

CHAPTER 2

DRAINAGE AREA CHARACTERISTICS

2.1 INTRODUCTION

In this chapter, a description of the soils, surface waters, topography, geology, and sensitive areas within the drainage basins of Friday Harbor is given. Accurately describing the drainage basins from a biological and physical perspective serves to develop a better overall understanding of the natural drainage characteristics of the area. Topics that impact the drainage patterns of the basins such as population trends, land use zoning, utilities, current stormwater conveyance system, water pollution, and design criteria are also presented.

2.2 LOCATION

The Town of Friday Harbor occupies approximately 1.10 square miles (707 acres) of land on the eastern shore of San Juan Island, San Juan County, Washington. San Juan Island is one of the largest of approximately 480 islands in the County. The island is only accessible by ferry, private boat, or airplane. Ferries run daily from Anacortes to the east and from Sydney, British Columbia, Canada to the west. Figure 2-1 provides a vicinity map, and Figure 2-2 shows a detailed map of San Juan Island. Friday Harbor is the County seat for San Juan County and serves as the center of employment, commerce, tourism, and transportation for San Juan Island.

2.3 DRAINAGE BASINS

There are no natural streams or lakes within the Town limits. The Town is bordered on three sides by hills and ridges, and therefore, most surface waters drain to the east into Friday Harbor. In the southwest part of the Town, the land drains to the south away from Friday Harbor into North Bay. Because there are no natural streams or lakes, water drains overland into and through the current stormwater conveyance system. This current system is somewhat discontinuous and piecemeal with pipes of various sizes and ditches scattered throughout the Town.

For the purposes of analysis and planning, the Town has been divided into drainage basins based on topography, natural drainage channels, and the manmade stormwater conveyance systems. Figure 2-3 shows the major drainage basins referenced in this report.

Drainage Basin No. 1 includes approximately 51 acres in the southeast portion of Town and includes the elementary school and a self-storage facility. Land use within the basin consists of wooded areas, pastures, and some single-family residences. Drainage is by

overland flow into a single ditch/pipe system which daylight into a field just north of the self-storage facility.

Drainage Basin No. 2 includes approximately 51 acres in the eastern portion of the Town. It includes the area east of Basin No. 1 and west to Sunshine Alley and Argyle Avenue. Land use within this basin consists of wooded areas, single-family residences, and pasture with some commercial/professional development in the northwest corner. Drainage occurs via overland flow into a combination of ditches and piped systems flowing to Sunshine Alley and subsequently into the harbor. Stormwater from Basin No. 1 flows into the Basin No. 2 conveyance system at Web Street and A Street.

Drainage Basin No. 3 includes approximately 164 acres of land south of Spring Street and Grover Street and west of Argyle Avenue. This basin includes residential, commercial, and industrial areas and the northern portion of the Friday Harbor airport. This basin drains to the south of the Town limits. The majority of the drainage in the eastern portion of Basin No. 3 is conveyed through ditches and pipes into a large wetland. This wetland is designated as wetland F-260 in the Towns Critical Areas Ordinance (Ordinance #1051). Discharge from this wetland is conveyed via ditches to the south through a detention pond operated by the Port of Friday Harbor. The drainage from the central and western portions of Basin No. 3, including drainage from the north portion of the airport, is also conveyed through a series of pipes and ditches to the detention pond. The discharge from the detention pond is conveyed through ditches, pipes, and manmade ponds to a point of discharge in North Bay. Some of the facilities downstream of the detention pond are located on private property.

The western portion of the basin, the area directly west of Hillcrest Place, drains west and then south to North Bay through the County.

Drainage Basin No. 4 includes approximately 105 acres of the central portion of Town including most of the downtown waterfront area. Land use within this basin is highly varied. There is a mix of single- and multi-family residences, pastures, the commercial properties along Spring Street, and mostly commercial properties in downtown. Drainage is conveyed through several pipe systems along Spring Street, Argyle Avenue, Reed Street, and First and Second Streets, and a ditch/culvert section along Park Street. This system eventually outfalls into Friday Harbor from Spring Street, near the ferry terminal.

Drainage Basin No. 5 includes only one small area in downtown, which is approximately 6 acres. This area is covered by streets, parking lots, and buildings, and is essentially entirely impervious. A pipe system collects stormwater on West Street, Front Street, and Spring Street and outfalls into Friday Harbor.

