

DRAFT ENVIRONMENTAL  
IMPACT STATEMENT

GUEMES ISLAND FERRY SYSTEM  
SKAGIT COUNTY, WASHINGTON

Prepared by the Skagit County  
Planning Department

December, 1977

## INTRODUCTION

### A. Action and Action Sponsor

The government of Skagit County proposes to replace the county-owned and run ferry Almar with a new, larger capacity ferry to serve Guemes Island residents, property owners, and visitors. Also proposed is reconstruction of the ferry docking facilities and parking/holding areas at Anacortes and on Guemes Island.

### B. Lead Agency

Skagit County Planning Department  
County Administration Building, Room 218  
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### C. Authors

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Otto M. Walberg, Associate Planner

Lloyd K. Johnson, County Engineer

Jack C. Rafter, Assistant County Engineer

### D. Required Licenses

Two shoreline substantial development permits and two building permits must be obtained prior to construction of the docking facilities: one of each from the City of Anacortes and one of each from Skagit County. U.S. Army Corps of Engineer permits must be obtained prior to construction of the dock facilities. Also, appropriate licenses must be obtained from the United States Coast Guard for the operation and maintenance of the proposed ferry system.

### E. Cost Per Copy

Cost to the public for a copy of this EIS is \$3.00

### F. Date of Issue: December 5, 1977.

### G. Date Comments Due

Written comments on the Draft EIS are requested by January 3, 1978, in order to incorporate them into the final EIS.

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## SUMMARY

### A. Proposal

The government of Skagit County proposes to replace the county owned and run ferry ALMAR with a new, larger capacity ferry (16 to 18 cars) to serve Guemes Island residents, property owners, and visitors. Also proposed is reconstruction of the ferry docking facilities and parking/holding areas at Anacortes and on Guemes Island.

### B. Impacts of the Proposed Action

The following impacts are summarized from the chapter, Impacts of the Proposed Action.

#### 1. Anacortes and Guemes Island Terminal Areas and Guemes Channel

Upland soils - Construction of the parking and holding area will disturb existing soils by grading and filling activities. Soils will be exposed to erosion while the paved surface will increase surface runoff.

Shoreline, intertidal and subtidal areas - Where construction of docking facilities will occur, the shoreline and intertidal areas will be disturbed. Some landfilling may be necessary in the shoreline areas. Old piling will be removed and new ones driven in areas adjacent to the existing structure.

Water - Surface runoff will be increased in areas disturbed and paved over. Quality of the surface water will be modified by sediment and oils from the asphalt and vehicles. The water quality of Guemes Channel should not be affected.

Flora and Fauna - Grasses and shrubs will be removed for construction of the parking and holding areas. Upland habitat will be removed from use by smaller mammals and birds. Some marine bottom species will be lost or disturbed during dock construction. If timed and designed to Department of Fisheries standards, anadromous fishes, smelt, and herring migration and spawning should not be adversely affected.

Parks and Recreation - Construction of the Anacortes parking/holding area may conflict with the plans of the City of Anacortes for and the desirability of using the undeveloped waterfront area for a park and beach access facility.

Light and Glare - Some increase in lighting may be necessary for the expanded upland facilities.

## 2. The Ferry System

Population and Housing - Analysis of population growth, housing, and ferry traffic usage over the last twenty-five years shows that growth on Guemes Island has occurred despite the stable ferry size and parallels similar trends in Skagit County.

Transportation - Analysis of historical ferry traffic shows steadily increasing usage over time, especially during the last six years. The variable linking the ferry system and increases in population and housing is the operating schedule which to date has been responsive to the service demands of island residents and property owners.

Judged on a transportation system cost and operation/maintenance basis against revenues generated, the proposed action of replacing the Almar with an 18 car ferry creates no significant adverse impacts. If anything, impacts are beneficial in relieving Skagit County taxpayers of subsidizing the Guemes Island Ferry.

Public Services - Increased tonnage and size capabilities of the proposed ferry and dock facilities will enable larger fire fighting vehicles to reach the island. Increased ferry size may prove beneficial to the busing of school children which occurs during periods of commuter demand.

## C. Alternatives

1. No Action - If no action is taken, the impacts associated with the proposal would be avoided or delayed until a later date. Continued operation of the Almar would continue and possibly escalate those operating costs discussed in the EIS text. Unless the rate structure is revised upward, costs will continue to exceed revenues with tax subsidies from other county sources needed to support the ferry system. Continued operation would mean increased hazards to users.
2. Ferry Size Alternative - Three ferry sizes were chosen as being the most feasible for the county to purchase and operate: 9, 18, and 27 car ferries. Each ferry was analyzed at three different trip levels: 75, 100, and 125 crossings per week. Also, each ferry was analyzed

for costs and revenues at three different operating capacities: 100% utilization, ie. 9 cars at all times on the 9 car ferry, 66% or 2/3, and 33% or 1/3 capacity.

The following conclusions are made after extensive analysis of known and projected ferry use data:

- (1) A small ferry is inadequate from both a service and a cost standpoint for both present and future traffic.
  - (2) A large ferry appears to be more than adequate to handle present and future traffic demands. Operation of this ferry on a normal schedule would result in a substantial financial loss and would necessitate a reduced schedule and/or an increase in fares.
  - (3) An intermediate sized ferry appears to be the only reasonable alternative from both a traffic and a cost of operation standpoint.
  - (4) The size finally selected should probably be based on the consideration that crew costs are far and away the greatest item of expense in the operation of the ferry and that maintenance and fuel costs are relatively minor and independent of size. These facts indicate that the ferry finally selected should probably be the largest vessel that can be obtained which would be allowed to operate with a two man crew.
3. Ramp Ferry - Another alternative is a ferry boat fitted with movable ramps at each end which can be lowered to shore-based ramps for the on and off loading of passengers and vehicles. The types of disadvantages and the higher overall costs indicate that the ramp ferry would not adequately meet the needs and objectives of Skagit County and the Guemes Ferry operation.

PROPOSED ACTIONA. Proposal

Acquisition of a new ferry boat to replace the ferry Almar now serving Guemes Island and reconstruction of the Anacortes and Guemes Island docking facilities and parking/holding areas.

B. Sponsor

Skagit County government.

C. Lead Agency

Skagit County Planning Department

D. Location and Area

The Guemes Island Ferry run and facilities are located on and along the Guemes Channel, Sections 12 and 13, Township 35 North, Range 1 East. The planning area is located approximately two miles east of the Washington State Ferry facility at Ship Harbor and approximately eighteen (18) road miles from Mount Vernon and Interstate 5. See Figure 1.

Figure 2 depicts the planning area in relation to major population centers of the Puget Sound region. The present Anacortes terminal is at the north end of I Avenue at 6th Street. The present Guemes Island terminal is at the south end of Guemes Island Road.

E. Proposal Description

This EIS addresses the acquisition and operation of a new ferry in particular and the reconstruction of the docking facilities in general. Definite design plans for the docks and holding/parking areas have not been chosen. A separate environmental assessment of those facilities will be made in the near future when funding is assured from the State and Federal Bridge Replacement Fund.

1. The vessel proposed to be obtained by Skagit County has the following characteristics: (See Exhibit H)

Length - 124'

Beam - 46'

Gross tons - 82.4

Class - T-class

Load limit - Legal highway loads

Construction - Steel

Crew - 2

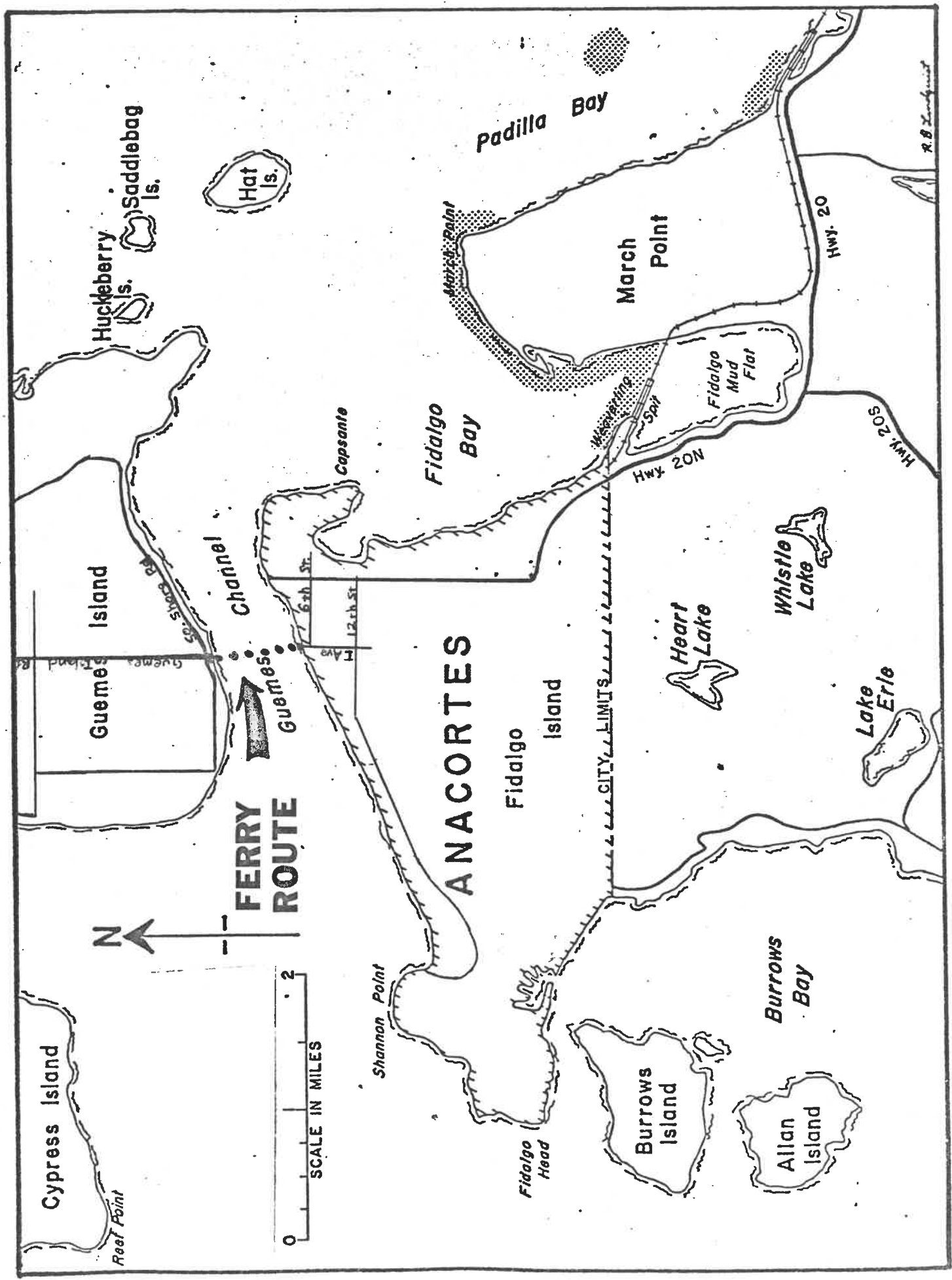
Capacities - 16 to 18 vehicles;  
50 passengers

Power - Two Murray - Teregurtha  
steerable right angle drive  
units capable of 360° rotation

Control - By above units, located  
at starboard bow, port stern;  
no rudders

FIGURE 1

F  
R  
E



R.B. Landmark

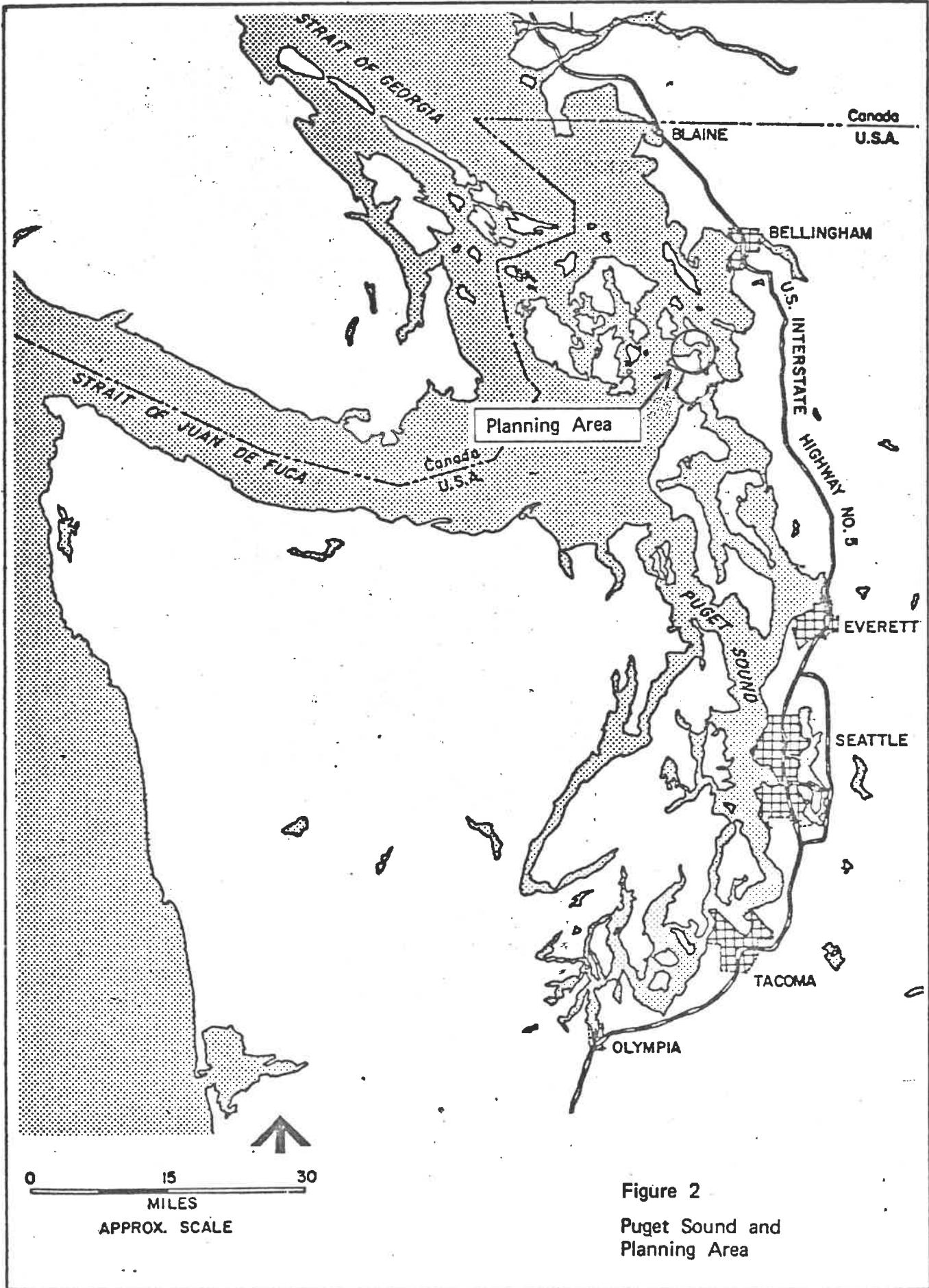


Figure 2

Puget Sound and Planning Area

The crew office will be located on the boat with security provided for system revenues. A passenger lounge with seating will be provided although toilet facilities will not. All equipment and safety measures will meet U.S. Coast Guard Standards.

2. The Anacortes Facility

At the time of this writing, three choices have been made regarding design of the Anacortes docking and parking/holding area facilities:

a. Scheme A.

Scheme "A" is shown in Exhibit A and would be located immediately to the west of the existing dock. As designed, the existing dock would be removed entirely. Scheme "A" would provide a 135 foot long concrete approach pier, a 75 foot long steel transfer span, a 60 vehicle capacity holding area, a 30 vehicle capacity storage area, and five parking spaces for handicapped persons and ferry crew use. The ferry craft would approach the pier from the north instead of from the west as the existing ferry presently does. The terminal building would be located immediately to the west of the new approach pier. Although Scheme "A" is expected to be the least expensive of the three alternatives proposed for the Anacortes facility, this scheme would likely entail the most disruption of existing ferry service during construction.

b. Scheme B

Scheme "B" is illustrated in Exhibit B and would be located to the west of the existing dock. The existing dock would be removed entirely. The new concrete approach pier would be 250 feet in length and the steel transfer span would be 90 feet in length. Scheme "B" would provide a 61 vehicle capacity holding area, a 30 vehicle capacity storage area, and four parking spaces for handicapped persons and ferry crew use. Scheme "B" is anticipated to represent a cost intermediate between Schemes "A" and "C". The new approach pier is located such that no disruption of existing ferry service is anticipated during construction.

c. Scheme C

Scheme "C" is illustrated in Exhibit C and would be located entirely to the west of the existing dock, which would be removed. The new concrete approach pier would be 250 feet in length and the steel transfer span would be 75 feet in length.



Scheme "C" would provide a vehicle holding area with a design capacity of 44 vehicles, but could accommodate up to 60 vehicles by using the west-bound through land for additional holding capacity. A 30 vehicle capacity storage area and ten parking spaces for handicapped persons and for ferry crew use would be provided. Scheme "C" is anticipated to be the most expensive of the three schemes and would require the most land area. The new approach pier is located such that no disruption of existing ferry service is anticipated during construction.

In any case, ferry traffic will continue to use I Avenue and 6th Street. Parking is proposed to accommodate approximately 60 cars and to try to eliminate parking on 6th Street.

### 3. The Guemes Island Facility

It is proposed that the present floating span structure will be replaced by a more permanent dock with a hinged apron and loading truss similar to the Anacortes Facility. The dock is proposed to be located immediately west of the present facility.

**Parking/holding area:** The county has acquired the Woodfield property, a half acre parcel located to the immediate northwest of the dock site. The county proposes to remove the old house and out-buildings, clear the property, and construct a combination parking and vehicle holding lane area. To date, two choices have been made regarding design of the facilities:

#### a. Scheme A

Scheme "A" is shown in Exhibit D. The existing dock would be entirely removed and replaced by a new concrete approach pier 80 feet in length and a steel transfer span 80 feet in length. Scheme "A" would provide a 65 vehicle capacity holding area, a 26 vehicle capacity storage area, and four parking spaces for handicapped persons and ferry crew use. Scheme "A" is the least expensive of the alternative dock facility design schemes proposed for Guemes Island. Construction of the proposed facility is anticipated to result in approximately 30 to 45 days of disruption of existing ferry service. Scheme "A" requires acquisition of land to the northwest of the proposed dock as well as acquisition of parking area and construction of a bulkhead to the east of the proposed pier.

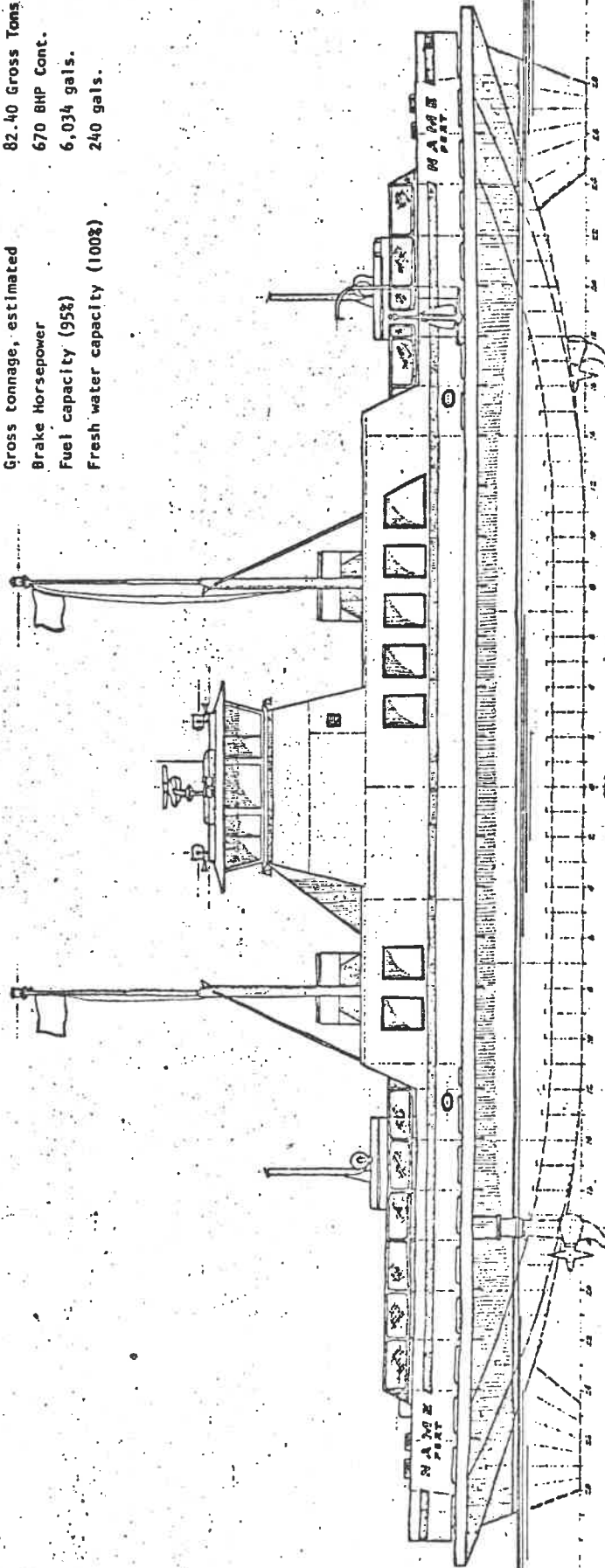
b. Scheme B

Scheme "B" is illustrated in Exhibit E. This scheme utilizes exactly the same dock facility shown in Scheme "A", but differs in parking area design and in the location of the terminal building. Scheme "B" provides a 60 vehicle capacity holding area, a 69 vehicle capacity storage area, and five parking spaces for handicapped persons and ferry crew use. Scheme "B" provides more than the required vehicle storage area. Scheme "B" requires acquisition of additional right-of-way along Guemes Island Road, and is anticipated to be the most expensive of the design alternatives for the Guemes Island dock facility. Construction of the proposed facility is anticipated to entail the same duration of existing ferry service disruptions, estimated at 30 to 45 days.

For a more detailed description of the various design schemes and the rationale used for facility sizing, see Appendix D.

**FERRY CONFIGURATION:**

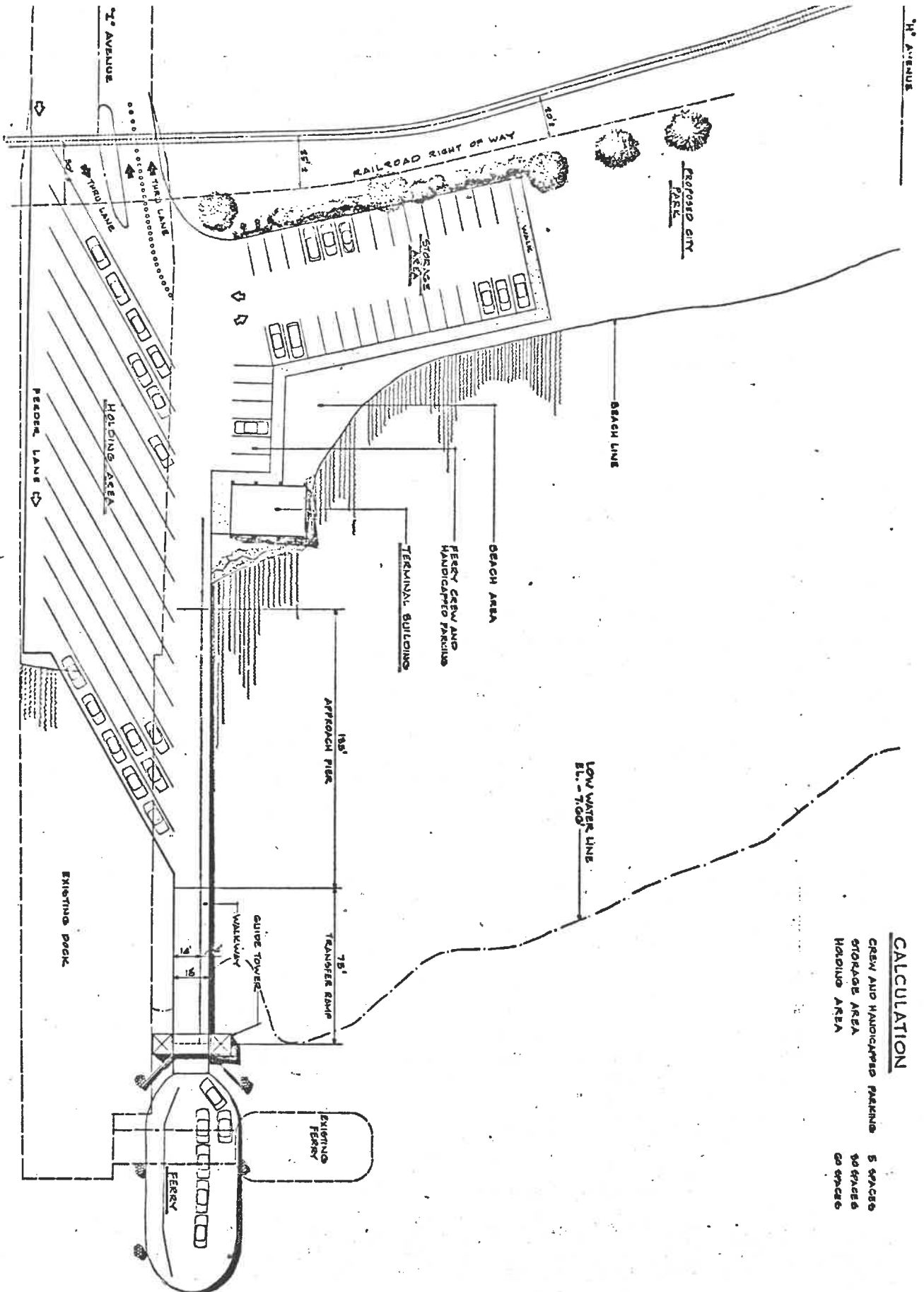
|                                 |                  |
|---------------------------------|------------------|
| Length overall                  | 124' - 0"        |
| Length on design load W.L.      | 100' - 0"        |
| Length between perpendiculars   | 100' - 0"        |
| Breadth, maximum over guard     | 46' - 0"         |
| Breadth, molded at DLWL         | 30' - 9-1/2"     |
| Depth, molded amidships at side | 9' - 6"          |
| Draft, mean; at DLWL            | 5' - 0"          |
| Displacement, at DLWL           | 298 LTSW         |
| Gross tonnage, estimated        | 82.40 Gross Tons |
| Brake Horsepower                | 670 BHP Cont.    |
| Fuel capacity (95%)             | 6,034 gals.      |
| Fresh water capacity (100%)     | 240 gals.        |



**OUTBOARD PROFILE**

**EXHIBIT**

**H**



**CALCULATION**

|                              |           |
|------------------------------|-----------|
| CREW AND HANDICAPPED PARKING | 5 SPACES  |
| STORAGE AREA                 | 30 SPACES |
| HOLDING AREA                 | 20 SPACES |

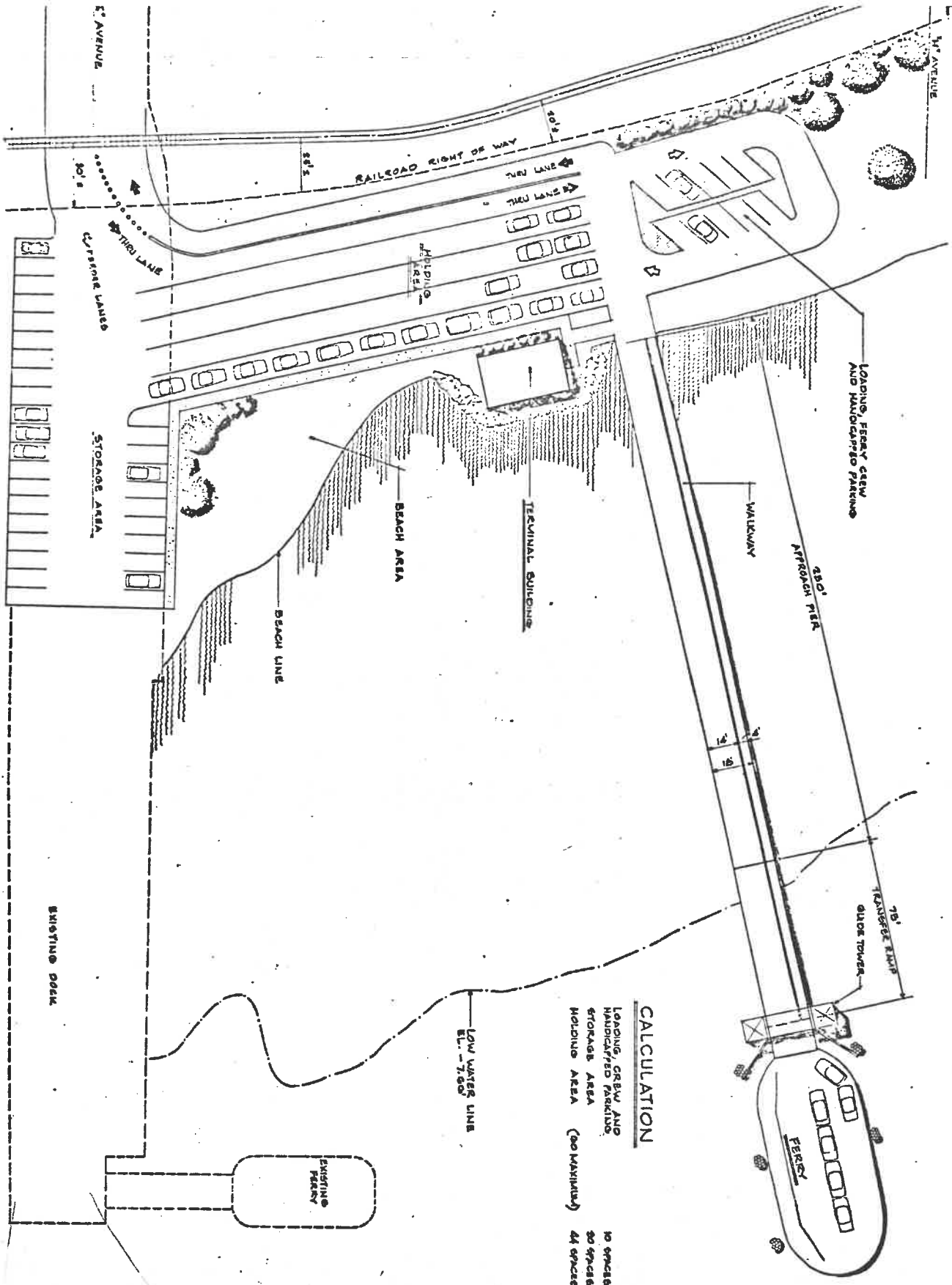
**SCHEME "A"**  
**GUEMES ISLAND FERRY**  
 ANACORTES FACILITY  
 SKAGIT COUNTY, WASHINGTON

