Assessment and Prioritization for Bioretention Projects in East Jefferson County

A Project of the Jefferson County Marine Resources Committee

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Table of Contents

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Brandon Maxwell, Civil Engineer, City of Port Townsend
John Merchant, Operations Manager, City of Port Townsend
Samantha Trone, Assistant City Engineer, City of Port Townsend Public Works
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Executive Summary

This project was undertaken by the Jefferson County Marine Resources Committee (JCMRC) with the goal of identifying the highest priority sites in East Jefferson County to retrofit with bioretention to reduce pollution in marine waters.

The project area includes all of East Jefferson County with a focus on developed areas where stormwater reaches marine water in the form of surface water. It also includes all of Discovery Bay to Diamond Point in Clallam County.

The methodology used is based on a process developed by Herrera Environmental Consultants in 2014 for the Hood Canal Coordinating Council (HCCC) and adapted to fit local needs, project budget, and available data.

Through a process that involved reviewing relevant reports, available water quality data, stormwater plans, and consultations with county and city staff, over 75 locations were identified in a first cut of all potential sites. Further review identified 37 sites for field visits in 18 areas across the County. Site visits were conducted by WSU Jefferson County Extension staff during November and December of 2015.

Each site was assessed for drainage patterns, potential water pollution sources, feasibility and appropriateness for bioretention, available space for bioretention and other considerations. Sites were prioritized as high, medium, or low need for a retrofitting project. Nine sites were ranked as high priority, seven of which are in Port Townsend. Another eight sites were ranked as medium priority.

The next step in this project is for a sub-committee of JCMRC members to score the top prioritized sites (High and Medium) based on criteria including: cost/benefit, feasibility, educational opportunities, potential volume treated, maintenance, local acceptance, builds on other projects, and environmental factors. A proposed score sheet is included in Appendix E.

Once ranking is completed the JCMRC will select projects to complete with available funding. They will also seek funding for other priority projects in the coming years.

Introduction

This project was undertaken by the Jefferson County Marine Resources Committee (JCMRC) because the members felt it was important to have a well researched, prioritized list of sites for the County that would benefit from the installation of a stormwater retrofit, specifically a rain garden or bioretention swale.

Past efforts to install rain gardens or other bioretention facilities have been the result of landowner willingness, training opportunities, and availability of resources such as the City of Port Townsend's contribution of excavating services. A more strategic approach is desired in order to use limited funds and resources as wisely as possible to improve water quality.

This report provides a comprehensive, county-wide list that identifies and prioritizes site-specific locations or “hot spots” in East Jefferson County where stormwater is likely impacting marine water quality and would benefit from a rain garden or another Low Impact Development installation. “Hot spots” are defined as urban drainage areas that regularly exceed acceptable standards for *E. coli*.

The completion of the *Hood Canal Regional Stormwater Retrofit Project* report in 2014 provided a process by which to identify and rank sites. This report also identified and ranked sites in Hood Canal Action Area. Since Hood Canal is only a portion of Jefferson County, the JCMRC wanted to complete the site ranking for the entire eastern portion of the county with a focus on protecting the marine environment.

The term stormwater retrofit refers to installing a stormwater runoff treatment and/or flow control facility on existing developed land, often requiring modifications to existing drainage systems or other drainage characteristics (such as pavement slope) on the site. Retrofits can consist of new best management practices (e.g., adding a rain garden) or modifications to an existing stormwater facility (e.g., changing the configuration of a stormwater pond) (*Herrera*, 2014).

WSU Jefferson County Extension, serving as a County Department, provides some grant-funded staff support for JCMRC projects. They were asked to conduct an initial assessment and to prioritize a comprehensive list of potential sites. This report describes the process used and the results. A JCMRC sub-committee will score the sites in 2016 and move forward on projects based on available funding.

Methodology

Overview

The project team used existing information and built on a prioritized list already developed for the Hood Canal to create a ranked list of sites for all of East Jefferson County.

The highest priority sites have a:

- known water quality problem resulting from polluted storm water,
- direct connection to marine waters, and a
- sufficient area to place a bioretention facility.

In cases where water quality had not been tested or the data was old, professional judgment by WSU water quality staff was used to determine potential sources of pollution to marine waters. Jefferson County MRC members with expertise will review and refine the list. Note: degraded water quality from failing septic systems was not addressed in this report because septic must be addressed using practices other than bioretention.

Project Area

The project area includes all of East Jefferson County with a focus on developed areas where stormwater reaches the surrounding water bodies. It includes all of Discovery Bay to Diamond Point – which is in Clallam County.

The focus is on identifying publicly owned sites that are both feasible for biorention and where rain gardens will improve water quality. Privately owned sites and those with other drainage issues are also identified.

There are two Action Areas defined by the Puget Sound Partnership in East Jefferson County. They are the Strait of Juan de Fuca Action Area (Strait) and the Hood Canal Action Area. Figure 1 shows the project area with site visit locations.

Process

In 2014, the Hood Canal Coordinating Council completed a report prioritizing sites in the Hood Canal Action Area. The report: *Hood Canal Regional Stormwater Retrofit Project* was prepared by Herrera Environmental Consultants and is referred to as *Herrera* in this document. The *Herrera* report was developed in consultation with Jefferson County Environmental Health and other appropriate county departments. The process used for this JCMRC project was adapted from *Herrera* where practical to fit local needs, project budget, and available data.

The *Herrera* report does not include the City of Port Townsend or Strait of Juan de Fuca Action Area. This document helps address the gap, following the methodology developed by Herrera Consultants Inc. for the Hood Canal whenever practical. This

project also re-assesses the results of the Herrera report, based on locally identified priorities and changing conditions.

Steps taken:

- Review the *Herrera* report for methods used, data collected and sites identified pertaining to Jefferson County.

- Using JCMRC criteria, determine which sites identified by *Herrera* are suitable for reconsideration, focusing on those areas that drain to marine waters.

- Identify any new sites in the Hood Canal Action Area or Strait Action Area based on criteria important to the JCMRC and by reviewing existing documents, water sampling results, web-based tools, and meetings with local jurisdictions including:

    - *Jefferson County Surface Water Management Plan.*
    - *Irondale and Port Hadlock Urban Growth Area Stormwater Management Plan.*
    - Web based and print maps of stormwater facilities for Port Townsend and Jefferson County.
    - Personal communications with Michael Dawson, Jefferson County Environmental Health, about quality sampling conducted for Port Townsend, Mats Mats Bay, Port Hadlock, Cape George, Discovery Bay and other locations. Review associated reports where available.
    - Personal communications with John Merchant, Brandon Maxwell, and Samantha Trone (City of Port Townsend Public Works) about stormwater facilities and issues.
    - Local knowledge of developed areas and observed water quality and quantity issues.

- Use *The Puget Sound Characterization Model* to examine the Strait Action Area and Port Townsend (this was already completed by *Herrera* for Hood Canal). *The Puget Sound Characterization Model* is a web-based decision support tool that uses water and habitat assessments to enhance comparison of different areas within a watershed for restoration or protection value. Using the model, focus was placed on pathogen and sediment inputs. Identified areas were categorized with a high need for restoration in the model.

- Compare list of sites with the areas in *The Puget Sound Characterization Model* to prepare a list of potential areas suitable for further study in East Jefferson County.

- Meet with local jurisdictions to verify list and confirm data.

- Further identify sites that have the potential to drain surface water to marine or fresh water using desktop analysis that included: aerial photographs, zoning maps, drainage infrastructure mapping, other utility mapping (water and sewer), locations of existing stormwater treatment and/or flow control facilities, mapped impervious surface areas, mapped boundaries of wetlands and other

environmentally sensitive areas, ground surface topography (LIDAR), parcel boundaries and ownership information, and drainage complaints.

- Conduct site visits to those locations that have been identified as potentially benefiting from retrofit restoration and that drain surface water to marine or fresh water bodies. Assess drainage patterns and potential water pollution sources and determine if there is space available for bioretention.

- Prioritize sites: high, medium and low; based on project criteria.

Upon completion of the prioritization, a team of JCMRC members will score the top ranked sites based on information provided in this report. Ranking considerations will include: cost/benefit, feasibility, educational opportunities, potential volume treated, maintenance, local acceptance, if it builds on other projects, and environmental factors. Once ranking is completed the JCMRC will select projects to build with available funding. They will also seek funding for other priority projects.

Limitations

Highways and large areas with stormwater plans in place such as Naval Magazine Indian Island, Port of Port Townsend Boat Haven, Port Ludlow, and the Port Townsend Paper Mill were excluded from this report.