Drainage Basin No. 6 includes approximately 36 acres in the west-central part of Town, south of Guard Street and west of Marguerite Place. This area is predominantly

woods/brush and single-family residences. Drainage is provided via a ditch/culvert system and flows into Basin No. 7 at Guard Street.

Drainage Basin No. 7 is the largest basin, approximately 271 acres, and includes all of the area north of Guard Street, including the wooded, brushy areas outside the Town limits that drain into the Town. Land use is largely woods, brush, and pasture with some mobile homes and single-family residences. Also included in the basin are the high school and wastewater treatment plant and some commercial/professional properties, all of which contain large areas of impervious surfaces. Drainage is accomplished through a ditch/culvert and pipe system. The outfall of Basin No. 6 flows overland just east of the high school into the collection system at Harbor Street. The outfall for Basin No. 7 is through a ditch/pipe which runs across Friday Avenue into Friday Harbor north of Harbor Street.

Each of these major drainage basins was divided into smaller subbasins to allow for a more accurate analysis of the drainage patterns. Figure 2-4 shows these subbasins. Information on these individual subbasins is included in Tables 4-8 and 4-9. The areas adjacent to Friday Harbor, within approximately 500 feet of the shoreline, are not included in any of the above drainage basins because they drain directly into Friday Harbor.

2.4 WATERWAYS AND WATERBODIES

The Town of Friday Harbor is bordered entirely on the eastern side by Friday Harbor. There are no lakes, streams, or rivers within the Town limits. Because of this, the natural drainage of the area is via overland flow into the Friday Harbor stormwater collection system. As identified in the Critical Areas Ordinance #1051, only three freshwater wetlands remain within the Town limits. The largest wetland is in the southern part of Town near Rose Lane in Drainage Basin 3. This wetland is designated as palustrine type wetlands. The remaining two wetlands are small, occupying less than 1 acre, each.

2.5 WATER QUALITY

There is no surface water in the form of lakes or streams within the Town limits. Therefore, the only water quality issue for the Town is that of Friday Harbor itself. This marine environment should be designated and used in a manner such that the citizens of Friday Harbor and San Juan County can enjoy the natural, recreational, and economic value of the harbor. Because of the potential for large quantities of sediments and other pollutants to enter the harbor from erosion and stormwater runoff, the impacts of the runoff on the habitat and water quality are addressed in this Plan.

In 1988, a study was performed to rank the watersheds of San Juan County. The purpose of this ranking was to provide a means for the Department of Ecology to appropriate funds for protecting and improving the water resources of the State's most polluted

watersheds. The *San Juan County Watershed Ranking* (1989), states that the threat to Friday Harbor from potential pollution from non-point sources is very high. While Friday Harbor contains large beds of kelp and eelgrass north of downtown, the document states that there is no significant fishery habitat remaining in Friday Harbor.

The impacts of stormwater pollution and other potential sources of stormwater pollution (i.e., septic failures, leaking sewer pipes, pet wastes, agricultural runoff) are discussed in further detail in Chapter 5 of this Plan.

2.6 TOPOGRAPHY

Figure 2-5 shows the topography of the study area and the entire watershed for Friday Harbor. The Town is completely bordered by Friday Harbor on the eastern side. From the water, the landscape rises at slopes ranging from 10 percent to greater than 40 percent near the marina and downtown Friday Harbor. The northern section of Town is bordered by three hills. Moving south from these hills, the land becomes somewhat flat, with slopes of about 2 to 3 percent. Near the center of Town, the land begins to climb towards the south and southwest, approaching two hills of about 250 feet. Moving from these hills to the east/southeast, the slopes once again level out to about 3 to 8 percent. Two small hills lie on the eastern edge of Town, with elevations of about 150 feet. Drainage in the Town typically runs towards the center of Town and then east into Friday Harbor.

2.7 GEOLOGY

The geology of the area is heavily influenced by glaciation. This has resulted in a scoured landscape, with large glacial deposits. The resulting soils are a mixture of clays, silts, sands, and gravels. Some areas are densely packed and others are loose and pose potential landslide problems. These soils vary in their stability, permeability, and erosion potential.

The geology of the area determines the potential landslide and erosion hazards of the area. The slope, soil type, and soil moisture play a role in the movement of these soils.