GRAPHIC SCALE:  
 0 10 20 30 40  
 DATE:  
 NOV. 30, 1977

**vtm**  
 VETERINARY TRAVEL MANAGEMENT

**NORTH**  
**EXHIBIT A**





**CALCULATION**

LOADING, CREW AND HANDICAPPED PARKING: 30 SPACES

STORAGE AREA: 30 SPACES

HOLDING AREA (NO WAITING): 44 SPACES

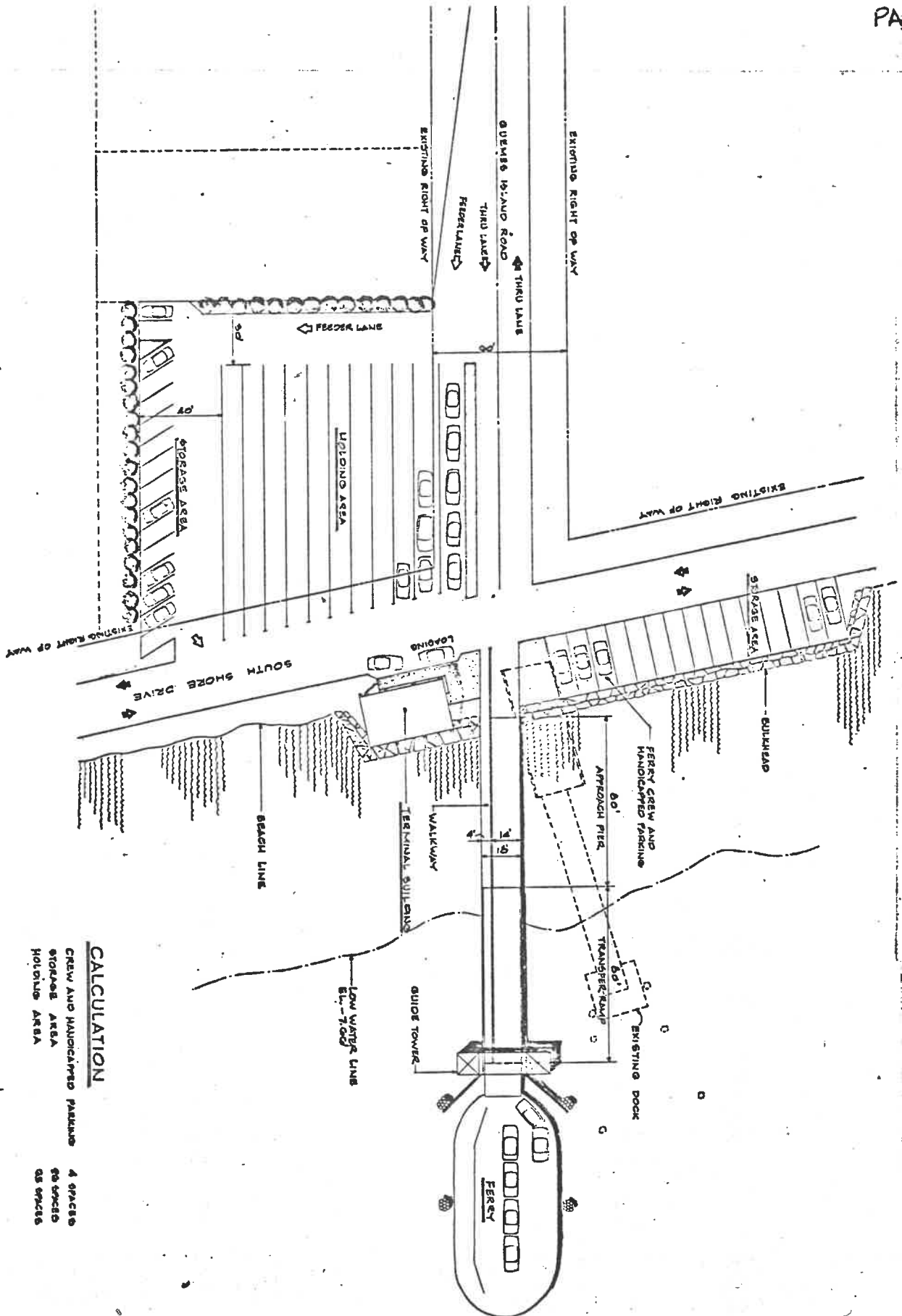
**SCHEME "C"**  
**GUEMES ISLAND FERRY**  
 ANACORTES FACILITY  
 SKAGIT COUNTY, WASHINGTON

GRAPHIC SCALE:  
 0 10 20 30 40  
 FEET

DATE:  
 NOV. 30, 1977

**vtn**  
 VICTOR T. NORTON  
 CIVIL ENGINEER  
 1000 1/2 AVENUE  
 SEASIDE, WASHINGTON 98148

**NORTH**  
  
**EXHIBIT C**



**CALCULATION**

|                              |           |
|------------------------------|-----------|
| CREW AND HANDICAPPED PARKING | 4 SPACES  |
| STORAGE AREA                 | 50 SPACES |
| HOLDING AREA                 | 25 SPACES |

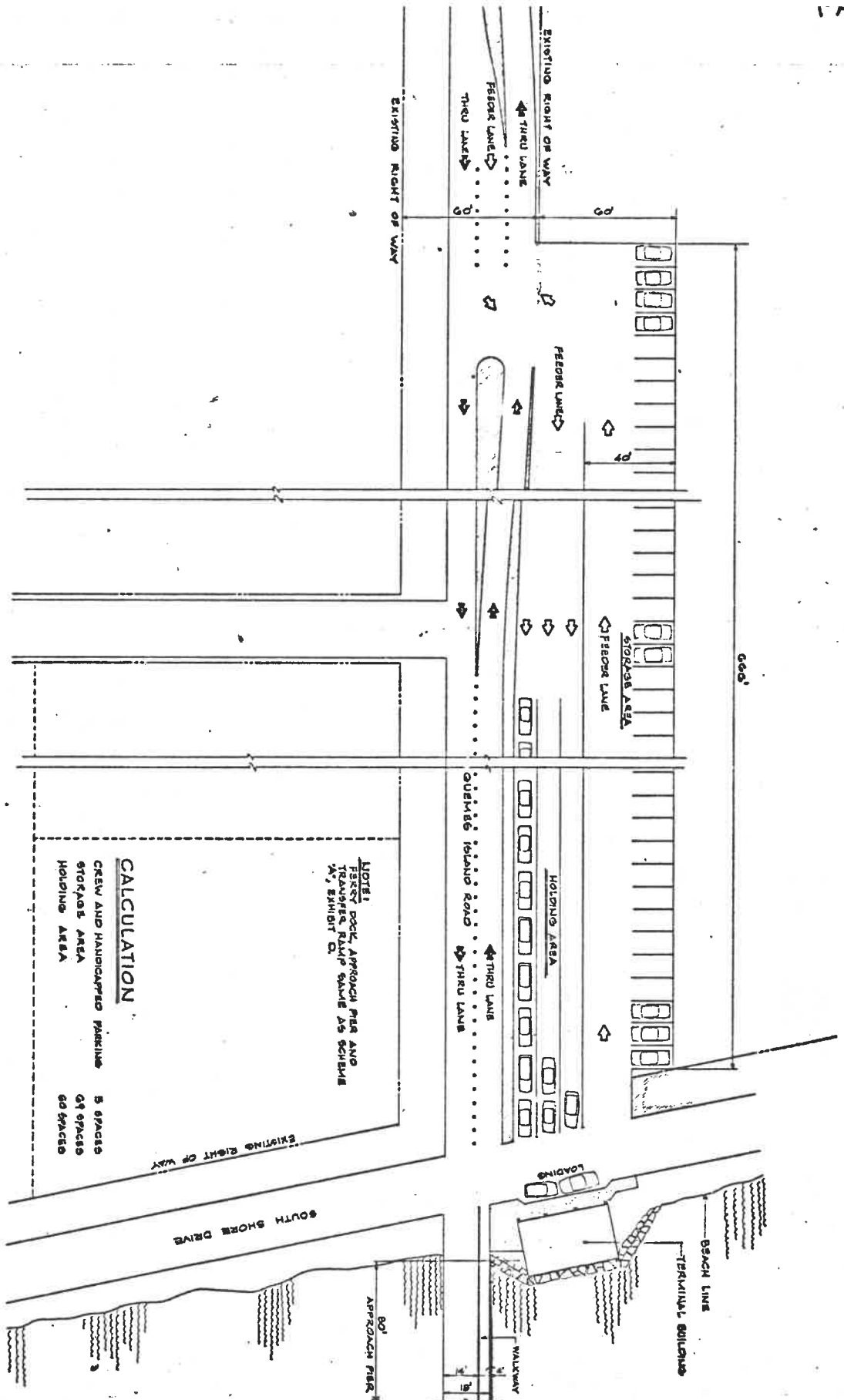
**SCHEME "A"**  
**GUEMES ISLAND FERRY**  
 GUEMES ISLAND FACILITY  
 SKAGIT COUNTY, WASHINGTON

GRAPHIC SCALE:  
 0 10 20 30 40  
 DATE:  
 NOV. 30, 1977

**VCH**  
 VICTOR CHAMBERLAIN CONSULTANTS  
 1200 1/2 AVENUE NORTH, SEASIDE, WASH. 98138



EXHIBIT  
**D**



LOT 1:  
 FERRY DOCK, APPROACH PIER AND  
 TERMINAL BUILDING SHALL BE SHOWN  
 AS EXHIBIT D.

**CALCULATION**

CREW AND HANDICAPPED PARKING 5 SPACES  
 STORAGE AREA 97 SPACES  
 HOLDING AREA 60 SPACES

**SCHEME "B"**  
**GUEMES ISLAND FERRY**  
 GUEMES ISLAND FACILITY  
 SKAGIT COUNTY, WASHINGTON

GRAPHIC SCALE:  
 0 10 20 30 40  
 DATE:  
 NOV. 30, 1977





## RELATIONSHIP TO EXISTING PLANS AND REGULATIONS

A. Anacortes Terminal Area1. Anacortes Comprehensive Plan - 1977

The newly adopted comprehensive plan designates the ferry dock area as Light Manufacturing. The existing and proposed uses are compatible with the extensive goals and policies of the plan as exemplified by the following General Goal:

"Improve the image of Anacortes as a marine oriented city by protecting and enhancing marine views, access, and resources, and by encouraging marine dependent and related activities."  
(Chapter III, p. 11).

2. Anacortes Zoning Ordinance - 1976

The zoning ordinance designates the ferry dock areas as Light Manufacturing. The proposed action is consistent with the activities and uses allowed within that zone.

See Appendix C for the regulations and standards for M-1, Light Manufacturing District.

3. Anacortes Comprehensive Park and Recreation Plan - 1977

The plan's capital improvement program, page 28, proposes that a beach park be developed at the Guemes Ferry Landing and should include "a covered picnic area, fishing pier, parking area, and be a rest, vista, and access point in the proposed Guemes Channel trail system." The plan also calls for arrangements to "be made to provide sharing of benefits of parking, restroom, and shelter facilities" if and when the county plans to reconstruct the ferry dock facilities. The park is also a part of the Six Year Capitol Improvement Program (page 32+).

Finding:

The county should work with the Anacortes Park Department during initial and subsequent design phases of the dock system in order to incorporate the beach park proposal in the overall project.

#### 4. Anacortes Shoreline Master Program

The following shoreline goals, objectives, policies, and regulations are applicable to the proposed reconstruction of the Anacortes ferry terminal facilities.

##### Goals and Objectives

##### I. Shoreline Use Element

**Goal:** Achieve uses and development which increase and preserve public physical and visual shoreline access.

**Objective:** Develop existing public view and access easements, and pursue additional public and private access opportunities.

**Goal:** Plan for and achieve those uses which permit all reasonable and appropriate uses through **a system of priorities.**

**Objective:** Establish review procedure which permits reasonable and appropriate uses through a system of priorities.

Use preferences have the following priorities:

First - water dependent uses.

Second - water related uses which provide public access.

Third - water related uses which do not provide public access.

Fourth - non-water related uses.

##### II. Economic Development Element

**Goal:** Provide opportunity for development of water dependent, commercial and industrial uses at appropriate locations.

**Objective:** Assure that adequate deep water sites will be available for uses requiring such sites.

**Goal:** Establish multiple-use commercial and industrial sites for compatible activities.

**Objective:** Provide services and utilities to serve multiple use sites, and encourage public access in commercial areas.

**Goal:** Encourage water oriented recreational/commercial development.

**Objective:** Maintain and improve existing water quality to make waters attractive to recreation users, and where appropriate, encourage uses complementary and compatible to recreational development.

### III. Public Access Element

Goal: Increase public physical and visual access to shorelines.

Objective: Provide design for public access to shoreline in City park and recreation plans.

Objective: Increase opportunities for public view sites and identify publicly owned access areas through appropriate signing.

Objective: Use street ends abutting shorelines for public access and view easements, and develop lateral access along the waterfront.

### IV. Transportation Element

Goal: Develop transportation networks and facilities which will have minimal disruption and interference with public and private use of the shoreline.

Objective: When possible, improve existing transportation facilities to enhance economic, recreational, and visual benefits to the public.

Objective: Assure that shore located activities provide sufficient parking in areas which avoid possible adverse impacts to quality or shoreline views.

Objective: Encourage landscaping of transportation facilities.

### ■ Finding:

The proposed action of facility reconstruction and construction of the parking area is consistent with the above goals and objectives. In order to fulfill the Public Access Element, the county should provide for public access on the dock facility. In order to fulfill the Transportation Element, the parking area should be located landward of the extreme high tide line of the pocket beach area to allow continued public access and should be designed to "avoid possible adverse impacts to water quality or shoreline views."

#### Shoreline Area Designation

The Anacortes Terminal area is designated as Urban II in the Anacortes Shoreline Master Program, which states:

#### URBAN II

This designation is primarily for those areas which contain a mixture of commercial, light manufacturing and high density residential uses. It is the intent

of this designation to maintain existing character of the area without substantially increasing bulk or scale of development, and to encourage location of water dependent or water related uses attractive to the public.

Uses include, but are not limited to:

1. Ferry terminals.
2. Urban parks and commercial recreation facilities.
3. Restaurants.
4. Resorts, convention centers, and hotels.
5. Marinas.
6. Shops and markets.

Urban II uses are permitted, where appropriate, in Urban I areas.

Regulation Table (between pp. 14 and 15)

For the Anacortes terminal area:

Lot coverage - 70%

Maximum height - 50' except for: "Cranes, gantries, mobile conveyors and similar equipment necessary for the functions of marinas, marine manufacturing, permitted commercial, industrial, or port activities and servicing vehicles.

Setback - N/A

■ Finding:

To be consistent, the proposed action should not cover over 70% of the subject property.

Use Activity Policies and Regulations

- 11) Ports and Water Related Industry: Public or private facilities for transfer of cargo or passengers from water-borne craft to land and vice-versa; and facilities for processing manufacturing and storage of goods.

Policies

- a) Water-dependent industrial or port uses should be given priority for frontage on navigable waters over other industrial uses.
- b) Public access opportunities are encouraged at port and industrial sites, if such access would not interfere with operations or endanger public health and safety.

- c) Cooperative and complementary port and industrial activities are encouraged to locate in common areas.
- d) Shoreline industrial areas presently served with City utilities and transportation networks and zoned industrial should be considered for use before establishing additional industrial shoreline areas.

#### Regulations

- a) Existing port or industrial development on shorelines which is neither shore nor water dependent or related shall be permitted to expand inland from, but not along the shoreline.
- b) Plans for industrial developments shall provide for screening and buffer areas.
- c) The Port of Anacortes and City shall coordinate the cooperative and multiple use of piers, docks, and parking facilities.

#### ■ Findings:

The proposed action is consistent with this section.

- 13) LANDFILL: The creation of upland area or the elevating of existing upland by deposition of soil, dredge spoil, or other solid material onto land or into shallow water bodies.

#### Policies

- a) Landfills which reduce the area of marine surface waters should be permitted for water dependent uses only.
- b) Fill materials are not to contain pollutants which could cause an adverse impact upon water quality.
- c) Landfills should be landscaped to maintain or improve existing views and prevent erosion where feasible.

#### Regulations

- a) Landfills shall comply with "Criteria for Governing the Design of Bulkheads, Landfills, and Marinas in Puget Sound, Hood Canal, and Strait of Juan De Fuca, for Protection of Fish and Shellfish Resources," State of Washington, Department of Fisheries, February 5, 1971.

#### ■ Finding:

If any Landfilling is done, it should be consistent with this section. Landscaping should be required.

- 16) Piers and Docks: Any platform structures or anchored devices located in or floating on water bodies.

#### Policies

- a) Use of floating docks or open pile piers is preferred over solid

structures in order to minimize obstruction to currents and circulation or marine life.

- b) The cooperative use of piers and docks shall be encouraged.
- c) Piers and docks shall not be constructed so as to obstruct navigable waters or to significantly reduce public use of the water surface.

#### Regulations

- a) Prior to granting a permit for a pier, dock or float, the effects of the structure upon adjacent shoreline shall be determined, and disposition of the permit by the City shall reflect such determination.
- b) Piers and docks may be restricted in areas of substantial littoral drift or significant historic/scenic values. In these areas open piling or floating structures may be required.

#### ■ Findings:

The City of Anacortes will have to make a determination per regulation 16.(a) for the proposed action to be consistent with this section.

#### General Regulations for Shoreline Areas

- 1) All soils disturbed by use activities, and which are potentially erodable or unstable shall be stabilized through seeding, mulching, terracing or other effective means.
- 2) Development on unique or fragile shoreline areas shall be avoided unless it can be shown in the proposal that development will not degrade the shoreline or that the development will enhance public use of shoreline resources.
- 3) Shorelines are to kept free of discarded waste materials.
- 4) Street rights-of-way or utility easements which offer physical or visual access to the shorelines or water body shall be preserved.

#### ■ Finding:

To be consistent, activities of the proposed action should be in compliance with these General Regulation:

#### B. Guemes Island Terminal Area

##### 1. Skagit County Comprehensive Plan for the Islands District, 1975

The following policies are applicable to the proposed reconstruction of the Guemes Island terminal area:

6.6.1.14 The elements and policies of the Shoreline Master Program and the River Basin - Water Pollution Abatement Program should be integrated into this plan upon their adoption by the Skagit County Board of Commissioners.

6.6.3.3. Skagit County's ferry service capacity should be enlarged to adequately serve the projected demand from the islands.

The comprehensive plan designates the site area as Residential.

■ Finding:

The proposed action is consistent with the comprehensive plan.

2. Skagit County Zoning Ordinance and Map

The zoning ordinance map designates the terminal area and the proposed parking and holding area as Residential. However, the existing ferry dock facilities and related parking are considered transportation systems as roads and bridges are and are, thus, exempt from provisions of the zoning ordinance. Since the proposed action is within the shoreline management area and since the Shoreline Master Program specifically addresses these types of actions, they are better handled by that program and the shoreline permit system.

3. Skagit County Shoreline Master Program

The following shoreline goals, policies, and regulations are applicable to the proposed reconstruction of the Guemes Island ferry dock and the construction of its related parking and holding area:

Chapter 4 Master Program Goals

1. Shoreline use - To allow for compatible uses of the shorelines in relationship to the limitations of their physical and environmental characteristics. Such uses should enhance rather than detract from or adversely impact, the existing shoreline environment.
3. Public access - To provide safe, convenient, properly administered and diversified public access to publicly owned shorelines of Skagit County without infringing upon the personal or property rights of adjacent residents. Such access should not have an adverse impact upon the environment.
4. Circulation - To permit safe, adequate, and diversified transportation systems that are compatible with the shorelines, resulting in minimum disruptions to the shoreline environment.

8. Restoration and enhancement - To restore and enhance those shoreline areas and facilities that are presently unsuitable for public or private access and use.

■ Finding:

The proposed action is consistent with the above goals, especially numbers 4 and 8.

Chapter 5 Shorelines of Statewide Significance

The State Legislature, through the Shoreline Management Act of 1971, designated as shorelines of statewide significance all marine waters, their water column, and beds seaward of the extreme low tide line. Furthermore, the legislature determined that in order to fulfill the goal of statewide public interest in shorelines of statewide significance, preference shall be given to those uses which are consistent with the following policies pursuant to RCW 90.58.020:

1. The state-wide interest should be recognized and protected over the local interest.
2. The natural character of shorelines of state-wide significance should be preserved.
3. Uses of shorelines of state-wide significance should result in long term benefits to the people of the state.
4. The natural resources and ecological systems of shorelines of state-wide significance should be protected.
5. Public access to publicly owned areas in shorelines of state-wide significance should be increased.
6. Recreational opportunities for the public should be increased on shorelines of state-wide significance.

■ Finding:

The proposed action is consistent with the above policies.

Chapter 6 Shoreline Area Designations

The Shoreline Area Designation Map designates the area landward of the ordinary high water mark (mean high tide) as Rural Residential and the area seaward of the same line as Aquatic.

Rural Residential Shoreline Area

- a. Definition: The Rural Residential Shoreline Area is a shoreline area characterized by low to medium intensity land uses that exhibit small scale alterations to the natural shoreline environment. These land uses are generally of a residential, commercial, recreational, and agricultural nature with utilities and services provided on an individual or community basis.



- b. Objective: The Rural Residential Shoreline Area is intended to provide for a transition area between the more intensive Urban Shoreline Area uses and those low intensity uses of the Rural Shoreline Area. It also intends to identify those shoreline areas that presently exhibit the low to medium level of uses and have the environmental capabilities to support such uses for future development.
- d. Management Policies:
- (1) Residential, recreational, and agricultural activities of low to medium intensity are preferred over other more land and resource consumptive or developmental uses.
  - (2) Residential and other developments in the Rural Residential Shoreline Area should be located, sited, designed, and maintained to protect and enhance the shoreline environment.
  - (3) Appropriate developments, if allowed, should occur in those areas of the Rural Residential Shoreline Area that are environmentally capable of supporting the use or uses while protecting and enhancing the shoreline environment.
  - (4) Public access opportunities to publicly owned shorelines and/or water bodies should be encouraged in the Rural Residential Shoreline Area.
  - (5) Residential and recreational developments should utilize shoreline areas for community or public open space.
  - (6) Commercial developments in the Rural Residential Shoreline Area should be limited to those uses that serve the surrounding residential, recreational, or agricultural activities and should not conflict with these activities.
  - (7) Access, utilities, and public services for Rural Residential developments should be economically and physically available and adequate to serve existing and planned needs.

■ Finding:

The proposed action is consistent with the above Management Policies. The parking/holding area will be setback from the immediate shoreline area, thereby protecting and enhancing the shoreline environment. (Nos. 2&3) Public access will be encouraged and enhanced by the project (No. 4) and the proposed action will "be economically and physically available and adequate to serve existing and planned needs" (No. 7).

### Aquatic Shoreline Area

- a. Definition: The Aquatic Shoreline Area is all water bodies including marine waters, lakes, and all rivers of the state together with their underlying lands and their water column, including but not limited to bays, straits, harbor areas, waterways, coves, estuaries, lakes, streams, tidelands, bedlands, and shorelands.
- b. Objective: The Aquatic Shoreline Area designation is intended to encourage and protect appropriate multiple uses of the water or, in some cases, single purpose, dominant uses in limited areas; to manage and protect the limited water surfaces and foreshores from inappropriate activities or encroachment; and, to preserve and wisely use the area's natural features and resources which are substantially different and diverse in character from those of the adjoining uplands and backshores.
- c. Designation Criteria: Areas to be designated as an Aquatic Shoreline Area should possess one or more of the following criteria:
  - (1) All marine water areas seaward of the ordinary high water mark including estuarine channels, sloughs, and associated wetlands.
- d. Management Policies:
  - (1) Aquatic Shoreline Areas should allow for compatible, appropriate uses that do not conflict with natural and cultural processes and features of the water body and associated wetlands. Such uses should be shoreline and water dependent.
  - (2) Port and water related industrial and commercial developments and any other development proposals of a consumptive land and resource nature should locate in appropriate, existing use areas and/or in officially areas.
  - (3) During proposal review, the protection, enhancement, and/or proper sustained yield utilization of the natural resources of the Aquatic Shoreline Area should be of primary consideration.
  - (5) Diverse public access opportunities to public water bodies should be encouraged and developed and should be compatible with the existing shorelines and water body uses and environment.

- (7) Priority should be given to those activities which create the least environmental impact to this shoreline area.
- (9) Abandoned and neglected structures in the Aquatic Shoreline Area which cause adverse visual impacts and are a hazard to public safety and welfare should be removed or restored to a useable condition.
- (10) Material from the bedlands and bottoms of the Aquatic Shoreline Area should not be used for landfill or to backfill shore defense works.

■ Finding:

The proposed action is compatible with the above policies of the Aquatic Shoreline Area because:

- 1. The use is shoreline and water dependent.
- 2. The action is occurring in an "existing use area".
- 3. The natural resources of the area will be protected.
- 4. Public access will be protected.
- 5. The action will create minimal environmental impact in the Aquatic Shoreline Area.
- 6. The public safety and welfare will be protected with the reconstruction of the docking facility.
- 7. Materials from the Aquatic Shoreline Area will not be used for landfill.

Chapter 7 Policies and Regulations

The following policies and regulations from two sections of this chapter are applicable to the proposed action:

7.10 Piers and Docks

1. POLICIES

A. General

- (1) Feasibility - Proposals for piers or wharves should exhibit the need or feasibility for such structures.
- (2) Uses- Piers and docks should be allowed only for use by water craft, water dependent and related economic activities, water related public recreation, and emergency vessels.
- (3) Existing Facilities - Multiple use and expansion of existing piers, wharves, and docks should be encouraged over the addition and/or proliferation of new facilities.

- (5) Public Access/Use - Encourage pier and dock projects to provide for public access, docking, launching, and use.
- (6) Water quality, fish, shellfish, and wildlife - Piers and docks and their associated activities should conserve and enhance water quality, fish, shellfish, and wildlife resources and habitats.
- (8) Restoration - Local programs and coordinated efforts among private and/or public agencies should be initiated to remove or repair failing, hazardous, or non-functioning piers and docks and restore such facilities and/or shore resources to a safe, usable state for commercial and public recreation activities.

■ Findings:

The proposed action is consistent with the above policies.

B. Geo-Hydraulic and Design/Location

(1) Marine and Lake Shores:

- a. Where geo-hydraulic processes are active (shore erosion and accretion, littoral drift) piers and docks should allow for a maximum of littoral drift and should minimize interference with basic geo-hydraulic processes.
- b. If a bulkhead-like base is proposed for a fixed pier or dock where there is net positive littoral drift, the base should be built landward of the ordinary high water mark (foreshore) or protective berms.
- c. Piers and docks should not be located in estuaries and biologically productive marshlands.

(3) Floating and/or open-pile construction should be utilized:

- a. Where geo-hydraulic processes are active
- b. Where shore trolling and commercial fishing is a significant activity.
- c. If there will be interference with currents, circulation, and aquatic life.

(4) Open-pile piers and docks should not form groins or baffles that trap littoral drift, adversely affect river channel form and alignment, promote

erosion or accretion, or significantly interfere with fisheries resources and other aquatic life.

- (5) Impacts - Piers and docks should be sited and designed to minimize all possible adverse impacts.

■ Finding:

The proposed action will utilize pier pilings to allow for littoral drift. Bulkhead-like base structures will be located no further seaward than the present structure.

2. REGULATIONS

A. Shoreline Areas

(3) Rural

- a. Docks, mooring buoys, and floats are permitted subject to the General Regulations.
- b. Piers and wharves for port, industrial, or commercial purposes are permitted as a conditional use.

(6) Aquatic

- a. Piers, docks, mooring buoys, and floats are permitted according to the appropriate upland Shoreline Area designation and the General Regulations.

■ Finding:

The shoreline substantial development permit must reflect that this action is a conditional use, thereby allowing greater flexibility by requiring certain conditions be met to mitigate potential adverse impacts.

