not applicable.

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

Primary Study Area: Not applicable.

Secondary Study Area: Based on the current land use designations and zoning, growth could occur. About 443-779 dwellings are possible. See the Guemes Ferry Replacement Growth Analysis Technical Memo, March 9, 2018 and Capacity Appendix. (Attachment D)

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

Primary Study Area: Not applicable.

Secondary Study Area: Not applicable.

c. Proposed measures to reduce or control housing impacts, if any:

Not applicable.

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

Primary Study Area: A three tier deckhouse is proposed on the replacement vessel. Small changes in wing wall heights may be implemented but would be imperceptible to ferry passengers or from nearby properties. A shore power structure similar to a cargo container would be placed on the existing terminal. It would not be incompatible with the working waterfront character of the terminal.

Secondary Study Area: Not applicable. New development would follow County zoning standards for height and bulk.

b. What views in the immediate vicinity would be altered or obstructed?

Primary Study Area: The ferry replacement and terminal improvements would not alter views. A ferry currently operates. The overall extent of the terminal and improvements would be similar.

Secondary Study Area: Not applicable. New development would follow County zoning standards for height and bulk.

c. Proposed measures to reduce or control aesthetic impacts, if any:

Application of County and City Comprehensive Plan policies, Shoreline Master Programs, and zoning standards for height, bulk, landscaping, and setbacks.

11. Light and glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

Primary Study Area: Existing ferry safety lights and vehicle lights will continue to be needed during hours of darkness. (Skagit County, 2008) *The ferry replacement would operate during the day and night, similar to the current vessel and no significant difference in light or glare is anticipated. Terminal improvements are not anticipated to change the number or location of lighting sources.*

Secondary Study Area: No change to plans or codes are proposed. Future growth could add structures and typical lighting sources for residential uses.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

Primary Study Area: See 11.a regarding similar lighting levels anticipated. No safety hazards or view interference is anticipated.

Secondary Study Area: Not applicable.

c. What existing offsite sources of light or glare may affect your proposal?

None.

d. Proposed measures to reduce or control light and glare impacts, if any:

The City of Anacortes applies standards to shield and direct lighting. (AMC 17.54.030)

Skagit County applies standards requiring full cut off fixtures to direct light from high intensity lamps and away from adjoining properties. (SCC 14.16.840)

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

Primary Study Area: The Kiwanis Waterfront Park abuts the Anacortes ferry terminal.

Secondary Study Area: Schoolhouse Park and Youngs Park are County parks located on the island.

b. Would the proposed project displace any existing recreational uses? If so, describe.

Primary Study Area: No changes to the Kiwanis Park is proposed.

Secondary Study Area: No changes to existing parks are proposed.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

Not applicable. No impacts are identified.

13. Historic and cultural preservation

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers? If so, specifically describe.

Primary Study Area: The ferry to be replaced is about 39 years old and is not anticipated to be subject to federal or state cultural resources laws. There are no designated historic structures at the terminals. The Washington Department of Archaeology and Historic Preservation has a predictive model indicating whether cultural surveys are advised. Both terminals, being located along the water, are considered to have a high risk of cultural resources and a survey is highly advised when there are development applications that could disturb land.

Secondary Study Area: No listed places are found on the island. Historic cemetery, community church and community hall were all originally established in the early 1900's.

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation. This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

None known.

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

When terminal designs are prepared, a review under federal and state cultural resources laws may be needed.

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

Washington State has a number of laws that oversee the protection and proper excavation of archaeological sites (RCW 27.53, WAC 25-48), human remains (RCW 27.44), and historic cemeteries or graves (RCW 68.60). The Governor's Executive Order 05-05 requires state agencies to integrate DAHP, the Governor's Office of Indian Affairs, and concerned tribes into their capital project planning process. This executive order affects any capital construction projects and any land acquisitions for purposes of capital construction not undergoing Section 106 review under the National Historic Preservation Act of 1966.

Under RCW 27.53, DAHP regulates the treatment of archaeological sites on both public and private lands and has the authority to require specific treatment of archaeological resources. All precontact resources or sites are protected, regardless of their significance or eligibility for local, state, or national registers. Historic archaeological resources or sites are protected unless DAHP has made a determination of "not-eligible" for listing on the state and national registers.

14. Transportation

a. Identify public streets and highways serving the site or affected geographic area, and describe proposed access to the existing street system. Show on site plans, if any.

Primary Study Area: 6th Street serves the Anacortes ferry terminal; South Shore Road and Guemes Island Road serve the Guemes Island ferry terminal.

Secondary Study Area: Guemes Island has almost 30 miles of roads. Another 8 miles are private. (Skagit County, 2010)

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?

Primary Study Area: SKAT (Skagit County Public Transit) serves the Anacortes terminal with Route 409.

Secondary Study Area: SKAT serves the Anacortes terminal. SKAT provides a call-in shuttle on the island during the time when the ferry is hauled out. (Skagit Transit, 2017) (Skagit County, 2008)

c. How many additional parking spaces would the completed project or nonproject proposal have? How many would the project or proposal eliminate?

Primary Study Area: No parking changes are proposed.

Secondary Study Area: Not applicable.

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).

Primary Study Area: Not applicable.

Secondary Study Area: Not applicable.

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

The Anacortes and Guemes terminals allow access to ferry transportation.

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?

Primary Study Area: Not applicable. No change to loading areas or parking areas are proposed.

Secondary Study Area: The ferry vessel would be larger in capacity under the Proposal or Reduced Ferry Size Alternative than the current No Action vessel. However, as described in the Environmental Assessment, the ferry size is not anticipated to cause an increase in island growth or traffic trips. The Reduced Ferry Size Alternative would be sized for a mid-point of the planning period and paired with demand management or transit improvements to allow the future vessel to serve to its full life.

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

Not applicable.

h. Proposed measures to reduce or control transportation impacts, if any:

No specific mitigation is required. The County and City prepare multi-modal transportation plans in coordination with the Skagit Council of Governments every six years to address proposed land uses. The plans are designed to address demand and to improve existing facilities to meet community needs. Both the County and City implement concurrency ordinances (see for example Skagit County Code Chapter 14.28) that require the local levels of service be met as growth occurs.

15. Public services

a. Would the project result in an increased need for public services (for example: Fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.

Primary Study Area: Not applicable.

Secondary Study Area: No change in allowed land use or growth are planned. If a smaller boat were implemented and growth rates become higher, added transit would help extend the use of the vessel if ferry service demand required it. This is under consideration with the Reduced Ferry Size Alternative.

b. Proposed measures to reduce or control direct impacts on public services, if any.

Implementation of SKAT service and capital plans, and implementation of County-wide Capital Facilities Plan adopted by Skagit County.

16. Utilities

a. Circle utilities currently available at the site: Electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.

Primary Study Area: All utilities listed are available at the terminals except for natural gas in Anacortes and sewer and natural gas at the Guemes terminal.

Secondary Study Area: Other than natural gas and sanitary sewer service, all of the listed utilities are available within all or some portion of the island. Water is provided by means of private wells or community association wells. (Skagit County, 2010)

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

Primary Study Area: See Section 6 regarding energy.

Secondary Study Area: Other than natural gas and sanitary sewer service, all of the listed utilities are available within all or some portion of the island. Water is provided by means of private wells or community association wells. (Skagit County, 2010)

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature – Applicant: Pat A. Rutz

Date: 4.12.18

Prepared by: Lisa Grueter, AICP, Principal, BERK Consulting

Date: April 10, 2018

D. SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS

(do not use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

Not applicable.

Proposed measures to avoid or reduce such increases are:

Not applicable.

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

Not applicable.

Proposed measures to protect or conserve plants, animals, fish, or marine life are:

Not applicable.

3. How would the proposal be likely to deplete energy or natural resources?

Not applicable.

Proposed measures to protect or conserve energy and natural resources are:

Not applicable.

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, flood plains, or prime farmlands?

Not applicable.

Proposed measures to protect such resources or to avoid or reduce impacts are:

Not applicable.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

Not applicable.

Proposed measures to avoid or reduce shoreline and land use impacts are:

Not applicable.

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

Not applicable.

Proposed measures to reduce or respond to such demand(s) are:

Not applicable.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

Not applicable.