2.8 SOILS

The soils of San Juan County were surveyed by the Soil Conservation Service (SCS) in 1962. The SCS indicates 12 soil types, which exist in significant amounts within the Town of Friday Harbor. Soils within the area consist mainly of the Roche-San Juan, Bellingham-Coveland-Bow and Everett Associations. The Roche-San Juan Association soils are typically gently to moderately sloping, moderately well drained soils of the glacial till plains and rocky uplands. The Bellingham-Coveland-Bow Association soils are nearly level to gently sloping, poorly to imperfectly drained soils of the basins and low glacial till plains on glaciated uplands. The Everett Association soils are gently

sloping and excessively drained. Figure 2-6 shows the distribution of soils within the Town.

In general, soils in the north part of Town consist of Coveland and Bow soils, with pockets of Roche soils. The northeast corner of the Town, east of Tucker Avenue and north of Larson Street, consists of very steep slopes and Roche-Rock soils. The central part of Town is exclusively of Roche soils. The remaining southeast portions of Town are mixed with large pockets of Roche and Coveland soils and a large pocket of Everett soils near the eastern border of the Town limits.

The SCS classifies soils into Hydrologic Soil Group A (low runoff potential) through Group D (high runoff potential) according to runoff potential. The SCS also provides information pertaining to the physical and chemical properties of the soils in the area, including soil permeability. Permeability is the rate at which water will infiltrate into the soil. In general, according to the SCS soil classification, the soils of the Town drain well with high rates of infiltration and low erosion hazard. Table 2-1 summarizes information of the soil groups found in the Town of Friday Harbor.

TABLE 2-1
Soil Characteristics

Soil Type	Slope	Erosion Hazard	Hydrologic Soil Group
Roche gravelly loam (RgA)	0 - 3%	Slight	D
Roche gravelly loam (RgB)	3 - 8%	Slight	D
Roche gravelly sandy loam (RhB)	3 - 8%	Moderate	D
Roche-Rock outcrop (RxD)	8 - 30%	Moderate	D
Roche-Rock outcrop (RxE)	30 - 70%	Severe	D
Roche stony loam (RsB)	3 - 8%	Slight	D
Everett gravelly sandy loam (EgB)	3 - 8%	Slight	A
Bow silt loam (BoA)	0 - 3%	Slight	D
Bow silt loam (BoB)	3 - 8%	Moderate	D
Alderwood gravelly sandy loam (AgC)	8 - 15%	Moderate	C
Coveland silt loam (CsA)	0 - 3%	Slight	D
Coveland silt loam (CsB)	3 - 8%	Moderate	D
Coveland gravelly silt loam (CoA)	0 - 3%	Slight	D
Coveland stony silt loam (CtC)	0 - 15%	Moderate	D

2.9 CLIMATE

The climate of the Town is heavily influenced by the moderating effects of the Pacific Ocean and the Olympic Mountains. The ocean moderates the climate, resulting in mild winters and cool, temperate summers. The Olympic Mountains tend to cause Pacific

storms to dump their moisture on the western slopes of the range. This reduces the precipitation that falls in the San Juan Islands to lesser amounts than the more southern parts of the Puget Sound. The annual precipitation level is approximately 26 inches. May through September are typically the driest months, with November through January being the wettest. The majority of precipitation falls as rain.

Precipitation data for the years 2000 through 2004 and the average precipitation for 1985 through 2004 are presented in Table 2-2. This is data from the Town of Friday Harbor Water Treatment Plant weather station located on San Juan Island.

TABLE 2-2
Precipitation (inches/month)

Month	Year					Average
	2000	2001	2002	2003	2004	1985-2004
January	2.88	3.55	4.81	4.80	3.22	3.61
February	1.45	1.96	2.37	1.73	0.09	2.31
March	2.02	2.11	2.10	3.21	2.08	2.08
April	1.28	1.47	1.63	2.71	0.34	1.62
May	2.82	0.85	1.35	0.62	2.11	1.52
June	1.36	1.79	1.07	0.43	0.51	1.30
July	0.47	0.59	0.13	0.13	0.57	0.67
August	0.41	1.01	0.22	0.10	3.59	0.95
September	1.06	1.04	0.64	1.03	2.27	0.90
October	2.58	4.05	0.90	9.02	2.44	3.00
November	3.42	3.77	1.97	5.40	4.53	4.86
December	3.59	5.17	2.39	1.42	3.47	3.86
Annual Total (in)	23.34	27.36	19.58	30.60	25.72	26.66