Other limitations include:

- Water quality data available for some, but not all areas, and some of the data was from as early as 2006.
- No long-term water quality data available.
- Maps and figures created in this report are not to scale.
- Sampling was primarily for fecal coliform and *E. coli*.
- No data is available for other types of pollution commonly found in stormwater.

Findings

Data collected and reported by *Herrera* for the Hood Canal was reviewed. All sites identified for Jefferson County in *Herrera* were reviewed and evaluated to determine if any met the criteria for this project (Appendix C). Those that did not have surface water reaching marine water were eliminated from further review.

The *Puget Sound Characterization Model* was used to examine the Strait Action Area and Port Townsend. Focus was placed on models for pathogens and sediment. Areas with high potential for restoration were identified and include portions of Port Townsend, Port Hadlock, and Discovery Bay. Models generated are located in a separate document titled *Strait PS Char Model Results*.

Water quality data, reports and personal communications were used to identify locations fitting JCMRC criteria. It should be noted that the water quality sampling conducted by Jefferson County Environmental Health was for fecal coliform and *E. coli* only. Other

contaminants are found in stormwater runoff that are not associated with pathogens, such as heavy metals, oil and gas, and chemicals. There was no data on these contaminants. Sources of these pollutants were assessed during site visits. Highlights of key findings follow by area.

Port Townsend

Communications with Michael Dawson of Jefferson County Public Health and City of Port Townsend staff John Merchant, Brandon Maxwell, and Samantha Trone were conducted throughout this project. Dawson provided water quality sampling data for the Port Townsend waterfront that included numerous elevated hits for *E. coli*. Each location identified was discussed with City staff to determine potential causes and solutions. Staff felt that locations for additional bioretention projects on the waterfront were limited. There are already a dozen or more rain gardens or filtration areas on the waterfront. It is unlikely to fit any more in without major reconstruction. Attention was turned to the contributing sources of flows (uphill). Treatment at the sources and along the path of the downhill flow would help reduce the volume of flow and therefore the amount of contaminants reaching the bay. The City provided a web-based link of stormwater utilities, which was used to identify locations for potential interception with bioretention facilities. Locating water flow and locations flat enough to allow infiltration were identified using one-foot contour LIDAR and site visits.

Results from Port Townsend Stormwater *E. coli* sampling 2013-14.

Sites with 3 or more samples are confirmed hot spots. Sites with less than 3 samples are high hits that were not confirmed due to lack of flow during site visits.

Sample Site #	Location Description	*E. coli* Geomean	Season	# of Samples	Priority
PT035	Uppermost 3' concrete stormwater outfall at end of Monroe St between Salmon Club boat ramp and NW Maritime Center	10,261	Aug-Sep 2014	2	High
PT025	9" steel pipe with rusted tide gate in rip rap just E of ferry dock at pocket park	4,265	Aug-Sep 2014	3	High
PT050	8" green plastic stormwater pipe under rip rap between Aladdin Motel and New Day Fisheries	3,654	Wet 2013-14	2	High
PT015	10" white PVC pipe under NE corner of Sea J's restaurant	1,949	Wet 2013-14	3	High
PT009	22" concrete stormwater outfall near AB docks	1,706	Wet 2012-13	2	High
PT019	20" concrete stormwater outfall at W end of Lighthouse Plaza at end of Gaines St	1,096	Aug-Sep 2014	3	High
PT074	Stormwater pit near Kah Tai lagoon across from yellow house, red trim on 19th	618	Wet 2014-15	2	High
PT029	10" black plastic pipe in concrete wall at end of Quincy St	365	Wet 2013-14	2	High
PT044	Stormwater culvert W end of Boat Haven 100' W of fence, culvert under Hwy 20	287	Wet 2013-14	2	Med
PT018	8" steel stormwater outfall at end of Kearney St at upper edge of beach in rocks	231	Aug-Sep 2014	3	Med
PT005	12" concrete stormwater outfall with green tide gate, E of medium travel-lift dock	206	Wet 2013-14	3	Med
PT073	Stormwater pit near Kah Tai lagoon across from green house, white trim on 19th	105	Wet 2014-15	4	Med

Source: M. Dawson, Jefferson County Public Health – Water Quality Northeast Jefferson Clean Water Project, Port Townsend, December 31,2015.

Port Hadlock

A stormwater management plan for the Irondale and Port Hadlock Urban Growth Area was developed in 2004 by Gray and Osborne, Inc. ("*Gray*"). Findings from *Gray* pertinent to this project include the following:

Most of the stormwater runoff in the Irondale/Hadlock Urban Growth Area (UGA) infiltrates before reaching a conveyance system. There is not a high volume of runoff in Hadlock overall, due to the relatively low level of development. However, there are two outfall areas to Port Townsend Bay within the UGA: (1) Core storm sewer system along Lower Hadlock Road and (2) road drainage from Moore St. in Irondale. Sampling results from the two outfalls were taken in 2003 and 2004 and showed that both contained a suite of pollutants expected in urban stormwater including heavy metals, oil and grease, nitrogen, phosphorus and suspended solids, in concentrations sufficiently high that treatment should be provided. There is a list of existing stormwater facilities on page 4-2 of the plan. It is important to note that Moore Street and the Port Hadlock Core Sewer system have identified water improvement plans with capital budgets. Pages 8-3 to 8-8 in the plan detail the improvements, which could include low impact development. Jefferson County Public Health published the *Northeast Jefferson Clean Water Report* in 2015, which notes they will continue to monitor Irondale Creek to determine the source of pollution that has closed the beach to shellfish harvest.

Mats Mats Bay

The report *Mats Mats Bay Water Quality Improvement Project Final Report* was published by Jefferson County Public Health in 2012. The area failed water quality standards in 2008 for fecal coliform and was listed as impaired. There were only a few instances where water quality standards for fecal coliform were exceeded at some point over 3 years. There was a high tide, storm surge, heavy precipitation event in November 2012 which resulted in a 0.5 meter freshwater lens over the bay and unusually high fecal coliform counts. The area monitored is showing a long-term improving trend and as of 2011 the bay is no longer threatened with a downgrade in shellfish classification. Jefferson County Public Health staff did note that a stormwater outfall on the west shore was in their medium to high priority for fecal coliform between 2010 and 2012, which was not investigated in this report. The catchment area for Mats Mats Bay is approximately 1,500 acres and has an average annual rainfall of 24 inches. There are 50 houses within 500 feet of the shoreline along the bay. There are commercial shellfish operations in the bay in the northwest corner of the bay. Most of the high counts were from septic or wildlife or agricultural animal waste.

Cape George

The Cape George area was sampled by Jefferson County Public Health and results were published in 2011 in the *Discovery Bay Clean Water Project Final Report*. There were some hotspots identified during sampling including some that may have been from stormwater, rather than septic system failure. A few of these are stormwater outfalls discharging streams with constant or near constant flow. The south portion of Cape George has a small park with two outfalls. One of these (a 24" concrete culvert) had occasional high fecal coliform counts. The infrastructure in Cape George is privately held and maintained.

Discovery Bay

The *Discovery Bay Clean Water Project Final Report* was published by Jefferson County Public Health in 2011. The report states that 120 acres of prime commercial clam beds were closed in 2006 due to high fecal coliform counts. During sampling conducted for the report no high fecal coliform samples were found in the marine (offshore) samples and the closed shellfish area was restored to Approved. There were hotspots found during shoreline sampling, but none were from stormwater infrastructure other than small-scale individual landowner pipes. Water quality monitoring revealed a long-term improving trend. The watershed is 42 square miles and receives an average of 20 inches of rain annually. Soils in this area sometimes allow infiltration of septic effluent too quickly - resulting in inadequate treatment.

Hood Canal (including Paradise Bay)

In 2012, Jefferson County Public Health published the *Hood Canal Clean Water Project Final Report.* In 2006, elevated levels of fecal coliform that posed potential threats to portions of Hood Canal #3 commercial shellfish growing areas were identified. High counts were found in almost every neighborhood at different times throughout the sampling period but most were not confirmed in resampling. None of the shoreline sampling spots were from stormwater infrastructure, other than small-scale individual landowner pipes, although there may have been a few that collected highway runoff. Sites at Donovan Creek, Tarboo tributary, White Rock, and Paradise had high counts that were not resolved and were referred to continuation of monitoring in the current Hood Canal Watershed Project. In addition to *E. coli,* nitrogen levels were also tested. There are no water quality standards in place for nitrogen in streams, but it was noted that values about 10 mg/L can be toxic to wildlife. Tarboo Creek had the highest recorded value of 0.40 mg/L in 2012. Not enough data was collected to assess a trend. A human sanitation problem was discovered in 2012 along the Big Quilcene River and subsequently the site was cleaned up. A long-term solution was called for. Paradise Bay formed a Water District and indicated a willingness to pay for large onsite septic system for the community. A site owned by DNR was identified but things were at an impasse at the time of the report.