B. General

- (1) Permit/statement of exemption - In order to assure that piers, dock, and related development is consistent with this program as required by RCW 90.58.140 (1), no such development may commence on shorelines without the responsible person having first obtained either a Shoreline Permit or Statement of exemption from the County; provided, that no shoreline permit nor statement of exemption shall be issued for a pier or dock on state owned tidelands or shorelands without the applicant having a lease from the Department

## of Natural Resources

■ Finding:

The county owns the tidelands utilized for the ferry dock on Guemes Island.

- (12) Utilities - Overhead wiring, or plumbing is not permitted on piers or docks. Utilities must meet the standards of applicable Uniform Building and Electrical Codes.

■ Finding:

Overhead wiring may be necessary for lighting and ramp operation. A variance to this standard should therefore be requested.

- (13) Petroleum and hazardous products storage and handling:
- a. Bulk storage of gasoline, oil, and other petroleum products for any use or purpose is not permitted on piers and docks. Bulk storage means non-portable storage in fixed tankage. Storage tanks for boat fueling facilities shall locate landward of the OHWM and meet the policies regulations for "Utilities, Chapter 7.18."

■ Finding:

No petroleum products will be stored on the Guemes Island side of the ferry system.

- (14) Safety - All piers, docks, mooring buoys and floats shall be located, constructed, and designated with appropriate markings so as not to be a hazard to public health, safety, and navigation and shall not materially interfere with normal public use of the water and shorelines.

7.17 TRANSPORTATION FACILITIES1. POLICIES

## A. General

- (1) Coordination - Transportation facility proposals should be consistent and coordinated with all federal, state and/or local planning functions and efforts, including comprehensive plans.
- (2) Geo-hydraulics -
  - a. Transportation facilities should be located, designed, and maintained to avoid adverse impacts to, or if necessary, protect the active geo-hydraulic processes operating along Skagit County's shorelines.

b. Transportation facilities should be located, designed, ~~to minimize the need for~~ shore defense and shoreline stabilization works.

- (3) Existing Facilities and Corridors - Transportation facilities and services should utilize existing shoreline corridors, providing such corridor or facility additions and modifications do not adversely impact the shoreline resource and are otherwise consistent with this program. If expansion of existing corridors will result in significant adverse impacts, then alternative, inland routes should be utilized.
- (4) Joint-use - Transportation corridors within shoreline areas should be jointly used by other shoreline related or dependent linear uses, such as utilities, whenever feasible.
- (5) Multiple Use/Public Access - Transportation facilities, necessarily located on shorelines and funded in any way by public monies, should provide for public point or linear access along the corridors to publicly owned shorelines and water bodies. Such access or multiple use should not unduly interfere with facility operations or endanger public health and safety. Shoreline trails, viewpoints, rest, and picnic areas are examples of public access.

(6) Natural Resources, Processes, and Other Uses

Transportation facility development, if permitted on shorelines, should not significantly damage, diminish, or adversely effect:

- a. Estuaries, natural wetlands, and marshes.
- b. Prime agricultural land.
- c. Natural resources such as but not limited to sand and gravel deposits, timber, or natural recreational beaches.
- d. Fish, shellfish, and wildlife habitats and migratory routes.
- e. Water quality and quantity.
- f. Public access to publicly owned shorelines and water bodies.

(7) Major Public Access to Publicly Owned Shorelines and Water Bodies

- (7) Hazardous Areas - Transportation facilities and corridors should be located, designed, and maintained to avoid, or if necessary, withstand 100 year frequency flooding and storm tides or surges without becoming hazards and without the placement of massive structural defense works.
- (9) Water Quality - Transportation facility design, construction and maintenance activities, should adhere to the guidelines, policies, standards, and regulations of water quality management programs and appropriate regulatory agencies.

■ Finding:

The proposed action is in compliance with the above policies because:

1. The proposal is consistent and coordinated with all federal, state, and local planning functions and efforts.
2. Geohydraulics will be protected.
3. Existing corridors will be used.
4. Public access will be preserved.
5. Natural resources will not be affected.
6. The proposal will be designed and constructed to avoid damage by coastal flooding and storms and will not affect water quality.

B. Location

- (2) All roadways, railways, bridges, and parking areas should not locate:
  - a. In front of feeder bluffs, over driftways, or on accretion shore forms.
  - c. In or through designated parks, scenic, natural, historic, archeological, or recreation areas.
  - d. Along sensitive shoreline areas such as but not limited to those with steep slopes or soils subject to erosion or sliding.

■ Finding:

Any portion of the dock facility will not be located in the above types of shorelines. The accretion shore form lies west of the dock.

- (4) Parking areas for all types of vehicles and for all forms of shoreline activity should not be permitted over water and should be adequately set back to allow for shoreline dependent activities.



■ Finding:

The parking area will be landward of the immediate shoreline area.

c. Design and Construction

- (1) All roadways, railroads, bridges, and parking areas, if permitted in shoreline areas, should be designed, constructed and maintained to prevent and/or control all debris, overburden, runoff, erosion and sedimentation generated from the effected areas.

■ Finding:

The applicant states that such action will be taken during construction of the facilities.

(2) Drainage and Flood Waters

- a. All transportation facilities, if permitted in shoreline areas, should be designed so as not to adversely affect or interfere with the flow of surface, sub-surface, and flood waters.
- b. Transportation facilities essential to shoreline dependent and related uses should, if possible, parallel the surface drainage flow. If facilities must cross or bisect drainage and tidal flows, they should be constructed as elevated, open structures.

(3) Construction and maintenance

- a. All shoreline areas disturbed by facility construction and maintenance should be replanted and stabilized with compatible, self-sustaining vegetation.
- b. Handling and application practices for fertilizers and pesticides should adhere to the guidelines and regulations of applicable regulatory agencies.

(4) All transportation facilities, if permitted parallel to shoreline areas, should be adequately setback from immediate shorelines and water bodies and should provide buffer areas of compatible, self-sustaining vegetation. Shoreline scenic drives and viewpoints should not be required to provide buffer areas.

(5) Parking Areas - Parking areas, if permitted within the shoreline area, should be constructed of permeable materials to minimize runoff and potential erosion and sedimentation.

(6) All transportation facilities should be designed and constructed to comply with County Engineer Standards.

■ Finding:

The applicant states that design and construction will be performed in a manner consistent with these policies except for (5). The parking area is proposed to be paved with impervious materials.

2. REGULATIONS

A. Shoreline Area

(2) Rural Residential

- b. Airports, landing fields, ferry terminals, and float plane related development are permitted as a conditional use.

(6) Aquatic

- b. Ferry terminals and float plane bases are permitted as a conditional use.

B. General

- (1) Other plans, ordinances - Proposals for transportation facilities shall comply with Skagit County comprehensive plans and zoning, subdivision, short plat, and Planned Unit Residential Development ordinances and any revisions or amendments thereto. In the case of conflicting standards or requirements, the more stringent shall apply.

■ Finding:

The proposed action has been found to be in conformance with affected comprehensive plans and zoning ordinances.

(3) Location

- a. Roads, railroads, and other transportation facilities EXCEPT for the exceptions noted in C. Tabular Regulations page 7-124, shall be located landward of:
  - 1. Estuaries and their associated wetlands.
  - 2. Erosion or accretion shore forms and associated drift sectors and backshore marshes.
  - 3. Officially designated fish, shellfish, and wildlife habitats.
- b. Roads, railroads, and other transportation facilities are not permitted to locate over water EXCEPT to serve shoreline and water dependent or related uses consistent with this program and unless inland alternatives have been fully proven infeasible.
- c. Roads, railroads, and other transportation facilities shall not block or appropriate public access to publicly owned shorelines and water bodies.

■ Finding:

The exception noted in (3) a. above states:

Exceptions: Setbacks do not apply to shoreline point accesses for boat and ferry terminals, marinas and boat launches, other approved shoreline dependent uses, approved water crossings, and proposed non-arterial and secondary roads upland of existing dedicated roads. Thus, the dock facility will not have to be located landward of the three areas mentioned in (3) a.

(4) Design, Construction, and Maintenance Procedures

- a. Water crossings - Transportation facilities that are allowed over water bodies and associated wetlands shall utilize elevated, open pile or pier structures and techniques. The number of water crossings shall be minimal.
- b. Bridge abutments and necessary approach fills shall be located landward of associated wetlands or the OHWM for water bodies without associated wetlands PROVIDED mid-river bridges piers shall be permitted.
- c. Overburden and excavated materials from both construction maintenance activities including drainage ditch clearance shall not be deposited or sidecasted into or on the shoreline side of roads, or in water bodies, natural wetlands, estuaries, tidelands, accretion beaches, and other associated wetlands.  
Such materials shall be deposited in stable locations where re-entry and erosion into waterways is prevented.
- d. All excavation materials and soils exposed to erosion by all phases of road, bridge and culvert work shall be stabilized and protected by seeding, mulching or other effective means immediately upon completion of operation.
- e. Relief culverts and diversions ditches shall not discharge into erodible soils, fills, or side cast materials.
- g. Erosion control - All surfaces and drainage systems shall be designed and maintained so as to prevent or minimize and control runoff and sedimentation.

■ Finding:

Construction of the ferry dock facilities and the parking/holding area will meet the above standards.

- (5) Landfills - Landfills associated with transportation facility development are not permitted in or on water bodies and all associated wetlands and beaches EXCEPT when all structural or upland alternatives have been proven infeasible and for uses in a location consistent with this program.

■ Finding:

The proposed action will not involve any landfills at or below the ordinary high water mark.

(6) Parking Areas

- a. Over water parking facilities are prohibited in all shoreline areas.
- b. Setbacks - Unless specifically stated in Tabular Regulations for each shoreline use, parking areas for approved shoreline uses shall be located landward of the primary facility or activity.
- c. Screening - Parking areas shall be screened from view of shoreline areas and adjacent properties through the planting of compatible, self-sustaining vegetation to be planted within six (6) months of facility completion. Screening should be effective within two (2) years of planting.

■ Finding:

Parking will not be over water and will be landward of the dock facility. The proponent will have to provide vegetative screening. Its effectiveness will be somewhat limited because of the openness of the area and the slope of the land which faces the channel.

EXISTING ENVIRONMENTElements of the Physical EnvironmentA. Ferry System and Facilities - General Description

For a more detailed evaluation of the ferry operations, see the Transportation section of Elements of the Human Environment, this chapter.

The Ferry

Skagit County has been operating the ferry Almar since 1965 to serve the residents, property owners, and visitors of Guemes Island. Previously, the ferry system was privately owned and operated.

The Almar was "backyard built" in 1947 on Swan Island in the Columbia River near Cathlamet, Washington, and was designed for use in that river.

A general description follows:

|                               |                                      |
|-------------------------------|--------------------------------------|
| Length - 61.8'                | Capacity - 9 automobiles; less than  |
| Beam - 31.8'                  | 50 passengers                        |
| Gross Tons - 94.0 (77 net)    | Power - twin 6-71 GMC diesels at one |
| Class - 100 ton (T Class)     | end                                  |
| Load Limit - 12 tons          | Control - by rudders                 |
| Construction - Steel (welded) | Crew - 2                             |

In January, 1977, the Skagit County Engineers and Captain A. F. Raynaud, Marine Surveyor, evaluated the ferry and both docking facilities. For the complete evaluation, see Appendix B. General comments follow:

The Anacortes Facility

The Anacortes docking facility, located at the foot of "I" Avenue, consists of a large dock area built over the intertidal zone. On the dock there is parking for approximately 25 vehicles, a waiting or staging area for vehicles to load into the ferry, and the combination office and waiting room building. The loading truss and apron are located at the end of the dock, at a right angle to the north-south length of the dock. The Engineer's evaluation reports that "60% of the dock is rotten and should be replaced", the waiting room structure is serviceable but that the floor is rotting, that the loading truss is in fair condition with the movable end rebuilt in 1974 and the apron rebuilt in 1976; that the hoisting tower is in fair to poor condition and should be replaced in the next two to three years and that the dolphins are in fair to good condition.

Overflow parking is available nearby along 6th Street. This parking, located in a residential area, is frequently needed, especially during the more popular summer months.

### The Guemes Island Facility

Lying at the foot of Guemes Island Road, the Guemes docking facility consists of a floating bridge-like span, the loading truss and apron, and dolphins. The condition of the span determines the 12 ton load limit of the ferry system. Parking is limited to a small lot just west of the span and to parallel parking along and on South Shore Road. The staging area consists of an extra lane  $\frac{1}{2}$  mile long on the Guemes Island Road. A telephone booth and a covered waiting shed flank the entrance to the floating span.

The Engineer's evaluation (Appendix B) states that the float is kept operational only by the addition of foam after it sunk in 1976, and that it will require continual maintenance until it is replaced. The loading apron hinge and counterbalance are judged to be in poor condition, the truss timbers are in fair to good condition with the steel hangers and bracing in fair to poor condition, and the end hinge judged poor.

### B. Anacortes Terminal Area and Guemes Channel

Uplands Soils - The Soil Conservation Soil Survey of Skagit County (Reference 1) indicates that the upland soil type in this vicinity is Alderwood gravelly loam with slopes of 3% to 8%. However, a major portion of the site has been altered by the construction of fills and roads, a railroad, dock facilities, and general residential, commercial, and light industrial development. Very little natural soil conditions exist within the site and vicinity.

Shoreline and Intertidal Area - The Anacortes Shoreline Inventory (Reference 2) describes the site vicinity as being altered by the construction of riprap for the railroad and the pier facilities. A sand and cobble "pocket" beach exists immediately west of the dock, providing the only discernible exposed intertidal area not restricted to public access by private development along this shoreline reach (ferry terminal to Ship Harbor).

The intertidal area is composed of sand and rock cobbles while the off-shore bottom is composed primarily of rock. Geohydraulic activity (erosion, transportation, and deposit of shoreline material) is minimal, having been diminished by past filling and development activities.

Water

Surface water runoff - Since most of the site has been covered by impervious materials with the exception of the area west of the dock and north of the railroad tracks, rainfall collects and drains directly into the channel. In the undeveloped portion of the site the natural drainage is described as "good" with surface runoff "slow" (Reference 1).

Surface water quality - Although no chemical analysis of the surface water was performed, it can be surmised that it contains typical urban runoff elements such as sediment, oils, greases, and man-made and natural debris.

Flora - The undeveloped portion of the site supports growth of black-berry bushes and wetland grasses and shrubs. No rare or threatened species are identified.

Fauna - No site specific seasonal species identification survey was performed. However, certain determinations can be made due to habitat type.

Mammals - Mammals expected to be found on the site, aside from domestic species, include: mice, shrews, rats, and occasionally possum and skunk.

Birdlife - Bird life most commonly found at the site depending on the season include loons, grebes, cormorants, heron, various waterfowl species and shore birds, gulls, sparrows, starlings, and finches. For a complete list of species, see Appendix A.

Marine Life - (Guemes Channel and Island included) The following marine life are found in the areas of both ferry terminals during part of the year:

Crab - Cancer magister

Mammals - Killer, Gray, and Minke Whales

Harbor and Doll's Porpoises; Harbor Seals

Fishes - All species of juvenile and adult Pacific salmon utilize Guemes Channel for migration: Pink, Coho, Chinook, Chum, and Sockeye. The Channel is considered to be a major migration route and critical to the growth and survival of salmon species. Numerous nearshore, bottom, and non-salmon sport fishes exist in the area, including steelhead and cut-throat trout, surf perch, smelt, herring, rockfish, cods, and sculpin. For a complete list, see Appendix A.



Shellfish

Subtidal - No significant subtidal hardshell clam beds are found in the Anacortes-Guemes Island area.

Intertidal - The following hardshell clams may be found on occasion in the gravel or sandy beaches in the Anacortes-Guemes Island area:

|              |                               |
|--------------|-------------------------------|
| Butter clams | Saxidomus giganteus           |
| Little necks | Protothaca staminea           |
| Manila clams | Venerupis japonica            |
| Cockles      | Clinocardium nuttalli         |
| Geoducks     | Panope generosa               |
| Horse clams  | Tresus nuttalli, tresus capax |

Razor clams (*Siliqua patula*) are found only on the Guemes Island side of the channel. (Reference 3)

Numerous species of other invertebrates such as worms, barnacles, hermit crabs, mussels, and snails also inhabit the intertidal and subtidal regions of the channel. See Appendix A for a more extensive inventory.

Land Use - A variety of land and water uses are in the vicinity of the Anacortes ferry terminal site. A private marina lies immediately east of the ferry dock with other port related industrial and commercial uses further east. To the south, Burlington-Northern tracks and right-of-way bisect the "I" Avenue access while beyond the railroad and upland is an older, well established residential neighborhood. Further west along the shore are more port related uses and, paralleling the shore, the railroad.

Noise- Noise in the area is generated by the nearby commercial and industrial use but are not considered significant. Noise related to the operation of the ferry is generated by the ferry itself, its whistle and especially by the automobile and truck traffic it serves. Vehicles must ascend and descend a short but steep hill on "I" Avenue before either turning east on 6th Street to downtown Anacortes or continuing south on "I" through the residential area. Traffic counts are discussed in the Transportation Circulation Section of this chapter.

The above noises are not considered to be overly significant but probably generate a periodic noise level of 45 to 60 DBA and do add to the background levels in what appears to be a quiet neighborhood. No noise level measurements were made on the site.

Light and Glare - Light and glare are generated by lighting facilities at the various commercial and industrial uses, including those of the ferry system. This lighting is viewed as essential to the operation and security of these uses although it may be a nuisance to some area residents.

C. Guemes Island Terminal Area

Upland Soils - The Soil Survey of Skagit County (Reference 1) indicates that the upland soil in the Guemes Island terminal area is Coastal Beach (0-3% slope), backed by Coveland gravelly loam (3-8% slope). With the exception of the north-south Guemes Island Road and east-west South Shore Road and immediate dock area, the soils in the area have been relatively undisturbed. Table A presents some soil characteristics:

TABLE A: Soil Characteristics - Guemes Dock Area

| Soil Type              | Natural Drainage | Surface Runoff | Internal Drainage | Occurance of high water table | Septic suitability | Fertility       | bearing Capacity |
|------------------------|------------------|----------------|-------------------|-------------------------------|--------------------|-----------------|------------------|
| Coastal beach          | Excessive        | Very slow      | Very Rapid        | Continual                     | Wet                | Poor            | Unstable         |
| Coveland gravelly loam | Imperfect        | Slow           | Slow              | Intermittent in winter        | Severe             | Moderately high | Low              |

(Reference 1 and 4)

Coastal beach soils also exhibit moderate corrosive effects on uncoated steel and concrete. (Reference 4) The Skagit County Shoreline Inventory indicates that the upland soil is best suited for farming and pasture (Reference 5).

Shoreline and Intertidal Area - The shoreline area of the Guemes Island ferry dock is typified by a low bank, gentle slope, grassy beach area backed up by gently sloping, rolling meadow uplands. At and below mean high tide, the beach is composed of gravel, cobbles, and driftwood and then becomes rocky further out in the intertidal area. This intidal area is generally accessible to the public.

The beach is a class II beach, inundated only during periods of high tide. This stretch of beach lies at the east end of an identified, well

developed class I accretion beach (Reference 6).

The offshore bottom steepens in profile and is rocky.

### Water

Surface Water Run-off - As noted in Table A, the two soils in the site vicinity exhibit very slow to slow surface water run-off capabilities. In the coastal beach soil, surface run-off is very slow because of the very rapid internal drainage of this loosely aggregated soil. The Coveland gravelly loam soil in the vicinity of the proposed parking area has both slow internal and surface drainage.

Surface Water Quality - Although no analysis of the surface drainage water was performed, it can be surmised that its quality is excellent except where oil, grease, rubber, and sediment is washed from the roadways.

Flora - Areas between the South Shore Road and the beach support native, wetland grasses which are tolerant to periodic inundation by saline waters. The area proposed for parking has native grasses with scattered shrub growth. No rare or threatened species are identified.

Fauna - No site specific seasonal species identification survey was performed. However, certain determinations can be made from analysis of the habitat type.

Mammals - Mammals expected to be found on or near the site aside from domestic species include: mice, shrews, rats, opossum, skunk, raccoon, and ground squirrels.

Bird Life - Bird life most commonly found at or near the site depending upon the season includes: loons, grebes, cormorants, herons, various waterfowl species and shore birds, gulls, sparrows, starlings, and finches. Raptor species include: the redtail hawk, marsh hawks, rough legged hawks, kestrel or sparrow hawks, osprey, and North American Bald Eagle. For a more complete list of species, see Appendix A.

Marine Life - See "Anacortes Terminal Area", this chapter.

Land Use - Uses immediate to the ferry dock include: roads, (Guemes Island Road, north and south; South Shore Road, east and west); small lot residences along the west side of Guemes Island Road and along South Shore Road to the west; a floating residence to the east of the ferry dock; and a recently started fruit tree orchard in the meadow northeast of the ferry dock.

An old, unused single story house with several dilapidated outbuildings occupies the proposed parking lot property. The ferry span, float, and dolphins and the floating residence are the only structural uses located in the intertidal and offshore area.

Noise - Noise in the area is generated by the ferry operation and the vehicles utilizing the ferry. These activities are only occasional and related to the scheduled and non-scheduled ferry runs. Flight training exercises from the Whidbey Naval Base occasionally generate noise in the area. The above activities may generate noise that is disturbing to area residents but otherwise, is not considered unreasonable or adverse.

Light and Glare - Light and glare are generated by the lighting at the ferry and along Guemes Island Road approaching the ferry dock. Although this lighting aids the operation and provides for security, it may be viewed as a nuisance to area residents.

D. Guemes Channel

General Characteristics - The distance at which the Almar crosses Guemes Channel is three fourths (3/4) of a mile wide. The average depth in the center of the channel is thirteen (13) fathoms (78 feet). The bottom is rocky and considered to be biologically productive.

The tide ranges eleven (11) feet between extreme low and high tides, generating currents greater than four (4) knots on the average in both east and west directions. Waves or swells of five (5) feet during storms are not uncommon while waves caused by passing ships can reach three (3) to four (4) feet in height. (Reference 7) -

Water Quality - The Washington State Department of Ecology rates Guemes Channel water quality as Class A (excellent) which is only exceeded by Class AA (extraordinary). To be rated as Class A, water quality must meet or exceed the following parameters:

1. Dissolved oxygen must exceed 6.0 mg/liter.
2. Water temperature must not exceed 16° C.
3. pH must be within a range of 7.0 to 8.5.

Table B shows that channel waters generally met or exceeded these criteria.

TABLE B  
July 1974 - May 1975

| <u>Depth (meters)</u> | <u>Temperature Range (° Celsius)</u> | <u>Salinity (0/100)</u> | <u>Dissolved Oxygen (mg/l)</u> |
|-----------------------|--------------------------------------|-------------------------|--------------------------------|
| 0                     | 6.5 - 13.5                           | 28.0 - 30.5             | 5.0 - 7.8                      |
| 5                     | 6.5 - 12.5                           | 29.0 - 30.5             | 5.0 - 8.2                      |
| 10                    | 6.5 - 12.0                           | 29.0 - 30.7             | 4.9 - 6.8                      |
| 15                    | 6.0 - 12.0                           | 29.0 - 30.7             | 4.8 - 8.6                      |
| 20                    | 6.0 - 12.0                           | 29.2 - 30.7             | 4.6 - 6.8                      |

Reference 2

Fauna - The types and species of marine life found in Guemes Channel were presented in the discussion of "B. Anacortes Terminal Area and Guemes Channel", this chapter, and are also more extensively presented in Appendix A.

Bird Life - Birds more exclusively found on the Channel include loons, grebes, cormorants, gulls and numerous seasonal waterfowl and shore bird species.

Water Uses - While supporting a wide range of marine life, Guemes Channel also serves a variety of man-made or man-induced uses, such as:

- Commercial and sports fishing, - salmon and non-salmon (crab, bottom fish) species.
- Navigation and commerce - serving Shell and Texaco oil refineries, port and industrial uses in Anacortes, log rafting and transport.
- Recreational boating
- Ferry service - state, county, private
- Storm water disposal
- Municipal and industrial sewage disposal
- Marine research and studies
- Dredge material disposal (near Bellingham Channel)

## ELEMENTS OF THE HUMAN ENVIRONMENT

### A. Population and Housing

1. Anacortes - The 1977 estimated population of the City of Anacortes is 8,200 people (Reference 8). The Comprehensive Land Use Plan for the City of Anacortes, 1977, states that the 1976 population of Anacortes was 8,015 people during the North Slope production activities of the Snelson-Anvil Company. Since this activity has diminished and is, practically speaking, dormant for the time being, normal population growth would probably reveal a 1977 population between the 8,015 and 8,200.

### 2. Guemes Island

a. Guemes Island falls within Census Division 8 for U. S. Bureau of the Census purposes, which also includes Cypress, Sinclair, and Vendovi Islands. For this report, it is assumed that 90% of the population and housing units are on Guemes Island. The Bureau of the Census reports the following for Division 8:

#### Historical Growth - Census Division 8

|      | <u>Population</u> | <u>Increase</u> | <u>% Increase</u> |
|------|-------------------|-----------------|-------------------|
| 1950 | 227               | --              | --                |
| 1960 | 265               | 38              | 17%               |
| 1970 | 284               | 19              | 7%                |

Population growth in Census Division 8 generally parallels that of Skagit County during the same periods. From 1950 to 1960 the county's population grew by 19%, while from 1960 to 1970 it increased only 2%.

Table C below presents an overview of population information for Census Division 8 which can be applied to the Guemes Island population:

TABLE C  
Census Division 8 Population Data - 1970

| Population |      |        |        |             |             | Households  |          |               |                       |
|------------|------|--------|--------|-------------|-------------|-------------|----------|---------------|-----------------------|
| Sex        |      |        | Age    |             |             | Group Qtrs. | Num-ber* | Popu-lation** | Persons per Household |
| Total      | Male | Female | Median | % < 18 yrs. | % > 65 yrs. |             |          |               |                       |
| 284        | 161  | 123    | 40.0   | 25.7        | 22.5        | 28          | 111      | 256           | 2.31                  |

\*Number of households occupied year round. Does not include seasonal housing.

\*\*Population less those in Group Quarters.

Based upon the assumption that 90% of the island area population, exclusive of the 28 in group quarters, resides on Guemes Island, the 1970 estimate for the island's population would be 230 people (1970).

To check the validity of the census, the number of housing units X average household size X occupancy rate, can be applied. For Guemes Island, this would reveal:

$$\begin{array}{rcccccc} \text{Housing Units} & \times & \text{Avg. Household size} & \times & \text{Occupancy Rate} & = & \text{Population} \\ 246 & & 2.31 & & .42 (42\%) & & 238 \end{array}$$

This figure verifies the census data.

- b. 1975 Population estimation based upon housing units for Guemes Island:  
A 1975 analysis of land use in Skagit County shows that there were 298 housing units on Guemes Island, an increase of 52 units over 1970's 246 units. Using the above formula with the same household size (2.31) and occupancy rate (42%), the 1975 estimated population of Guemes Island is 289 people (1975). For this impact analysis and because no untested assumptions are made, this more current figure will be utilized.

Thus, of the approximate 298 housing units on the island, 125 (42%) are occupied by permanent residents and 173 (58%) are utilized by part time, seasonal renters, and property owners.

c. Summary of population and housing

The following table summarizes historical data on the permanent population and the growth in all housing units, permanent and seasonal.

Table D - Guemes Island

| Year | Population       |          |           | Housing Units    |          |           |
|------|------------------|----------|-----------|------------------|----------|-----------|
|      | No.              | Increase | %Increase | No.              | Increase | %Increase |
| 1960 | 216 <sup>a</sup> | 34       | 17%       | NA               | NA       | NA        |
| 1970 | 230 <sup>b</sup> | 14       | 6%        | 246 <sup>c</sup> | NA       | NA        |
| 1975 | 289              | 59       | 26%       | 298              | 52       | 21%       |

- a. CD8 1960 population of 265 - 25 group qtrs. = 240 x .90 = 216.
- b. CD8 1970 population of 284 - 28 group qtrs. = 256 x .90 = 230.
- c. CD8 1970 housing units of 266 - 20 on Cypress, Sinclair = 246.

d. Population projections

Applying the low (1% per year) and high (2% per year) growth rates used by the Planning Department for estimating population growth for the county and for various district comprehensive plans, the following population projections for Guemes Island are obtained:

| <u>1975</u> | <u>1985 low (1%)</u> | <u>1985 high (2%)</u> | <u>2000 low</u> | <u>2000 high</u> |
|-------------|----------------------|-----------------------|-----------------|------------------|
| 289         | 319                  | 352                   | 370             | 474              |

1975 Comprehensive Plan - If the island were to develop fully according to the 1975 Comprehensive Plan designations, the following would result:

|   |   |              |
|---|---|--------------|
| 22 acres of Commercial                              |   |              |
| 1843 acres of Residential @ 1 acre lots x 2.31*     | = | 4,257        |
| 3017 acres of Rural Open Space @ 5 acre lots x 2.31 | = | 1,394        |
| <u>4882</u>   |   | <u>5,641</u> |

\*Average family size

This figure does not reflect permanent and seasonal population fluctuations. Adjusted for the 1970 occupancy rate of .42 (42%), the maximum permanent population would be approximately 2370 persons. An increase in the occupancy rate, which seems very likely for other demographic, social, and economic reasons, would exhibit a concurrent increase in the permanent population. The comprehensive plan does not establish a particular year or plateau when this degree of development will be reached. Too many factors are involved which would effect the ultimate development level reached on Guemes Island.