2.10 CRITICAL AREAS

The 2002 *Town of Friday Harbor Comprehensive Plan* included discussions and maps of the critical areas within the Urban Growth Area. A discussion of these sensitive and critical areas as they relate to stormwater runoff in Friday Harbor follows in this section. The *Town of Friday Harbor Comprehensive Plan* was adopted in August 2002, and has had minor revisions in 2003, 2004, and 2005. The critical areas include aquifer recharge areas, wetlands, fish and wildlife habitat, flood hazard areas, and geologically hazardous areas. The Town’s Critical Areas Ordinance (Ordinance #1051, codified as FHMC Chapter 18.08) addresses the policies and regulations for the management of wetlands, eel grass areas, and aquifer recharge areas in the public’s interest and welfare. Figure 2-7 illustrates the critical areas identified in the 2002 *Comprehensive Plan* and Ordinance #1051. The purpose of the Critical Areas Ordinance is to promote the maintenance,

enhancement, and preservation of critical areas and environmentally sensitive natural systems by avoiding or minimizing adverse impacts from construction and development.

2.10.1 AQUIFER RECHARGE AREAS

The Critical Areas Ordinance identifies one major area of high aquifer recharge potential within the Town limits of Friday Harbor. This area lies south of Harrison Street and is entirely composed of Everett soils, which have a very high infiltration rate. Development in this area could impact the amount and quality of recharge to the underlying aquifer. Ordinance #1051 limits development in this area to single-family residential uses or multi-family residential uses under FHMC Title 17. This area could potentially provide an excellent location for infiltration for excess stormwater runoff if adequate treatment is provided. Currently, approximately half of this area is developed with single-family residences. Figure 2-7 shows the aquifer recharge area.

2.10.2 CRITICAL HABITAT/EEL GRASS AREAS

Because of the lack of freshwater surface water, there is no freshwater fishery habitat within the Town limits. Friday Harbor itself provides significant amounts of marine habitat; however, there is not any predominant or economically significant species of plant or animals. The harbor has large beds of kelp and eelgrass, which support various types of marine life. Figure 2-7 shows the location of eel grass areas. Proposals that include development over water and that are located within 200 feet of an identified eel grass area may require an evaluation of the potential effect of the proposal. The Town may make a threshold determination on the impact of the proposal.

2.10.3 GEOLOGICALLY HAZARDOUS AREAS

The 2002 *Comprehensive Plan* identifies the Geologically Hazardous Areas as areas susceptible to landslide, erosion, earthquake, or other geological events. The 2002 *Comprehensive Plan* indicates that development in geologically hazardous areas may not be suitable under any circumstance or may be acceptable if the hazards are reduced or mitigated by engineering, design, or modified construction practice.

Erosion is the wearing away of land by geologic forces. Typically, this is done by water running across the surface, carrying topsoil away. The topsoil is deposited into streams, lakes, and oceans. The type of soil and slope of the land are the two factors affecting erosion. Because the soils of Friday Harbor are porous and drain well, the potential for erosion in the Town occurs only in the areas with steep slopes. According to the Soil Conservation Service land survey from 1962, the only areas with steep enough slopes to cause an erosion hazard exist in the northeast portion of Town, east of Tucker Avenue and north of Larson Street. Figure 2-8 shows this area.

Landslides are much more catastrophic than the slow process of erosion. These events cause large masses of soil, rock, and debris to slide down a hillside. Steep slopes are

especially susceptible to landslides, but soil composition and structure of the slopes are important also. Areas that have gravel and sand overlying a layer of hard, impermeable till are very susceptible. At times of heavy rainfall, the top layer can become saturated and heavy, with a thin layer of water underneath. If steep enough, the top layer will slide down the hill, possibly causing others areas to break loose as well. Figure 2-9 shows the areas identified as potential areas for a landslide. All of these areas are of moderate to steep slopes (8 to 70 percent) and consist of Roche-Rock soils.

2.10.4 FLOOD HAZARD AREAS

The 2002 *Comprehensive Plan* identifies Flood Hazard Areas as lands subject to a 1 percent or greater chance of flooding in any one year. Only one area has been identified as a potential flood hazard. This area is along the shores of Friday Harbor. This area is influenced by the tides and wind-driven waves rather than from rainfall events. There are also some areas of local flooding during periods of rainfall. These are discussed in Chapter 4, Existing Stormwater Drainage System. Areas of local flooding are shown in Figure 2-10.