Site Visits

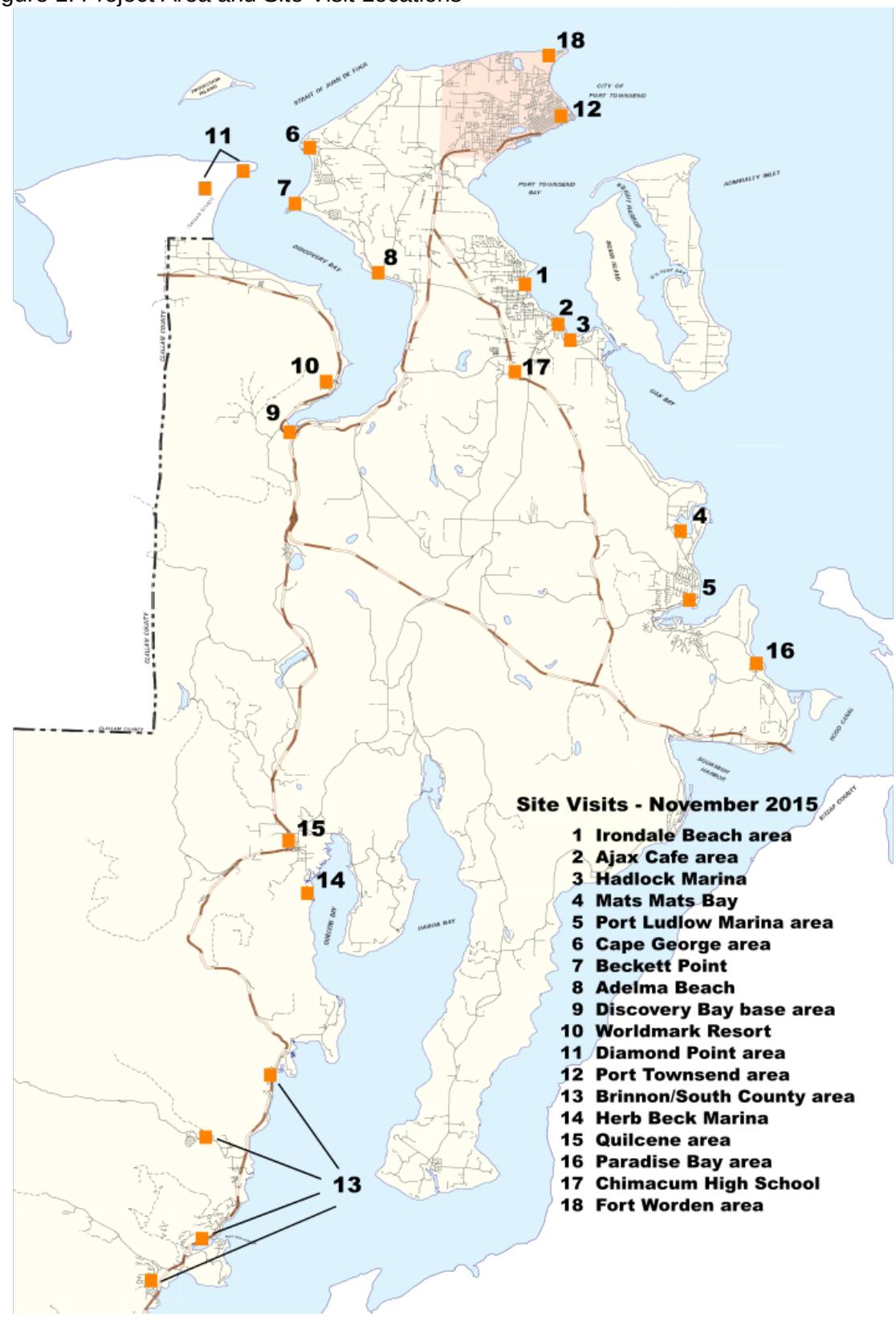
More than 75 locations were identified in a first cut of all sites with potential to fit the JCMRC criteria (Appendix A).

Using the tools described in the Methodology section of this report, sites were eliminated primarily based on: lack of water reaching marine water, low need due to sparse development, water quality issues not resolvable using bioremediation (i.e.: septic failures), or local knowledge that a water quality problem had been resolved.

A total of 37 sites were selected for a field visit in 18 areas across the County. Site visits were conducted by WSU Jefferson County Extension staff during November and December of 2015 (Figure 1). A Site Visit Form was used during the evaluation (Appendix D) and rough field notes were taken (Appendix B).

Each site was assessed for drainage patterns, potential water pollution sources, feasibility and appropriateness for bioremediation, available space for bioretention, and other considerations. Sites were prioritized as high, medium, or low need for a retrofitting project. Notes for site visits to the site ranking high and medium are found in Appendix B and include actions and next steps to be taken.

Figure 1: Project Area and Site Visit Locations



Results

Most of Jefferson County is rural with dispersed residential development. There are urban areas including Port Townsend, Port Hadlock, Cape George, Discovery Bay, Port Ludlow, Quilcene and Brinnon. It is not surprising that the greatest area of need for improved stormwater treatment is Port Townsend, which has the densest development.

High Priority Sites

The nine sites listed below were ranked high priority. All of the high priority sites had water quality problems (determined either through sampling data or through subjective visual observation of likely contaminant sources); drained to marine waters; and had room for a retrofit project. Most are on public land. See Table 1 for overview of these sites with evaluation criteria and view the field notes for each site in Appendix B. They are not listed in order – the JCMRC will score the sites to determine ranking.

Site ID	Site Name	Community
2b	Ajax Cafe Area	Hadlock
12a-1	Jefferson County Community Center	Port Townsend
12a-2	Marine View Apts North	Port Townsend
12a-3	Marine View Apts South	Port Townsend
12b	Kah Tai along Kearney Street	Port Townsend
12c	Jefferson Courthouse	Port Townsend
12e	Chetzemoka Park	Port Townsend
12f	Blaine & Madison	Port Townsend
14	Herb Beck Marina	Quilcene

See Figures 2, 3, and 4 for vicinity maps of high priority sites.

Figure 2: Port Townsend High Priority Areas

Figure 3: Port Hadlock High Priority Area

Figure 4 Herb Beck Marina High Priority Area

Medium Priority Sites

Factors considered in prioritizing sites as medium included ownership, lower need, and lack of information. As funding becomes available, it would be worthwhile to further evaluate these sites, all of which had space for retrofitting and had potential water quality issues. See Table 1 for overview of these sites with evaluation criteria and view the field notes for each site in Appendix B.

Site ID	Site Name	Community
1b	Moore Street to end at Irondale Beach	Irondale
1c	Irondale Beach creek	Irondale
2c	Boat School Area	Hadlock
4b	Mats Mats Boat Launch	Mats Mats
6b	Cape George “Members Only” Park	Cape George
16	Paradise Bay	Ludlow
18a	Fort Worden Pier	Port Townsend
18b	Fort Worden area	Port Townsend

Low Priority Sites

The remaining sites were considered low priority based on lack of known or potential water quality issues, unlikely that stormwater would reach marine water, or lack of information.

Site ID	Site Name	Community
3	Hadlock Marina	Hadlock
7	Beckett Point	Discovery Bay
8	Adelma Beach	Discovery Bay
10	Worldmark Resort	Discovery Bay
15	Quilcene	Quilcene
17	Chimacum High School	Chimacum
11a	Diamond Point along Beach Drive	Clallam
11b	Miller State Park	Clallam
12d	Quincy & Foster	Port Townsend
13a	Canal View Neighborhood	Brinnon
13b	Pleasant Harbor	Brinnon
13c	Appalosa Neighborhood	Brinnon
13d	Brinnon business area	Brinnon
13e	Brinnon Boat Launch	Brinnon
1a	Irondale Rd & 4th Ave, Irondale (Jesus is Lord sign)	Irondale
2a	Business Park	Hadlock
4a	North Mats Mats	Mats Mats
6a	Cape George Marina area	Cape George
9a	Fat Smittys	Discovery Bay
9b	Store Road	Discovery Bay

A site visit was conducted in the Port Ludlow area and the recommendation is to put this area on hold since the Jefferson County Environmental Health will be conducting water quality monitoring in the coming year.

