

CHAPTER 2

PHYSICAL AND ECONOMIC CONSIDERATIONS

2.1 INTRODUCTION

Physical features such as topography, location, climate and economic factors play an important role in the planning of community utility systems. Collectively, these factors have a considerable impact on the processes involved in determining the location, size and extent of facilities to be planned and the ability of the community to accept the financial burden of the improvements. These factors are briefly described in this chapter. In addition, the status of existing wastewater treatment and disposal methods (onsite septic systems) deserves some discussion as well and is presented at the end of this Chapter.

2.2 LOCATION, TOPOGRAPHY AND SOILS

The community of Clinton lies along the southeastern shoreline of Whidbey Island at Possession Sound, in unincorporated Island County. As shown in Chapter 1, Figures 1.2 and 1.3, the proposed service area has three natural topographical drainage basins. The entire proposed service area is smaller than and situated within the corporate boundary of the Clinton Water District. Most residential development parallels the shoreline in a north-south direction with the ferry terminal in the center. The proposed service area is mostly rural with a modest commercial corridor along SR 525, and is typical of rural waterfront communities. Currently sewage treatment and disposal is provided by on-site wastewater systems.

The topography of the area consists mainly of rolling hillsides, which are dissected by a few small streams. Elevations in the proposed service area range from sea level to approximately 360 feet above sea level. Figure 2.1 shows the topography of the Clinton area.

The soils of Island County, which have developed from glacial drift and marine sediment, vary considerably in texture, permeability, depth to water table, and topography. They consist of layers of glacial till, clay, sand, and gravel, most of which were deposited during the last glaciation, 14,000 years ago.

In general, the unconsolidated deposits range in thickness from a few hundred feet to about 3,000 feet. Large differences in the physical characteristics of the glacial deposits are due to differences in the mode of deposition of the materials. Advancing glaciers typically deposited a compact mixture of clay, silt, sand, gravel, and boulders (till). Retreating glaciers typically deposited coarse-grained sand and gravels (outwash).

The Clinton area consists of variable soils. The soils along the coast are a mixture of tidal marsh, Coastal Beach sand and gravel, and rough broken land, which denotes areas of very steep slopes according to the USDA Island County Soil Survey, 1958.

There are larger areas of well-drained soils in the upland areas of Clinton. The upland soils, some of which have good to somewhat excessive drainage, are in the Hoypus, Keystone, and Whidbey soil series. The depressions in the uplands and terraces are designated as Bellingham and Norma loam series, which are poorly drained.

2.3 CLIMATE

The area of Clinton has a temperate marine climate typified by warm, dry summers and cool, wet winters. Mean annual precipitation average is historically about 32 inches. Average summer temperature is 61°F and average winter temperature is 38°F, with a mean annual temperature of 50°F. Prevailing winds are from the northwest in summer and from the southwest in the winter.

2.4 TRANSPORTATION

A very significant element of transportation into the Clinton area is the Mukilteo-Clinton ferry. The ferry provides a critical transportation link between the urban areas on the east side of Puget Sound and Whidbey Island. In 1999, just over 2 million drivers and their vehicles passed through Clinton by way of the ferry. Currently Washington State Ferries is in the process of replacing and expanding the dock, along with replacing the existing terminal building and agent's office. The ferry terminal facilities are operated and maintained solely by Washington State Ferries.

Clinton is connected from the ferry terminal to the rest of Whidbey Island by highway State Route (SR) 525. Highway 525 is very important in that it is the most direct route of transportation used by people traveling between Whidbey Island and the Seattle metropolitan area. The only other means of access to and from the island is from the north on highway State Route (SR) 20 near Anacortes and by way of the Keystone / Port Townsend ferry on the west side of the Island. Other public roads on the Island generally consist of two-lane rural and residential access roads. The Washington State Department of Transportation and Island County maintain the network of public roads within unincorporated areas of Whidbey Island such as Clinton.

2.5 WATER SUPPLY AND WELLS

The area is served by one water utility: Clinton Water District. Clinton Water District currently contains approximately 65,000 lineal feet of 1" to 10" pipe diameter pipe, 71 fire hydrants, and operates 6 municipal wells in three separate locations. Additionally, the Clinton Water District operates three water pump stations for water transmission and distribution. The Clinton Water District storage capacity is comprised of 4 reservoirs with the following capacities totaling 683,000 thousand gallons.

- Reservoir #1 – 100,000 gallons constructed in 1965
- Reservoir #2 –150,000 gallons constructed in 1969 reconstructed in 2001
- Reservoir #3 – 208,000 gallons constructed in 1995
- Reservoir #4 – 225,000 gallons constructed in 1998

The six sources identified above are located in two well fields and one individual well site located within the CWD. Well Field number 1 (SO7) is located in the SE ¼ of Section 25, Township 29 North, Range 3 East. Well Field number 2 (SO8) is located in the NE ¼ of Section 36, Township 29 North, Range 3 East. Well number 5 (SO4) is located in the SE ¼ of Section 26, Township 29 North, Range 3 East

Whidbey Island geology is generally comprised of unconsolidated Pleistocene glacial and interglacial deposits that overlie tertiary and older bedrock. Superficial deposits consist of glacial till, clay, sand, and gravel. For purposes of describing aquifers on Whidbey Island, the unconsolidated deposits have been divided into five aquifers of sand and/ or gravel and four confining geological units.