Attachment B: Skagit County Priority Habitat and Species 2017

Available: https://wdfw.wa.gov/publications/00165/

** Important Note **

"These are the species and habitats identified for Skagit County. This list of species and habitats was developed using the distribution maps found in the Priority Habitat and Species (PHS) List (see http://wdfw.wa.gov/conservation/phs/). Species distribution maps depict counties where each priority species is known to occur as well as other counties where habitat primarily associated with the species exists. Two assumptions were made when developing distribution maps for each species:

1) There is a high likelihood a species is present in a county, even if it has not been directly observed, if the habitat with which it is primarily associated exists; 2) Over time, species can naturally change their distribution and move to new counties where usable habitat exists.

Distribution maps in the PHS List were developed using the best information available. As new information becomes available, known distribution for some species may expand or contract. WDFW will periodically review and update the distribution maps in PHS list. "

	Species/ Habitats	**State Status**	**Federal Status**
Habitats	Biodiversity Areas & Corridors		
	Herbaceous Balds		
	Old-Growth/Mature Forest		
	Oregon White Oak Woodlands		
	Riparian		
	Freshwater Wetlands & Fresh Deepwater		
	Instream		
	Puget Sound Nearshore		
	Caves		
	Cliffs		
	Snags and Logs		
	Talus		
Fishes	Pacific Lamprey		
	River Lamprey	Candidate	Species of Concern
	White Sturgeon		
	Pacific Herring	Candidate	
	Longfin Smelt		
	Surfsmelt		

	Species/ Habitats	State Status	Federal Status
	Bull Trout/ Dolly Varden	Candidate *	Threatened *
	Chinook Salmon	Candidate	Threatened (Upper Columbia Spring run is Endangered)
	Chum Salmon	Candidate	Threatened
	Coastal Res./ Searun Cutthroat		Species of Concern
	Coho		Threatened – Lower Columbia Species of Concern – Puget Sound
	Kokanee		
	Pink Salmon		
	Rainbow Trout/ Steelhead/ Inland Redband Trout	Candidate **	Threatened **
	Sockeye Salmon	Candidate	
	Pacific Cod	Candidate	Species of Concern
	Pacific Hake	Candidate	Species of Concern
	Walleye Pollock	Candidate	
	Black Rockfish	Candidate	
	Brown Rockfish	Candidate	
	Canary Rockfish	Candidate	Threatened
	China Rockfish	Candidate	
	Copper Rockfish	Candidate	
	Greenstriped Rockfish	Candidate	
	Quillback Rockfish	Candidate	
	Redstripe Rockfish	Candidate	
	Tiger Rockfish	Candidate	
	Yellowtail Rockfish	Candidate	
	Lingcod		
	Pacific Sand Lance		
	English Sole		
	Rock Sole		
Amphibians	Columbia Spotted Frog	Candidate	
	Oregon Spotted Frog	Endangered	Threatened
	Western Toad	Candidate	

	Species/ Habitats	State Status	Federal Status
Birds	Brandt's Cormorant	Candidate	
	Common Loon	Sensitive	
	Common Murre	Candidate	
	Marbled Murrelet	Threatened	Threatened
	Short-tailed Albatross	Candidate	Endangered
	Western grebe	Candidate	
	W WA nonbreeding concentrations of: Loons, Grebes, Cormorants, Fulmar, Shearwaters, Storm-petrels, Alcids		
	W WA breeding concentrations of: Cormorants, Storm-petrels, Terns, Alcids		
	Great Blue Heron		
	Brant		
	Cavity-nesting ducks: Wood Duck, Barrow's Goldeneye, Common Goldeneye, Bufflehead, Hooded Merganser		
	Western Washington nonbreeding concentrations of: Barrow's Goldeneye, Common Goldeneye, Bufflehead		
	Harlequin Duck		
	Snow Goose		
	Trumpeter Swan		
	Tundra Swan		
	Waterfowl Concentrations		
	Golden Eagle	Candidate	
	Northern Goshawk	Candidate	
	Sooty Grouse		
	W WA nonbreeding concentrations of: Charadriidae, Scolopacidae, Phalaropodidae		
	Band-tailed Pigeon		

	Species/ Habitats	State Status	Federal Status
	Spotted Owl	Endangered	Threatened
	Vaux's Swift	Candidate	
	Black-backed Woodpecker	Candidate	
	Pileated Woodpecker	Candidate	
	Purple Martin	Candidate	
Mammals	Dall's Porpoise		
	Gray Whale	Sensitive	
	Harbor Seal		
	Orca (Killer Whale)	Endangered	Endangered
	Pacific Harbor Porpoise	Candidate	
	Roosting Concentrations of: Big-brown Bat, Myotis bats, Pallid Bat		
	Townsend's Big-eared Bat	Candidate	
	Keen's Myotis (formerly Keen's Long-eared Bat)	Candidate	
	Cascade Red Fox	Candidate	
	Fisher	Endangered	Species of Concern
	Grizzly Bear	Endangered	Threatened
	Lynx	Threatened	Threatened
	Marten		
	Wolverine	Candidate	Candidate
	Columbian Black-tailed Deer		
	Mountain Goat		
	Elk		
Invertebrates	Pinto (Northern) Abalone	Candidate	Species of Concern
	Geoduck		
	Butter Clam		
	Native Littleneck Clam		
	Manila Clam		
	Olympia Oyster	Candidate	
	Pacific Oyster		
	Dungeness Crab		

	Species/ Habitats	State Status	Federal Status
	Pandalid shrimp (Pandalidae)		
	Johnson's Hairstreak	Candidate	
	Valley Silverspot	Candidate	
	Red Urchin		

* Bull Trout only

** Steelhead only

Attachment C: Environmental Assessment and SEPA Checklist References

BERK Consulting. (2016). Skagit County Growth Projections: Summary of Methods and Results. Retrieved from https://www.skagitcounty.net/PlanningAndPermit/Documents/CompPlan2016/Attachment%20A%20-%20Skagit%20County%20Growth%20Projections%20Memo%20BERK%20Consultin.pdf

Elliot Bay Design Group. (2013). *V/V Guemes O.N. 601686: Ferry Replacement Plan*. Prepared on behelf of Skagit County.

Environmental Protection Agency. (1997, December 1). Sole Source Aquifer Designation of the Guemes Island Aquifer System; Skagit County, Washington, Federal Register / Vol. 62, No. 230. Seattle, WA, US.

Glosten. (2017). *Guemes Island Ferry Replacement: Concept Design Report*. Prepared on behalf of Skagit County.

Glosten. (2017, December 14). Guemes Island Ferry Replacement: Transportation System Assessment. Prepared on behalf of Skagit County, Mount Vernon, WA: Prepared on behalf of Skagit County.

Glosten. (2017). *Guemes Island Ferry Replacement: Vessel Capacity Study*. Mount Vernon: Prepared on behalf of Skagit County.

Glosten. (2018). *Guemes Island Ferry Replacement: 28-Car Option Cost Estimate*. Seattle: March.

Hart Crowser. (2015). *Biological Evaluation, Guemes Ferry Breakwater Section Replacement*. Mount Vernon: Prepared on behalf of Skagit County.

OFM. (2017). *Washington State Office of Financial Management Small Area Estimated Program*. Retrieved from https://www.ofm.wa.gov/washington-data-research/population-demographics/population-estimates/small-area-estimates-program

Public Utility District No. 1 of Skagit County . (2008). *2007 WATER SYSTEM PLAN: Volume I*. Mount Vernon: Skagit County PUD.

Public Utility District No. 1 of Skagit County, 2014. (2014). *Capital Facilities Plan*. Retrieved from Skagit County : https://www.skagitcounty.net/Departments/PlanningAndPermit/CFPmain.htm

Skagit County. (1977). *Draft Environmental Impact Statement: Guemes Island Ferry System*.

Skagit County. (2008, November 4). Guemes Island Ferry Proposed Schedule Changes SEPA Non-Project Checklist. Mount Vernon, WA.

Skagit County. (2010). Guemes Island Subarea Plan. Retrieved from https://www.skagitcounty.net/Departments/PlanningAndPermit/GuemesPlanACmain.htm

Skagit County. (2010, July 19). Guemes Island Subarea Plan SEPA Checklist. Mount Vernon, WA.