Table 1: High and Medium Retrofit Sites Overview

Organized by location

High Priority Sites

Site ID	Site Name	Community	Captures Flow	Drains to marine water	WQ problem	Room for BMP	Owner	Notes
2b	Ajax Cafe Area	Hadlock	Drains a fairly large area of road and parking	To lagoon via surface flow down Lower Hadlock Rd. and Ajax Café parking area.	Adjacent to commercial shellfish area. Lagoon is a mapped wetland. Drains an area with a relatively moderately high level of traffic.	In parking area adjacent to lagoon (near Port a John). Parking spots would be lost.	Likely owned by Jefferson County, further investigation will be needed.	Lagoon is outflow area for PH Core Storm drainage. Review *Gray* 2004 for details on flow and improvements. Discuss LID feasibility with County.
12a-1	Jefferson County Community Center	PT	Area along west side of Taylor St. between Clay and Franklin captures flow from community center parking areas	To Port Townsend Bay at Quincy stream via storm drains at Jefferson and Quincy	Flow from parking areas and street that would contain more contaminants than other areas due to traffic/parking volume.	Area south of the Community Center along west side of Taylor St. between Clay and Franklin. Some overflow parking could be lost.	City ROW	Discuss with City
12a-2	Marine View Apts North (Clay St)	PT	From approx. 2 block area west between Taylor & Quincy	To Port Townsend Bay via storm drains (Monroe or Quincy)	Monroe outfall had highest *E. coli* numbers. Transit stop on Clay	On the north side of the Marine View Apartments between Quincy and Madison on the north side of Clay	City ROW	Discuss with City

High Priority Sites cont.

Site ID	Site Name	Community	Captures Flow	Drains to marine water	WQ problem	Room for BMP	Owner	Notes
12a-3	Marine View Apts South (Franklin St)	PT	From approx. 3 block area west between Taylor & Quincy	To Port Townsend Bay via storm drains (Monroe or Quincy)	Monroe outfall (PT35) had highest E.coli numbers (10,261 in 2 samples in 2013-14). Minor parking, traffic.	On the south side of the Marine View Apartments between Quincy and Madison along the north side of Franklin	City ROW	Discuss with City
12b	Kah Tai along Kearney Street	PT	From Lawrence & Kearney. High flow.	To Port Townsend Bay via pump at Kearney and WA St.	E.coli numbers 231 in 3 samples in August 14 from Kearney Pump (PT018)	On west side of Kearney in Kah Tai park.	City of PT	Shoreline & wetland issues. Audubon interested in creating habitat.
12c	Jefferson Courthouse	PT	From Washington	To Port Townsend Bay thru Lighthouse Plaza and Gaines St outfall	High traffic and braking on Washington. *E. coli* numbers 1096 in 3 samples in 2013-14 from end of Gaines (PT19)	On corner of Washington and Walker. Vacant land.	County or City	Discuss with City, County

High Priority Sites cont.

Site ID	Site Name	Community	Captures Flow	Drains to marine water	WQ problem	Room for BMP	Owner	Notes
12e	Chetzemoka Park	PT	From Roosevelt on the north side of the park from the southeast side of Morgan Hill including Clallam, Jackson and Monroe Streets	To Strait via flow over bluff within park (constructed stream bed)	Moderately high traffic with typical stormwater contaminants likely.	In north corner of park	City of PT	No recent testing at outfall
12f	Blaine & Madison	PT	Moderately heavy flow from a large portion of Morgan Hill that comes down Tyler and ties into roadside swale (concrete gutter) on Blaine	To Port Townsend Bay via Monroe St. .	Monroe outfall (PT35) had highest E.coli numbers (10,261 in 2 samples in 2013-14).	In vacant lot on north side of Blaine at Madison	City ROW	Determine ownership, ROW width. Check effectiveness of treatment filters located at corner of Blaine and Tyler.
14	Herb Beck Marina	Quilcene	Linger Longer Rd; parking area for marina and park.	Via surface flow. Down boat ramp.	County only sampled a small stream, which had good quality. Boat launch & parking are sources; adjacent to Coast Shellfish hatchery.	Several locations; parking spots may be lost	Port or County	Identify ownership. Observe flow during a rainfall event.

Medium Priority Sites *Organized by location*

Site ID	Site Name	Community	Captures Flow	Drains to marine water	WQ problem	Room for BMP	Owner	Notes
16	Paradise Bay	Ludlow	Residential, steep hillside; high flow	Yes – visible pipe	Unknown	Unlikely	Private	No Action
18a	Fort Worden Pier	PT	Road down to beach.	Yes – surface flow	Unknown – moderate level of traffic. Likely typical stormwater contaminants.	Yes	State Parks	Conduct further assessment on Pier area. Reconstruction of pier may affect potential project there.
18b	Fort Worden area	PT	Fort Worden	Unknown	Unknown	Yes	State Parks/ PDA	Waiting for old map of stormwater from Park officials. Check Chinese Lagoon flow
1b	Moore Street to end at Irondale Beach	Irondale	Moore St	Maybe during high tide via restoration on north side of road – most infiltrates.	Yes in past - contact Co. for latest	Yes	County	Confirm w/Co. Health that numbers are low to none. *Gray* 2004 report mentions $200K solution. Flow is too heavy for a simple bioretention.
1c	Irondale Beach Creek	Irondale	4th Street & Irondale area	Yes – directly onto beach from flowing stream. Scouring evident.	Yes, County has identified this as a hot spot.	Yes	County or WDFW	Flow is too heavy for a simple bioretention BMP.

Medium Priority Sites cont.

Site ID	Site Name	Community	Captures Flow	Drains to marine water	WQ problem	Room for BMP	Owner	Notes
2c	Boat School Area	Hadlock	Upper Hadlock business area	Yes – via visible pipes	Unknown	Unlikely, unknown what BMP	County ROW; private	Outflow area for PH Core Storm drainage. Review *Gray* 2004 for details on flow and improvements. Discuss LID feasibility with County. Flow is too heavy for a simple bioretention.
4b	Mats Mats Boat Launch	Mats Mats	Paved parking lot for boat launch	Yes – via visible pipe	Not during sampling.	Maybe	Port	Ask County about WQ. Discuss potential locations with Port.
6b	Cape George "Members Only" Park	Cape George	Low traffic area; steep hill	Yes – via 2 visible pipes	24" pipe had occasional high counts (County)	Yes – in neighborhood area that contributes stormwater.	Private (Cape George ROW area)	Confirm any County Health WQ testing. If this site is ranked high, contact Cape George facilities manager for next steps.

Recommendations and Next Steps

A team of JCMRC members will score the top prioritized sites based on information provided in this report and additional site visits as needed. The ranking criteria will likely include: cost/benefit, feasibility, educational opportunities, potential volume treated, maintenance, local acceptance, if it builds on other projects and environmental factors (See draft scoring sheet Appendix E). Each site has 'next steps' associated with the notes in Appendix B.

Once ranking is completed, the JCMRC will select projects to build with available funding. They will also seek funding for other priority projects.

As the top sites are identified it will be important to continue to work with key partners including the City of Port Townsend, Jefferson County, the Port of Port Townsend and any private stakeholders.

It is recommended that the Port Ludlow area by assessed once water quality sampling is completed in coming years by Jefferson County and to continue to review new information on other areas as it becomes available. In addition, conduct a follow-up site visit to the outfall on Mats View Road as identified by Jefferson County Public Health. Maps of the stormwater drain system are expected to be available in the future for Fort Worden State Park and they should be examined for potential opportunities.

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Herrera Environmental Consultants Inc. *Hood Canal Regional Stormwater Retrofit Project.* June 30, 2014.

Jefferson County Public Works. *Jefferson County Surface Water Management Plan.* December 2005.