Lots and acres - Data at the County Assessor's office shows that there are 419 unplatted lots or acreages and 751 platted lots on Guemes Island. If there were no further land divisions, these lots and acreages would support the following:

|           |   |                     |   |                |   |              |
|-----------|---|---------------------|---|----------------|---|--------------|
| Lots      | X | Average family size | X | Occupancy rate | = | Population   |
| 1170 lots | x | 2.31                | x | .42            | = | <u>1,135</u> |



Again, the 1,135 persons reflects an occupancy rate and average family size which are subject to changes over the present and coming years.

e. Seasonal population estimates

Utilizing the 173 housing units which are occupied on a seasonal basis per b. above and the average family size (for Census Division 8) of 2.31, the 1975 estimated seasonal population would be 400 people. With the permanent population (289) added, there would be an estimated 689 people on the island during peak vacation months, probably in July and August.

However, the seasonal population estimate does not include the vacationer or visitor who stays for only a day, or for a weekend or longer at a resort, or in a travel trailer or camper, or at a friend's or relative's home. It also does not reflect the possibility of an average larger family size, i.e. 3.2 would give a seasonal population of 554, or the possibility of relatives and friends accompanying the renter or seasonal users on their vacation.

## B. Transportation - The Ferry System

### 1. Ferry Traffic History, 1947 - 1976

Table E presents traffic data for the years 1947 through 1976 in tabular form. This same information is presented graphically on Figure 3. The same information is presented on Figure 4, a log scale, which is used for the basis of one method of projecting traffic forecasts for the future. Comments regarding the Traffic Historical information are summarized below:

1. Information for the year 1976 should be generally disregarded or corrected to account for the ferry employees strike occurring during that period.
  2. The characteristics of the Guemes Ferry Traffic closely parallels the characteristics of Skagit County and Guemes Island population growth. Generally, this growth was fairly slow during the 1950's and 1960's (1-2%) and much more rapid during the 1970's as discussed in the Population section.
  3. The Traffic information indicates that while the number of vehicles and passengers increased rapidly, the number of trips has increased at a much lower rate. This is due primarily to the physical limitations of the ferry operation and schedule.
  4. The trip distribution by month for the year of 1975 is presented graphically on Figure 5. This same characteristic distribution occurred in all years examined. The fact that the number of trips is unequal between the winter and summer months makes ferry operation and sizing studies very difficult.
2. Ferry Schedule - The Almar makes the first run of the day, leaving Anacortes at 6:30 A.M. except for Sundays and holidays when the initial run is at 9:00 A.M. The final run occurs at 6:00 P.M. on Mondays through Thursdays, midnight on Fridays and Saturdays, and 7:00 P.M. on Sundays (8:30 P.M. summer schedule). See Table F for exact loading times.

Crossing time is approximately seven (7) minutes, depending on weather conditions and other traffic. Unloading a full load takes three to five minutes and upon completion on the Guemes side, the waiting vehicles, if any, load on for the return trip.

Total schedule round trips per year, including the summer and holiday schedule, is 5,440. This makes for a daily average of 15 trips and a weekly average of 105 or 106 trips.

TABLE E

## TRAFFIC HISTORY 1947-1976

| <u>YEAR</u> | <u>TOTAL ROUND TRIPS</u> | <u>AVERAGE TRIPS PER WEEK</u> | <u>EXTRA TRIPS</u> | <u>TOTAL VEHICLES</u> | <u>TOTAL PASSENGERS</u> |
|-------------|--------------------------|-------------------------------|--------------------|-----------------------|-------------------------|
| 1947        | 5,021                    | 96                            | 42                 | 16,322                | 48,924                  |
| 1964        | 5,745                    | 110                           | 18                 | 24,673                | 60,317                  |
| 1965        | 5,927                    | 114                           | 34                 | 24,995                | 60,447                  |
| 1966        | 6,053                    | 116                           | 44                 | 25,350                | 58,603                  |
| 1967        | 6,142                    | 118                           | 51                 | 26,095                | 60,706                  |
| 1968        | 5,845                    | 112                           | 27                 | 22,184                | 59,212                  |
| 1969        | 6,295                    | 121                           | 64                 | 26,970                | 69,142                  |
| 1970        | 6,350                    | 122                           | 69                 | 27,440                | 70,221                  |
| 1971        | 6,980                    | 134                           | 121                | 28,999                | 73,687                  |
| 1972        | 6,910                    | 133                           | 115                | 30,256                | 76,963                  |
| 1973        | 7,000                    | 135                           | 123                | 31,540                | 81,441                  |
| 1974        | 6,987                    | 134                           | 122                | 32,224                | 84,176                  |
| 1975        | 7,019                    | 135                           | 125                | 33,171                | 85,443                  |
| 1976        | 6,764                    | 130                           | 103                | 32,617                | 79,905                  |

FIGURE 3

# QUEMES ISLAND FERRY TRAFFIC HISTORY

1947-1976

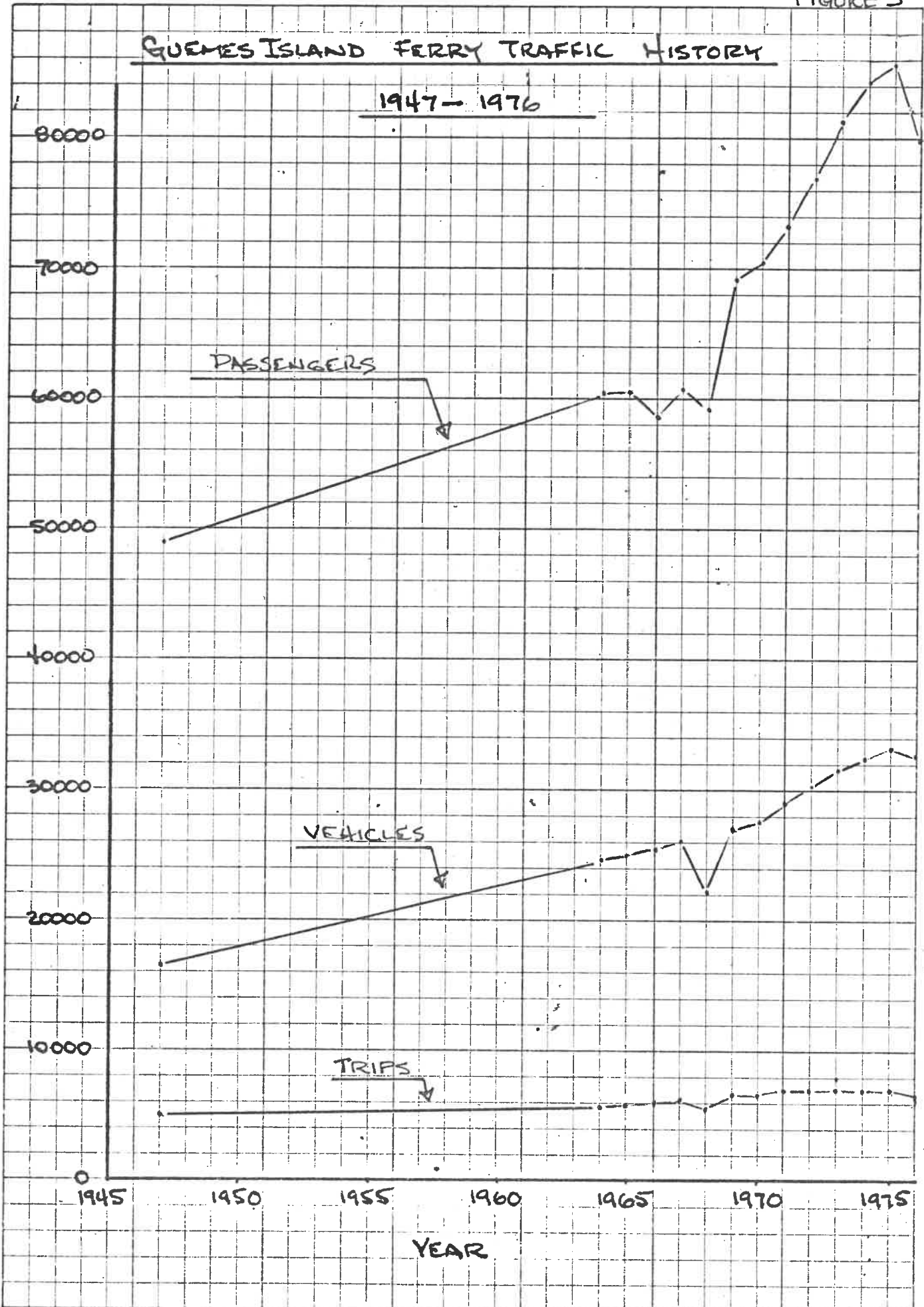
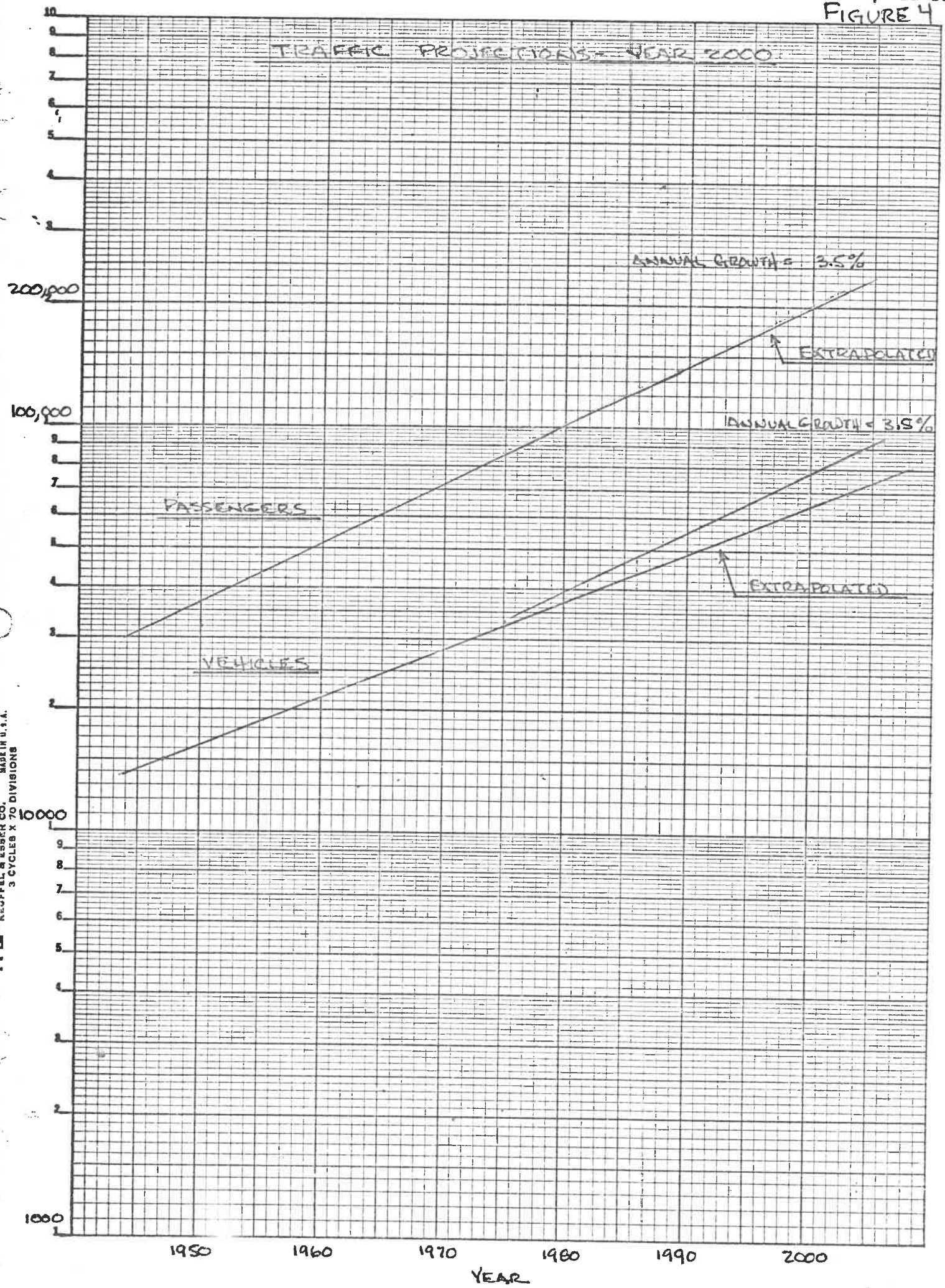


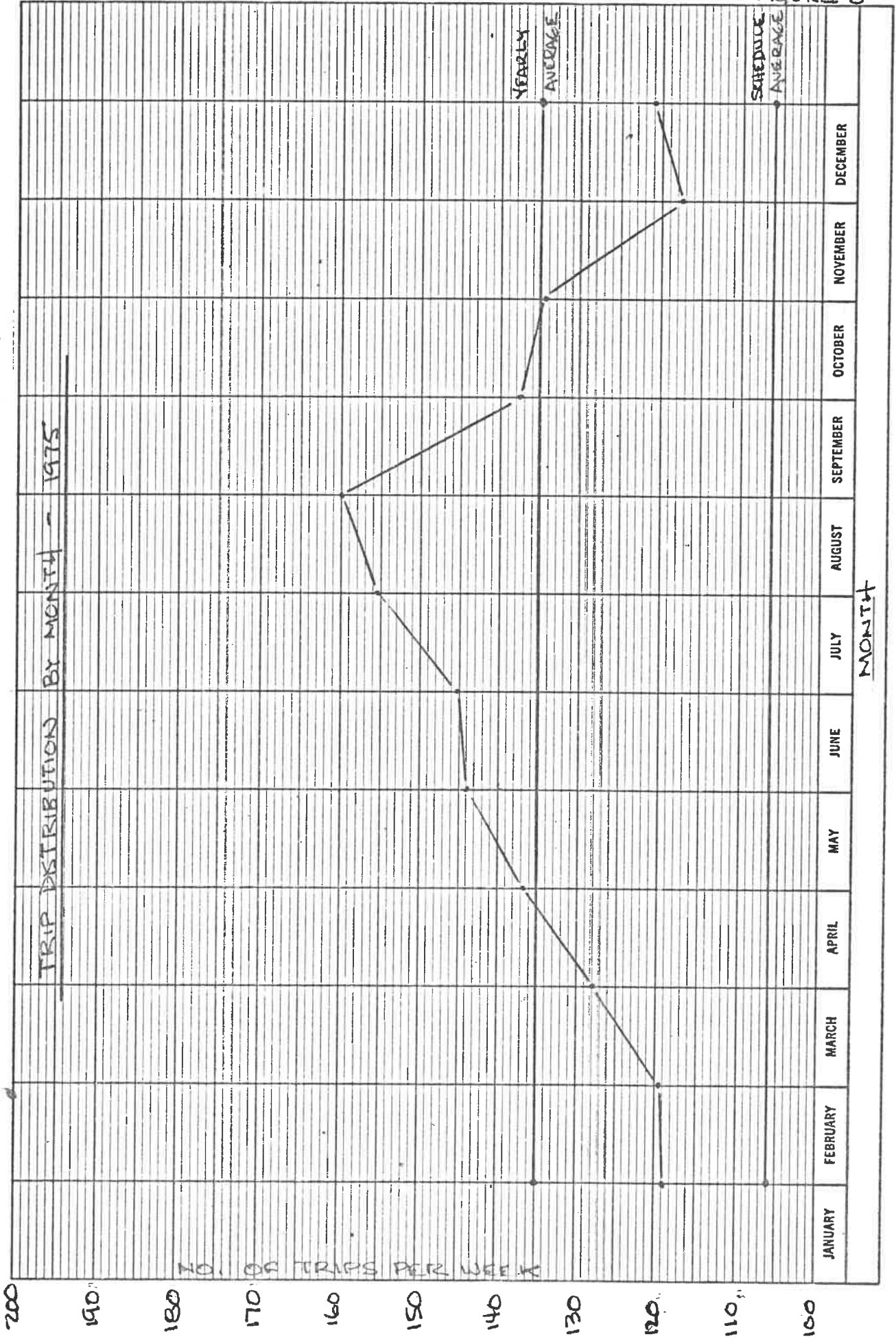
FIGURE 4

TRAFFIC PROJECTIONS - YEAR 2000



1-100 HMIC 359  
 KUPFEL & KOPPEL CO. MADE IN U.S.A.  
 3 CYCLES X 70 DIVISIONS

FIGURE 5



BY 317  
 DIVISION  
 KEUFFEL & ESSER CO.  
 MADE IN U.S.A.

NO. OF TRIPS PER WEEK

MONTH

TABLE F  
**Guemes Island**  
**Ferry Schedule**

| Mon. to Fri. | Friday  | Saturday | ** Sun. & Holidays |
|--------------|---------|----------|--------------------|
| 6:30 am      | 6:30 am | *6:30 am | -                  |
| 7:00         | 7:00    | 7:00     | -                  |
| 7:30         | 7:30    | -        | -                  |
| 8:00         | 8:00    | 8:00     | 9:00 am            |
| 9:00         | 9:00    | 9:00     | 10:15              |
| 10:00        | 10:00   | 10:00    | 11:30              |
| 11:00        | 11:00   | 11:00    | 12:30 pm           |
| 1:00 pm      | 1:00 pm | 1:00 pm  | 1:00               |
| 2:30         | 2:30    | 2:00     | 2:30               |
| 3:30         | 3:30    | 3:00     | 3:00               |
| 4:00         | 4:00    | 4:00     | 4:00               |
| 5:05         | 5:05    | 5:00     | 5:00               |
| 5:30         | 5:30    | -        | -                  |
| 6:00         | 6:00    | 6:00     | 6:00               |
| -            | 7:00    | 7:00     | 7:00               |
| -            | 8:00    | 8:00     | * 8:30             |
| -            | 10:00   | 9:00     | -                  |
| -            | 11:00   | 10:30    | -                  |
| -            | 12:00   | -        | -                  |
| -            | -       | 12:00    | -                  |

\* Summer Schedule: June 1 through Labor Day  
 \*\* Labor Day, Christmas, New Year, 4th of July, Thanksgiving

3. Unscheduled Runs - However, due to the past and current demand and the size of the Almar (9 car maximum), the ferry makes an average of four plus extra runs per day, thirty (30) every week to take care of extra cars waiting on each side. Thus, there are over 25% more runs than those regularly scheduled. Following is a five year breakdown of extra crossings made by the Almar:

| <u>Year</u> | <u>Trips</u> | <u>Averages</u>     |
|-------------|--------------|---------------------|
| 1972        | - 1502       | Total 7,744         |
| 1973        | - 1618       | Annual Average 1549 |
| 1974        | - 1605       | Monthly Average 129 |
| 1975        | - 1637       | Weekly Average 30   |
| 1976        | - 1382*      | Daily Average 4.3   |

\*Ferry down time during mid-summer decreased the number of runs during 1976. The decrease was not due to decreased demand. This low year tended to skew the averages downward.

Despite the fact that the annual average of 1549 extra runs is low because of 1976, these runs still represent a 28% increase over the regularly scheduled runs of 5,440 per year.

Examining the figures for January, April, July and August of 1977, shows that the Almar has averaged 182 extra trips per month. At that rate, the annual total of extra runs is expected to reach or exceed 2,200, a 34% increase over 1975. County Engineer records indicate that many of these extra trips are made at less than half capacity.

4. Alternative Service - While the Almar is undergoing regular or unscheduled maintenance, the County utilizes the services of a 40 person capacity launch to transport people only, while limited vehicle service is provided by Island Ferry Charter.

5. Weight and Size Limitations - The Guemes Island Floating span has limited the total single vehicle cargo weight to twelve tons. Since full size logging trucks are unable to gain access, logs are hauled by smaller, single bed rigs. Because of the size and design of the Almar and the span, full size mobile homes must be moved to the island by barge. This service is usually provided by privately owned and operated Island Ferry Charter.
6. Ticket Sales - Tickets are sold to the users before or as they go on the ferry. The crewman must then go through two locks to lock the money in the office which is housed in the same building as the passenger waiting room. Although locked, the office must then be left unattended while the Almar makes the run to Guemes Island. This arrangement has made for security problems and thefts.

### C. Public Services

1. Fire - Guemes Island is in Fire District No. 17, a volunteer unit consisting of approximately 15 persons, two tanker trucks with 1,500 gallon capacity each, one portable fold-a-tank as back-up, and one pump truck with a 750 gallon per minute pumping ability. Dispatch to fires is through the Anacortes Fire Department.

If needed, fire fighting units limited to 12 tons per unit from Anacortes can be ferried to the island. If the fire is after operating hours, the captain and crew must be located and notified of the emergency. Existing equipment on the island is adequate to handle most frequent types of fires such as chimney, kitchen, and brush fires, but may be hardpressed to handle a major fire (Reference 9). The City of Anacortes has its own full time fire department.

2. Police - Police services are provided by the Skagit County Sheriff's Office for Guemes Island and by the Anacortes Police Department for that city. Although, the county periodically patrols the island, most visits are in response to alarms and complaints of residents or victims concerning speeding, thefts, and burglaries. On weekends during the hunting season, a Sheriff's Deputy is on the island to check for firearms violations. Sheriff John Boynton considers Guemes Island to be a low crime area. (Reference 10).
3. Schools - Guemes Island and Anacortes are within School District #103, a first class district under the general supervision of Intermediate School District #108 in Bellingham. Students must be ferried to Anacortes to attend Island View elementary and the junior high and high schools.



4. Health - Guemes Island and Anacortes lie within Hospital District No. 2, with hospital services available at Island Hospital, 4th and 'M' Avenues, Anacortes. There is no ambulance on the island. If a health emergency arises requiring ambulance or aid car services, the ambulance must be ferried across the channel to the island. Otherwise, a private vehicle must be used to take the patient to Anacortes. In either case, if the emergency occurs after ferry operating hours, the crew must be located and notified, and the Almar activated.

In emergency cases requiring more immediate attention, helicopter service is available from the Whidbey Naval Air Base in Oak Harbor. There is a heliport on the island to facilitate such an event.

5. Parks and Recreation - Anacortes has its own Parks Department which manages Washington Park on the west end of the city, several smaller parks and the public swimming pool. The 1977 Comprehensive Park and Recreation Plan identifies the "pocket beach" area by the Anacortes terminal as a potential day use site.

The county owns an eleven acre park at the north end of the island near Clark Point. The park is intended for either day or overnight use but there are no amenities such as restrooms, water, power, or even picnic tables to facilitate such uses.

There also is an unknown amount of private acreage in the open space taxation system which must allow for public recreational access. The Washington State Department of Natural Resources manages state owned tidelands along the southwest shore, along an area  $\frac{1}{2}$  mile east of the ferry dock, and along the northeast shore. These tidelands are scheduled for marking in 1978 to allow for public use.

#### D. Utilities

1. Water - Water service is provided by either individual wells or by several community water systems on the island. Water service to the Anacortes terminal is provided by the City of Anacortes water system.
2. Sewer - On Guemes Island, wastewater disposal is accomplished by individual residential septic tank drainfield systems or, in a few cases, outdoor privies or compost privies. The City of Anacortes has a municipal sewage collection and treatment system serving the area.
3. Solid Waste - A local firm, Rocket Sanitation, provides garbage pickup service to island residents. The waste is then trucked to the county run Inman Pit north of Bayview.

The City of Anacortes Sanitation Department collects garbage and hauls it to Gibraltar Pit on Fidalgo Island.

4. Telephone - Telephone service is provided by General Telephone to the City and to the Island.
  5. Power - Electrical power is supplied by Puget Sound Power and Light. Home fuel oil, natural gas, and propane are provided by area dealers.
- E. Aesthetics - The aesthetic characteristics of Guemes Island, like so many of the San Juan and Canadian Gulf islands, is one of the prime forces which attracts people to visit, recreate, and live there. The interior is generally rural in nature with larger parcels of land and fewer dwellings per acre than is found along the shoreline areas, a rather typical island development pattern. The Anacortes terminal area, with the exception of the adjacent "pocket" beach, represents a commercially and industrially developed shoreline with the sights, sounds, and odors associated with those activities. The Guemes terminal area, on the other hand, is representative of a quieter, rural lifestyle with the ferry and its facilities the only intrusion into the setting.

However, unlike the San Juan County islands, Guemes Island, attractive as it is to those who reside or vacation there, has not experienced the marked increase in tourists and land buyers. This is evident from the rather stable but nevertheless increasing level of ferry usage and permanent population discussed in this chapter. It is theorized that this is so because of the island's proximity to the more developed mainland, that the short ferry ride does not provide the tourist with the sense of remoteness one associates more with the islands of San Juan County.

F. Archaeological/Historical

The Anacortes and Guemes Island terminal sites have no known resources of archaeological or historical significance (Reference 11). If there were any resources on the Anacortes site, they would have been either destroyed or removed during past development activity. Although there are no archaeological or historical resources at the immediate Guemes Island site, Northwest Indians were known to frequent the island while on hunting, gathering or trading journeys.

G. Energy - Fuels

The ferry Almar averages eight (8) gallons of diesel fuel per round trip as discussed in B. Transportation, this section and chapter. At approximately 7000 round trips per year, the total average annual fuel consumption is 56,000 gallons, extra crossings included.

## IMPACTS OF THE PROPOSED ACTION

### I. Elements of the Physical Environment

#### A. Ferry System and Facilities

The Ferry - The proposed ferry, as detailed in the Proposed Action chapter, will carry approximately seven more vehicles than the Almar. The County Engineers state that the new boat will have greater maneuverability because of the diagonal corner positioning of the engines and that repair and maintenance capabilities are enhanced by this design: the boat can operate with one engine if the other is down for repair; if prop damage occurs, the drive units can be swung up for prop replacement rather than drydocking as is necessary with the Almar; if more extensive damage to the right angle drive units occurs, they can be replaced while afloat in a short period of time; entire engine units can be replaced in less than 24 hours; and the 360° propulsion and steering capability will eliminate most docking maneuvers presently carried out by the Almar and its crew.

The proposed ferry will be able to carry load and size limits presently legal for travel on the state and interstate highway systems. For a detailed evaluation of impacts associated with a larger ferry boat and its operation, refer to the Transportation section of Elements of the Human Environment, this chapter.

#### The Anacortes Facility

See "B. Anacortes Terminal Area" below.

#### The Guemes Island Facility

Reconstruction of the Guemes Island Facility will replace the existing span and float with a more permanent docking structure. It is proposed that the new design and construction will enable vehicles of legal size and load to utilize the ferry system. To some island residents, this may be seen as a beneficial impact and, to others, a potential for more intensive development with the advent of larger trucks and wider loads than is presently allowed across the floating span. Construction of a new parking/holding area will remove some of the parallel road shoulder parking now occurring along South Shore Road. For a more detailed impact analysis, see "C. Guemes Island Terminal Area", below.

## B. Anacortes Terminal Area

### Upland Soils

1. Direct impacts - Construction of a parking and/or holding area will disturb the existing soils by grading and filling activities. Soils will be exposed to possible erosion and runoff will be increased. Covering the area with an impervious surface will retard the erosion but will further increase surface water runoff.
2. Indirect impacts - No indirect impacts to soils are identified as a result of the proposed action.

3. Mitigating measures

Objective: To prevent erosion of soils.

Measures: Construction should be accomplished during the dryer summer months to prevent erosion and sedimentation. Soils should not be left exposed for any unusual length of time. Periphery soils on the site not to be paved should be stabilized and landscaped prior to project completion. Surface runoff should be contained and directed to the Guemes Channel without creating standing water or erosion of adjacent properties.

### Shoreline and Intertidal Area

1. Direct impacts - Re-construction of the vehicle loading facility will disturb the immediate beach, intertidal, and subtidal area. A separate environmental assessment will be made of the facility re-construction alternatives and will be presented in greater detail at a later date. For the purposes of this document (ferry system impact analysis), the following should suffice.  
Re-construction will require the removal of old piling and the driving of new, where none are present. Some landfilling may be required as well as paving on the immediate shoreline upland area. Some bottom dwelling (benthic) organisms will be disturbed and some will be lost during construction (See "Fauna"). The extent of loss is dependent upon the design alternative chosen. If not timed correctly, construction could interfere with smelt, herring, and anadromous fisheries spawning and migration activity. Bulkheading into the intertidal area could severely interfere with these fisheries activities of Guemes Channel.

2. Indirect impacts - No indirect impacts to the shoreline and intertidal area can be identified as a result of the proposed action.
3. Mitigating Measures -
  - Objective: To minimize disturbance and potential erosion of the shoreline area.
  - Measures: The use of heavy machinery in the shoreline area should be minimized and should not be allowed to enter the intertidal area. Construction should occur at lower tides and during the dryer summer months. If disturbed, the beach should be returned to original slope and condition. Any runoff generated by impervious surfacing should be collected and routed to the channel without causing erosion of shoreline materials.

#### Water

1. Direct impacts - surface runoff will be increased in areas disturbed and paved over. If collected and directed properly, this should not create any offsite impacts.
  - Quality of the surface water on and draining the site will be modified by the addition of sediment and oils generated by the asphalt surface and vehicles.
2. Indirect impacts - No indirect impacts to surface water quantity and quality can be identified.
3. Mitigating measures
  - Objectives: To reduce surface water runoff volume and/or direction; to improve water quality.
  - Measures: The use of pervious materials such as crushed rock would reduce surface water runoff volumes. If paved, the design should enable the collection and routing of waters to the channel and not to allow for standing water on and off the site on adjacent properties. Sedimentation will be reduced when the parking/holding area is covered but for the peripheral disturbed soils, if any, landscaping measures should be implemented to reduce erosion.