Skagit County Health and Public Works Departments. (2006). *CRITICAL AQUIFER RECHARGE AREA: SKAGIT COUNTY: DISCUSSION AND BEST AVAILABLE SCIENCE REVIEW*. Mount Vernon: Skagit County.

Skagit County Public Works Department. (2010). *Guemes Island/ Anacortes Ferry Terminal Rehabilitation Project*. Mount Vernon: Skagit County Public Works Department.

Skagit Transit. (2017). *Guemes Island Shuttle*. Retrieved from Skagit Transit: http://www.skagittransit.org/guemes-island-shuttle/

U.S. Census. (2000). Occupancy Status (Table H003). Census 2000 Summary File 1 (SF 1).

U.S. Census. (2010). Occupancy Status (Table H3) 2010 Census Summary File 1. Retrieved from https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_00_SF1_H003&prodType=table

U.S. Census. (2016). Occupancy Status (Table B25002). 2012-2016 American Community Survey 5-Year Estimates. Retrieved from https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_16_5YR_B25002&prodType=table

US Geological Survey. (1995). *Hydrogeology and Quality of Ground Water on Guemes Island, Skagit County, Washington*. Tacoma: US Geological Survey.

Washington State Department of Fish and Wildlife. (2018, March 8). *Aquatic Invasive Species*. Retrieved from Washington State Department of Fish and Wildlife: https://wdfw.wa.gov/ais/

William L. Moon III, PE, Glosten. (2018, February 12). Senior Naval Architect. Seattle, WA.

Attachment D: Growth Memo

Guemes Ferry Replacement Growth Analysis Technical Memo

Draft April 10, 2018

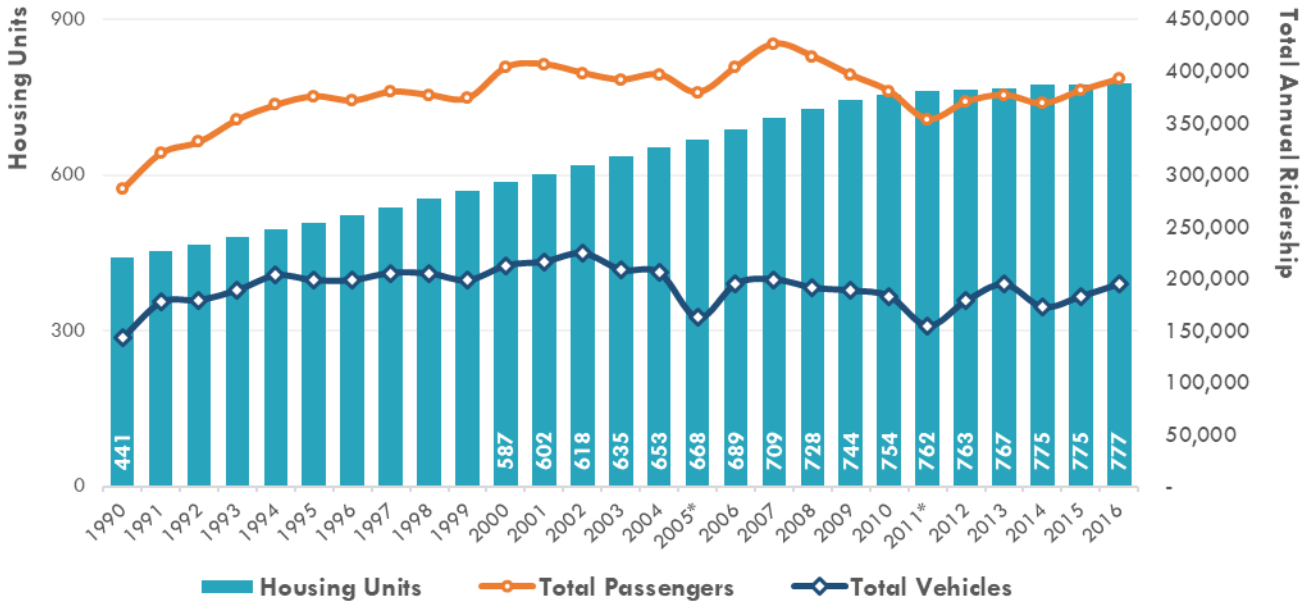
Purpose of this Document

BERK Consulting, Inc. was asked to analyze three scenarios for future housing and population growth on Guemes Island to project potential impacts on ferry ridership and vehicle demand. This document presents the results of this work along with a discussion of potential limitations on growth based on available land capacity and water resources.

Analysis of Historic Trends

Exhibit 1 presents 26 years of historic ridership data alongside the number of housing units on Guemes Island. The first decade shows a close relationship between ridership and housing. Then vehicle ridership peaked in 2002 while passenger ridership peaked in 2007. Thereafter ridership begins to decline or fluctuate while housing growth continued slowly. In order to develop reasonable assumptions about the relationship between housing growth on Guemes and future impacts on ferry ridership demand, it is important to consider factors that may have contributed to ridership trends in more recent years.

Exhibit 1. Population and Housing Growth Compared to Ridership, 1990 - 2016



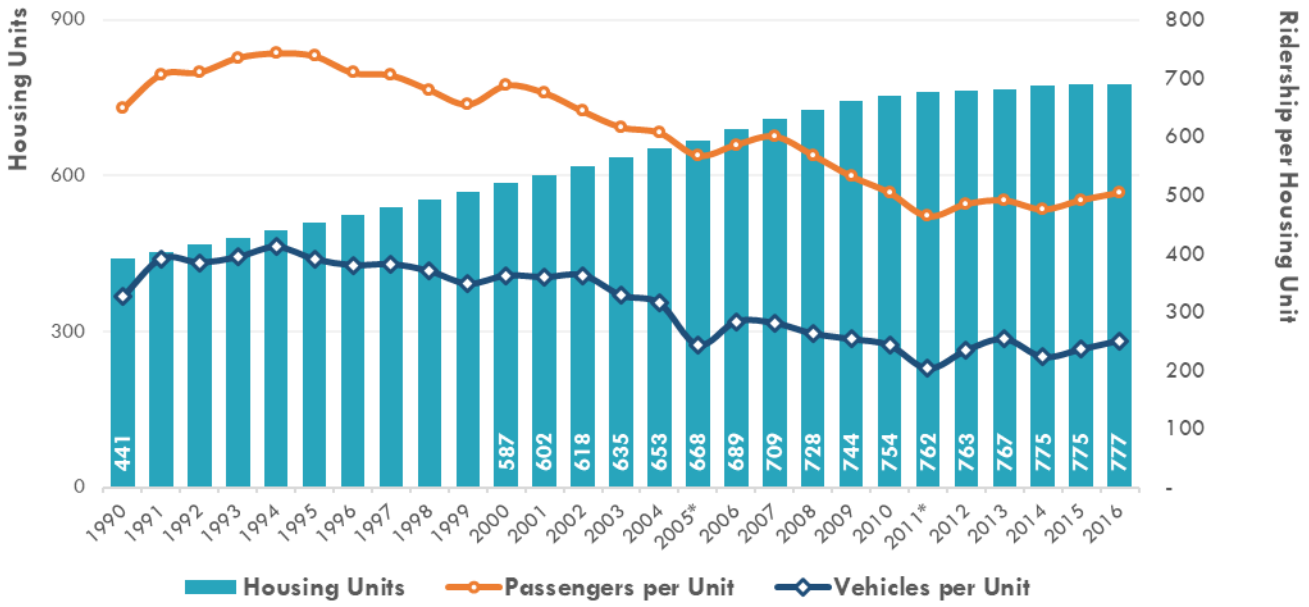
* In 2005 & 2011 there were extended ferry outages, with shorter maintenance outages in 2010, 2012, 2014, & 2015. No housing data exists for years 1991-1999, so linear growth is assumed.

Source: Skagit County, 2018; OFM, 2018; BERK, 2018.