Puget Sound Characterization Model (beta) extracted from:
http://www.ecy.wa.gov/puget_sound/characterization/index.html

Appendix A – All Sites Considered

**Site visits number shows if site was visited; otherwise shows as driveby (db) or discussion only (mtg.)*

Sorted by Community

Herrera ID or County ID	*Site Visit #; db=drive by; mtg=discussed	Site Name	Community	Herrera Score if scored	What's Known Prior to Site Visit
	13c	Appalosa Neighborhood	Brinnon	20	East side of Hwy 101 on north side of Dosewallips River. Herrera recommends ditch retrofit, bioretention
36	13d	Brinnon Community Center	Brinnon	25	Selected for design by Herrera; bioretention, drywell retrofit
	13d	Brinnon Lane Neighborhood	Brinnon	16	Off Dosewallips Rd on north side of river; mix of commercial & residential. Herrera recommended ditch retrofit;
32	13e	Brinnon Parking Boat Launch	Brinnon	Didn't clear Herrera screen	Reviewed by Herrera
	13a	Canal view neighborhood	Brinnon	15	Dawson: Flooded in 2014; in floodplain; ditch retrofit
34	db	Dosewallips State Park	Brinnon	21	Selected for design by Herrera; bioretention
35	db	Geoduck Tavern	Brinnon	Didn't clear Herrera screen	Reviewed by Herrera; on Hood Canal. There doesn't appear to be room to do anything.
	13b	Pleasant Harbor Marina	Brinnon		
33	13d	Real Estate Agent in Brinnon	Brinnon	Didn't clear Herrera screen	Reviewed by Herrera
	db	Seal Rock	Brinnon		
	db	Cape George Highlands	Cape George	Strait Action Area	Across road from Cape George
	6a	Cape George Marina Area	Cape George	Strait Action Area	Complex; Dawson didn't find any WQ issues. The PS Char. Model indicated this area had high potential for restoration.
	6b	Cape George Park	Cape George	Strait Action Area	Bob notices outfall during summer.
49	17	Chimacum High School	Chimacum	21	Herrera didn't select due to staff changes at school but recommended bioretention. Dawson: need to see if surface water from area behind gym gets to creek.
	11a	Diamond Point	Clallam Co		
	11b	Miller State Park	Clallam Co		
	8	Adelma Beach	Discovery Bay	Strait Action Area	Aerial shows no outfalls; Dawson notes one possible metal culvert in area

Herrera ID or County ID	Site Visit # db=drive by; mtg=discussed	Site Name	Community	Herrera Score if scored	What's Known Prior to Site Visit
	7	Beckett Point	Discovery Bay	Strait Action Area	Aerial shows no outfalls
	9a & 9b	Discovery Bay commercial area; Snow and Salmon Creek	Discovery Bay	Strait Action Area	Unknown. Dawson – might be pipe on creek side behind Quonset hut area? PS Char. Model indicated retrofit potential.
	db	Discovery Bay Golf Course	Discovery Bay	Strait Action Area	Source: Dawson; mentioned as possible but no numbers, clean in past?
	db	Discovery Bay Heights	Discovery Bay	Strait Action Area	Similar to Cape George
	db	Discovery Junction/Fairmont (rural residential)	Discovery Bay	Strait Action Area	Dawson – not known but houses along shore
	db	Four Corners west of Highway 20	Discovery Bay	Strait Action Area	Aerial shows no outfalls – a distance from marine
	db	Maynard area light commercial	Discovery Bay	Strait Action Area	Dawson: possibility trucking area or parking lots, behind buildings.
	db	Ocean Grove Community	Discovery Bay	Strait Action Area	Aerial shows no outfalls; on bluff; landslide hazard
	10	Worldmark by Wyndham resort	Discovery Bay	Strait Action Area	Dawson: good possibility, pavement/rooftops. They do mussel monitoring. Terry Tossland is office mgr
	db	Y – YAM Camp	Discovery Bay	Strait Action Area	On bluff; lightly developed
	db	Discovery Bay RV Park	Gardiner	Strait Action Area	Suggested by Dawson; resolved problem with septic in past; parking, dog park
	db	Gardiner	Gardiner	Strait Action Area	
	2b	Ajax Cafe Area	Hadlock		
	2c	Boat School Area	Hadlock		
	2a	Business Park	Hadlock		
47	db	Carl's Building Supply	Hadlock	19	Unlikely to drain to marine; Herrera recommends Filterra, bioretention
45	db	Chimacum Creek Primary School	Hadlock	Didn't clear Herrera screen	Could drain to Chimacum Creek
42	na	Christie Road Apts & MH Park	Hadlock	Didn't clear Herrera screen	Not sure of location
48	db	East Jefferson Baseball Fields	Hadlock	Didn't clear Herrera screen	Unlikely to drain to marine

Herrera ID or County ID	Site Visit # db=drive by; mtg=discussed	Site Name	Community	Herrera Score if scored	What's Known Prior to Site Visit
	3	Hadlock Marina	Hadlock		
	1a	Irondale Rd & Jesus sign	Hadlock		Dawson:– Could problems at beach be from 'Jesus is Lord' sign area?
44	db	Jefferson County Library	Hadlock	Didn't clear Herrera screen	Could drain to Chimacum Creek
41	db	Post Office Port Hadlock	Hadlock	Didn't clear Herrera screen	Unlikely to drain to marine
40	db	QFC Port Hadlock	Hadlock	16	Herrera recommends bioretention, Filterra; Dawson: Area requires investigation to understand flows
46	db	Sign Station	Hadlock	Didn't clear Herrera screen	Could drain to Chimacum Creek
43	db	True Value Hadlock	Hadlock	Didn't clear Herrera screen	Unlikely to drain to marine
	1a	Corner of Irondale Rd and 4th Ave, Irondale (Jesus is Lord sign)	Irondale Beach		
	1c	Irondale Beach creek	Irondale Beach		
	1b	Moore Street to end at Irondale Beach park	Irondale Beach		
	5a	Ludlow Area	Ludlow	Strait Action Area	Dawson: no numbers, will be sampling area next year. McNamara: Port Ludlow Assoc. are Shore Stewards but former mgr. is gone. He was JC LID Peer Leader.
37	db	Port Ludlow Center & Chevron	Ludlow	Didn't clear Herrera screen	Ludlow not tested for WQ; source Dawson
39	5b	Port Ludlow Marina Parking	Ludlow	Didn't clear Herrera screen	Ludlow not tested for WQ; source Dawson
	db	Port Ludlow neighborhood	Ludlow	17	Ludlow not tested for WQ; source Dawson; Herrera recommends ditch retrofit, bioretention
38	db	Port Ludlow Place (Commercial)	Ludlow	Didn't clear Herrera screen	Ludlow not tested for WQ; source Dawson
	db	Marrowstone Island	Marrowstone	not scored	Nordland is only commercial area
	4b	Mats Mats Boat Launch	Mats Mats		
	4a	North Mats Mats	Mats Mats		

Herrera ID or County ID	Site Visit # db=drive by; mtg=discussed	Site Name	Community	Herrera Score if scored	What's Known Prior to Site Visit
	12f	Blaine St & Madison	PT		
PT44	mtg	Boat Haven #44	PT	not scored	Stormwater culvert W end of Boat Haven 100' W of fence, culvert under Hwy 20
PT05	mtg	Boat Haven #5	PT	not scored	12" concrete stormwater outfall with green tide gate, E of medium travel-lift dock
	12e	Chetzemoka Park	PT		
	db	Chinese Gardens	PT	not scored	Dawson: Outfall of Chinese Gardens at low tide; no #'s ; there is a manhole. Also pond between Cemetery & Chinese garden smells/complaints. Not resolved.
	12a1	Community Center	PT	not scored	
PT19	12c	Courthouse / Gaines St. #19	PT	not scored	Source: from Courthouse. Dawson; 20" concrete stormwater outfall at W end of Lighthouse Plaza at end of Gaines St
	db	Fairgrounds	PT	not scored	
	18b	Ft Worden area	PT	not scored	
	18a	Ft Worden Pier	PT	not scored	Parking lot flooded 10/31/15 – photos. Dawson: lots of catch basins but no map – don't know where they go, couldn't find any pipes in a shoreline survey
PT73	12b	Kah Tai #73	PT	not scored	Stormwater pit near Kah Tai lagoon across from green house, white trim on 19th
PT74	12b	Kah Tai #74	PT	not scored	Source: Dawson; comes down 19th St. Stormwater pit near Kah Tai lagoon across from yellow house, red trim on 19th.
PT18	12b	Kearney #18	PT	not scored	8" steel stormwater outfall at end of Kearney St at upper edge of beach in rocks
	12a2	Marine View Apts North	PT		
	12a3	Marine View Apts South	PT		
PT35	mtg	Monroe Street Pipe #35	PT	not scored	Source: Dawson; #1 hotspot 2013-14 sampling; 10k *E. coli*; Uppermost 3' concrete stormwater outfall at end of Monroe St.
PT50	mtg	New Day Fishery/Aladdin Motel #50	PT	not scored	Source: Dawson; #3 hotspot 2013-14 sampling– buried in rip rap in St ROW, 8" green plastic
	12d	Quincy & Foster	PT	not scored	Available space in park. Linda Smith, neighbor
PT29	mtg	Quincy St. #29	PT	not scored	Source: Dawson; 10" black plastic pipe in concrete wall at end of Quincy St

Herrera ID or County ID	Site Visit # db=drive by; mtg=discussed	Site Name	Community	Herrera Score if scored	What's Known Prior to Site Visit
PT25	mtg	Rotary Park near Ferry next to US Bank #25	PT	not scored	Source: Dawson: #2 hotspot 2013-14 sampling; 9" steel pipe with rusted tide gate in rip rap just E of ferry dock at pocket park
PT15	mtg	Sea J's #15	PT	not scored	Source: Dawson; #4 hotspot 2013-14 sampling; 10" white PVC pipe under NE corner of Sea J's restaurant
	14	Herb Beck Marina	Quilcene	not scored	Shellfish area
	15	Quilcene	Quilcene	not scored	
	db	Seamont	Quilcene	not scored	

Appendix B – Field Notes (Rough)

This document contains notes from a series of field visits to locations around East Jefferson County conducted in November or December of 2015 by WSU Jefferson County staff on behalf of the Jefferson County Marine Resources Committee (JCMRC). The goal was to identify areas where unfiltered storm water reached marine water, then determine if the area was suitable for biofiltration. See Figure 1 for mapped locations.