#### Flora

1. Direct impacts - Grasses and shrubs will be removed from the site of the parking/holding areas. This is not deemed a significant impact.
2. Indirect impacts - No indirect impacts to the site vegetation can be identified.

## Fauna

1. Direct Impacts - Construction of the parking/holding areas will remove some habitat or cover utilized by small mammals and some bird species discussed in the previous chapter. The extent of the disturbance to the animals and amount of vegetation removed is not significant by itself but will represent a loss in an area already extensively developed.

Reconstruction of the docking facility will disturb and eliminate some marine invertebrates and, if not timed correctly, may interfere with spawning and migrating smelt, herring, steelhead and cutthroat trout, and salmon as discussed earlier in this chapter. Bulkhead-ing and filling into the intertidal area could severely interfere with Guemes Channel fisheries activities. The extent of disturbance depends upon the particular design alternative chosen but the differences will probably be minimal; disturbance will occur and if correctly done, overall impacts should prove temporary.

2. Indirect impacts - No indirect impacts to fauna can be identified as a result of the proposed action.

3. Mitigating measures

Objectives: Minimize loss of intertidal and subtidal marine life and interference of fisheries activities.

Measures: To prevent disruption of spawning or migrating fishes, dock design and construction should be carried out according to Washington State Department of Fisheries guidelines and standards. This may mean that filling and bulkhead - like structures which may intrude into fisheries migration routes should not be constructed below the mean high tide line.

## Land Use

1. Direct impacts - If the undeveloped property to the west is part of the proposed action, i.e. parking and/or holding area, the use will be changed from its existing undeveloped open space status to that of a more intensive land use. Generally, more parking for passenger traffic will be made available. Other uses in the area will not be significantly affected by the proposed action of facility reconstruction.
2. Indirect impacts - No indirect impacts to land use are identified as a result of the proposed action.

Noise

Other than temporary on-site construction noises, no significant direct or indirect impacts associated with the proposed action can be identified. Ferry traffic will continue to use I Avenue or 6th Street for ingress and egress.

Light and Glare

1. Direct impacts - Some increased lighting may be necessary if expanded or new parking and holding areas are constructed. Although relatively insignificant, it would add to the lighting level already present and may prove disturbing to some area residents.
2. Indirect impacts - No indirect impacts to lighting associated with the proposed action can be identified.

C. Guemes Island Terminal AreaUpland Soils

1. Direct impacts - Construction of the parking/holding area will disturb the existing soils by grading and filling. Soils will be exposed to possible erosion and runoff will be increased. Covering the area with an impervious surface will retard the erosion but will further increase surface water runoff.
2. Indirect impacts - No indirect impacts to soils are identified.
3. Mitigating measures

Objectives: To prevent erosion of soils.

Measures: Construction should be accomplished during the dryer summer months to prevent erosion and sedimentation. Soils should not be left exposed for any unusual length of time. Periphery soils on the site not to be paved should be stabilized and landscaped prior to project completion. Surface runoff should be contained and directed to the Guemes Channel without creating standing water or erosion of adjacent properties.

Shoreline and Intertidal Area

1. Direct impacts - Re-construction of the loading facility will disturb the immediate beach, intertidal, and subtidal areas. Replacement of the span and dolphins will require piling to be driven where none are present. Removal of old piling will also occur. Some paving on the immediate upland area will be required. Some bottom dwelling (benthic) organisms will be disturbed and lost during construction.

2. Indirect impacts - No indirect impacts to the shoreline and intertidal area can be identified.

3. Mitigating measures

**Objective:** To minimize disturbance and potential erosion of the shoreline area.

**Measures:** The use of heavy machinery in the shoreline area should be minimized and should not be allowed to enter the intertidal area. Construction should occur at lower tides and during the dryer summer months. If disturbed, the beach should be returned to original slope and condition. Any runoff generated by impervious surfacing should be collected and routed to the channel without causing erosion of shoreline materials.

### Water

1. Direct impacts - Surface runoff will be increased in areas disturbed and paved over. If collected and directed properly, this should not create any offsite impacts.

Quality of the surface water on and draining the site will be modified by the addition of sediment and oils generated by the asphalt surface and vehicles.

2. Indirect impacts- No indirect impacts to surface water quantity and quality can be identified.

3. Mitigating measures

**Objectives:** To reduce surface water runoff volume and/or direction; to improve water quality.

**Measures:** The use of pervious materials such as crushed rock would reduce surface water runoff volumes. If paved, the design should enable the collection and routing of waters to the channel and not to allow for standing water on and off the site on adjacent properties. Sedimentation will be reduced when the parking/holding area is covered but for the peripheral disturbed soils, if any, landscaping measures should be implemented to reduce their erosion.

### Flora

1. Direct impacts - Grasses and shrubs will be removed from the site of the parking/holding area. This is not deemed a significant impact.
2. Indirect impacts - No indirect impacts to the site vegetation can be identified.



## Fauna

1. Direct impacts - Construction of the parking/holding area will remove habitat of the mammalian and some bird species discussed in the previous chapter. Since the size of the parking/holding area is minimal when compared to the surrounding land uses, disrupted species should be able to re-settle in adjacent areas.

Reconstruction of the dock facility will disturb and possibly eliminate some bottom species and, if not timed correctly, disrupt anadromous fish in the area. Such impacts should be temporary.

2. Indirect impacts - Increased piling in the vicinity may attract organisms which utilize piling for its surface habitat such as barnacles and limpets.

3. Mitigating measures

**Objectives:** Minimize loss of intertidal and subtidal marine life and interference of fisheries activities.

**Measures:** To prevent disruption of spawning or migrating fishes, dock construction should be timed according to Washington State Department of Fisheries guidelines. Filling and bulkhead - like structures which may block fisheries migration should not be constructed below the mean high tide line in accordance with the Skagit County Shoreline Master Program.

## Land Use

1. Direct impacts - In the immediate ferry terminal area, the proposed action will change a rural residential use to a parking/holding area use. This change will remove most ferry waiting traffic from the extra lane along Guemes Island Road and should eliminate most of the haphazard parallel parking along South Shore Road. These are viewed as beneficial impacts, especially to those residents on Guemes Island Road.

No significant land use impacts are associated with the reconstruction of the dock facility.

Direct impacts associated with the change in ferry size and operation are discussed in depth in the Population and Transportation sections of the Elements of the Human Environment, this chapter.

2. Indirect impacts - No indirect impacts associated with the changes at the ferry terminal area can be identified.

Noise

No significant direct or indirect impacts associated with the proposed action can be identified other than temporary on-site construction noises. Decreases in vehicular noise may be experienced by the residents along Guemes Island Road as the proposed holding area is utilized instead of the road. This is seen as a beneficial impact.

Light and Glare

1. Direct impacts - Some increased lighting may be necessary in the proposed parking/holding area for safety and security reasons. Although relatively insignificant, it may be disturbing to some area residents.
2. Indirect impacts - No indirect impacts associated with the proposed action can be identified.

D. Guemes ChannelWater Quality

No significant direct and indirect impacts associated with the proposed action can be identified. The quantity and quality of surface runoff generated by the proposed parking/holding area is insignificant when compared to the assimilative capability of Guemes Channel. The state water quality standards will not be affected.

Fauna

1. Direct impacts - Some loss of benthic marine life may occur when piling are driven for the dock facility. The amount lost is insignificant when compared to the extent of marine life along the channel bottom. The operation of the ferry will no more affect fauna than the present ferry.
2. Indirect impacts - No indirect impacts associated with the proposed action can be identified.

Water Uses

No significant direct and indirect impacts associated with the proposed action can be identified. A larger ferry run on a revised and reduced schedule making few if any extra crossings will reduce potential navigational hazards with other channel traffic, especially the oil tankers.

## II. Elements of the Human Environment

### A. Population and Housing

1. Anacortes - No significant direct or indirect impacts to the population and housing of the City of Anacortes associated with the proposed action can be identified.

#### 2. Guemes Island

a. Direct and indirect impacts - Quantifying and even qualifying impacts to the population and housing of Guemes Island as a result of the changes in ferry size and operations is extremely difficult and loaded with assumptions and plain guesses. Examining historical use data and the population and/or housing figures for the same periods provides us with the only reliable, concrete base from which to make future projections.

As reported in the Transportation section of this and the Existing Environment chapter, increases in ferry usage have been nominal and have generally paralleled the changes occurring in Skagit County as a whole. Usage appears especially nominal during the 1950's when refineries were constructed on March's Point and both Skagit County's and Guemes Island's population increased 19% and 17% respectively (see A. Population and Housing, Existing Environment chapter). In this case, an outside influence, i.e. refinery location and development, is viewed as the prime factor in boosting population and housing, not the ferry system.

Similarly, Guemes Island experienced the Skagit County "slow growth" cycle from 1960 to 1970. The Guemes population increased 6% (14 persons) while the county experienced only a 2% increase over the ten year period. Heavy out-migration by the young-adult age groups due to better employment opportunities elsewhere was the prime factor.

1969 and '70, however, saw the beginning of increases in both vehicle and passenger usage of the ferry system and concurrent increases in population and housing (See Figure 3, Table D). The increase in passenger use is most notable. Examination of permanent population figures for 1970 and 1975 (Table D, page EE-8), shows a 26% increase in those five years or 59 persons.

52 housing units were constructed between 1970 and 1975, an average of 10.4 units per year or 21% over the five year period.

The slight increase in population over the number of housing units constructed indicates several events are occurring: the average family size on the island is increasing or more people, perhaps unrelated, are living in each unit; or, some housing which was once seasonal have now become full-time residences.

In any case, the historical trends exhibit parallels between ferry usage and population/housing. If there is any cause-and-effect relationships at work, it is the increasing population of Guemes Island which is causing the increased usage of the ferry system and the system has responded directly to the demand placed upon it as evidenced by the steady rise in extra, unscheduled trips. No changes have been made in ferry size since 1947 but it is the operation of the ferry that has been the responsive variable. Guemes Island has taken on a rather "sudden" appeal due to the attractiveness of having a rural island lifestyle with the urban convenience of a ferry operation that responds to user demands, the reverse of the San Juan island situation where the resident must adjust his/her life to the ferry schedule.

As evidenced in Skagit County and elsewhere in the Pacific Northwest, a whole series of inter-related economic and social factors coupled with shifts in lifestyle goals has had more to do with fostering regional changes. What is occurring on Guemes Island in terms of growth is similar to what has been happening in the Pacific Northwest for the last five to ten years:

- Population migration out of the Northeast and North Central states to the South and West Coast states.
- Population migration from California to Oregon and Washington.
- Economic expansion of the Pacific Rim countries with a corresponding increase in diversification of that base. Vancouver, B.C. and Washington are notable cases.
- Greater disposable incomes with greater interest in land investment and development.
- More land suitable for low to medium density development at some of the lowest prices in the United States.

- Greater population reaching retirement age and retiring earlier than normal, with this population desiring a milder year round climate and a safer, less hectic lifestyle which can be found in rural Washington.
- Greater population of post - World War II people who are changing personal and family goals from success in business and society to success in their personal and interpersonal lives.

b. Mitigating Measures

**Objective:** Reduce or moderate the increase in the permanent population of Guemes Island so as to preserve the rural lifestyle for present and future generations.

**Measures:** Since the purposes of this EIS is to address the proposed change in ferry size, growth controlling measures such as land use zone changes, down zoning, or building restrictions will not be discussed.

As we have seen, the primary factor affecting population growth has been the ready availability of the ferry from 6:30 AM to at least 6:00 P.M. Traffic analysis has shown that many extra runs are made to accommodate only a few vehicles. If the citizens of Guemes Island wish to fulfill the above objective, one of the most effective means would be to establish a definitive ferry schedule with no extra runs, except in case of emergencies, and with minimum "commuter runs".

Since cost to the user and the county is an important factor, a 16 or 18 car ferry making 100 trips per week (a little less than present Almar scheduled runs) would only need to operate at 54% capacity or 9.5 cars per trip to break even on expenses and revenues. Making fewer trips (75 per week) or more (125 per week) would require capacity to reach 65% or 11.7 cars per trip. Thus, the citizens of Guemes Island should work with the county to establish a balanced but firm ferry operating schedule that meets the needs of the people it serves and the taxpayers who support it.

## B. Transportation

1. Direct and Indirect Impacts - As our previous evaluations have shown, changes in ferry sizing will not have a significant effect on population, housing and land use. Ferry scheduling, however, will. Similarly direct and indirect impacts to the existing transportation system are related more to the schedule of the proposed ferry than its size. Under the present situation, a 9 car ferry, the Almar, is making 130 or more runs a week to meet the user demand while a 16 or 18 car ferry can make fewer runs to meet existing and planned needs while not incurring cost overruns experienced with the existing system. Table G presents a comparison of operating costs for 9, 18, and 27 car ferries at three different levels of scheduled crossings: 75, 100 and 125 trips per week. The larger 27 car ferry is included for alternative comparison purposes. Cost evaluations are based upon known, current operating costs and do not reflect future contingencies such as inflation. This table capsulates the presentation of direct cost impacts to the transportation system as it now exists. Note that an additional crew member may be necessary at a higher operating schedule.

Table H presents cost and revenue comparisons for 9, 18, and 27 car ferries operating at 100%, 66% (2/3), and 33% (1/3) of capacity or utility. 1975 is used as the base year for costs and revenues since these revenues have remained the same today.

Examination of the Total Cost Per Trip (Table G) shows a one dollar higher cost per trip for the 18 car ferry due to the difference in fuel consumption. However, the cost per car is reduced well below that of a 9 car ferry, indicating a more favorable recovery of revenues to meet operating costs which is not the current situation as shown in Table H, 1975 Cost vs. Revenues. As indicated in that table, Profit or Loss Per Trip, the proposed action (18 car ferry), will generate a slight profit per trip at 100% capacity, slight loss at 66% (2/3) capacity, and a greater loss at 33% (1/3) capacity using the current rate structure.

Judged on a transportation system cost and operation/maintenance basis against revenues generated, the proposed action of replacing the Almar with an 18 car ferry creates no significant adverse direct or indirect impacts to the transportation system.

| FERRY SIZE $\frac{1}{2}$ SCHEDULE ANALYSIS<br>OPERATIONAL COSTS | 9 CAR FERRY<br>(SMALL) |                 |                 | 10 CAR FERRY<br>(INTERMEDIATE) |                 |                 | 12 CAR FERRY<br>(LARGE) |                 |                 |
|---|------------------------|-----------------|-----------------|--------------------------------|-----------------|-----------------|-------------------------|-----------------|-----------------|
|   | 75 TRIPS/ WEEK         | 100 TRIPS/ WEEK | 125 TRIPS/ WEEK | 75 TRIPS/ WEEK                 | 100 TRIPS/ WEEK | 125 TRIPS/ WEEK | 75 TRIPS/ WEEK          | 100 TRIPS/ WEEK | 125 TRIPS/ WEEK |
| NO. OF CREW   | 2                      | 2               | 3               | 2                              | 2               | 3               | 3                       | 3               | 4               |
| WAGES/WK (\$10x1800) ÷ 52 x NO. CREW                            | 629.31                 | 629.31          | 1038.46         | 629.31                         | 629.31          | 1038.46         | 1038.46                 | 1038.46         | 1384.62         |
| BENEFITS @ 35%  | 242.31                 | 242.31          | 362.60          | 242.31                         | 242.31          | 362.60          | 362.60                  | 362.60          | 484.62          |
| SUBTOTAL  | 871.62                 | 871.62          | 1401.92         | 871.62                         | 871.62          | 1401.92         | 1401.92                 | 1401.92         | 1869.24         |
| OVERHEAD @ 50%  | 435.81                 | 435.81          | 700.96          | 435.81                         | 435.81          | 700.96          | 700.96                  | 700.96          | 934.62          |
| TOTAL - DIRECT & INDIRECT                                       | 1307.43                | 1307.43         | 2102.88         | 1307.43                        | 1307.43         | 2102.88         | 2102.88                 | 2102.88         | 2803.86         |
| COST PER TRIP - WAGES & SUPPORT                                 | 17.43                  | 13.07           | 16.82           | 17.43                          | 13.07           | 16.82           | 16.82                   | 28.03           | 22.43           |
| FUEL CONSUMPTION - GPH PER ENGINE                               | 8                      | 8               | 8               | 10                             | 10              | 10              | 10                      | 12              | 12              |
| GAL. PER TRIP (GPH x 2 x 1/2 HR)                                | 8                      | 8               | 8               | 10                             | 10              | 10              | 10                      | 12              | 12              |
| COST/TRIP - FUEL @ OIL = GPT x \$.50                            | 4.00                   | 4.00            | 4.00            | 5.00                           | 5.00            | 5.00            | 5.00                    | 6.00            | 6.00            |
| TOTAL COST PER TRIP   | 21.43                  | 17.07           | 20.82           | 22.43                          | 18.07           | 21.82           | 21.82                   | 34.03           | 28.43           |
| COST PER CAR (NO PASSENGERS)                                    |                        |                 |                 |                                |                 |                 |                         |                 |                 |
| AT CAPACITY \$  | 2.38                   | 1.89            | 2.31            | 1.25                           | 1.00            | 1.21            | 1.21                    | 1.26            | 1.05            |
| AT 2/3 CAPACITY \$  | 3.57                   | 2.84            | 3.47            | 1.87                           | 1.51            | 1.82            | 1.82                    | 1.89            | 1.57            |
| AT 1/3 CAPACITY \$  | 7.14                   | 5.69            | 6.94            | 3.74                           | 3.01            | 3.63            | 3.63                    | 3.78            | 3.16            |

| COST VS. REVENUE                              | 9 CAR FERRY<br>(SMALL) |                       |                       | 18 CAR FERRY<br>(INTERMEDIATE) |                       |                       | 27 CAR FERRY<br>(LARGE) |                       |                       |
|---|------------------------|-----------------------|-----------------------|--------------------------------|-----------------------|-----------------------|-------------------------|-----------------------|-----------------------|
|   | 100%<br>LOAD<br>FACTOR | 66%<br>LOAD<br>FACTOR | 33%<br>LOAD<br>FACTOR | 100%<br>LOAD<br>FACTOR         | 66%<br>LOAD<br>FACTOR | 33%<br>LOAD<br>FACTOR | 100%<br>LOAD<br>FACTOR  | 66%<br>LOAD<br>FACTOR | 33%<br>LOAD<br>FACTOR |
| 1975  | 9                      | 6                     | 3                     | 18                             | 12                    | 6                     | 27                      | 18                    | 9                     |
| CARS PER TRIP                                 | 3686                   | 5528                  | 11057                 | 1843                           | 2764                  | 5528                  | 1228                    | 1843                  | 3686                  |
| NO. OF TRIPS/YEAR TO CARRY 33171 VEHICLES     | 71                     | 106                   | 213                   | 35                             | 53                    | 106                   | 24                      | 35                    | 71                    |
| NO. OF TRIPS/WEEK TO CARRY 33171 VEHICLES     | 23                     | 15                    | 8                     | 46                             | 31                    | 15                    | 70                      | 46                    | 23                    |
| NO. OF PASSENGERS PER TRIP - 85443 PASSENGERS |                        |                       |                       |                                |                       |                       |                         |                       |                       |
| REVENUE PER TRIP (1977 DOLLARS)               |                        |                       |                       |                                |                       |                       |                         |                       |                       |
| CAR REVENUE = \$1.50 X NO. OF CARS            | 13.50                  | 9.00                  | 4.50                  | 27.00                          | 18.00                 | 9.00                  | 40.50                   | 27.00                 | 13.50                 |
| PASSENGER REVENUE = \$13625 X NO. PASS.       | 8.34                   | 5.14                  | 2.90                  | 16.67                          | 11.24                 | 5.14                  | 25.37                   | 16.67                 | 8.34                  |
| TOTAL REVENUE PER TRIP - \$                   | 21.84                  | 14.14                 | 7.40                  | 43.67                          | 29.24                 | 14.14                 | 65.87                   | 43.67                 | 21.84                 |
| COST PER TRIP                                 |                        |                       |                       |                                |                       |                       |                         |                       |                       |
| WAGES AND SUPPORT PER WEEK \$                 | 1307.43                | 1307.43               | 2614.86               | 1307.43                        | 1307.43               | 1307.43               | 2102.88                 | 2102.88               | 2102.88               |
| WAGES AND SUPPORT PER TRIP \$                 | 18.41                  | 12.33                 | 12.27                 | 37.36                          | 24.67                 | 12.33                 | 87.58                   | 60.08                 | 29.62                 |
| FUEL, OIL, ETC, PER TRIP \$                   | 4.00                   | 4.00                  | 4.00                  | 5.00                           | 5.00                  | 5.00                  | 6.00                    | 6.00                  | 6.00                  |
| TOTAL COST PER TRIP \$                        | 22.41                  | 16.33                 | 16.27                 | 42.36                          | 29.67                 | 17.33                 | 93.58                   | 66.08                 | 35.62                 |
| PROFIT < LOSS > PER TRIP \$                   | < 0.57 >               | < 1.89 >              | < 8.87 >              | 1.31                           | < 0.43 >              | < 2.89 >              | < 27.71 >               | < 22.41 >             | < 13.78 >             |
| PROFIT < LOSS > PER YEAR \$                   | < 2101.02 >            | < 10447.92 >          | < 98075.5 >           | 2414.33                        | < 1188.52 >           | < 15975.92 >          | < 34027.88 >            | < 41301.63 >          | < 50743.68 >          |



### Traffic Projections - Year 2000

Two methods were used to extrapolate the Ferry Traffic data to the year 2000. In the first method, the vehicle and passenger figures were averaged over the years 1970 thru 1975 and the average growth determined for that period. This growth factor (3.5%) was then applied to the 1975 values and compounded to the year 2000. This method resulted in values for the year 2000 as follows:

|            |                  |
|------------|------------------|
| Vehicles   | 78,013 per year  |
| Passengers | 201,923 per year |

The second method involved fitting a curve to the traffic history data plotted on a log scale as shown on Figure 4. This method resulted slightly lower projections as follows.

|            |                  |
|------------|------------------|
| Vehicles   | 65,000 per year  |
| Passengers | 200,000 per year |

The more conservative values derived from the second method were used in the economic and sizing studies in the Alternatives to the Proposed Action chapter.

It should be noted that these ferry traffic growth values agree closely with the rate of population growth anticipated for Guemes Island.

### C. Public Services

#### 1. Fire

- a. Direct impacts - The increased tonnage capabilities of the proposed ferry and dock facilities will enable larger fire fighting vehicles to get to the island to fight a major house or forest fire, reducing the risk of major losses.
- b. Indirect impacts - No indirect impacts associated with the proposed action can be identified.

#### 2. Police

No significant direct or indirect impacts associated with the proposed action are identified.

#### 3. Schools

No significant direct or indirect impacts associated with the proposed action are identified. Some beneficial impact may result from the effects of increased ferry size on the scheduled busing of children to and from school since busing occurs during periods of commuter demand on ferry service.

4. Health

No significant direct and indirect impacts to health services associated with the proposed action are identified.

5. Parks and recreation

a. Direct impacts

- Anacortes terminal facility: The direct impacts to parks and recreation are not known as this is being written. An environmental assessment is expected to be issued at a latter date on the specifics of terminal facility reconstruction. The "unknown" is the location of the parking area. If it is located on the undeveloped property to the west along the shoreline access to the beach and intertidal area will be eliminated or, at least, inhibited by the facility. This site is the last relatively undeveloped accessible beach along the Anacortes shoreline from the city proper to Ship Harbor. This development would be in conflict with the Anacortes Comprehensive Park and Recreational Plan, 1977, Preliminary Draft (See "Relationship to Existing Plans" Chapter). If the parking is located above the railroad between H and I Avenues, the beach site could then be used as a day use area, providing recreational amenities for Anacortes citizens as well as for those travelling to Guemes Island.
- Guemes Island terminal facility: No direct impacts associated with the proposed action can be identified. Public access to the county owned tidelands and beach will not be lessened by the proposal.
- The ferry: News of the increase in ferry size may have an unquantifiable effect on recreational access to and use on Guemes Island. The effect, however, would be nominal since there are limited areas and facilities for recreational experiences. An increase in the facilities would have much greater effect on demand and use. The quality of the recreational experience has to be developed first.

- b. Indirect impacts- No indirect impacts associated with the proposed action are identified.

c. Mitigating Measures

**Objective:** Preserve the area west of the Anacortes ferry dock for a day use park and shoreline access facility.

**Measure:** If the subject property is the only feasible location for a ferry traffic holding area, the holding lanes should be located as far landward as possible with the design of the area allowing for development of a day use park and for continued access to the beach and intertidal area. If the above design alternative is chosen, parking for walk-on passengers should be located on the bluff above the railroad.

If the ferry dock design alternative locating the new dock and lanes on or adjacent to the present facility with the subject property the only feasible location for parking, the parking should be located as far landward as possible. The design should allow for development of a day use park and continued access to the beach and intertidal area.

D. Utilities

1. Water

No significant direct and indirect impacts to the community and private water systems can be identified as a result of the proposed action.

2. Sewer

No significant direct and indirect impacts to the existing sewage disposal systems can be identified as a result of the proposed actions.

3. Solid Waste

No significant direct and indirect impacts to the solid waste collection and disposal system can be identified as a result of the proposed actions.

4. Telephone

No significant direct and indirect impacts to the telephone system can be identified as a result of the proposed action.

5. Power

No significant direct and indirect impacts to the power and fuel services can be identified as a result of the proposed action.

## E. Aesthetics

### 1. Anacortes Terminal Facility

- a. Direct impacts - Reconstruction of the dock facility will not significantly alter site and area aesthetic qualities. The potential of utilizing a portion of the existing facility for public access would greatly benefit the citizens of Anacortes and Skagit County. Currently, access along the developed Anacortes waterfront is limited because of the daily activities of the industries.

Construction of parking and/or holding lanes on the undeveloped property west of the existing docks will introduce a more intensive use than exists presently. This change will involve additional paving, fencing, and lighting and will represent an intrusion into the aesthetics of the beach area. See 5. Parks and recreation, under C. Public Services this chapter, for more discussion of this impact.

- b. Indirect impacts - No indirect impacts are identified as results of the proposed action.

c. Mitigating Measures

See C. Public Services, 5. Parks and Recreation, this chapter.

### 2. Guemes Island Terminal Facility

- a. Direct impacts - Reconstruction of the ferry docking facility will not alter site and area aesthetic qualities any more than the existing facility. The parking/holding area with its paving and lighting will represent a moderate intrusion into the rural and rural residential setting.

b. Mitigating Measures

Objective: Reduce the degree of "intrusion" of the parking/holding area.

Measures: A crushed rock surface could be used in place of asphalt paving. Some degree of landscaping utilizing native plant species should be required around the perimeter. Lighting could be limited to the existing street lights along Guemes Island Road.

### 3. The Ferry

- a. Direct impacts - No significant direct impacts on aesthetics can be identified with the proposed action of replacing the Almar with a newer, larger ferry.
- b. Indirect impacts - Some local residents who have been utilizing the Almar for a number of years may be disturbed by the change from "old" to "new", that a larger, smoother operating vessel is just not quite the same as the time worn Almar. Then, there will be some residents who will welcome the change and the greater reliability of a new ferry. In any event, the aesthetic change will be more of a personal experience and not strictly a physical one.

### F. Archaeological/Historical

No direct or indirect impacts can be identified as a result of the proposed action.

### G. Energy - Fuels

The proposed ferry is expected to average ten (10) gallons of fuel per round trip as compared with the eight (8) gallons used by the Almar. This would mean an average annual utilization of 70,000 gallons, a 25% increase over the Almar's consumption, if the proposed ferry makes the same number of crossings as the Almar.

However, a reduced schedule with no extra runs would directly reduce the level of fuel consumption. For instance, if the proposed ferry made the same number of crossings as presently scheduled (5,440), total fuel consumption for the year would be 54,400 gallons, less than that presently used for all crossings.

The amount of fuel to be expended on dock facility construction is undeterminable at this time but is not expected to be adversely significant.

RELATIONSHIP BETWEEN SHORT-TERM USES OF MAN'S ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG TERM PRODUCTIVITY

The ferry - Acquisition and operation of a new ferry boat will represent both short and long term gains and benefits involving no significant environmental losses. Continued use of the Almar will only increase costs to the taxpayer as maintenance and down-time requirements increase. Also, delaying the purchase of a new vessel will add the price of inflation to the eventual cost to the county.

Future options and alternatives will not be lost by obtaining a ferry of less than twice the present capacity. Analysis in this impact statement has demonstrated the indirect relationship between ferry size and island population. Rather, the variable of ferry schedules is the determining factor of usage and remains the adjustable alternative which must be evaluated and established to the benefit of all concerned.

Anacortes Terminal Facility - A majority of the site area is presently developed and used for ferry docking and parking. A new docking facility would occupy inter- and subtidal areas presently undeveloped but portions of the existing facility would be removed with some natural restoration of the channel bottom. Locating parking and/or holding lanes on the undeveloped property to the west would preclude use of the area by some wildlife or its use as a day use park unless such a park can be accommodated in the design. Intertidal and subtidal productivity would be maintained.

Guemes Island Facility - A new docking facility would occupy inter- and subtidal areas presently undeveloped. The existing span, float, and pilings would be removed, returning the bottom to its natural condition. Locating parking and holding lanes on the Woodfield property would preclude use of the area by some wildlife and domestic animals.

IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

No significant amounts of natural resources will be committed to the construction of the ferry, the docking facilities, or the parking and holding areas. All proposed actions are expected to be utilized for many years without addition of greater amounts of resources. The only exception will be the fuel consumed by the ferry as discussed in "G. Energy - fuels", of the Existing Environment and Impact chapters. Although the proposed ferry's miles per gallon fuel consumption is 25% greater than the Almar's, total consumption will be based upon the operating schedule established for the new ferry.

## ALTERNATIVES TO THE PROPOSED ACTION

### I. No Action

If no action were taken by the county, the ferry Almar and the existing docking, parking, and holding area facilities would continue to be used. The impacts associated with the proposal would be avoided or delayed until a later date.

Continued operation of the ferry Almar would continue and possibly escalate those operating costs shown in tables in the Impact analysis chapter and later in this chapter. Unless the rate structure is revised upward, costs will continue to exceed revenues with tax subsidies from other county sources needed to support the ferry system.

Also, no action would mean increased dangers and hazards to users of the ferry and associated facilities. As evidenced by the evaluations in Appendix B., the Almar and facilities are in need of extensive repairs and replacement of working and structural parts. Continual maintenance requirements would be expensive and would hamper scheduled operation.

### II. Ferry Size Alternatives: 9, 18, and 27 Car Ferries

Three ferry sizes were picked for the purpose of examining the economic characteristics of the ferry system. Each of these ferry sizes was also examined under different operational schedules. Table G summarizes this information in tabular form. This table also appeared in the impact analysis chapter. Explanations of this summary are as follows:

1. The ferry sizes picked for comparison were 9, 18, and 27 nominal capacity ferrys. The nine car ferry approximates the characteristics of the Almar. The 18 car size was picked as being representative of a ferry just under the 100 ton limit. The 27 car ferry size was picked as being representative of a ferry over the 100 ton limit, which would most likely require a larger, differently licensed crew.
2. The number of trips used for the analysis (75, 100, and 125 per week) were selected as being representative of the number of trips necessary to meet the current schedule and needs without a great number of extra trips or overtime. The existing system averages 100 to 130 trips per week.
3. The analysis uses current (1977) wage rates, benefits, and a reasonable figure for overhead and other operational costs. No capital costs are considered, i.e. equipment purchases.



| FERRY SIZE & SCHEDULE ANALYSIS<br>OPERATIONAL COSTS | 9 CAR FERRY<br>(SMALL) |                       |                       | 10 CAR FERRY<br>(INTERMEDIATE) |                       |                       | 27 CAR FERRY<br>(LARGE) |                       |                       |
|---|------------------------|-----------------------|-----------------------|--------------------------------|-----------------------|-----------------------|-------------------------|-----------------------|-----------------------|
|   | 75<br>TRIPS/<br>WEEK   | 100<br>TRIPS/<br>WEEK | 125<br>TRIPS/<br>WEEK | 75<br>TRIPS/<br>WEEK           | 100<br>TRIPS/<br>WEEK | 125<br>TRIPS/<br>WEEK | 75<br>TRIPS/<br>WEEK    | 100<br>TRIPS/<br>WEEK | 125<br>TRIPS/<br>WEEK |
| NO. OF CREW   | 2                      | 2                     | 3                     | 2                              | 2                     | 3                     | 3                       | 3                     | 4                     |
| WAGES/WK (\$10x1800) ÷ 52 x NO. CREW                | 629.31                 | 629.31                | 1038.46               | 629.31                         | 629.31                | 1038.46               | 1038.46                 | 1038.46               | 1384.62               |
| BENEFITS @ 35%                                      | 242.31                 | 242.31                | 362.60                | 242.31                         | 242.31                | 362.60                | 362.60                  | 362.60                | 484.62                |
| SUBTOTAL  | 871.62                 | 871.62                | 1401.92               | 871.62                         | 871.62                | 1401.92               | 1401.92                 | 1401.92               | 1869.24               |
| OVERHEAD @ 50%                                      | 435.81                 | 435.81                | 700.96                | 435.81                         | 435.81                | 700.96                | 700.96                  | 700.96                | 934.62                |
| TOTAL - DIRECT & INDIRECT                           | 1307.43                | 1307.43               | 2102.88               | 1307.43                        | 1307.43               | 2102.88               | 2102.88                 | 2102.88               | 2803.86               |
| COST PER TRIP - WAGES & SUPPORT                     | 17.43                  | 13.07                 | 16.82                 | 17.43                          | 13.07                 | 16.82                 | 16.82                   | 28.03                 | 22.43                 |
| FUEL CONSUMPTION - GPH PER ENGINE                   | 8                      | 8                     | 8                     | 10                             | 10                    | 10                    | 10                      | 12                    | 12                    |
| GAL. PER TRIP (GPH x 2 x 1/2 HR)                    | 8                      | 8                     | 8                     | 10                             | 10                    | 10                    | 10                      | 12                    | 12                    |
| COST/TRIP - FUEL OIL = GPT x \$.50                  | 4.00                   | 4.00                  | 4.00                  | 5.00                           | 5.00                  | 5.00                  | 5.00                    | 6.00                  | 6.00                  |
| TOTAL COST PER TRIP                                 | 21.43                  | 17.07                 | 20.82                 | 22.43                          | 18.07                 | 21.82                 | 34.03                   | 27.03                 | 28.43                 |
| COST PER CAR (NO PASSENGERS)                        |                        |                       |                       |                                |                       |                       |                         |                       |                       |
| AT CAPACITY \$                                      | 2.38                   | 1.89                  | 2.31                  | 1.25                           | 1.00                  | 1.21                  | 1.26                    | 1.00                  | 1.05                  |
| AT 2/3 CAPACITY \$                                  | 3.57                   | 2.84                  | 3.47                  | 1.87                           | 1.51                  | 1.82                  | 1.89                    | 1.50                  | 1.57                  |
| AT 1/3 CAPACITY \$                                  | 7.14                   | 5.69                  | 6.94                  | 3.74                           | 3.01                  | 3.63                  | 3.78                    | 3.00                  | 3.16                  |

Ferry Economic (Cost vs. Revenue) Characteristics for 1975 and 2000

Table I depicts cost and revenues for the three ferry sizes based upon current costs and 1975 traffic usage figures. Table J was developed using the conservative traffic figures projected for the year 2000 in the B. Transportation section, Impact analysis chapter, which are: 65,000 vehicles and 200,000 passengers in that one year.

Revenue projections used for both Tables I and J were based on the following formulas:

$$\text{Car Revenue/Trip} = \frac{3}{4} (\text{no. of cars in load} \times \$1) + \frac{1}{4} (\text{no. of cars in load} \times \$3) = \$1.50 \times \text{no. of cars in load}$$

$$\text{Passenger Revenue/Trip} = \frac{3}{4} (\text{no. of passengers in load} \times \$0.25) + \frac{1}{4} (\text{no. of passengers in load} \times \$0.70) = \$0.3625 \times \text{no. of passengers in load}$$

$$\text{Total Revenue/Trip} = \text{Car revenue} + \text{Passenger revenue}$$

Trip costs were developed as shown using representation costs in 1977 dollars. In as much as it is expected that both revenues and costs will be inflated or deflated with time at about the same percentages, these comparison should be valid.

General conclusions drawn from Tables I and J are summarized as follows:

1. A small ferry operating at low average load factors cannot make enough trips to handle the projected traffic in the year 2000.
2. A small ferry operating at reasonable load factors will incur a substantial economic loss.
3. An intermediate size ferry operating at reasonable load factors can maintain a reasonable schedule with the traffic projected for the year 2000.
4. An intermediate size ferry, operating on a reasonable schedule at reasonable load factors is economically attractive.
5. The cost of operating an intermediate sized ferry at low load factors are approximately the same as operating a small ferry with higher load factors.

| COST VS. REVENUE                              | 9 CAR FERRY<br>(SMALL) |                       |                       | 18 CAR FERRY<br>(INTERMEDIATE) |                       |                       | 27 CAR FERRY<br>(LARGE) |                       |                       |
|---|------------------------|-----------------------|-----------------------|--------------------------------|-----------------------|-----------------------|-------------------------|-----------------------|-----------------------|
|   | 100%<br>LOAD<br>FACTOR | 66%<br>LOAD<br>FACTOR | 33%<br>LOAD<br>FACTOR | 100%<br>LOAD<br>FACTOR         | 66%<br>LOAD<br>FACTOR | 33%<br>LOAD<br>FACTOR | 100%<br>LOAD<br>FACTOR  | 66%<br>LOAD<br>FACTOR | 33%<br>LOAD<br>FACTOR |
| CARS PER TRIP                                 | 9                      | 6                     | 3                     | 18                             | 12                    | 6                     | 27                      | 18                    | 9                     |
| NO. OF TRIPS/YEAR TO CARRY 33171 VEHICLES     | 3686                   | 5528                  | 11057                 | 1843                           | 2764                  | 5528                  | 1228                    | 1843                  | 3686                  |
| NO. OF TRIPS/ WEEK TO CARRY 33171 VEHICLES    | 71                     | 106                   | 213                   | 35                             | 53                    | 106                   | 24                      | 35                    | 71                    |
| NO. OF PASSENGERS PER TRIP - 85443 PASSENGERS | 23                     | 15                    | 8                     | 46                             | 31                    | 15                    | 70                      | 46                    | 23                    |
| REVENUE PER TRIP (1977 DOLLARS)               |                        |                       |                       |                                |                       |                       |                         |                       |                       |
| CAR REVENUE = \$1.50 X NO. OF CARS            | 13.50                  | 9.00                  | 4.50                  | 27.00                          | 18.00                 | 9.00                  | 40.50                   | 27.00                 | 13.50                 |
| PASSENGER REVENUE = \$3625 X NO. PASS.        | 8.34                   | 5.44                  | 2.90                  | 16.67                          | 11.24                 | 5.44                  | 25.37                   | 16.67                 | 8.34                  |
| TOTAL REVENUE PER TRIP - \$                   | 21.84                  | 14.44                 | 7.40                  | 43.67                          | 29.24                 | 14.44                 | 65.87                   | 43.67                 | 21.84                 |
| COST PER TRIP:                                |                        |                       |                       |                                |                       |                       |                         |                       |                       |
| WAGES AND SUPPORT PER WEEK \$                 | 1307.43                | 1307.43               | 2614.86               | 1307.43                        | 1307.43               | 1307.43               | 2102.88                 | 2102.88               | 2102.88               |
| WAGES AND SUPPORT PER TRIP \$                 | 18.41                  | 12.33                 | 12.27                 | 37.36                          | 24.67                 | 12.33                 | 87.58                   | 60.08                 | 29.62                 |
| FUEL, OIL, ETC, PER TRIP \$                   | 4.00                   | 4.00                  | 4.00                  | 5.00                           | 5.00                  | 5.00                  | 6.00                    | 6.00                  | 6.00                  |
| TOTAL COST PER TRIP \$                        | 22.41                  | 16.33                 | 16.27                 | 42.36                          | 29.67                 | 17.33                 | 93.58                   | 66.08                 | 35.62                 |
| PROFIT < LOSS > PER TRIP \$                   | < 0.57 >               | < 1.89 >              | < 8.87 >              | 1.31                           | < 0.43 >              | < 2.89 >              | < 27.71 >               | < 22.41 >             | < 13.78 >             |
| PROFIT < LOSS > PER YEAR \$                   | < 2101.02 >            | < 10447.92 >          | < 98075.51 >          | 2414.33                        | < 1188.52 >           | < 15975.92 >          | < 34027.88 >            | < 41301.63 >          | < 50793.08 >          |

| COST VS. REVENUE                                | 9 CAR FERRY (SMALL) |                 |                 | 18 CAR FERRY (INTERMEDIATE) |                 |                 | 27 CAR FERRY (LARGE) |                 |                 |
|---|---------------------|-----------------|-----------------|-----------------------------|-----------------|-----------------|----------------------|-----------------|-----------------|
|   | 100% LOAD FACTOR    | 66% LOAD FACTOR | 33% LOAD FACTOR | 100% LOAD FACTOR            | 66% LOAD FACTOR | 33% LOAD FACTOR | 100% LOAD FACTOR     | 66% LOAD FACTOR | 33% LOAD FACTOR |
| CARS PER TRIP                                   | 9                   | 6               | 3               | 18                          | 12              | 6               | 27                   | 18              | 9               |
| NO. OF TRIPS/YEAR TO CARRY 65000 VEHICLES       | 7222                | 10834           | 21666           | 3611                        | 5417            | 10834           | 2407                 | 3611            | 7222            |
| NO. OF TRIPS/WEEK TO CARRY 65000 VEHICLES       | 139                 | 208             | 417             | 69                          | 104             | 208             | 46                   | 69              | 139             |
| NO. OF PASSENGERS PER TRIP - 200,000 PASSENGERS | 28                  | 18              | 9               | 56                          | 37              | 18              | 84                   | 56              | 28              |
| REVENUE PER TRIP (1977 DOLLARS)                 |                     |                 |                 |                             |                 |                 |                      |                 |                 |
| CAR REVENUE = \$1.50 X NO. OF CARS              | 13.50               | 9.00            | 4.50            | 27.00                       | 18.00           | 9.00            | 40.50                | 27.00           | 13.50           |
| PASSENGER REVENUE = \$3625 X NO. PASS.          | 10.15               | 6.52            | 3.26            | 20.30                       | 13.41           | 6.52            | 30.45                | 20.30           | 10.15           |
| TOTAL REVENUE PER TRIP - \$                     | 23.65               | 15.52           | 7.76            | 47.30                       | 31.41           | 15.52           | 70.95                | 47.30           | 23.65           |
| COST PER TRIP                                   |                     |                 |                 |                             |                 |                 |                      |                 |                 |
| WAGES AND SUPPORT PER WEEK \$                   | 2102.88             | 2614.86         | 3922.29         | 1307.43                     | 1307.43         | 2614.86         | 2102.88              | 2102.88         | 2803.86         |
| WAGES AND SUPPORT PER TRIP \$                   | 15.13               | 12.57           | 9.40            | 18.95                       | 12.57           | 12.57           | 45.71                | 30.48           | 20.17           |
| FUEL, OIL, ETC. PER TRIP \$                     | 4.00                | 4.00            | 4.00            | 5.00                        | 5.00            | 5.00            | 6.00                 | 6.00            | 6.00            |
| TOTAL COST PER TRIP \$                          | 19.13               | 16.57           | 13.40           | 23.95                       | 17.57           | 17.57           | 51.71                | 36.48           | 26.17           |
| PROFIT < LOSS > PER TRIP \$                     | 4.52                | < 1.05 >        | < 5.64 >        | 23.35                       | 13.84           | < 2.05 >        | 19.24                | 10.82           | 2.52            |
| PROFIT < LOSS > PER YEAR \$                     | 32643.44            | < 11375.70 >    | < 122196.24 >   | 84316.85                    | 74971.28        | < 22209.70 >    | 46310.68             | 39071.02        | < 18199.44 >    |

6. The costs of operating a large ferry on a reasonable schedule will probably result in very low load factors and a financial deficit.
7. The traffic projections will not justify the operation of a large ferry.

#### Ferry Sizing Conclusions

This report assumes the following objectives of obtaining a new ferry, the proposed action:

1. Provide adequate service through a reasonable operating schedule. For the purposes of this analysis, the present average of 105 trips per week is deemed "adequate".
2. Provide this service at a reasonable cost. For the purposes of this analysis, the present fare schedule is deemed "reasonable".
3. Reserve capacity for ferry traffic growth to the year 2000.

Using the 1975 traffic figures and the year 2000 projections as the standards for comparison, we make the following observation:

#### 1. Schedule

1975 - a. A small ferry is adequate to maintain the current schedule if it is assumed that a considerable number of extra trips will be required to handle peak loads.

b. An intermediate sized ferry can maintain the current schedule with fewer extra trips, if any.

c. A large ferry is more than adequate to maintain the current schedule.

2000 - a. A small ferry cannot handle the projected traffic regardless of the schedule and cannot begin to cope with the peak demands.

b. An intermediate sized ferry can maintain current schedules and carry the projected traffic.

c. A large ferry is more than adequate to main current schedules and carry the projected traffic.

#### 2. Cost

1975 - a. A small ferry will continue to operate at a substantial loss regardless of the schedule or require an increase in fares.

- b. An intermediate size ferry will operate with substantially less loss than a small sized ferry at lower load factors or at about the same over all cost with today's traffic.
  - c. A large ferry will operate at much higher losses than either the small or intermediate sizes with today's traffic while maintaining reasonable schedules.
- 2000 -
- a. The small ferry is trip limited by the number of hours in the day. If it could make enough trips to handle the traffic it would operate at a substantial loss.
  - b. The intermediate could operate profitably at current schedules or could allow a reduction in fares.
  - c. The large ferry could about break even on current schedules with the projected traffic load.

These comments are summarized on Table K entitled Service Objective Criteria Comparison. This comparison of size alternatives leads to several fairly obvious conclusions:

1. A small ferry is inadequate from both a service and a cost standpoint for both present and future traffic.
2. A large ferry appears to be more than adequate to handle present and future traffic demands. Operation of this ferry on a normal schedule would result in a substantial financial loss and would necessitate financial loss and would necessitate adoption of a reduced schedule and/or increase fares.
3. An intermediate sized ferry appears to be the only reasonable alternative from both a traffic and a cost of operation standpoint.
4. The size finally selected should probably be based on the consideration that crew costs are far and away the greatest item of expense in the operation of the ferry and that maintenance and fuel costs are relatively minor and independent of size. These facts indicate that the ferry finally selected should probably be the largest vessel that can be obtained which would be allowed to operate with a two man crew.

SERVICE OBJECTIVE CRITERIA COMPARISON

Table K

| Service Objective                    | Small Ferry<br>9 cars  | Intermediate Ferry<br>18 cars   | Large Ferry<br>27 cars  |
|--------------------------------------|--|---|---|
| Adequate Service Reasonable Schedule | <p>1975 Adequate for normal loads; requires extensive extra trips to handle peak loads.</p> <p>2000 Not capable of handling traffic under normal or peak loads</p>                             | <p>1975 Adequate. Requires few extra trips; has ability to handle peak loads.</p> <p>2000 Adequate for projected traffic</p>  | <p>1975 More than adequate</p> <p>2000 More than adequate</p>   |
| Reasonable cost of Operation         | <p>1975 Will operate at a substantial loss with normal traffic.</p> <p>2000 Not capable of handling traffic with normal schedules - increased schedule would result in a substantial loss.</p> | <p>1975 Will operate more profitably at the same load factors or less total traffic.</p> <p>2000 Operation in normal schedules would be profitable or would allow a reduction in fares.</p> | <p>1975 Will operate at a substantial loss with normal traffic.</p> <p>2000 Operation would about break even with normal schedule; could operate on a reduced schedule more economically.</p> |

### III. Ramp Ferry

Another alternative is a ferry boat fitted with movable ramps at each end which can be lowered to a shore-based ramp or ramps for the on and off loading of passengers and vehicles. Such ferries are being used in Canada and in Europe.

No consideration of ferry size is necessary as this appears in the previous analysis section (II.). Investigation of this type of ferry system in light of the physical shore characteristics and needs of the users and operators revealed the following advantages and disadvantages as compared to a conventional dock ferry:

#### Advantages

Lower initial cost.

Lower maintenance cost.

Fast turn around time.

Ability to serve other islands with lower landing costs than conventional ferry needing a dock facility.

Beach ramp could be used for other purposes during off hours (limited boat launching).

On the Anacortes side, the undeveloped proposed park area could be used for loading and unloading.

#### Disadvantages

Debris accumulated on the beach would have to be removed periodically.

Ramps would have to be periodically cleaned of seaweed and algae.

Occasional ferry service to other islands may not be desired by residents and property owners of those islands.

Two ramp systems would be needed: one for cars, one for passengers.

Walk-on handicapped may be inconvenienced by using the ramps. Conditions may be dangerous for use by the handicapped.

Fuel consumption would be greater due to the added weight of the ramps.

Ferry has to be a minimum length of 120 feet with ramps 40 feet each; total length would be 200 feet with ramps lowered. Berthing dock would be necessary.

Possibility of Bridge Replacement Fund not financing 75% of Facility cost.



Cost

The costs figures listed below are for comparison of systems only. Accurate costs can only be determined after preliminary design has been completed and the scope of work has been defined.

| Ramp System:                  |                    | Conventional:      |
|-------------------------------|--------------------|--------------------|
| Ferry Boat                    | \$1,250,000        | \$950,000          |
| Facilities                    | <u>900,000</u>     | <u>1,500,000</u>   |
| Subtotal                      | 2,150,000          | 2,450,000          |
| Less 75% facility<br>funding* | - 675,000          | 1,125,000          |
| Total cost                    | <u>\$1,475,000</u> | <u>\$1,325,000</u> |

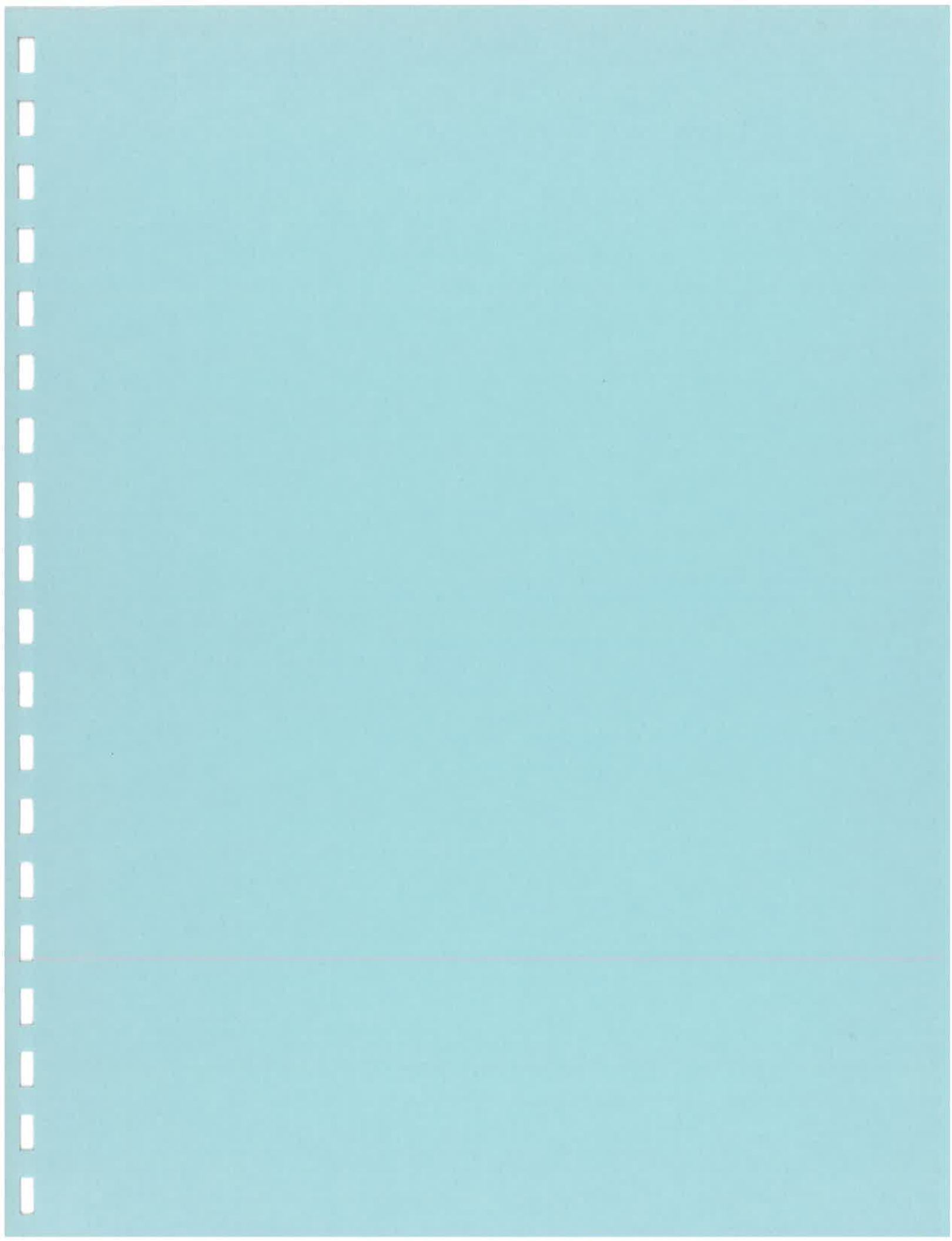
\*Bridge Replacement Fund grant. Funding for ramp facilities is uncertain.  
Source: Skagit County Engineer's Office.

Conclusion

The types of disadvantages and the cost estimates indicate that the ramp system ferry would not adequately meet the needs and objectives of Skagit County and the Guemes Island ferry operation.

## REFERENCES

1. Soil Survey of Skagit County, U.S. Department of Agriculture, Soil Conservation Service, No. 6, January, 1960.
2. Anacortes Shoreline Inventory, by Environmental Analysis Consultants, Bellingham, for the Anacortes City Council, January, 1977.
3. Washington Marine Atlas, Volume No. 1, Department of Natural Resources, July, 1974.
4. Puget Sound and Adjacent Waters Study, Appendix XIV, Watershed Management, by the Pacific Northwest River Basins Commission, 1970.
5. Skagit County Shoreline Inventory, Range 1 East, Township 35 North, Skagit County Planning Department, Mount Vernon, 1972.
6. Preliminary Accretion Beach Inventory, by Wolf Bauer, August, 1974, for the Skagit County Planning Department, Mount Vernon.
7. Marine Recreation Site Analysis Report, Skagit Regional Planning Council, Fall, 1977.
8. State of Washington Population Trends - 1977, Office of Financial Management, Population Studies Division, August, 1977.
9. Conversation with Alan Bush, Assistant Fire Chief, Fire District 17, November 15, 1977.
10. Conversation with Sheriff John Boynton, Skagit County Sheriff's Office, November 16, 1977.
11. Conversation with Hal Kennedy, Office of Public Archaeology, University of Washington, November 22, 1977.



## APPENDIX A

### NON-SALMON SPORTS FISHERIES WHICH MAY BE FOUND IN ANACORTES

|                           |                                |
|---------------------------|--------------------------------|
| Steelhead - Rainbow Trout | <i>Salmo gairdenrii</i>        |
| Cutthroat Trout           | <i>S. clarkii</i>              |
| Surf Perch - redbtail     | <i>Amphistichus rhodoterus</i> |
| Smelt                     | <i>Hypomesus pretiosus</i>     |

### BOTTOM SPORTS FISHERIES IN ANACORTES

|   |                                |
|---|--------------------------------|
| True Cod (Pacific Cod) - deep   | <i>Gadus macrocephalus</i>     |
| Rock Fish - rocks, shipwrecks,<br>kelp, shallow to<br>deep  | <i>Sebastes</i> sp.            |
| Lingcod - lower intertidal to<br>deep water with<br>strong tides                                      | <i>Ophiodon elongatus</i>      |
| Kelp Greenling - rocky shores<br>reefs and kelp   | <i>Hexagrammos decagrammus</i> |
| Rock Sole   | <i>Lepidopetta bilineata</i>   |
| Starry Flounder   | <i>Platichthys stellus</i>     |
| Pacific Halibut - Port Angeles,   | <i>Hippoglossus stenolepis</i> |
| Striped Sea Perch   | <i>Embiotoca lateralis</i>     |
| Pile Perch  | <i>Damalichthys vacca</i>      |
| Black Cod (sablefish) - deep  |                                |
| Sole and Flounders: 15sp in<br>Puget Sound - shallow bays<br>sandy to muddy bottoms to<br>deep water. |                                |
| Yellowtail rockfish - "sea bass"  |                                |
| Candlefish  |                                |
| Pilchards   |                                |
| Anchovies   |                                |
| Staghorn sculpin ("bull-head")  |                                |

### Shrimp and Crab Fisheries:

Five kinds of shrimp are considered "food" shrimp:

|                      |   |
|----------------------|---|
| a. Spot Shrimp       | <i>Pandalus platyceros</i>                              |
| b. Coon Strip Shrimp | <i>Pandalus dani</i>                                    |
| c. Side Strip Shrimp | <i>Pandalopsis dispar</i>                               |
| d. Pink Shrimp       | <i>Pandalus borealis</i> and<br><i>Pandalus jordani</i> |

The Dungeness crab, *Cancer magister*, is the only "food" crab found in the area.

Marine Mammals: The National Marine Fisheries Service and Marine Shoreline Fauna of Washington, A Status Survey (1975) report the following marine mammals have been sighted in Anacortes marine water:

Killer Whales - known to mate in Anacortes waters  
Gray Whales  
Minke Whales  
Harbor Porpoises  
Dall's Porpoises  
Harbor Seals - 100 were sited in Fidalgo Bay in 1973 population census.

INTERTIDAL SOFTSHELL CLAMS

Intertidal softshell clams which may be found along the mud beaches of Skagit County include:

Eastern softshell clam                      Mya Arenaria

SHELLFISH SUBTIDAL HARDSHELL CLAMS

Significant subtidal hardshell clam beds are not found in Anacortes. Subtidal hardshell clams which on occasion may be found include:

|                    |                                  |
|--------------------|----------------------------------|
| Geoduck            | Panope generosa                  |
| Butterclams        | Saxidomus giganteus              |
| Native littlenecks | Venerupis staminea               |
| Manila Clams       | Venerupis japonica               |
| Horse clams        | Tresus nuttalli and Tresus capax |
| Cockles            | Clinocardium nuttalli            |

For information, contact Washington State Department of Fisheries. Clam survey available at Shellfish Research lab, Point Whitney.