Recharge to the groundwater system comes mostly from precipitation. However, percolation of water from septic systems and from farm and domestic irrigation also provides water for recharge.

Groundwater moves both horizontally and vertically in the aquifer. The conceptual pattern of steady-state groundwater movement is horizontal and toward Puget Sound in aquifers; downward in confining units that underlies the higher altitude areas; and upward in confining units that underlie low-altitude areas and in areas offshore from the coastline.

Water quality in the Clinton area is generally good, although some localized problems do exist in Island County, most notably seawater intrusion. Seawater intrusion is most common in narrow parts of the island, coastal areas, and lowlands. Although the Clinton area has no history of seawater intrusion, continual monitoring is required to detect any potential problems. Seawater intrusion is identified by increasing concentrations of sodium chloride, and elevated specific conductivity and dissolved solids.

Because of a relatively shallow water table and the widespread use of on-site sewage disposal systems, there is a potential for groundwater contamination. There are a number of county regulations in place designed to protect the islands' aquifers from contamination. In 1982, the U.S. Environmental Protection Agency designated the aquifers beneath Whidbey and Camano Islands as sole source aquifers. The management and control of contaminants entering the water supply is critical. The Clinton Water District has no water supply other than existing groundwater supplies. In addition, the CWD has noted an increasing trend in nitrate levels in groundwater, which is reason for some concern. During the past five years, nitrate concentrations between 1.0 and 1.5 ppm (parts per million) have been measured in CWD well water samples.

Drinking water quality standards established by EPA and Washington DOH stipulate a maximum allowable nitrate concentration of 10 ppm.

The subject area has no rivers or lakes, and only a few small streams. The quality of marine waters surrounding the Island is also a concern, as these waters support an abundant shellfish resource and are of economic and recreational value to residents.

2.6 ENDANGERED SPECIES ACT IMPACTS

On March 24, 1999, the Chinook Salmon was listed as a *threatened species* in the waters of Puget Sound. Adult and juvenile Chinook Salmon, along with other species, inhabit the marine waters along the coast of Clinton, which includes a large Department of Natural Resources designated eelgrass bed. In addition, the Puget Sound Bull Trout was also listed as a *threatened species* under ESA on April 8, 1999. The Bull Trout, which inhabit the fresh waters of the Clinton area, require very cold, clean water in order to exist. The Department of Natural Resources regulates a commercial geoduck bed directly off the coast of Clinton - Bed number 112, otherwise known as the Randall Point Bed, stretches from Sandy Point southward to the area of Possession Sound. Centralized oversight and management of wastewater treatment and disposal could reduce the risk of contamination to these species habitats.

Within the proposed service area there is an eagle tree where eagles nest. Eagles are on the Priority Habitats and Species List, which is a list generated by the Washington Department of Fish and Wildlife to identify and aid in the conservation of Washington's important fish and wildlife. The eagle tree is located in the NE ¼ of the SW ¼ of Section 19, Township 29 North, Range 4 East. More specifically the nest is located 20 feet from the top of a Douglas Fir tree on the bluff edge. The tree is due east of the church on Wilson Place.

2.7 STATUS OF EXISTING ONSITE WASTEWATER SYSTEMS

A majority of the existing onsite wastewater systems are believed to be functioning adequately at the current time. While there is no conclusive evidence of significant problems that are supported by uniform evaluation criteria in the proposed service area, isolated problems have been recorded in individual property records by the Island County Health Department.

Some onsite septic systems serving current needs do not meet today's wastewater treatment and disposal standards as established by Island County. In many cases the small lots do not have sufficient area to provide for a reserve drainfield area. Continued use of inadequate systems could degrade the groundwater and near-shore marine waters if they are not upgraded.

Alternative upgrades for onsite wastewater treatment systems (upgrades which do not need a reserve drainfield) do exist. They include more intensive methods of treating wastewater such as aerobic reactor tanks and media filters combined with special

disposal methods such as pressure distribution, gravelless drainfields and mounds. These systems can produce a high quality effluent and provide opportunities for reduced area requirements for onsite disposal but also require regular equipment monitoring and maintenance.

While poor soils, high water tables, and small lots will continue to influence the effectiveness of some of the onsite septic systems, most of the proposed service area seem to be operating trouble-free with regular inspection and maintenance. Also, a possible factor contributing to the successful ongoing use of some onsite systems is the seasonal residential occupancy which allows the system to “rest” periodically.

2.8 REGULATORY AUTHORITY FOR ONSITE WASTEWATER SYSTEMS

Island County Health Department: Onsite wastewater systems with design flows at a common point of less than 3,500 gpd.

WA Department of Health (DOH): Onsite wastewater systems with flows between 3,500 and 14,500 gpd at any common point, excluding mechanical treatment systems.

WA Department of Ecology: Mechanical or lagoon-type onsite wastewater systems followed by subsurface disposal exceeding 3,500 gpd at any common point, and systems exceeding 14,500 gpd at any common point.