ID #	Site Name
1a	Corner of Irondale Rd and 4th Ave, Irondale (Jesus is Lord sign)
1b	Moore Street to end at Irondale Beach park
1c	Irondale Beach creek
2a	Business Park
2b	Ajax Cafe Area
2c	Boat School Area
3	Hadlock Marina
4a	North Mats Mats
4b	Mats Mats Boat Launch
5a	Condon Lane
5b	Port Ludlow Marina Area
6a	Cape George Marina area
6b	Cape George “Members Only” Park
7	Beckett Point
8	Adelma Beach
9a	Fat Smittys
9b	Store Road
10	Worldmark Resort
11a	Diamond Point along Beach Drive
11b	Miller State Park
12a	Clay and Franklin between Tyler and Madison
12b	Kah Tai Park along Kearny Street
12c	Courthouse
12d	Quincy and Foster
12e	Chetzemoka Park
12f	Blaine and Madison
13a	Canal View Neighborhood
13b	Pleasant Harbor
13c	Appalosa Neighborhood
13d	Brinnon
13e	Brinnon Boat Launch
14	Herb Beck Marina
15	Quilcene
16	Paradise Bay
17	Chimacum High School
18a	Fort Worden Pier
18b	Fort Worden area

Irondale, Hadlock, Mats Mats & North Ludlow area

Date: 11/4/2015, 2pm-5pm
Staff: Bob Simmons, Darcy McNamara

1. Irondale Beach

1a) Corner of Irondale Rd and 4th Ave, Irondale (Jesus is Lord sign)

There are 2 catchbasins on west side of 4th Ave near the corner of Irondale Road. They appear to take street runoff. Can't see down ravine behind the old gas station – it is fenced.

Ranking:	Low
Drains to Marine:	Not directly
Impervious surface:	Y
Potential WQ problems:	unknown
Available space for BMP:	Potentially on west side of 4th St.

Action: Do second site visit. Discuss with County to determine flow. *Gray* 2004 pg 4-2 says discharge to infiltration trench.

1b) Moore Street to end at Irondale Beach Park

Water is running down the south side of E. Moore St. from about the corner of 3rd St. from a small ravine/wetland between 2nd and 3rd house up from the beach. There is algae growing in the water which is running frequently (perennially?) Neighbors came out and told us it was from seeps in the hillside. We presume water originates somewhere below the Jesus is Lord corner and Moore St.

The water goes down a storm drain and the end of the last driveway before the beach. It crosses Moore and comes out a culvert (#895) on the other side on the east side of the last house's driveway. It then runs down a ditch toward the beach and through another culvert (#1056) under the old road. It exits to the restoration area swale. Neighbors said it used to be a sewage outlet in the old days – never a creek. There was only a little water there during out visit. It likely soaks into the sand quickly but may reach marine water during high flows or high tides.

Ranking:	Med
Drains to Marine:	Maybe during high tide via restoration on north side of road – most infiltrates.
Impervious surface:	Y
Potential WQ problems:	Yes in past.
Available space for BMP:	Y
Culvert end treatment:	895 CBI catchbasin; 1056 has RH rock headwall

Action:
Confirm with County Health that numbers are low to none now. Cost to fix according to *Gray* 2004 is over $200k. Discuss LID options with County. See *Gray* report for more details.

1c) Irondale Beach creek
A small creek runs to marine water on the far SE side of the parking lot for Irondale Beach. It was daylighted during the Ecology restoration (2-3 years ago). Blackberries and a plant in the mustard family are taking over rapidly. The creek meanders under the vines and plants and is difficult to see. It was running slightly during our visit. It outlets onto a pond in the upper tidelands and then clearly spills over into the marine water.

Ranking:	Med – due to filtration already occurring; will change if WQ problems
Drains to Marine:	Y directly onto beach from flowing stream. Scouring evident.
Drains to Marine:	Y
Imperious surface:	Y
Potential WQ problems:	unknown
Available space for BMP:	Y but probably not feasible due to constant flow

Action:
Need to find out results of new Health Dept. investigation. If WQ problems then we can work to address. *Gray* 2004 doesn't mention stream.

2: Hadlock business area and Lower Hadlock

2a) Business Park
Drove behind the business park on the north side of Oak Bay Rd. There is a parking area and then a large flat grassy area that drops off steeply. We stopped here to see what the sources would be to the culverts along Lower Hadlock Rd.

2b) Ajax Cafe Area
Water runs down Lower Hadlock Rd. and enters compacted earth parking area on the east side of the road, near the end. Water crosses the parking area and in high flows likely enters the lagoon. This is a commercial shellfish area. There is room for a rain garden or swale if a couple parking spaces are given up.

Ranking:	High
Drains to Marine:	Yes. To adjacent lagoon – commercial shellfish area
Impervious surface:	Y, paving and compacted earth, gravel
Potential WQ problems:	unknown, but is a commercial shellfish bed
Available space for BMP:	Y – but parking spot will be lost

Action:
Determine ownership of potential BMP area
Check with County on WQ & capital improvements planned for area (Gray 2004).

2c) Boat School Area
Water runs down Lower Hadlock Rd. and enters 2 culverts that cross the road – one at each end of the Boat Schools 2 driveways (#92 & #2232). The culverts dump water over the steep embankment down to marine water. Water is from Lower Hadlock Rd and also from the Hadlock businesses above. Water comes (via pipe we think but couldn't see) across the Boat School parking lot and into a deep, wide depression (approx. 12 ft deep x 20' x 20') with large cedars and blackberry bushes growing in it. This 'pond' appears to overflow during big storms into the roadside ditch. There are high water marks on the trees approx 2-3 ft high. This area acts as a natural rain garden. This is a high volume area. Note: A second site visit during a storm event confirmed above.

Ranking: Med – due to filtration already occurring; will change if WQ problems; this is a high flow area.
Drains to Marine: Y
Drains to Marine: Y
Impervious surface: Y
Potential WQ problems: unknown
Available space for BMP: Unlikely – not sure what BMP to recommend
Culvert treatment: #92, none; #2232 BRH beveled with rock headwall

Action:
Check with DOH on WQ concerns. There were septic issues in the past from the nearby apts. This was resolved. Outflow area for PH Core Storm drainage. Review *Gray* 2004 for details on flow and improvements. Discuss LID feasibility with County.

3. Hadlock Marina

Drive by. Not likely to be a problem. Parking area might drain to wooded area/swale on west side of property. Aerial shows a wetland along the shore there. Culvert #1841 is in the northwest corner nearest swale. End treatment is BBE (unknown code).

Action: Check with DOH re: WQ & revisit if concerns.

4. Mats Mats Bay

4a) North Mats Mats

Very rural, low density. Mixing cleared/wooded. Road runoff is the main issue with some outlets near the shore. Numerous culverts #13, #938 on Bayshore; 1033 on Prospect appear nearest water. #416 drains under road to field with a ditch that leads to lagoon.

Rating: Low, due to low traffic on roads.
Drains to Marine: Y
Impervious surface: Y - low
Potential WQ problems: Y – septic in past
Available space for BMP: Y likely

Action: Check with DOH on WQ.
Note: JC Public Health noted during their review of this report that their sample site M116 on Mats View Dr. had high hits and was not visited. Recommend a site visit.