Glosten's Vessel Capacity Study evaluated trends with a statistical model and found that ticket prices and parking had a larger impact on ridership than the recession did. (Glosten, 2017)This period closely matches the overall passenger decline shown in the data, as well as a more gradual decline in vehicles. Since 2012, ridership counts begin to slowly climb again. Another factor is ferry outages. In 2005 and 2011, there were extended ferry outages, which show up at dips in the annual totals. An analysis of monthly ridership indicates these years were more typical of the surrounding years during the non-outage periods. Similarly, there were shorter maintenance outages in 2010, 2012, 2014, and 2015. Finally, there was an interim test schedule change that occurred during the years 2006 and 2007 which added sailing between 6:05pm and 10:00pm Monday through Thursday. Then, in 2008, the schedule as finally adopted partially contracted to remove all sailings after 8:30pm Monday through Thursday.

A clearer way to show the historic relationship between housing production and ferry ridership is measuring passengers and vehicles per housing unit on an annual basis, as presented in Exhibit 2. During most of this period, there was an overall pattern of declining annual passenger and vehicle counts per housing unit. This decline could be due to a slow decline in population per housing unit between 1990 and 2010 found in Census data due to declines in both household size and the percentage of homes that are occupied full time. For many years, the majority of housing units on Guemes were used only occasionally as recreational or vacation homes. The 1970 Census records showed an occupancy rate of 42% (Skagit County, 1977), and this rate has fluctuated only slightly in years since. In the year 2000, 46.6% of units were occupied full time (U.S. Census, 2000). In 2010 this rate dropped to 40.2% (U.S. Census, 2010). According to the most recent American Community Survey, this rate has climbed back to 42.2% (U.S. Census, 2016). OFM's population estimates for Guemes Island reflect this slight increase in occupancy following 2010 (OFM, 2017). These estimates are consistent with a change in ridership trends that is evident following 2011 whereby both passengers and vehicles per housing unit increases slowly.

Exhibit 2. Ridership per Housing Unit, 1990 - 2016

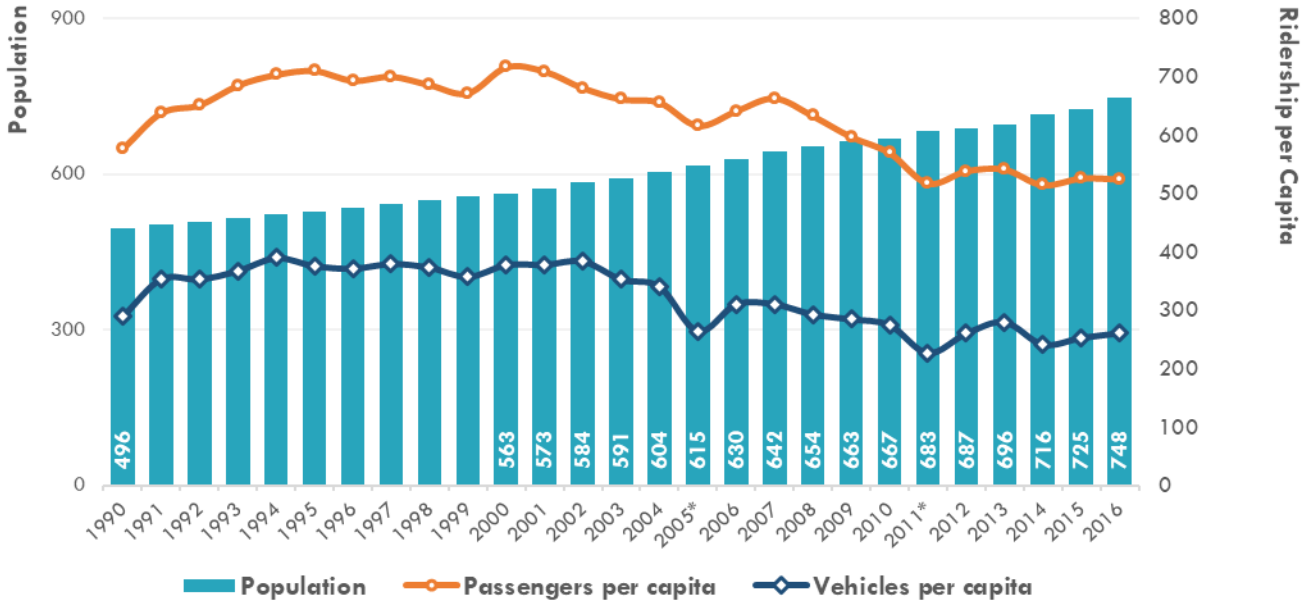


* In 2005 & 2011 there were extended ferry outages, with shorter maintenance outages in 2010, 2012, 2014, & 2015. No housing data exists for years 1991-1999, so linear growth is assumed.

Source: Skagit County, 2018; OFM, 2018; BERK, 2018.

Exhibit 3 accounts for estimates changes in population by showing ridership per capita. This chart shows a fairly steady relationship between population and ridership with the exception of years with ferry service outages and the economic recession and recovery, also influenced by parking and ferry prices, from 2008 through 2011. the exception of years with ferry service outages and the economic recession of 2008 through 2011. The most recent period of 2012 through 2016 shows a steady number of passengers and vehicles per capita, although reduced from the pre-recession period.

Exhibit 3. Ridership per Capita, 1990 - 2016



* In 2005 & 2011 there were extended ferry outages, with shorter maintenance outages in 2010, 2012, 2014, & 2015. No population data exists for years 1991-1999, so linear growth is assumed.

Source: Skagit County, 2018; OFM, 2018; BERK, 2018.

Exhibit 4 summarizes average annual ridership per housing unit and per capita for the 2012 through 2016 period. Ridership per housing unit has increased at a modest rate during this period. Passengers per capita declined slightly during this period, while vehicles per capita remained steady.[1]

Exhibit 4. Ridership per Housing Unit and per Capita Summary, 2012 – 2016

	Average Annual 2012 – 2016 (excluding 2014*)
Passenger Round Trips per housing unit	247
Vehicle Round Trips per housing unit	122
Passenger Round Trips per capita	267
Vehicle Round Trips per capita	132

[1] When interpreting these figures, it is important to consider that data on housing unit counts are fairly reliable and based on permit completions reported to OFM. Population estimates are based on assumptions about housing occupancy and household size informed by 5-year rolling estimates from the Census American Community Survey. Therefore, there is a greater degree of uncertainty about the population estimates.

* In 2014 there was an approximately one-month ferry outage during which time a contract passenger ferry ran. This reduced ridership compared to trends. Therefore, BERK removed 2014 in average annual calculations.
Source: BERK, 2018.

Analysis of Housing and Population Growth Scenarios

There are several issues that contribute to uncertainty regarding future growth on Guemes Island. A few are summarized here.

- **Housing occupancy rates**: Will the increase in housing occupancy found in the most recent American Community Survey estimates continue in years to come? As owners of second homes on Guemes Island reach retirement age, some may choose to move to the island full time. The median age of residents currently living on the island is 64, indicating the community may be popular among people who retired, are semi-retired, or are reaching retirement age in the years to come.
- **The impact of short-term rentals**: A quick search for short-term vacation rentals on Guemes Island revealed 15 units on Airbnb and 7 on HomeAway. As internet sites such as these make it easier for owners of second homes to rent homes short-term and generate income, there is a possibility of increased demand for second homes. This could lead to increased home production, lower home occupancy rates, and potentially higher ferry ridership demand from recreational visitors.
- **Limitations on growth capacity due to water availability**: The majority of homes on Guemes Island rely on ground water, which is in limited supply. The island has a Sole Source Aquifer designation, and the capacity of this aquifer to accommodate additional growth is unknown (Skagit County, 2010). The island has several small public water systems. Additionally, some homes on Guemes rely on water catchment for some or all of their water needs. Due to uncertainty about ground water capacity and the availability and expense of alternative sources, the effect of this on the growth rate is uncertain.
- **Limitations on land capacity for new growth**: Much of the vacant land on the island is zoned for rural residential use, either 1 unit per 10 acres or 1 unit per 2.5 acres.[2] However there is some uncertainty regarding the current number of legal lots. Therefore, BERKs estimate of land capacity for net new residential units ranges from a low of 443 to a high of 779 units. Furthermore, these estimates do not consider the likely amount of capacity that would not be available for development due to landowner preferences. These issues are discussed in detail in a technical appendix to this memo. BERK's preliminary estimates of low and high capacity for housing unit growth are presented in all growth projection charts for context.