2.10.5 WETLANDS

Wetlands are ecosystems that provide several beneficial functions. They reduce flooding, erosion, siltation, ground and surface water pollution, serve as aquifer recharge areas, and provide wildlife habitat. Three palustrine wetlands are located within the Town limits. Palustrine wetlands are those freshwater upland wetlands fed by ground or surface water. The U.S. Department of Interior, Fish and Wildlife Service prepared an inventory of the wetlands on San Juan Island in 1981. One of the palustrine wetlands lies east of Warbass Way. The second one is located off of Tucker Avenue in the northern section of Town. The other one lies in the southern part of Town near Mullis Street. Figure 2-7 shows the location of these wetlands.

The wetlands are identified in the Town's Critical Area Ordinance (Ordinance #1051). The regulations of the Critical Areas Ordinance apply to any development, with a few exemptions, located in whole or in part, within 50 feet of an identified wetland.

2.11 POPULATION TRENDS

San Juan County has experienced one of the highest rates of population growth of any county in the State during the last 30 years. During the same period, the Town of Friday Harbor has experienced a growth rate of 3.3 percent, which is approximately one-third the growth rate of the County. The Friday Harbor Planning Commission recommended that an annual population growth rate of 2.78 percent be used for the purpose of GMA planning over the next 20 years. Following joint work sessions between the Planning Commission and Town Council, a population growth rate of 1.4 percent was adopted.

Based on this annual growth rate, population in the Town is projected to increase from 2,075 in 2004 to 2,705 in 2024.

2.12 LAND USE AND ZONING

Existing land use within the Town Limits of Friday Harbor is described in the 2002 *Comprehensive Plan*. Figure 2-11 shows the current distribution of land use within the Town. The information on Figure 2-11 was taken from aerial photos. The majority of land is used for private residences, with most being single family, but also with some multi-family residences and mobile homes. Residential uses account for approximately 44 percent of the area within the Town. In the downtown area east of Blair Avenue, use is of predominantly small businesses, shops, and professional services. Other commercial and some light industry lie along Spring Street and Guard Street. North of Spring Street, land use is highly mixed with schools, businesses, single- and multi-family housing, and large tracts of vacant land north of Larson Street. Commercial, professional, and industrial uses account for approximately 20 percent of the land use in Friday Harbor, with vacant areas covering roughly 36 percent.

Future land use within the Town is illustrated in Figure 2-12, based on the Amended Land Use Map in the 2002 *Comprehensive Plan*. This plan concentrates commercial uses in the downtown and immediately surrounding areas. Light industry will be planned for the areas south of Spring Street and also on Guard Street and Carter Avenue. The remainder of the Town is zoned for residential. Multi-family housing and professional services will be used to buffer single-family housing from the commercial and industrial areas. Multi-family housing will also lie along Guard Street, Park Street, and in the northeast corner of the Town limits.

Stormwater runoff is highly dependent upon land use, so it is important to identify the type of future development and policies for the development. The 2002 *Comprehensive Plan* sets out policies for commercial, industrial, and public services land use designations stating that development should comply with the Town's Storm Drainage Standards. The Environment section of the land use element contains a goal of maintaining water quality through an adequate stormwater management program and system and a policy which states "the Town should adopt regulations to protect "critical areas" which provide for:...stormwater runoff controls."

2.13 UTILITY SERVICES

The Town of Friday Harbor has the responsibility to provide its citizens with roads, water, sanitary sewer service, refuse service, stormwater control, and fire protection. Telephone service is provided by Century-Tel Communications. The Town of Friday Harbor receives electricity from Orcas Power & Light Company. Police services are contracted with San Juan County.

2.14 STORMWATER UTILITIES

The Town of Friday Harbor Stormwater Management Utility was established in 1993 by the Town of Friday Harbor Ordinance No. 913. The Utility operates and maintains the storm or surface water drains, channels, and facilities and outfalls for storm drainage. The service area for the utility is the Town limits. The Town Administrator is the administrator of the Utility.

The Utility has the ability to establish rates and charges in order to pay for the needs of the Utility. The rate structure policy for the Utility is currently set forth in the Town of Friday Harbor Ordinance No. 914. The rates and charges are established to pay for the costs associated with the development and adoption of a Stormwater Management Plan, the costs, including debt service and related financing expenses for construction of stormwater facilities, the operation and maintenance of the storm drainage facilities within the service area, the purchase of easements which may be necessary for the storm and surface water drainage system, the costs of monitoring, inspection, enforcement, and administration of the Utility.