4b) Mats Mats Boat Launch

Port manages a boat launch at the south end of Mats Mats Bay. There is a paved road and parking area for a half dozen boats. There is a natural looking wooded swale in the middle of the parking area that collects water from ½ the area. That water drains into a pipe in the middle of the swale; the pipe leads to another storm drain that collects water on the west side of the parking area. The stormdrain undergrounds and comes out of a bulkhead and onto the beach – about 50 feet away. There is a small grassy picnic area (approx. 20' x 30') that the pipe runs under and an old wooden building with a concrete foundation in the area. Building is about 15' x 15' and appeared empty. There is a natural wooded/pasture/swale on adjacent property, marked private. The grassy area would be ideal for a rain

garden or a swale, but for the picnic area. The area is also constrained by large cedar and Douglas fir trees. There are know water quality problems in the area but mostly septic. Good educational opportunity.

Ranking:	Med – due to direct flushing of stormwater to marine.
Drains to Marine:	Y straight onto beach via black plastic pipe 12" dia. approx
Impervious surface:	Y
Potential WQ problems:	unknown
Available space for BMP:	Y – maybe
Culverts:	Boat Launch culverts not shown on Co. map

Action:

- Check with County on WQ
- Talk with Port about BMP options

5. North Ludlow Area

5a) Condon Lane and Montgomery

Lots of steep and uneven terrain with paved driveways, patios and streets. Houses on the uphill sides of the streets usually had numerous pipes and catch basins draining water under yards to the roadside ditches. Driveways all paved, have large culverts under them to convey ditch water. Homes on the downhill side have steep downhill drives with parking areas and stormdrains. It is unknown where the stormdrains outlet, but presumable the shore directly below. There is not much extra room in the ROW, if any. BMPs would like have to occur on a rare vacant lot or on private property. Any action would entail gaining the cooperation of various Ludlow associations. It isn't clear if there is a WQ problem. Clearly with the density there could be issues with car washing, fertilizer and pet waste. There are a number of Shore Steward signs on homes.

See 5b.

5b) Port Ludlow Marina Area

A drive by visit included the church/community center, condos, sewage treatment facility, clubhouse, Inn and marina. Plenty of impervious surface and lots of uneven terrain and slopes. Some stormdrains, although they do not show on our map layer for this area. There is a large lagoon in the area with a waterfall. Unknown where the water is from or why it is there.

We know that County Health has not done any testing in the area but plans to do so next year. The culverts are not shown on the County map for the marina and resort area.

The marina is a Shore Steward although our contacts are not there any longer. PLA was very interested before in doing LID but that person is no longer there.

Ranking for all of North Ludlow area: Reserved. This area will be a big undertaking. Ranking may depend on other priorities.

Drains to Marine:	Y probably
Impervious surface:	Y lots
Potential WQ problems:	unknown
Available space for BMP:	Y, probably somewhere in marina area

Action:
Contact Port Ludlow Associates and offer to visit to discuss WQ.
Wait until County Health first to see what their timeline is.

Cape George, Discovery Bay, Gardiner, Diamond Point

Date: 11/20/15, 2pm - 5pm
Staff: Bob Simmons, Darcy McNamara
Note: Visit was after a large storm event on 11/16-18.

6. Cape George

6a) Marina area

Heavy equipment was building up armoring along the shoreline from the Marina to the forested land to the north during our site visit. They were using grapefruit sized rocks and some logs that didn't appear to be anchored. We were not able to see any outfalls but they may have been at the bottom of a large ravine where it didn't appear to have room for a rain garden.

Ranking:	Low
Drains to Marine:	Maybe
Impervious surface:	Y
Potential WQ problems:	unknown – but likely from septic if any
Available space for BMP:	Unlikely

Action: No further action

6b) "Members Only" Park

A small park on the waterfront along Coleman Rd. conveys stormwater and intermittent (likely) streamwater in subterranean pipes from a very large ravine and nearby, very steep roads. There are 2 outfalls directly to marine waters – a large concrete pipe and a smaller green plastic pipe. We determined the concrete one took runoff from the ravine conveying the water that likely used to flow above ground in the ravine. A tightline that comes from the upper part of Coleman Drive discharges into this pipe about 300' up the ravine from the road crossing. This is a high volume system as evidenced by the number of catch basins in the ravine (4-5), amount of rock armoring they had (although some may have been decorative, erosion in the area where the water jumped the drain pipe (or overflowed it) and the signs that heavy equipment had recently been in the area cleaning a catchbasin of muddy grapefruit sized rocks. The plastic pipe appeared to take runoff from Colman Rd. at the park intersection.

Water coming from the 2 pipes was clear and running. An earlier site visit this summer showed foamy water that appeared to be of poor water quality. There is room for a rain garden in the park, however pipes would have to be dug up and redirected to intercept the stormwater into a bioretention facility. Flow from the stormdrains at the park/Coleman Rd intersection is likely the best candidate for a simple bioretention system. Flow is too high in the flow from the ravine for a simple bioretention system, however there is also a possibility for a rain garden to intercept the water from the upper part of Coleman road, just before it enters the pipe that conveys stormwater into the ravine.
Cape George is a private development, it is unknown if they or the County would be interested in pursuing a project.

Ranking	Med
Drains to Marine:	Y
Impervious surface:	Y
Potential WQ problems:	Unknown
Available space for BMP:	Yes, likely

Action:
Confirm any County Health WQ testing. If this site is ranked high, contact Cape George facilities manager for next steps.

7. Beckett Point

Area has homes on a spit of land. They are quite crowded. There is a lagoon in the center of the spit with culverts under the road. The culvert does not likely connect the marine water and the lagoon. The area probably drains quite well, being on sand. The surface water is diffuse for the most part.

Ranking:	Low
Drains to Marine:	Maybe
Impervious surface:	Y – but low and well draining
Potential WQ problems:	unknown – but likely from septic if any
Available space for BMP:	Unlikely

Action: No further action

8. Adelma Beach

Rural area, low density with lots of native cover. Very low concern for this area.

Ranking:	Low
Drains to Marine:	Maybe
Impervious surface:	Little
Potential WQ problems:	Unknown – but likely from septic if any
Available space for BMP:	N

Action: No further action

9. Base of Discovery Bay

9a) Fat Smitty's Restaurant

Parking area takes runoff from the highway where is appears to collect in the middle and runs off to each side of the parking lot and off into bushes. No catchbasins were seen. Snow Creek runs in a ravine at the east end of the parking lot and under the highway to the marine water. Runoff does not drain straight to the creek due to a rise at the end of the pavement. Water head south under a very old moss covered car and into dense vegetation near an old shed. It likely soaks in before getting to the creek, but we couldn't tell for sure. There is no location for rain garden unless car and building were removed.

Ranking: Low
Drains to Marine: Maybe to Snow Creek the to marine
Impervious surface: Y
Potential WQ problems: Unknown
Available space for BMP: No

Action: No further action

9b) Store Road

Store Rd is a short stretch of road parallel to the highway behind a few stores. There is a culvert conveying water from one side of the road to the other and into a well vegetated swale with water and cattails.

Ranking: Low
Drains to Marine: N
Impervious surface: Y
Potential WQ problems: Unknown – but swale appeared to function
Available space for BMP: No

Action: No further action

10. Worldmark Resort

This is a high density group of condos type buildings with roads connecting them on a very steep hillside below Highway 101. Nearly the entire area is paved or buildings. The best BMP for this area is permeable pavement, the cost of which would likely fall entirely on the resort owner. We did not see any outfalls, but are likely some, since there are storm drains in the parking areas (unless they used dry wells).

Ranking: Low
Drains to Marine: Likely but not observed
Impervious surface: Y - lots
Potential WQ problems: Unknown
Available space for BMP: Pervious pavement would be the best choice, but very costly and would be difficult to remove old in the tight location.

Action: No further action

11. Diamond Point

11a) Diamond Point along Beach Drive

Area is similar to Beckett Point, except the buildings are larger and there are more roads. Surface runoff is likely diffuse, but does concentrate and run along the roads. Did not see any marine outfalls, there may be some that drain to the marsh area in the lower portion of the community.

Ranking: Low
Drains to Marine: Not observed
Impervious surface: Y
Potential WQ problems: Unknown – in Clallam County

Available space for BMP: Perhaps on a vacant lot.
Action: No further action

11b) Miller State Park

This is a new State Park with a small parking lot and loop driveway. There are a couple areas not paved in the parking lot that will likely be planted later but were filled with water during our stop. There was water in the depressions at the entrance and also a ditch had recently been dug at the back of the parking lot to drain water.

Ranking:	Low
Drains to Marine:	Not much possibility due to distance from surface waters
Impervious surface:	Y, but not a lot
Potential WQ problems:	Unknown, Clallam County
Available space for BMP:	Perhaps in the areas within the new parking lot

Action: No further action

Port Townsend

Port Townsend ranks high for retrofitting with bioretention. Potential water quality contamination due to the amount of impervious surface, dense development, and higher traffic on the roads. There are already numerous rain gardens in the downtown area on the north end of town around City Hall. However, there is limited opportunity to provide additional treatment in the downtown area due to lack of space.