INTERTIDAL HARDSHELL CLAMS

Significant intertidal hardshell clam beds are not found in Anacortes. Intertidal clam beds can be found along the western and northern shores of March Point and the southern and northeastern shores of Guemes Channel.

Intertidal hardshell clams which on occasion may be found along the sand and gravel beaches of Anacortes include:

|              |                                  |
|--------------|----------------------------------|
| Butter clams | Saxidomus giganteus              |
| Little necks | Protothaca staminea              |
| Manila Clams | Venerupis japonica               |
| Cockles      | Clinocardium nuttalli            |
| Geoducks     | Panope generosa                  |
| Horesclams   | Tresus nuttalli and Tresus capax |

For information, contact Washington State Department of Fisheries. Clam survey information available at Shellfish Research Lab, Point Whitney.



BIRDLIFE SPECIES LIST AT FIDALGO BAY \*

LEGEND OF ABBREVIATIONS  
FOR  
BIRDLIFE SPECIES LIST

\* - known to breed in the state

Abundance:

C - common; often seen or heard in appropriate habitats

U - uncommon; usually present, not always seen or heard

R - rare; present in appropriate habitats only in small numbers, seldom seen or heard

Seasonal occurrence:

x - resident; present all year, although abundance may vary seasonally

s - summer visitor (includes spring and fall)

w - winter visitor (includes spring and fall)

f - fall only

m - spring and fall migrant

# - observed in field in mid-September, 1973

|                            |    |                        |       |
|----------------------------|----|------------------------|-------|
| *Common Loon               | Cw | Dunlin                 | Cw    |
| *Red-throated Loon         | Cw | Short-billed Dowitcher | Cm    |
| *Red-necked Grebe          | Cw | #Long-billed Dowitcher | Cm    |
| *Horned Grebe              | Cw | Western Sandpiper      | Cm    |
| *Eared Grebe               | Cw | Sanderling             | Cw    |
| *Western Grebe             | Cw | Northern Phalarope     | Cm    |
| *Pied-billed Grebe         | Cr | Parasitic Jaeger       | Cm    |
| #*Double-crested Cormorant | Cr | #*Glaucous-winged Gull | Cr    |
| *Brandt's Cormorant        | Cr | *Western Gull          | Cr    |
| #*Great Blue Heron         | Cr | Herring Gull           | Cw    |
| Brant                      | Rw | Thayer's Gull          | Cw    |
| Snowgoose                  | Cw | #*California Gull      | Cm,Uw |
| #*Mallard Duck             | Cr | *Ring-billed Gull      | Cw    |
| *Pintail Duck              | Cw | # New Gull             | Cw,Uw |
| *Green-winged Teal         | Cw | Bonaparte's Gull       | Cw    |
| American Widgeon           | Cw | Heerman's Gull         | Cf    |
| *Shoveler                  | Cw | Black-legged Kittiwake | Cw    |
| Greater Scaup              | Cw | # Common Tern          | Cm    |
| *Lesser Scaup              | Cw | *Pigeon Guillemot      | Cr    |
| Common Goldeneye           | Cw | *Marbled Murrelet      | Cr    |
| *Barrow's Goldeneye        | Cw | *Rhinoceros Auklet     | Cr    |
| Bufflehead                 | Cw | *Mourning Dove         | Cr    |
| # White-winged Scoter      | Cw | *Short-eared Owl       | Us,Rw |
| # Surf Scoter              | Cw | #*Belted Kingfisher    | Cr    |
| *Ruddy Duck                | Uw | Common Flicker         | Cr    |
| *Flooded Merganser         | Rr | *Violet-green Swallow  | Uw    |
| *Common Merganser          | Ur | *Barn Swallow          | Cs    |
| *Red-breasted Merganser    | Uw | #*Common Crow          | Cs    |
| # Red-tailed Hawk          | Cr | #*Robin                | Cr    |
| *Marsh Hawk                | Cr | *Waterpiper            | Cr    |
| *American Kestrel          | Ur | Northern Shrike        | Uw    |
| #*Killdeer                 | Cr | #*Starling             | Cr    |
| # Black Turnstone          | Cw | *Red-winged Blackbird  | Cr    |
| *American Coot             | Cr | *Brewer's Blackbird    | Cr    |
| Semipalmated Plover        | Cm | #*Brown-headed Cowbird | Cs,Uw |
| Black-bellied Plover       | Cm | *House Finch           | Cr    |
| Ruddy Turnstone            | Um | *Pine Siskin           | Cr    |
| Whimbrel                   | Cm | *American Goldfinch    | Cr    |
| *Spotted Sandpiper         | Cs | *Rufous-sided Towhee   | Cr    |
| Greater Yellowlegs         | Cm | *Savannah Sparrow      | Cs,Uw |
| Red Knot                   | Cm | *Oregon Junco          | Cr    |
| Pectoral Sandpiper         | Cf | *White-crowned Sparrow | Cr    |
| Least Sandpiper            | Cm | #*Lincoln's Sparrow    | Cs,Rw |
|                            |    | #*Song Sparrow         | Cr    |

A SAMPLING PROGRAM OF INTERTIDAL AND SUBTIDAL HABITATS IN NORTH-ERN PUGET SOUND. Draft Final Report. Huxley College of Environmental Studies, Western Washington State College.

Sampling in .25 m<sup>2</sup> quadrants.

ALGAE

- Chlorophyta (Green Algae)  
Cladophora sp.  
Codium sp.  
Enteromorpha linza  
Enteromorpha sp.  
Monostroma fuscum  
Monostroma sp.  
Sporomorpha sp.  
Ulva sp.  
Ulva rigida  
Phaeophyta (Brown Algae)  
Analepus japonicus  
Desmarestia sp.  
Fucus distichus  
Laminaria saccharina  
Laminaria sp.  
Rhodophyta (Red Algae)  
Callithamnion sp.  
Ceramium sp.  
Ceramium strictum  
Ceramium washingtoniensis  
Cryptosiphonia woodii  
Farlowia mollis  
Gelidium sp.  
Gelidium stollata  
Heterosiphonia sp.  
Heterosiphonia sp.  
Iridaea sp.  
Lophosiphonia sp.  
Microcladia borealis  
Microcladia sp.  
Odonthalia floccosa  
Odonthalia sp.  
Platythamnion sp.  
Platythamnion coccineum  
Pacificum  
Plocamium sp.  
Plocamium tenue  
Polysiphonia latissima  
Polysiphonia sp.  
Porphyra sp.

- Prionitis lyalli  
Pterosiphonia gracilis  
Pterosiphonia sp.  
Pterochondria woodii  
Rhodocela larix  
Scaglia occidentalis  
Spermatophyta (Seed-Bearing Plants)  
Zostera marina  
**INVERTEBRATES**  
Anthozoa (Sea Anemones)  
Anthopleura artemesia  
Anthopleura artemesia  
Anthopleura elegantissima  
Nemertea (Ribbon Worms)  
Cerebratulus californiensis  
Empictonema gracile  
Paranemertes peregrina  
Amphineura (Chitons)  
Cyanoplax dentiens  
Nopalia muscosa  
Nopalia sp.  
Prosobranchia (Snails)  
Collisella pelta  
Collisella sp.  
Lacuna sp.  
Lacuna variegata  
Littorina scutulata  
Littorina sitkana  
Margarites pupillus  
Notoacmea persona  
Notoacmea scutum  
Notoacmea sp.  
Thais emarginata  
Thais lamellosa  
Thais sp.

**Bivalvia (Clams)**

- Clinocardium nuttalli  
Cryptomya californica  
Macoma balthica  
Macoma inquinata  
Macoma nasuta  
Macoma sp.  
Mya arenaria  
Myrella tumida  
Mytilus edulis  
Protothaca staminea  
Protothaca sp.  
Pseudocardium lordi  
Saxidomus giganteus  
Transenella tontilla  
Polychaeta (Marine Worms)  
Ammotrypane aulopaster  
Armandia brevis  
Arabella tricolor  
Axiobella rubrocincta  
Boccardia sp.  
Capitella capitata  
Chaetozone setosa  
Cirratulus cirratus  
Dorvillea moniloceras  
Dorvillea sp.  
Etcone longa  
Etcone sp.  
Exogone lourei  
Exogone sp.  
Glycinde picta  
Hemipodus borealis  
Harmothoe extenuata  
Lumbrineris inflata  
Lumbrineris sp.  
Naiareis sp.  
Nephtys caccoides  
Nerine cirratulus  
Nereis sp.  
Nicomache personata  
Nicomache sp.  
Notomastus lineata  
Notomastus sp.  
Notomastus tenuis  
Onuphis sp.

- Ophidromus pugettensis  
Owenia fusiformis  
Phyllodoce maculata  
Phyllodoce sp.  
Pista fasciata  
Pista sp.  
Platynereis bicantali-culata  
Polydora ligni  
Prionospio pinnata  
Pseudopolydora kempii  
Japonica  
Pseudopotamilla ocellata  
Scoloplos armiger  
Spio filicornis  
Spiophanes bombyx  
Spiophanes cirrata  
Spilis sp.  
Thelepus crispus  
Thelepus sp.  
**Sipuncula (Marine Worms)**  
Cirripedia (Barnacles)  
Balanus glandula  
Balanus sp.  
Cthamalus dalii  
**Isopoda (Marine Insect)**  
Dynamenella sp.  
Exosphaeroma amplicauda  
Gnorimosphaeroma oregonensis  
Leptochelia savignyi  
**Decapoda (Crabs)**  
Cancer oregonensis  
Hemigrapsus nudus  
Hemigrapsus oregonensis  
Hemigrapsus sp.  
Pagurus hirsutiusculus  
Pagurus granosimanus  
Pagurus sp.  
Pinnixa schmitti  
Pinnixa sp.  
Pagetta gracilis  
**Phoronida (Hemichordates)**  
Phoronopsis harmeri  
**Asterioidea (Sea Stars)**  
Leptasterias hexactis  
Holothuroidea (Sea Cucumbers)  
Leptosynapta clarki  
Leptosynapta sp.



APPENDIX B

GUEMES ISLAND FERRY

By

Skagit County Engineering Department

January - 1977

The following is a general description of the Guemes Island Ferry System as it now exists:

A. Guemes Ferry Almar:

1. Description

- a. Class - 100 Ton
- b. Length - 65 feet
- c. Capacity - 9 cars  
50 passengers
- d. Power - Twin 6-71 G.M.C. Diesels  
Single Ended
- e. Crew - 2 man
- f. Year Built - 1947
- g. Built for fresh water - Columbia River use.

2. Service:

- a. Ferry runs between Anacortes and Guemes Island, a distance of 0.9 mile.
- b. Number of crossings per week - 104
- c. Number of extra trips per year above schedule:

1972 - 1502  
1973 - 1618  
1974 - 1605  
1975 - 1637  
1976 - 1382 \*

\* Ferry down time during mid summer decreased the number of ferry runs during the year. This decrease was not due to a decreased demand.

3. Conditions:

- a. Hull - The two following photographs show the condition of the ferry hull. The electrolysis causing the pitting in the hull plates has been practically stopped due to the paint system used on the hull. The same pitting occurs on the inside of the hull to a lesser degree. In addition, the hull plates which were only 1/4" thick originally have become brittle and subject to cracking due to continual flexing over the last 30 years.  
The second photo shows how the chine plates have been stretched beyond their plastic limit. When steel has been cold deformed in this manner it becomes brittle and more subject to fatigue cracking.

## GUEMES ISLAND FERRY

As a result of the above, we have been developing one to three small holes or cracks through various parts of the hull each year.

In the future we would expect the cracking to be more frequent and larger. If a crack develops at night any compartment or engine room could be flooded.

### b. Engines and drive unit:

The propulsion system is in fair condition. We have a spare engine, clutch, and propellers. The engines have to be overhauled every 10 to 12,000 hours.

Because the propellers are mounted close to the water surface the propellers cavitate when the boat is lightly loaded.

### c. Electrical system:

The electrical system is essentially a 32 volt obsolete system in poor condition.

### d. Wheelhouse and passenger cabin:

Both buildings are partially made of wood. Parking vehicles under a wood structure presents a high fire risk. The other liability is asking the passengers to use the ships ladder to gain access to the passenger cabin.

## B. Anacortes Dock

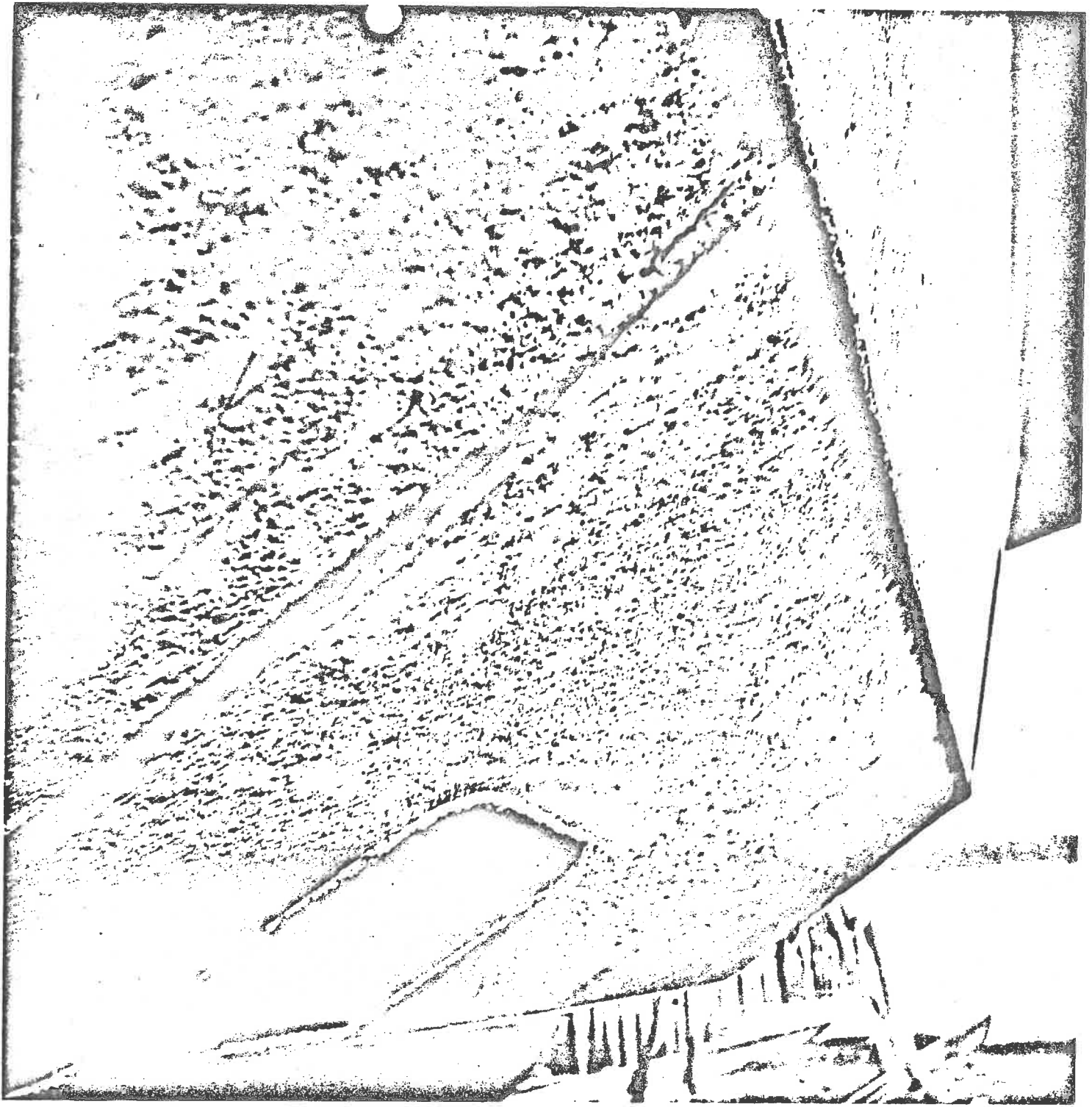
### 1. Dock

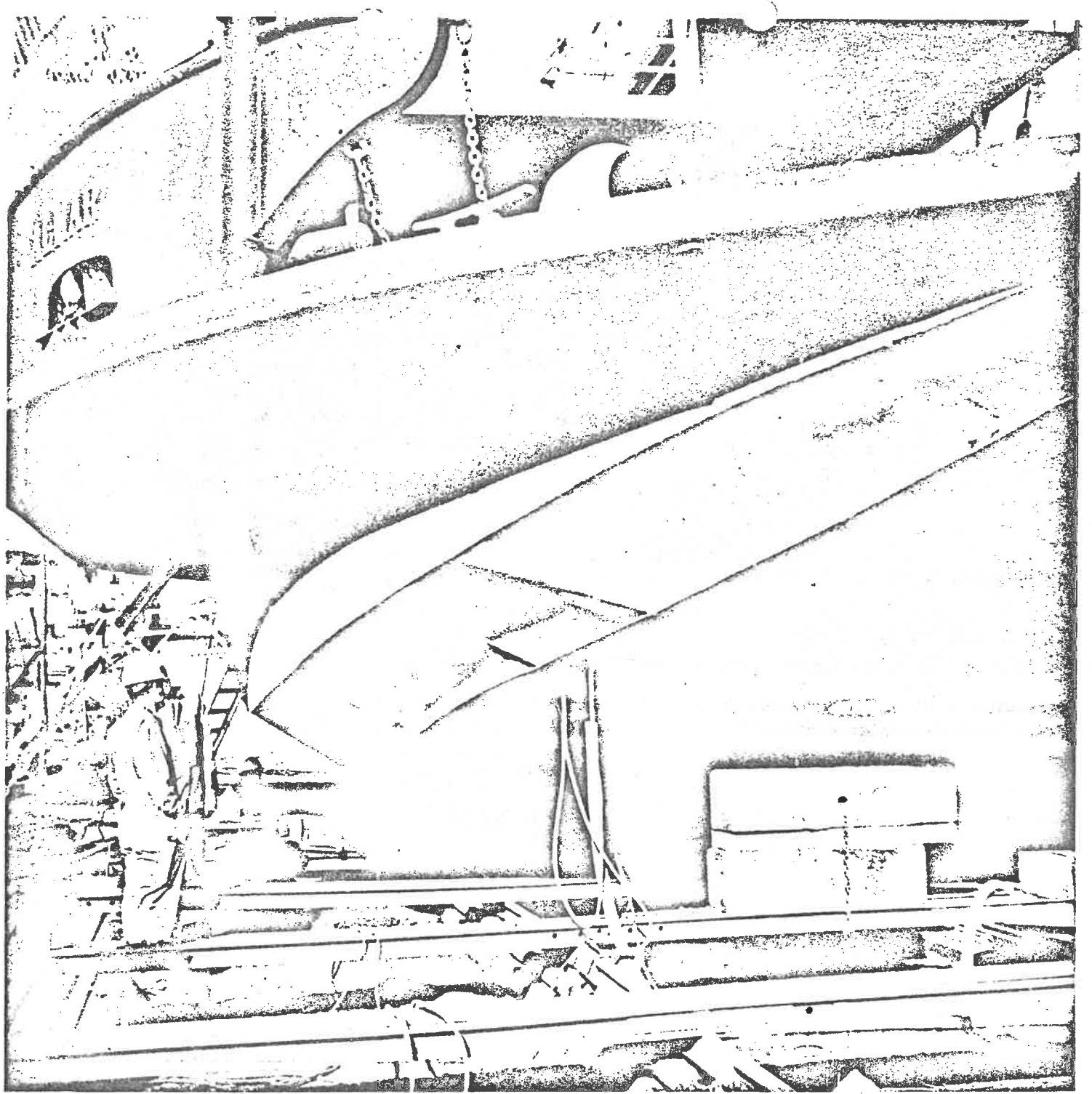
- a. Piling - all rotten piling replaced in 1976
- b. Deck - Approximately 60% of the deck is rotten and should be replaced.
- c. Railing condition - Fair
- d. Waiting room - Structure okay but floor is rotten.
- e. Office and storage - Both deck and structure in poor condition.
- f. Toilets - System must be changed within the next 90 days.
- g. Electrical system - Condition fair.

### 2. Loading Truss

- a. Movable end rebuilt in 1974
- b. Apron rebuilt in 1976.

- c. Truss - Fair Condition
- d. Fixed end supports - rebuilt in 1976
- e. Hoisting tower - fair to poor condition must be replaced in the next two to three years.
- f. Dolphins - fair to good condition.
- g. Guemes Span
  - 1. This span is the controlling factor in determining the 12 ton load limit on the ferry system.
  - 2. Float
    - a) Float was foam filled in November, 1975. Although the foam will insure against sinking it has increased the deteriorating of the float. Additional foam had to be added under the float in December, 1976. Float will require continuing heavy maintenance until replaced.
  - 3. Loading apron.
    - a) Hinge and counter balance are in poor condition.
  - 4. Truss
    - a) Timber in fair to good condition.
    - b) Steel hangers and bracing are in fair to poor condition and should be replaced.
  - 5. Fixed end hinge - Condition poor.





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SEAMAR  
All Codes

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LAview 5-6174

# CAPTAIN A.F. RAYNAUD

MARINE SURVEYOR

*Structural Damages and Appraisals*

5101 N.E. 55th Street  
SEATTLE, WASHINGTON 98105

## Survey Report

REPORT #5656

RECEIVED  
FEB 9 1977

FERRY "ALMAR"

CONDITION SURVEY

ANACORTES, WASHINGTON

SKAGIT COUNTY

JANUARY 19, 1977

At the request of Mr. Jack C. Rafter, Assistant County Engineer, Skagit County, for and on behalf of interested Owners, Underwriters and/or Whom Concerned, the undersigned surveyor did on January 19, 1977 attend on board the captioned vessel as it lay afloat and also while under operation between Anacortes and Guemes Island, Washington.

The purpose of this survey was to determine the general condition of the vessel and its suitability to continue in service on its designated route.

Present at time of survey were:

|                           |   |
|---------------------------|---|
| Mr. J. Mansfield          | Skagit County Commissioner                |
| Mr. Jack C. Rafter        | Assistant County Engineer (Skagit County) |
| Mr. Antone Ray Separovich | Master of the "ALMAR"                     |
| Mr. Albert A. Bacotich    | Engineer of the "ALMAR"                   |

### PARTICULARS OF VESSEL

|                    |         |              |                                 |
|--------------------|---------|--------------|---------------------------------|
| Official No.       | 254,209 | Rig          | Oil screw                       |
| Signal No.         | WM 3843 | Construction | Steel (welded)                  |
| Registered Length  | 61.8'   | Service      | Ferry (automobile & passengers) |
| Registered Breadth | 31.8'   | Year Built   | 1947                            |
| Registered Depth   | 6.7'    | Where Built  | Cathlamet, WA                   |
| Gross Tons         | 94.0    | Horsepower   | 330 (total)                     |
| Net Tons           | 77.0    | Home Port    | Bellingham, WA                  |

|            |       |
|------------|-------|
| Refer'd To | Noted |
| JOHNSON    |       |
| RAFTER     | deck  |
| ENSLEY     |       |
| ROTHROCK   |       |
| NELSON     |       |
| WILSON     |       |
| MICHAEL    |       |
| Rail. Shop |       |
| DIST. 1    |       |
| DIST. 2    |       |
| DIST. 3    |       |
| PAINT SHOP |       |
| BRIDGE     |       |
| FILE       |       |

As the vessel was engaged in its regular runs, there was no opportunity, and no facilities were available to examine the hull exterior below the main or weather deck.

However, the undersigned did obtain information from Captain James Meeker, Inspection Officer, U. S. Coast Guard, and from Mr. O. E. Meberg, Plant Superintendent, Duwamish Shipyard, regarding the condition of the hull underbody. Both persons stated that the underbody shell plating was very heavily pitted, and a section in way of No. 3 Hold and fuel tank was deteriorated to such an extent that replacement was required.

The hull from deep load line to keel was sandblasted and shell plating audio-gauged. While the audio gauge test showed only minor wastage in the plate thickness, this test can not be considered as completely conclusive, for no drilling was made in any of the pitted areas to determine how much or how little metal was actually left in the pitted areas.

Photographs also show excessive pitting of the shell plating and to such an extent that building up by welding would not be practical, and would be costly. The installation of "doubler plates" is not permitted by the U. S. Coast Guard on inspected vessels and, in any event, this is not considered as being in the best practice.

All compartments (10) were opened up for survey and entered by the undersigned, accompanied by the Engineer. The compartments were found to be meticulously clean, well coated and free from any heavy rust or scale.

The side shell plating, bottom plating, bulkheads, stringers, frames and beams were all found to be very heavily pitted. The plating was sounded by hammering, and the undersigned was able to detect a number of areas where the plating was obviously very thin. No attempt was made to puncture or drill the plating above or below the waterline. Seam, butt and insert welding was found to be in good condition.

Altho the vessel was fully loaded on three trips, and has approximately 28,000 pounds of sand ballast in sacks stowed in the after compartments, it appeared to have excessive vibration. Welded fractures were noted in way of the after compartments, probably caused by the excessive vibration and thinning of the plating.

The sand ballast was found to be stowed on the bottom plating and against the side shell plating. It is recommended that the ballast be stowed on dunnage and kept away from the side shell plating, as the sand has been wetted by salt water. This condition will accelerate the rusting and pitting of the plating, and loose sand could clog the bilge lines and pumps.

The engine room was found to be very clean, well coated and in good order. Bilges had a minimum of oil and water and engines were clean and wiped down, reflecting good maintenance. Both engines were in operation during the survey and, aside from vibration and noise, appeared to be in good running order.

Main switchboard and wiring were found to be obsolete and showed signs of over age. It is recommended that if the vessel is to be retained in service, the switchboard and wiring be replaced.

Passenger quarters are sheathed with wood, and life belts stowed under seat lockers. While the compartment was found to be very clean and in good order, the wood sheathing and life belt lockers could be a potential fire hazard.

The ladder from the main deck to the passenger quarters and wheel house should be replaced with a more suitable ladder, as the treads on the existing unit are hazardous to the footing of persons not used to shipboard ladders.

Main deck plating shows very evident signs of wear and tear, as it is "stretched" in a number of areas, and the plating is concaved between the deck beams.

Altho the man hole covers on the main deck had all been overhauled and repaired, it was noted that most of them leaked and did not fit properly.



Wheel house, lockers, stowage areas, etc. were found to be in good order.

Vessel is single ended and has to be turned at each end of the run. This maneuver requires time, extra fuel consumption and additional wear and tear on the engines, propulsion units, hull and rudder. It also increases the possibility of damage to the vessel and the slips in the event of miscalculation, or failure of an engine.

The vessel is overage - built in 1947. The average life of a well built seagoing vessel is twenty years, providing it has been well maintained. This vessel is lightly built and has had hard usage due to short runs, heavy loads, and a period of time where electrolysis action took place. The vessel is too small for present day traffic of automobiles, trucks and passenger needs.

The condition of the hull plating is a potential hazard. If the vessel were to strike a floating or submerged object, the damage inflicted would be far greater than if the plating was in good order.

In spite of the fact that there are a number of compartments in the hull, the rupturing of one or two could cause the vessel to list heavily, or capsize, with a very probable loss of life and property. Litigation in an accident of this nature is very costly, regardless of how little the litigants may or may not have suffered. It must always be born in mind that there is no such thing as an "unsinkable ship."

To rebuild or replat this vessel would be a costly procedure, and the greater portion of the vessel would still be overage, with the deteriorated members still in existence. It takes time and money to redesign, remove and replace. This would also apply if a surplus vessel could be obtained free and rebuilt; the cost is generally greater than the advantage.

The Coast Guard does not arbitrarily condemn a vessel outright because it has deficiencies, but it does require the Owners to make repairs that it considers necessary for the safety and seaworthiness of the vessel. These requirements and repairs can be, and usually are, very expensive and seldom can be appealed or delayed for "Owners' earliest convenience."

It is the undersigned's considered opinion that the existing vessel has outlived its economical usefulness, and the repair costs are far too great for the vessel's earning power.

It is recommended that due thought and consideration be given to the replacement of the existing vessel with one that has been properly designed and built to meet the needs of the community's ferry traffic.

The "ALMAR" could be sold as is, where is, with no warranty or guarantee whatsoever, or it could be kept as a standby vessel.

This survey was made and report is given without prejudice to the question of rights or liability on the part of any or all persons concerned or interested.

Dated at Seattle, WA

February 8, 1977

  
A. F. RAYNAUD, Surveyor

## APPENDIX C

### 8-7.03.9 M-1 Light Manufacturing District

#### 8-7.03.9.1 Use Regulations

The following uses are permitted in this district provided they conform to the performance standards of Section 8-7.04.1. The Building Inspector, under the supervision of the City Engineer, will determine which industrial uses, not specifically enumerated below, may be permitted in this district.

#### 8-7.03.9.1.1 Permitted Primary Uses

1. Wholesale trade; repair services; transportation terminals and stations (exclusive of aircraft landing fields); material handling facilities, warehouses, and storage yards provided that storage yards shall be surrounded by a sight-obscuring fence 8 feet high; EXCEPT that storage or handling of highly flammable or explosive materials (such as fireworks, gun powder, gasoline) in wholesale quantities, the storage of raw hides or skins, stock yards, the substitution of chain link fences in lieu of site obscuring fences, shall be permitted only by special exception provided by the Board of Adjustment. The Board will grant such special exception only after public notice and hearing, and after attaching such special conditions and safeguards as will protect the public health, safety and welfare.
2. The following are examples of light manufacturing which is to be permitted in this district:
  - (a) Air oriented industry.
  - (b) Auto wrecking yards and junk yards, provided they are surrounded by a sight-obscuring fence 8 feet high.
  - (c) Bottling works.
  - (d) Milk distribution station.
  - (e) Flour or feed mill.
  - (f) Ice plant.
  - (g) Machine shop.
  - (h) Electronic manufacturing or assembly.
  - (i) Welding shop.