Due to the uncertainty regarding how much growth may occur on Guemes in years to come, this memo presents three different growth scenarios that use different growth rate assumptions, as shown in Exhibit 5. Scenarios 1 and 3 are both projections based on historic growth trends. The Low projection assumes that the slower rate of growth seen on the Island since 2010 will continue. The High projection assumes that the average annual growth rate will return to the historic average from the years 2000 through 2017. Scenario 2 assumes Guemes will grow at the same rate as OFM's Medium population projection

[2] See the Technical Appendix on Land Capacity Estimation for a more detailed discussion.

for Skagit County, released in 2012.[3] This is the countywide rate of growth that was adopted in the Skagit County Comprehensive Plan (BERK Consulting, 2016). The County has adopted the Medium OFM rate for their own countywide projections in 2012. This OFM Medium rate falls between the Low and High historic trends scenarios for Guemes.

Exhibit 5. Growth Scenarios Considered in this Analysis

Scenario	Growth Rate	Net New Housing Units, 2017-2036	Projected Housing Units, 2036	Growth Assumptions
1. Historic Trends Low	0.52%	81	863	Matches the rate of growth observed on Guemes Island between 2010 and 2017.
2. County Comprehensive Plan (Medium)	1.18%	195	997	This is the medium (most likely) population growth projection for Skagit County released by OFM in 2012. The County adopted this rate of growth in their 2016 Comprehensive Plan. (BERK Consulting, 2016)
3. Historic Trends High	1.7%	296	1,078	Matches the rate of growth observed on Guemes Island between 2000 and 2017.

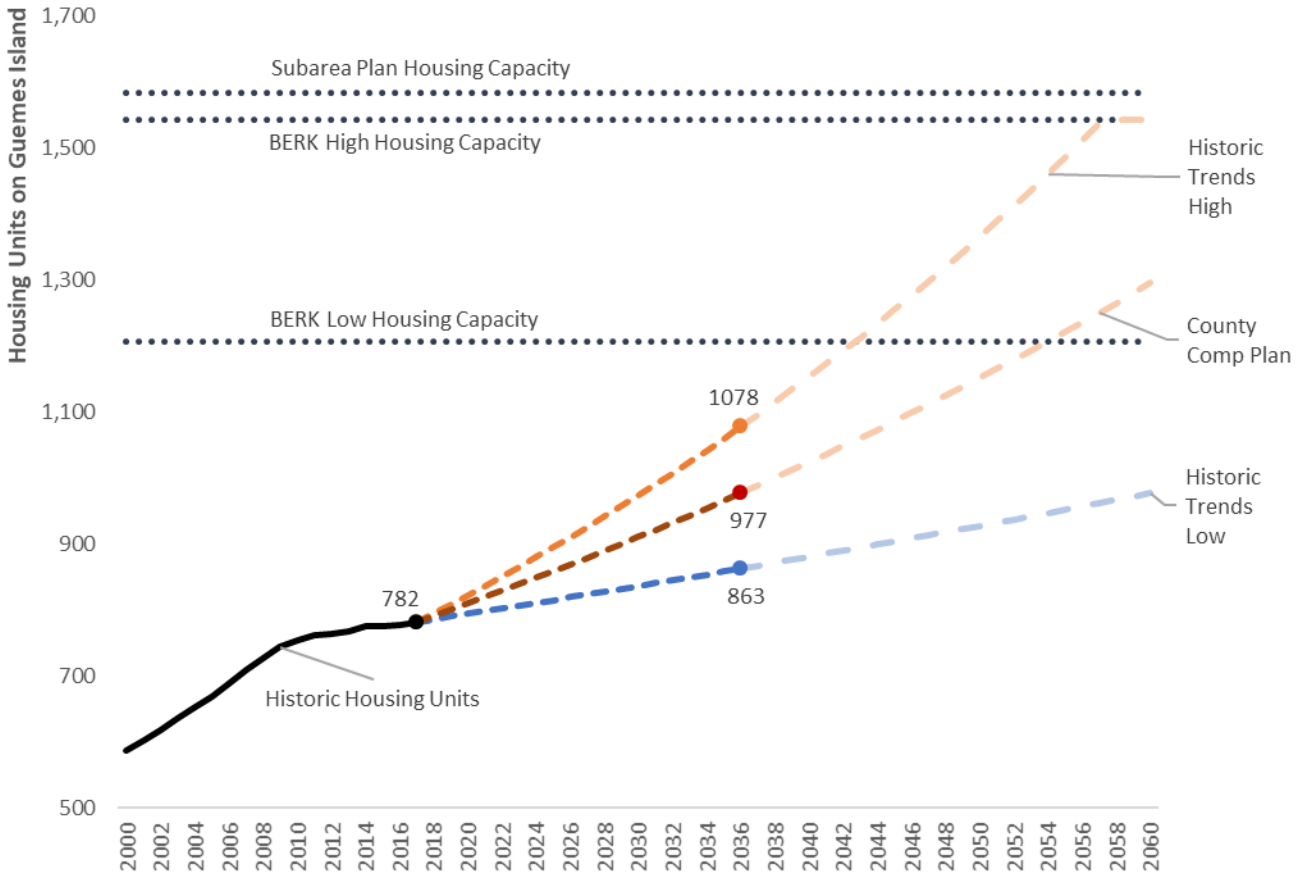
Source: OFM, 2012 and BERK, 2018

The projections limit Scenario 3 housing growth by BERK's high estimate of total housing capacity.

Exhibit 6 compares the three scenarios to three estimates of potential capacity for new housing growth on Guemes Island. BERK's High and Low Housing Capacity estimates are based on analysis described in the technical appendix. The third capacity estimate is based on analysis in the Guemes Island Subarea Plan (Skagit County, 2010). This comparison shows projected growth through the target year of 2036 as well as onward to the year 2060 to reflect conditions that could potentially occur during the 40 years lifespan of the new ferry. None of the scenarios are projected to reach BERK's low estimate of housing capacity before the year 2036. However, Scenarios 2 (County Comprehensive Plan) is projected to surpass that capacity around 2050, and Scenario 3 (Historic Trends High) is projected to exceed all three capacity estimates before 2060. The projections limit Scenario 3 housing growth by BERK's high estimate of total housing capacity.

[3] In 2017 OFM released a new growth projection for Skagit County. The Medium Projection for our period of analysis is only slightly higher than it was in 2012, 1.25% compared to 1.18%.

Exhibit 6. Comparison of Growth Scenarios



Source: Skagit County, 2010; OFM, 2018; BERK, 2018.

Exhibit 7 shows projections of annual vehicle and passenger round trips in 2036 based on the projected number of housing units. These projections assume the historic average annual ridership per housing unit (presented in Exhibit 4) remains constant in year to come. Source: BERK, 2018.

Exhibit 8 presents the same information for the year 2060.

Exhibit 7. Potential Ferry Ridership Demand, 2036

Scenario	Projected Housing Units	Annual Vehicle Round Trips	Annual Passenger Round Trips
1. Historic Trends Low	863	105,272	212,870
2. County Comprehensive Plan (Medium)	977	119,218	241,069
3. Historic Trends High	1,078	131,497	265,898

Source: BERK, 2018.