The rate structure for the monthly service charge is based on the amount of impervious ground cover contained within each parcel of property. The amount of impervious ground cover is equated to the number of Equivalent Residential Units (ERU), 2,000 square feet of impervious ground cover, contained on the property. All detached single-family residences are deemed to contain one ERU. Undeveloped property within the service area is not charged a service charge.

In addition to the monthly service charge, the Utility levies a connection charge against each parcel of undeveloped property at the time that it is developed. The connection charge for a parcel is determined by multiplying the connection charge for an ERU by the number of ERUs that will exist on the property to be developed.

2.15 EXISTING STORMWATER CONVEYANCE SYSTEM

The existing stormwater conveyance system for the Town consists of a combination of open ditches, pipes, culverts, and overland sheet flow. A complete inventory of the storm drainage conveyance system has been developed. A summary of the conveyance system inventory is contained in Table 2-3. A base map showing the drainage facilities cataloged in the inventory is contained in the plastic sleeve at the back of this Plan.

**TABLE 2-3
Stormwater System Inventory**

Structure	Quantity
Catch Basins	195
Open Ditch	19,150 feet
6-inch Pipe	2,070 feet
8-inch Pipe	13,280 feet
10-inch Pipe	205 feet
12-inch Pipe	8,300 feet
15-inch Pipe	4,660 feet
18-inch Pipe	3,970 feet
24-inch Pipe	5,330 feet
30-inch Pipe	215 feet
36-inch Pipe	1,010 feet

2.16 POINT AND NONPOINT SOURCE OF POLLUTION

Point sources are typically designated as the discharge from a single outfall, such as the discharge from an industrial plant. However, an outfall from a stormwater conveyance system is also defined as a point source. Surface runoff may contribute pollutants, which are discharged at the stormwater conveyance system’s outfall and would be classified as a point source. Surface water pollution may arise from urban settings, particularly from commercial areas. Service stations may contribute oil, grease, and heavy metals to stormwater runoff. Heavy machinery washing areas may be contributing sediments, oils, grease, and heavy metals to the stormwater system. A more detailed discussion of potential point sources of runoff pollution is provided in Chapter 5, Nonpoint Source Pollution Analysis.

Nonpoint sources are diffuse in nature and are generated by a type of land use or activity. Nonpoint sources of pollution in the Town may include nutrients and pesticides from the Town parks, recreational areas, residential lawns, and agricultural areas. Roads, parking lots, and driveways are likely to contribute oil, grease, and heavy metals to stormwater runoff. A more detailed discussion of potential nonpoint sources of runoff pollution is provided in Chapter 5 of this Plan.

2.17 DESIGN CRITERIA

Stormwater planning typically involves the design of conveyance, storage, and/or treatment facilities adequate for an amount of stormwater runoff predicted from a design storm event. A design storm is defined by the average frequency that the given amount of precipitation is experienced. For example, historical data for the Friday Harbor area has established that a total rainfall of 3.6 inches in a 24-hour period is an event which is

expected to occur on average once every 100 years. However, although the rainfall for the 100-year storm remains fairly constant, the 100-year storm runoff from a site increases upon development. This is due to a larger percentage of rainfall running across the surface to the collection system rather than infiltrating into the ground.

The design storms selected for analysis of the Town's existing stormwater conveyance system include the 6-month, 2-, 25- and 100-year, 24-hour storm events. The 24-hour precipitation totals for these storms are given in Table 2-4. This information is based on the NOAA (National Oceanic and Atmospheric Administration) isopluvial maps, which are included in the appendices.

TABLE 2-4

Design Storm 24-Hour Precipitation Totals

Storm	Precipitation (inches)
6-month	0.96
2-year	1.5
25-year	3.0
100-year	3.6

The storm drainage design criteria for this Plan are based on the requirements of the 1992 Washington State Department of Ecology *Stormwater Management Manual for the Puget Sound Basin*. Hydraulic modeling for the Town of Friday Harbor was performed using the Santa Barbara Urban Hydrograph (SBUH) method. Conveyance facilities were modeled to determine their capacity to convey runoff resulting from the four storm events discussed above. Capital improvements (Chapter 6) are recommended for all facilities with insufficient capacity to convey the 25-year storm event, with higher priority given to correct systems with insufficient capacity to convey the 2-year storm event.

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