8-7.03.9.1.2 Permitted accessory uses

1. On any lot of 40,000 square feet or more, a residence for a caretaker or custodian.
2. Advertising devices provided such devices conform to Section 8-7.04.2.

8-7.03.9.2 Area and Dimensional Regulations

8-7.03.9.2.1 Minimum lot requirements:

6,000 square feet area.

8-7.03.9.2.2 Minimum setback requirements

1. Front yard minimum depth: 15 feet. Buildings on a corner lot shall observe the minimum setback on both streets.
2. Along any property line adjoining a residentially zoned district, with no intervening street or alley, there shall be a setback of at least 5 feet.

8-7.03.9.2.3 Maximum land coverage by buildings

The maximum land coverage by buildings shall be 50%.

8-7.03.9.2.4 Maximum building height

Two stories not to exceed 50 feet.

8-7.03.9.2.5 Minimum parking requirements

As required by Section 8-7.04.4.1.

PROPOSED GUEMES ISLAND FERRY DOCK FACILITIES

New dock facilities are proposed for both the Guemes Island and the Anacortes ferry landings in order to accommodate the new 19 vehicle craft, illustrated in Exhibit H, and additional ferry traffic as well as to provide substantial improvements in dock-side facilities for ferry passengers. At the present time, three alternative design schemes have been developed for the Anacortes dock facility and two alternate schemes for the Guemes Island facility. Each of the proposed alternate design schemes is presented and briefly described in the following discussion. In each case, the terminal building and the proposed structural systems for the docks will remain the same. The proposed dock facilities are located at or immediately adjacent to the existing dock facilities at both the Anacortes and the Guemes Island terminals. Each design alternative was intended to provide a 60 vehicle holding area and a 30 vehicle storage area. In every scheme, the approach pier will be 18 feet in width, but will vary in length.

A. ANACORTES FERRY DOCK FACILITIES1. SCHEME "A"

Scheme "A" is shown in Exhibit A and would be located immediately to the west of the existing dock. As designed, the existing dock would be removed entirely. The new approach pier and the northernmost portion of the holding area would be of new construction utilizing one of the two proposed structural systems shown in Exhibits F and G. Scheme "A" would provide a 135 foot long concrete approach pier, a 75 foot long steel transfer span, a 60 vehicle capacity holding area, a 30 vehicle capacity storage area, and five parking spaces for handicapped persons and ferry crew use. The ferry craft would approach the pier from the north instead of from the west as the existing ferry presently does. The terminal building would be located immediately to the west of the new approach pier. Although Scheme "A" is expected to be the least expensive of the three alternatives proposed for the Anacortes facility, this scheme would likely entail the most disruption of existing ferry service during construction. A preliminary estimate suggests that Scheme "A" would disrupt the existing ferry service for approximately 30 days.

2. SCHEME "B"

Scheme "B" is illustrated in Exhibit B and would be located to the west of the existing dock. The existing dock would be removed entirely. The new concrete approach pier would be 250 feet in length and the steel transfer span would be 90 feet in length. Scheme "B" would provide a 61 vehicle capacity holding area, a 30 vehicle capacity storage area, and four parking spaces for handicapped persons and ferry crew use. As designed, Scheme "B" additionally provides a two vehicle loading area and, of the three proposed alternate design schemes, most facilitates passenger loading and unloading at the terminal building. The terminal building would be located to the east of the proposed dock, adjacent to the vehicle holding area. The ferry craft would approach the pier from the northwest. Scheme "B" is anticipated to represent a cost intermediate between Schemes "A" and "C". The new approach pier is located such that no disruption of existing ferry service is anticipated during construction. Scheme "B" utilizes approximately the same land area as does Scheme "C".

3. SCHEME "C"

Scheme "C" is illustrated in Exhibit C and would be located entirely to the west of the existing dock, which would be removed. The new concrete approach pier would be 250 feet in length and the steel transfer span would be 75 feet in length. Scheme "C" would provide a vehicle holding area with a design capacity of 44 vehicles, but could accommodate up to 60 vehicles by using the west-bound through lane for additional holding capacity. A 30 vehicle capacity storage area and ten parking spaces for handicapped persons and for ferry crew use would be provided. The terminal building would be located to the east of the dock facility. The ferry craft would approach the pier from the north-northwest at an angle approximately intermediate between the approach angles provided by Schemes "A" and "B". Scheme "C" is anticipated to be the most expensive of the three schemes and would require the most land area. The new approach pier is located such that no disruption of existing ferry service is anticipated during construction.

4. RELATIONSHIP TO CITY PARK PROPOSAL

In all three design alternatives for the Anacortes facility, acquisition of land immediately to the west of the existing dock will be required. The City of Anacortes Park and Recreation Plan indicates that the area west of "I" Avenue, east of "H" Avenue and north of the railroad right-of-way is proposed for a City park which would provide covered picnic facilities, a public fishing pier, trails, and passive waterfront recreational opportunities. All three of the proposed alternative dock facilities design schemes require acquisition of some of the proposed park site. However, a shared parking arrangement benefiting both the ferry dock facility and the proposed park could be achieved. The existing dock could be utilized in part for a public fishing pier instead of being removed if the City of Anacortes makes all arrangements necessary to acquire and retain all or a portion of the existing dock. The ferry dock is a compatible use with the proposed park facility. At the present time, no funding has been allocated for construction of the proposed park nor a definite construction timetable established, although the proposed park has received strong recommendation.

B. GUEMES ISLAND DOCK FACILITY

1. SCHEME "A"

Scheme "A" is shown in Exhibit D. The existing dock would be entirely removed and replaced by a new concrete approach pier 80 feet in length and a steel transfer span 80 feet in length. Scheme "A" would provide a 65 vehicle capacity holding area, a 26 vehicle capacity storage area, and four parking spaces for handicapped persons and ferry crew use. Additionally, two passenger loading spaces would be provided alongside the Terminal building, which is located to the west of the proposed pier structure. The ferry craft would approach the dock from the south. Scheme "A" is the least expensive of the alternative dock facility design schemes proposed for Guemes Island. Construction of the proposed facility is anticipated to result in approximately 30 to 45 days of disruption of existing ferry service. Scheme "A" requires acquisition of land to the northwest of the proposed dock as well as acquisition of parking area and construction of a bulkhead to the east of the proposed pier.

2. SCHEME "B"

Scheme "B" is illustrated in Exhibit E. This scheme utilizes exactly the same dock facility shown in Scheme "A", but differs in parking area design and in the location of the terminal building. Scheme "B" provides a 60 vehicle capacity holding area, a 69 vehicle capacity storage area, and five parking spaces for handicapped persons and ferry crew use. Two passenger loading spaces are provided alongside the terminal building, which is located to the east of the proposed pier. Scheme "B" provides more than the required vehicle storage area. This additional parking occurs because of the roadway length required to accommodate vehicle movements in the holding area and three lanes. Scheme "B" requires acquisition of additional right-of-way along Guemes Island Road, and is anticipated to be the most expensive of the design alternatives for the Guemes Island dock facility. Construction of the proposed facility is anticipated to entail the same duration of existing ferry service disruptions, estimated at 30 to 45 days..

TABLE 1. COMPARISON OF ALTERNATIVE DOCK FACILITY DESIGN SCHEMES

| Scheme                             | Length of Approach Pier | Length of Transfer Span | Holding Area Capacity (parking spaces) | Storage Area Capacity (parking spaces) | Handicapped and Ferry Crew Parking (parking spaces) |
|------------------------------------|-------------------------|-------------------------|--|--|---|
| <u>Anacortes Dock Facility</u>     |                         |                         |  |  |   |
| A                                  | 135'                    | 75'                     | 60                                     | 30                                     | 5   |
| B                                  | 250'                    | 90'                     | 61                                     | 30                                     | 4   |
| C                                  | 250'                    | 75'                     | 44 (design)<br>60 (maximum)            | 30                                     | 10  |
| <u>Guemes Island Dock Facility</u> |                         |                         |  |  |   |
| A                                  | 80'                     | 80'                     | 65                                     | 26                                     | 4   |
| B                                  | 80'                     | 80'                     | 60                                     | 69                                     | 5   |



C. TERMINAL BUILDING: ALL SCHEMES

The terminal buildings proposed for both the Anacortes and the Guemes Island ferry dock facilities will comfortably accommodate approximately 40 persons. The one-story buildings are anticipated to be approximately 40 feet by 24 feet in size and will include restrooms facilities for both men and women, storage and utility areas, and a waiting room containing approximately 40 fixed seats, vending machines, and wall-mounted public telephones. Pole-type construction with exterior cedar siding is presently proposed.

D. APPROACH PIER: STRUCTURAL SYSTEM

In all of the proposed dock facility design schemes, the configuration of the approach pier consists of a 14 foot wide traffic lane, complying with HS 20 highway loading standards, and a 4 foot wide pedestrian walkway. Concrete wheel guard and steel railings will be provided per State Highway Department standards.

In general, the approach pier shall be of concrete construction due to sub-surface conditions and the desire of durable service. The approach pier shall be surfaced with concrete bulb tees or double stemmed bridge sections, and shall be supported by concrete pilings and cap beams. The bulb tee system requires a maximum 3'-10" total depth and maximum 60 foot cap beam spacings. The double stemmed bridge sections require maximum 3'-3" total depth and maximum 50 foot cap beam spacings.

Sectional drawings illustrating the double stemmed system and the bulb tee system are illustrated in Exhibits F and G.

The elevation of the approach pier will be two feet higher than the elevation of the existing Anacortes pier facilities. The Guemes Island pier presently is a "floating" structure and will be replaced by a "fixed" structure.



FACILITY SIZING RATIONALE

TABLE 4. PROJECTED PEAK HOUR TRAFFIC AND REQUIRED ON-SHORE HOLDING CAPACITY

| YEAR       | VEHICLES/HOUR ARRIVING<br>1st TWO HOURS | VEHICLES/HOUR ARRIVING<br>2nd TWO HOURS | ON-SHORE<br>HOLDING REQUIRED |
|------------|---|---|------------------------------|
| 1975       | 70                                      | 20                                      | 60                           |
| 1985       |   |   |                              |
| low 1%/yr  | 77                                      | 22                                      | 74                           |
| high 3%/yr | 94                                      | 27                                      | 108                          |
| 2000       |   |   |                              |
| low 1%/yr  | 89                                      | 26                                      | 98                           |
| high 2%/yr | 127                                     | 36                                      | 174                          |

The figures in Table 4 indicate peak hour volumes on a Friday afternoon in the summer. Obviously, these volumes will not exist at all times, but instead represent "worst" conditions.

It should further be recognized that figures in Table 4 reflect peak (summer) traffic. As indicated earlier, only about 41% of the total population on Guemes Island are permanent residents and the remainder are seasonal residents. Table 4, however, does not account for summertime and weekend vacationers or visitors to resorts, trailer courts, or friends' and relatives' homes. Estimates prepared by the Guemes Island Community Club have placed the summertime weekend population as high as 1,500 persons in 1974. The same source, however, claimed a permanent Island population of 375 to 400 persons in 1974, which is approximately 25% higher than Census District figures. Therefore, a summertime weekend population of approximately 1,200 persons has been assumed. These estimates indicate that the weekend summertime (visitor) population is approximately four times the permanent year-round population and approximately 1.6 times the regular seasonal summertime population.

Table 4 indicates that a 60 vehicle capacity holding area will be required to accommodate present weekend summertime traffic demands. Additionally, Table 4 indicates that projected future peak traffic demands could necessitate a 108 vehicle holding capacity by 1985 and a 174 vehicle holding capacity by the year 2000.

At the present time, it is not feasible to provide a holding area accommodating more than 60 vehicles due to cost and space limitations at the dock sites. It is estimated, however, that the proposed 60 vehicle holding area will accommodate demand by permanent residents through the year 2000, and will accommodate regular seasonal summertime residents through the year 1994.



EXHIBIT  
A

# SCHEME "A" GUMES ISLAND FERRY ANACORTES FACILITY SKagit COUNTY, WASHINGTON

GRAPHIC SCALE  
DATE: Nov. 30, 1977

VTH

## CALCULATION

- CREW AND HANDICAPPED PARKING 5 SPACES
- STORAGE AREA 50 SPACES
- HOLDING AREA 60 SPACES

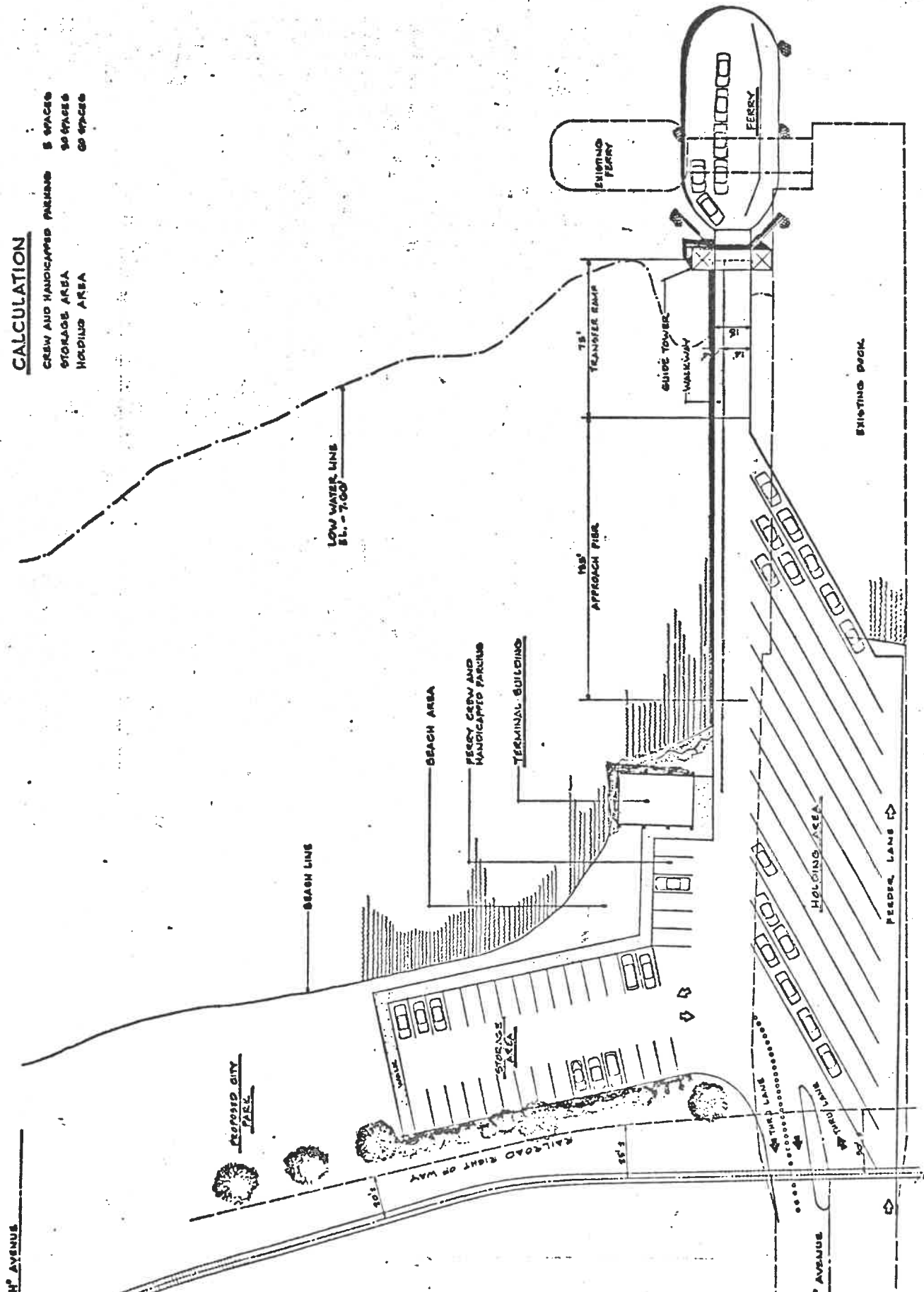






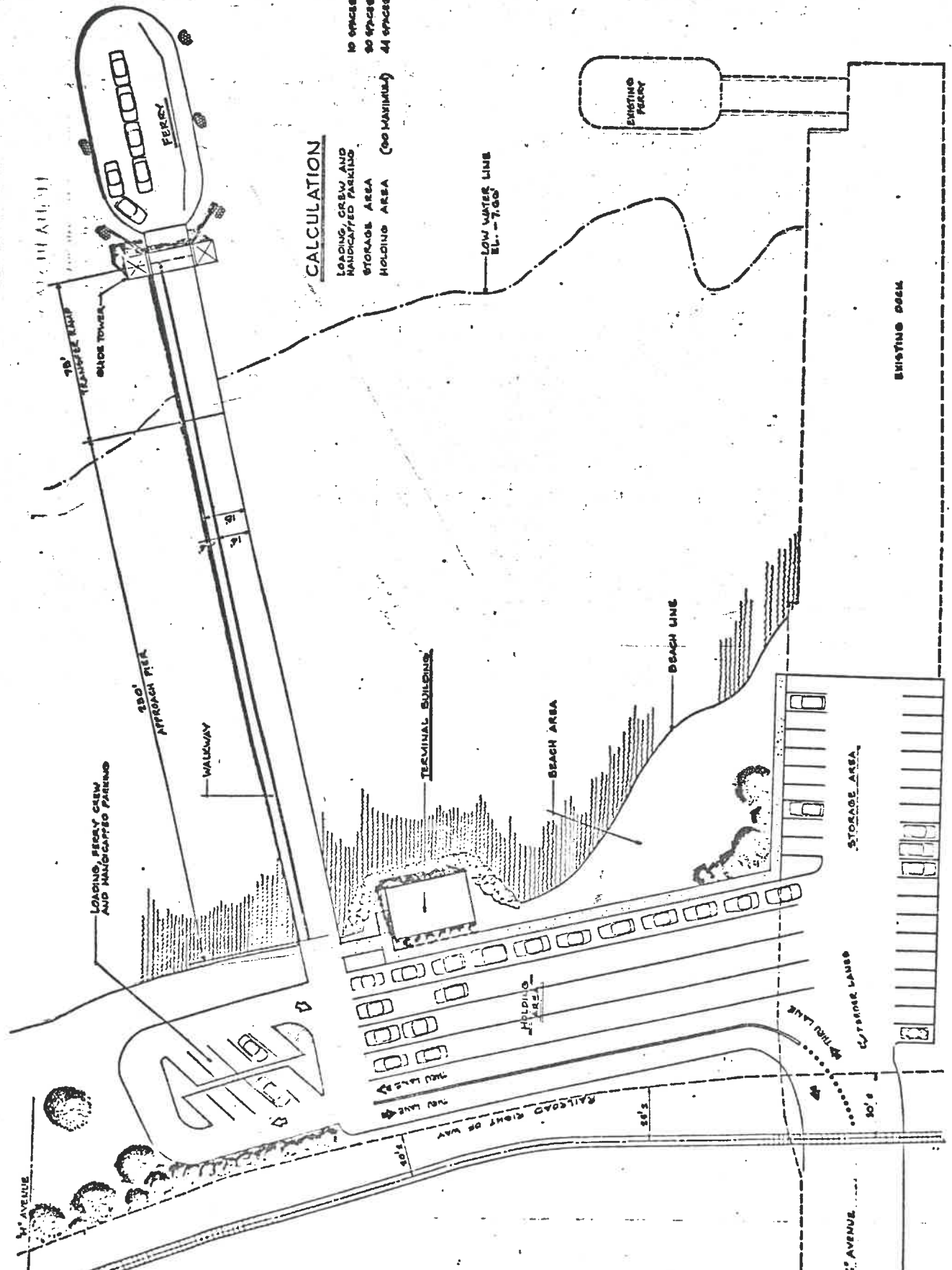
EXHIBIT  
C

# SCHEME "C" GUMES ISLAND FERRY ANACORTES FACILITY SKagit COUNTY, WASHINGTON

GRAPHIC SCALE:  
0 10 20 30  
DATE: NOV. 30, 1977

## CALCULATION

- LOADING, CREW AND HANDICAPPED PARKING 10 spaces
- STORAGE AREA 30 spaces
- HOLDING AREA (approximately) 44 spaces





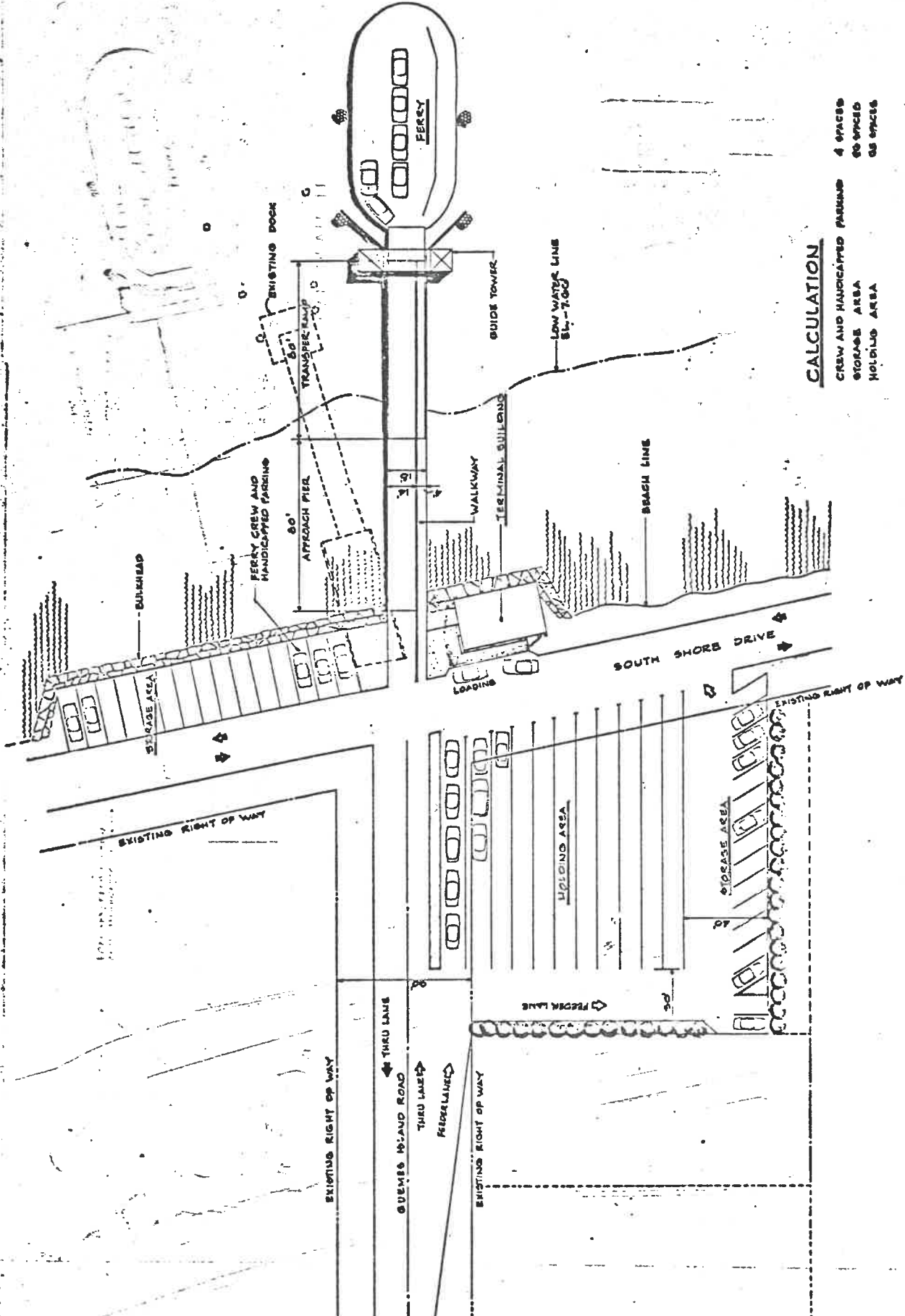
EXHIBIT

D

# GUEMES ISLAND FERRY SCHEME "A"

QUEMES ISLAND FACILITY  
SKAGIT COUNTY, WASHINGTON

GRAPHIC SCALE  
0 20 40  
DATE: NOV. 29, 1977



### CALCULATION

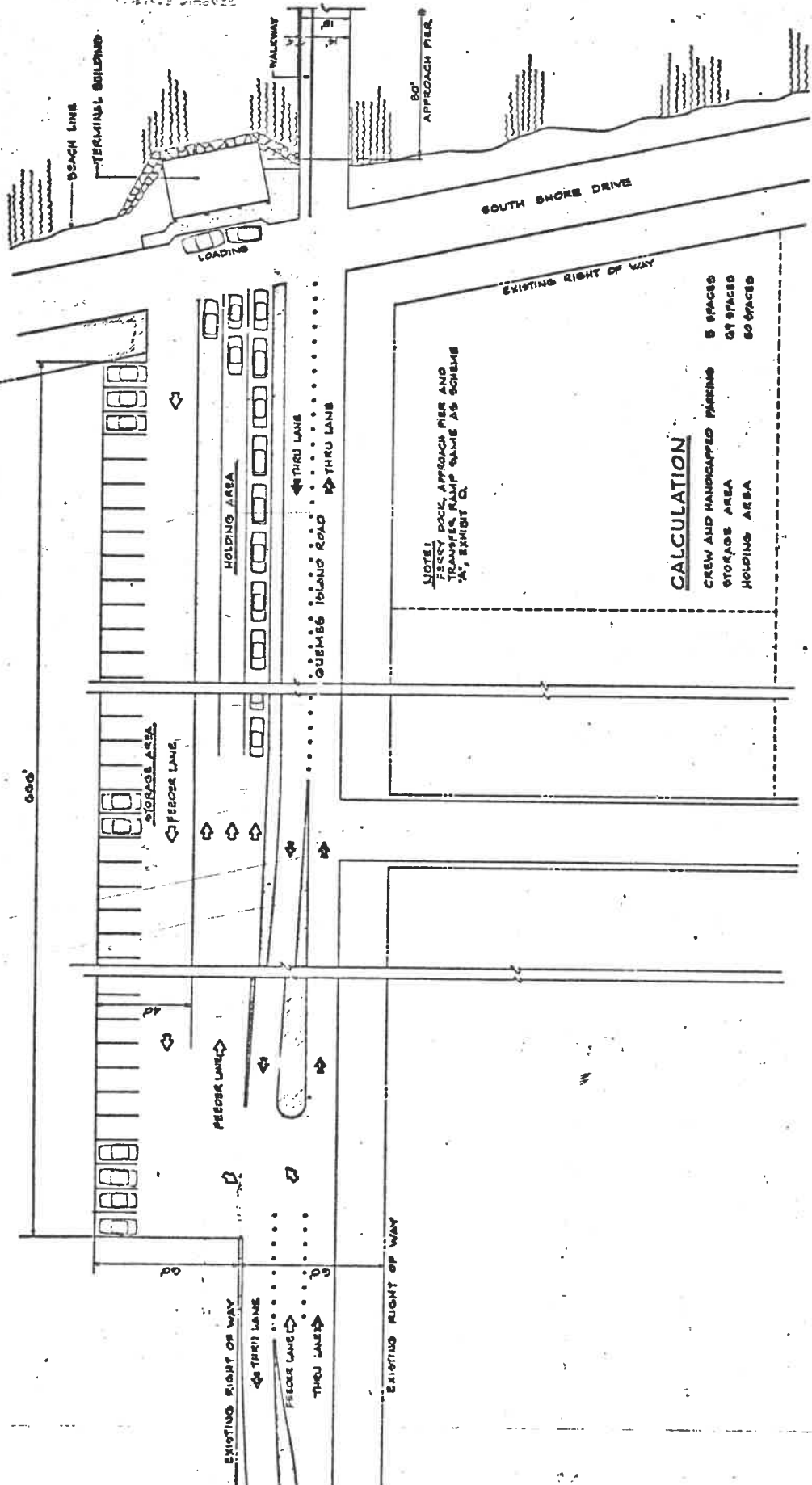
- CREW AND HANDICAPPED PARKING 4 SPACES
- STORAGE AREA 60 SPACES
- HOLDING AREA 65 SPACES



EXHIBIT

# SCHEME "B" QUEMES ISLAND FERRY QUEMES ISLAND FACILITY SKAGIT COUNTY, WASHINGTON

GRAPHIC SCALE  
DATE: NOV. 20, 1977  
V.M.



NOTE:  
FERRY DOCK, APPROACH PIER AND  
TERMINAL BUILDING SAME AS SCHEMES  
'A', EXHIBIT 'C'.

### CALCULATION

- CREW AND HANDICAPPED PARKING 5 SPACES
- STORAGE AREA 29 SPACES
- HOLDING AREA 60 SPACES

EXISTING RIGHT OF WAY

EXISTING RIGHT OF WAY

EXISTING RIGHT OF WAY

FEEDER LANE

FEEDER LANE

HOLDING AREA

HOLDING AREA

THRU LANE

TRUCK LANE

QUEMES ISLAND ROAD

STORAGE AREA

STORAGE AREA

LOADING

TERMINAL BUILDING

BEACH LINE

90' APPROACH PIER

SOUTH SHORE DRIVE

600'