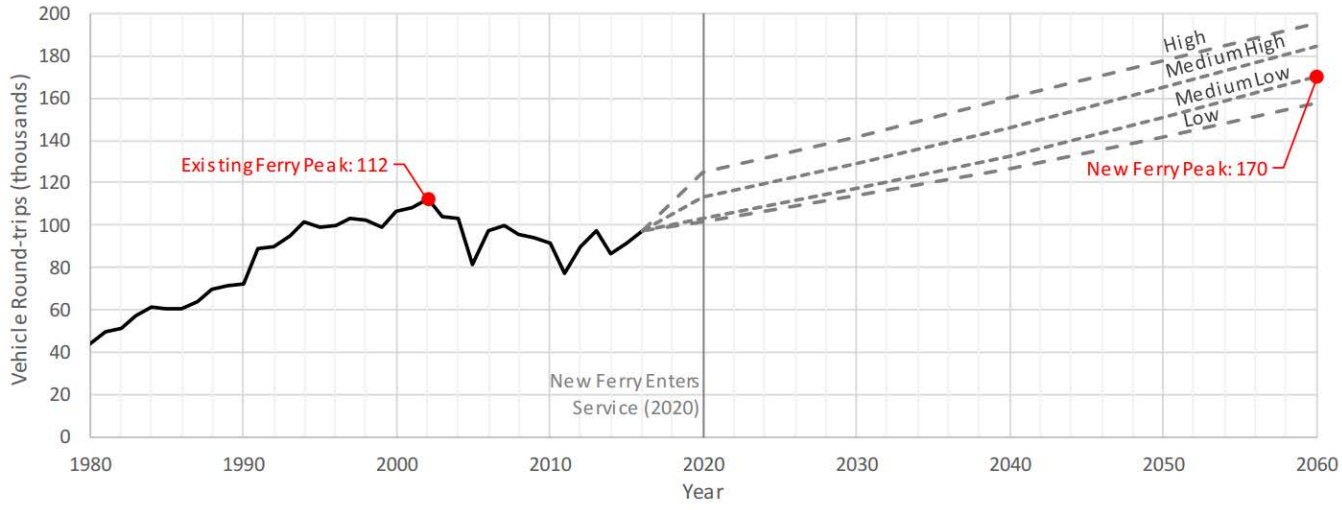
Exhibit 8. Potential Ferry Ridership Demand, 2060

Scenario	Projected Housing Units	Annual Vehicle Round Trips	Annual Passenger Round Trips
1. Historic Trends Low	977	119,218	241,070
2. County Comprehensive Plan (Medium)	1,295	157,984	319,458
3. Historic Trends High	1,543	188,269	380,697

Source: BERK, 2018.

A previous study by Glosten (2017) presented projections for ferry vehicle and passenger ridership to the year 2060. Exhibit 9 shows Gloston's vehicle projections. There is a great deal of consistency between BERK's Scenario 2 (Comprehensive Plan Medium) and Scenario 3 (Historic Trends High) projections and the range of projections in Gloston's study. Gloston's "Low" projection shows a rate of growth fairly similar to BERK's Scenario 2 "County Comprehensive Plan (Medium)". Gloston's "High" projection is roughly equivalent to BERK's Scenario 3 "Historic Trends High", with the exception that BERK's projection is based on housing growth that is limited by available land capacity. Therefore the 2060 end point of BERK's Scenario 3 is roughly equivalent to Gloston's "Medium High" projection. BERK's Scenario 1 "Historic Trends Low" is somewhat lower than any of Gloston's projections.

Exhibit 9. Gloston's Projected Vehicle Round-Trip Demand for Guemes Island Ferry



Source: Gloston, 2018.

Technical Appendix on Land Capacity Estimation

Technical Appendix: Guemes Ferry Replacement Land Capacity Methodology Documentation

PURPOSE OF THIS DOCUMENT

This document presents the methodology used by BERK Consulting, Inc. to estimate total capacity for new housing construction on Guemes Island. As discussed below, this estimation of capacity does not consider limitations on growth presented by available water supply or market factors.

METHOD AND PRELIMINARY RESULTS

Introduction

For each scenario below, the general methodology for determining development capacity is summarized in Exhibit 1, with detailed discussion of the assumptions, different scenarios, and preliminary results presented in the following sections.

Exhibit 1. Development Capacity Methodology

Existing Housing Units	+	Housing Capacity on Vacant Lots	+	Additional Capacity Through Subdivision	-	(Potential Capacity on Trust Lands or Easements)	=	**Total Potential Housing Units**

Currently available data leaves some ambiguity with regards to defining the boundaries of legal lots. The two scenarios adopt two different sets of assumptions. In the first scenario, a lot is considered to be any unique combination of a Parcel Number (PNumber) and zone type. This allows us to directly use the acreage listed in the assessor data, and results in a higher estimate of development capacity.

The second scenario assumes that any parcel polygons that have adjoining boundaries and common ownership are considered a lot. This requires that we use GIS calculated acreage (as described below), and results in a lower estimate of development capacity due to the smaller number of total lots.

This capacity model also accounts for the potential role of Accessory Dwelling Unit (ADU) development. It is not reasonable to assume that every home-owner who can build an ADU would choose to do so. Therefore, in order to develop a more reasonable estimate of the total amount of additional housing capacity that could be added through ADUs, BERK calculated the annual rate of ADU development based on historic trends, and projected forward over a 40 year period. ADU development is currently restricted to an owner-occupied property, and cannot be built where chloride levels in the ground water exceed 25 ppm.

Lastly, we have confirmed with the Skagit Land Trust and San Juan Preservation Trust that all of their fee properties are not developable. Additionally, for the Skagit Land Trust, none of their properties with conservation easements are developable. The San Juan Preservation Trust, however, estimates that their properties with conservation easements could accommodate 5 additional housing units. Because that

estimate is for easements across all zone types and is not parcel specific, that number is manually added to the calculations below.

Existing Conditions

Washington State Office of Financial Management (OFM) estimates there were 782 housing units on Guemes Island as of April 1, 2017. This analysis needs to determine the location of those units to determine the amount of additional capacity for growth by parcel. To do this, BERK relied on two fields in the Assessor database: "Land Use" and "Living Area" (square feet of living space). Exhibit 2 presents our assumptions. For all non-residential land uses, the Living Area field is used as a proxy for the location of housing units. This helps to account for housing units on non-residential properties such as farms, which are allowed one housing unit.

Exhibit 2. Assumptions for Determining the Presence of a Dwelling Unit on Parcels

Land Use	Assumed # of Housing Units	Notes on Assumptions
(110) HOUSEHOLD SFR OUTSIDE CITY	1	
(111) HOUSEHOLD, SFR, INSIDE CITY	1	
(120) HOUSEHOLD, 2-4 UNITS	3	Mid-point between 2 and 4 units. Assessor data on building type did not indicate number of units.
(180) MOBILE HOMES	1	Inspected lot in Google Earth to confirm it is not a mobile home park.
(181) MH LEASED PROPERTY	1	Inspected lot in Google Earth to confirm it is not a mobile home park.
All non-residential land uses	0*	*If Living Area > 0, then assume 1 unit

Source: Skagit County Assessor 2018; BERK 2018

Using this method, BERK calculates a total of 764 units on Guemes Island. This is just 18 units less than the OFM estimate for April 2017, or a 2% difference. The difference between the OFM estimate and BERK's could be explained in a few ways, including inaccuracy in OFM's estimate, inaccuracies in the Assessor database, or the presence of accessory dwelling units (ADUs) that are not tracked separately in the Assessor database. Between 1997 and 2017, a total of 16 permitted ADUs were built on Guemes Island. So, it seems reasonable to assume that the difference could be attributed to ADUs. More importantly, these findings indicate that permitted ADUs are not currently common on Guemes.

Scenario 1 Assumptions / Methodology (Higher Estimate):

This scenario is based on the unique combination of PNumber and zone type. Some PNumbers are associated with points in multiple zones, so it follows that any unique combination of PNumber and zone type is considered a lot for this scenario. If the same PNumber is associated with multiple zone types, then that feature is flagged ensuring that neither the acreage nor total existing dwelling units are double counted in the analysis. A summary of PNumbers and acreage by zone is presented in Exhibit 3

Exhibit 3. Scenario A- Existing Conditions by Zone

Zone	Unique Parcel Numbers	Total Assessor Acres	Estimated Housing Units	Assessor Acres for parcels with housing units
Rural Intermediate	868	776	509	458
Rural Reserve	567	3,871	254	1,344
Rural Resource	17	492	1	39
Totals	**1,452**	**5,139**	**764**	**1,841**

Source: Skagit County Assessor, 2018; BERK, 2018.

First, PNumber points are dissolved by PNumber and zone type. Any feature with a unique combination of PNumber and zoning is considered a lot for this scenario, and the acreage is summed using the listed acres in the assessor's database.

To determine potential capacity, the housing capacity of vacant lots less than twice the minimum lot size is calculated based on current zoning without any subdivision. Because the current zoning allows one unit per lot without subdivision in this case, if any lot has a housing unit, it is considered build out / undevelopable regardless of its size. If a lot does not have a housing unit, and does not fall on a land trust fee property or conservation easement, then we assume it is buildable and can accommodate one housing unit. However, there has not been a determination of legal lot status, which is done on an individual permit basis.

Next, the subdivision of properties of sufficient size is considered. If a vacant or underutilized lot has capacity to be subdivided, then the total potential housing units for the lot is adjusted based on the maximum allowable density of housing units allowed in the respective zone type. A property is considered underutilized if the zoning would allow for more housing units if the property is sufficiently large to be subdivided. For example, a 12-acre lot zoned Rural Reserve could have 1 housing unit. A 21-acre lot zoned Rural Reserve could have 2 housing units.

Exhibit 4. Standard Zone Density

Zone	Standard Density	CaRD Density if on Public Water System*
Rural Intermediate	1 du/ 2.5 ac	Not applicable
Rural Reserve	1 du/10 ac	2 du/10 ac (1 du/5 ac)
Rural Resource	1 du/40 ac	4 du/40 ac (1 du/10 ac)

Note: There shall be no density bonus for CaRD developments in areas designated as a "sole source aquifer," except where the source of water is from a public water system whose source is outside the designated area or from an approved alternative water system pursuant to Chapter 12.48 SCC.

ADU capacity is calculated by determining the rate of ADU development between 1997 and 2017, and projecting that rate forward 40 years. There were 16 ADUs built on Guemes Island in that time period, at an average annual rate of 0.8 ADUs per year. This results in a total ADU capacity of 32 ADUs, which are allocated proportionally across the Rural Intermediate and Rural Reserve zones.

If a lot contains a land trust fee property, or contains a conservation easement, then no additional development is possible, and those are removed from the possible total development capacity.

Using the formula presented in the introduction, total capacity is summarized by zone type, as shown in Exhibit 5. These estimates include the assumption that Washington Department of Natural Resources (DNR) school trust lands are potentially developable, whereas the Guemes Island Subarea Plan does not include DNR lands in its capacity analysis. It is unlikely the properties would develop given the property. The units are included for a conservative capacity estimate. Under the current zoning of Rural Resource, these properties could accommodate 3 housing units.

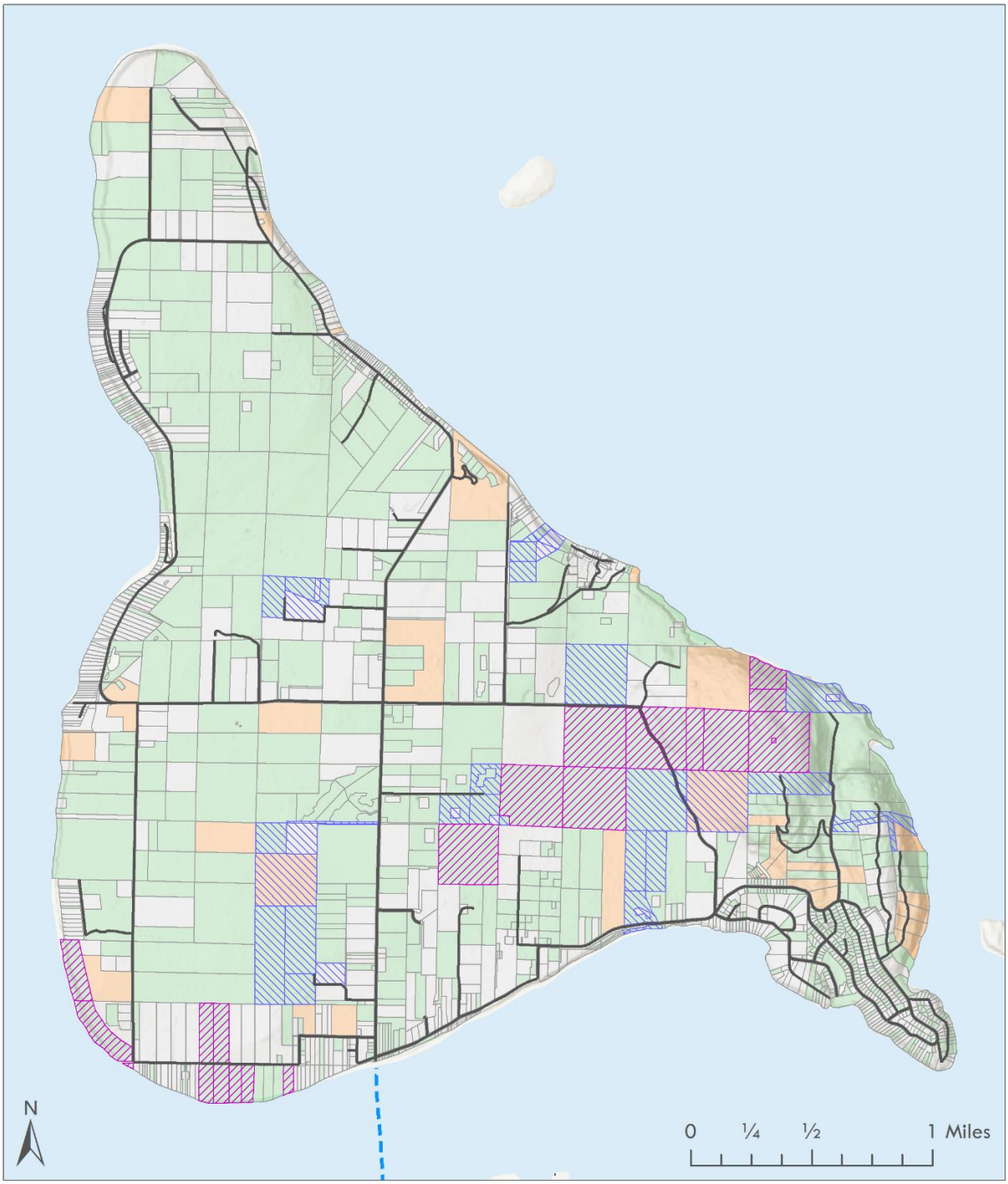
Exhibit 5. Scenario A - Development Capacity by Zone

Zone	Existing Housing Units	Housing Capacity on Vacant Lots	Additional Capacity Through Subdivision	Additional Capacity From ADUs	Minus Potential on Trust Lands / Easements	Total Potential Housing Units
Rural Intermediate	509	349	64	19	-7	934
Rural Reserve	254	309	69	13	-48	597
Rural Resource	1	16	0	0	-5	12
Totals:	**764**	**674**	**133**	**32**	**-60***	**1,543**

Note: *Number has been adjusted to reflect San Juan Preservation Trust's estimated development capacity on properties with conservation easements. It is unlikely the properties would develop given the property owners have agreed to conservation easements. The units are included for a conservative capacity estimate.
Source: Skagit County Assessor, 2018; BERK, 2018.

Exhibit 6 shows these results visually on a map of Guemes Island.

Exhibit 6. Scenario A - Development Capacity Map



*Note: this scenario assumes Washington DNR trust land is potentially developable, whereas the estimates in the Guemes Island Subarea Plan do not include DNR lands in its capacity estimates. It is unlikely the properties would develop. The units are included for a conservative capacity estimate.
Source: Skagit County, 2018; BERK, 2018.

Scenario 2 Assumptions (Lower Estimate)

This scenario is based on the proximity of parcel polygons which share common ownership and adjacent boundaries. Parcel polygons with a common owner, zone type, and share common boundaries / appear to have been split due to a road or right-of-way, are treated as one lot for this scenario. Because some of the parcel polygons share the same PNumber, we use the GIS calculated acreage to determine capacity in this scenario. If we were to use the assessor database figure for acreage, different polygons with the same PNumber would be attributed the same acreage, resulting in an inaccurate assessment of capacity. A summary of parcel polygons and acreage by zone is presented in

Exhibit 7.

Exhibit 7. Scenario B - Existing Conditions by Zone

Zone	Parcel Polygons	GIS Acres	Estimated Housing Units	GIS Acres in Parcels with Housing Units
Rural Intermediate	922	751	509	545
Rural Reserve	604	3,868	254	2,270
Rural Resource	17	503	1	40
Totals	**1,543**	**5,121**	**764**	**2,855**

Source: Skagit County Assessor, 2018; BERK, 2018.

In this scenario, parcel polygons are dissolved by common owner and zone type. The data is then manually inspected so that assumed lots split by a road or right-of-way, or have a spelling error in the assessor data causing adjacent polygons to not dissolve, are treated as one lot.

During the dissolve and inspection process, these features are given a new, unique identifier "X_Order_CommonOwnership". This is the field is used to aggregate features and values from the parcel level to the common ownership level.

Existing units are calculated at the parcel/PNumber level, and then aggregated to the common ownership level.

To determine potential capacity, first, the housing capacity of vacant lots less than two times the lot size is calculated based on current zoning without any subdivision. Because the current zoning allows one unit per lot even if below the minimum lot size, it is considered build out / undevelopable when it has one home. If a lot does not have a housing unit, and does not fall on a land trust fee property or conservation easement, then we assume it is buildable and can accommodate one housing unit even if below the minimum lot size. However, there has not been a determination of legal lot status, which is done on an individual permit basis.

Next, the subdivision of vacant or underutilized properties of sufficient size is considered. If a lot has capacity to be subdivided, then the total potential housing units for the lot is adjusted based on the maximum allowable density of housing units allowed in the respective zone type. A property is considered underutilized if the zoning would allow for more housing units if the property is sufficiently large to be subdivided.

ADU capacity is calculated by determining the rate of ADU development between 1997 and 2017, and projecting that rate forward 40 years. There were 16 ADUs built on Guemes Island in that time period, at an average annual rate of 0.8 ADUs per year. This results in a total ADU capacity of 32 ADUs, which are allocated proportionally across the Rural Intermediate and Rural Reserve zones.

If a lot contains a land trust fee property, or contains a conservation easement, then no additional development is possible, and those are removed from the possible total development capacity. It is important to note that in this scenario, because the parcels have been aggregated by common ownership into larger lots, it is possible part of a lot is protected and part is developable. To address this nuance, the ratio of protected to developed land is calculated and applied to determine an updated housing capacity for the entire lot.

Using the formula presented in the introduction, total capacity is summarized by zone type, as shown in Exhibit 8. These estimates include the assumption that Washington DNR school trust lands are potentially developable, whereas the Guemes Island Subarea Plan does not include DNR lands in its capacity analysis. It is unlikely the properties would develop. The units are included for a conservative capacity estimate. Under the current zoning of Rural Resource, these properties could accommodate 3 housing units.

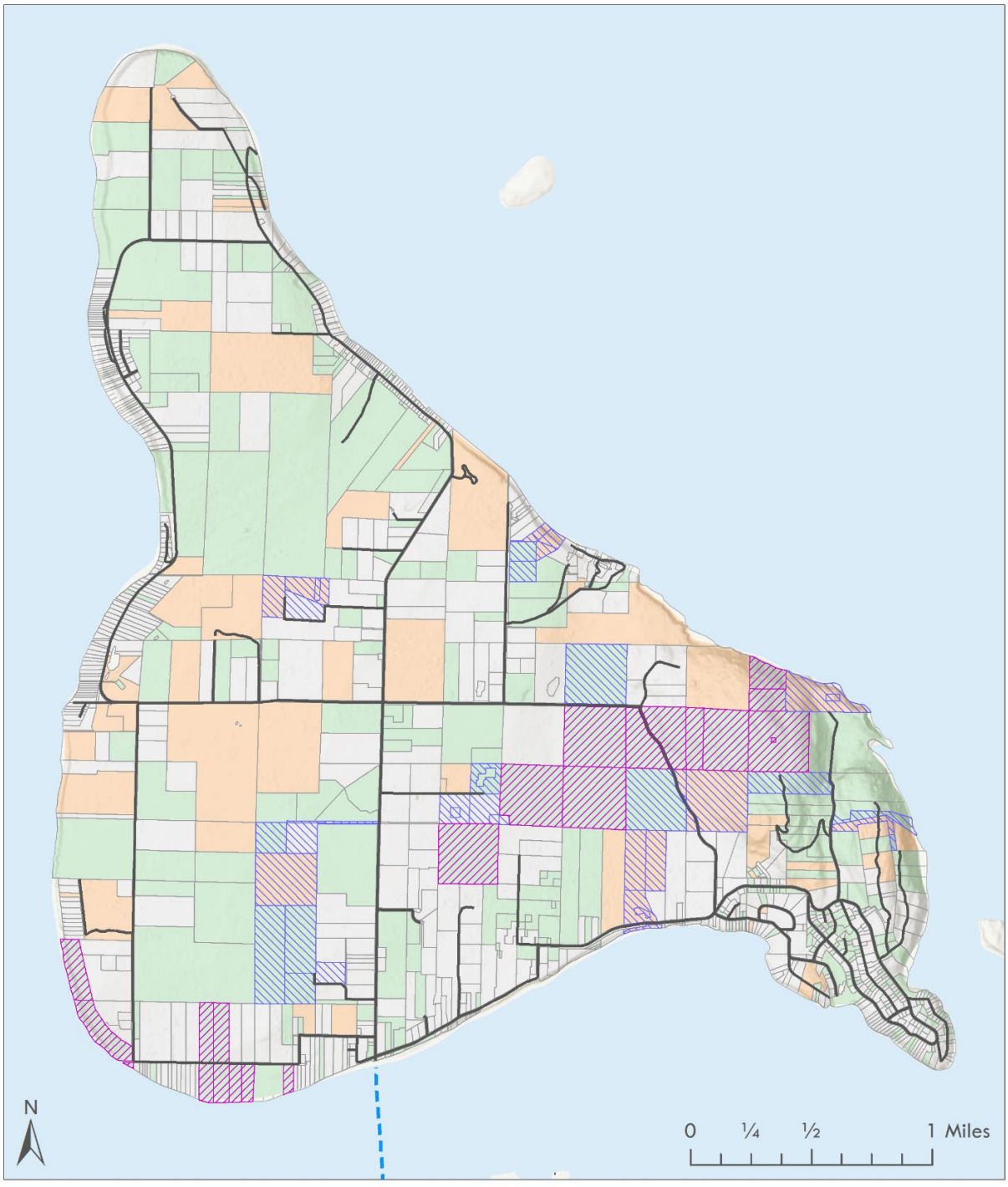
Exhibit 8. Scenario B - Development Capacity by Zone

Zone	Existing Housing Units	Housing Capacity on Vacant Lots	Additional Capacity Through Subdivision	Additional Capacity From ADUs	Minus Potential on Trust Lands / Easements	Total Potential Housing Units
Rural Intermediate	509	153	45	19	-6	720
Rural Reserve	254	126	123	13	-38	478
Rural Resource	1	9	4	0	-5	9
Totals	**764**	**288**	**172**	**32**	**-49***	**1,207**

Note: *Number has been adjusted to reflect San Juan Preservation Trust's estimated development capacity on properties with conservation easements. It is unlikely the properties would develop given the property owners have agreed to conservation easements. The units are included for a conservative capacity estimate.
Source: Skagit County Assessor, 2018. BERK, 2018.

Exhibit 9 shows these results visually on a map of Guemes Island.

Exhibit 9. Scenario B - Development Capacity Map



*Note: this scenario assumes Washington DNR trust land is potentially developable, whereas the estimates in the Guemes Island Subarea Plan do not include DNR lands in its capacity estimates. It is unlikely the properties would develop. The units are included for a conservative capacity estimate.
Source: Skagit County, 2018; BERK, 2018.

Comparison of Net Capacity with Guemes Island Subarea Plan

Based on the approach conducted to date, the net development results of Scenario A are similar to that included in the January 2011 adopted Guemes Island Subarea Plan. Scenario B is lower.

Exhibit 10. Scenario A and B compared to Guemes Island Subarea Plan

	Subarea Plan 2010 Capacity	Scenario A 2018 Capacity	Scenario A plus ADU	Scenario B 2018 Capacity	Scenario B plus ADU
Rural Intermediate	475	406	425	192	211
Rural Reserve	380	325	343	206	224
Rural Resource	6	11	11	8	8
Totals	**861**	***747***	***779***	**411**	**443**

Notes: These estimates include the assumption that Washington DNR school trust lands are potentially developable, whereas the Guemes Island Subarea Plan does not include DNR lands in its capacity analysis. It is unlikely the properties would develop. The units are included for a conservative capacity estimate. Under the current zoning of Rural Resource, these properties could accommodate 3 housing units.
Source: Skagit County 2011; BERK, 2018.