The following sites, which have been tested for water quality by Jefferson County Environment Health and found to have some level of *E. coli* present, were discussed in a meeting with WSU Staff (Bob Simmons and Darcy McNamara) and City Staff (John Merchant, Brandon Maxwell, Samantha Trone, and Dave Zellar).

Waterfront sites with water quality problems that lacked the space for a retrofit bioretention BMP are:

- Sea J's – flows out under building which is on pilings.
- Rotary Park near Ferry next to US Bank – only drains small park – Unknown why such high numbers were found. Lacks space for bioretention.
- Quincy St. - no room; look for opportunities at the source.
- Monroe Street Pipe outfall - no room; look for opportunities at the source.
- New Day Fishery/Aladdin Motel – backup inside sewer, which likely led to high numbers in the county testing; problem has been fixed; - unlikely there is room for BMP.

Sites with potential on the Jefferson County list were:

- Kah Tai area with Kearney St.
- Clay and Franklin Streets which drain to Monroe St outfall.
- Blaine St which drains to Monroe St outfall.
- Washington St. which drains to Gaines St outfall.

Other notes:

1. Jefferson Street “flows like a river” down to Quincy St outfall.

2. There is an above ground pipe in the Franklin St ROW between Madison and Monroe (behind the condos above the field), that takes water from Franklin and the uptown area.
3. City had to add an overflow basin to the rain garden by the Hair Salon/Soak near the skate park due to high flows in that area.
4. There are NO CSO's in PT. There was one at Gaines, but it was removed. There are inputs of stormwater flow into the sewer system, however the flows do not seem to overwhelm the system to cause treatment plant overflows at this point. The city would like to remove these tie-ins however.
5. Main Street organization maintains the downtown rain gardens as part of their responsibilities for receiving B&O funds.
6. People would like a plant list for local rain gardens.
7. Downtown doesn't have much room for additional rain gardens.
8. There are 5 filters at Blaine and Tyler with perlite that are changed periodically.
9. Palace Hotel – gull poop is washed off sidewalks and into storm outfall. Smell sometimes reported on beach is likely from stagnant water and decaying vegetation.
10. Admiralty Apts. has an outfall pipe sticking out of building.
11. There are sump pumps in the old Town Tavern and Waterman Katz buildings to help keep the water table under the buildings down and avoid flooding the basements. The water is pumped into the Quincy outfall.
12. Courthouse & Walker –water flows down to Gaines St. but John doesn't think a there is space for a rain garden near the tennis courts – It would have to go uphill – but the ROW is large – 73 feet.

12. Port Townsend Site Visits

Two site visits were conducted after a meeting with John Merchant, City of Port Townsend Public Works. *Additional site visits were also conducted by Bob Simmons during rainfall events in December.*
Date: 11/25/2015 1:30pm – 4:30pm
Staff: Bob Simmons, Darcy McNamara and Samatha Trone and Brandon Maxwell, City of PT.

12a) Clay and Franklin Streets between Tyler and Madison

This area is relatively flat. Removing contaminants from the system here will help the Monroe St. outfall or the Quincy St outfall. Right-of-ways appear wide and they are used, heavily in some places, for parking – especially during Farmer's Market and festivals. There were a number of locations that looked promising – although the soils are on the clay side. The ROW's are 73 feet.
Bob Simmons conducted additional site visits and three areas were identified as having space for a rain garden and capturing flow:

- **12a1 Community Center**: area south of the Community Center along west side of Taylor St. between Clay and Franklin appears to capture flow from parking areas and street that would contain more contaminants than other areas due to traffic/parking volume. There is space, although some overflow parking could be lost along Taylor. Flow goes to Quincy St outfall.
- **12a2 Marine View Apts North**: Area on the north side of the Marine View Apartments between Quincy and Madison on the north side of Clay. Flow goes to Monroe St outfall.
- **12a3 Marine View Apts South**: Area on the south side of the Marine View Apartments between Quincy and Madison along the north side of Franklin. Flow goes to Monroe St outfall.

Ranking:	High
Drains to Marine:	Y
Impervious surface:	Y
Potential WQ problems:	Likely
Available space for BMP:	Y

Action: Map areas that drain to each catchbasin and map the entire area and place rain gardens for each area. Ideally identify locations that would capture all of the run off in PT Basin 12 near the sources.

12b) Kah Tai along Kearney Street

Water flows off the hillside (Lawrence and uptown streets feeding in), and crosses Kearney into a swale along Kearney and Kah Tai park area. The area overflows in heavy storm events and flows back onto Kearney Street into the storm drain, which eventually gets pumped via a stormwater pump station at Kearney and Washington with a capacity of approximately 600 gallons a minute which discharges out into Port Townsend Bay. There is a small wetland that must be avoided, but it appears there is plenty of room for a rain garden or expansion of current infiltration area. Audubon has expressed interest in increasing the wetland area for bird habitat.

Ranking:	High
Drains to Marine:	Yes in heavy storm events
Impervious surface:	Y
Potential WQ problems:	Y -
Available space for BMP:	Y – owned by City of Port Townsend

Action: Recommend moving to design. Shoreline and critical area ordinances may come into play.

Site visits to the following locations were conducted by Bob Simmons in December 2015 after meeting with City staff.

12c) Courthouse

Water flows down Washington and under Sims to the Lighthouse Plaza and into the bay at Gaines St outfall. We believe this is PT 19 as identified by Michael Dawson who describes this as a 20" outfall with high *E. coli* hits in 3 samples during 2013-14. There is space on the corner of Walker and Washington Streets in a field associated with the Courthouse where water could be intercepted for a bioretention facility.

Ranking:	High
Drains to Marine:	Yes
Impervious surface:	Y
Potential WQ problems:	Y – sampling has indicated high hits in past at the Gaines St outfall
Available space for BMP:	Y – public ownership

Action: Discuss location with City and County.

12d) Quincy and Foster

Site is near top of Morgan Hill. Located in City of PT basin 13. The flow path was assessed during storm events in December. Water flows down Quincy along Sather Park, then on down Quincy towards Taft St. During a moderate rainfall in fairly saturated conditions, it was not reaching Taft, showing that it infiltrated along the way. In heavier rainfall it would reach Taft, picking up other uphill

side streets and continues to Tyler St. stormdrains. These drains lead to the perlite stormwater treatment vault on Blaine St (and Tyler St) and then flows along the north side of Blaine to Monroe Street via a concrete gutter with the outfall eventually being the 30 inch discharge pipe at the Maritime Center. Further on down the flow path that drainage picks up flow from other streets and heads down to Tyler, which brings it to Blaine – running down along the NW side of the road through culverts and open road ditches.

Linda Smith, is a good contact with knowledge and history of flows and reports significant flows in the area: Quincy has the largest flow. Another possibility is one block north of on Quincy at Root -the lower corner of the City's old unused reservoir. Root does not exist on that side of the street. All the property belongs to the city. It may be a less complicated rain garden and catch the water one block north. But only from Quincy.

Ranking:	Low
Drains to Marine:	Y
Impervious surface:	Y
Potential WQ problems:	Y
Available space for BMP:	Y – City land or private owner

Action: Discuss location with City. Walk site with neighbor to learn more.

12e) Chetzemoka Park

Water enters the park off Roosevelt on the north side of the park from the southeast side of Morgan Hill including Clallam, Jackson and Monroe Streets. Water flows across the park and over the bluff. It is unknown if the outfall includes a tightline or is just flowing over the bank through thick vegetation. Located in City of PT basin 13.

Ranking:	High
Drains to Marine:	Yes
Impervious surface:	Y
Potential WQ problems:	Likely
Available space for BMP:	Y – City Park and private

Action: Neighbors interested in rain garden. Assist them if they pursue.

12f) Blaine and Madison

Runoff could be captured in a vacant lot on the north side of Blaine Street at the corner of Madison before it enters the Monroe St stormwater outfall on the bay. There is heavy flow from Morgan Hill.

Ranking:	High
Drains to Marine:	Yes
Impervious surface:	Y
Potential WQ problems:	Y
Available space for BMP:	Y – unknown ownership

Action: Determine ownership. Discuss location with City.

Hood Canal

Date: 11/30/2015 11am - 5pm
Staff: Bob Simmons, Darcy McNamara

13. Brinnon Area

13a) Canal View Neighborhood

This area has low density, dispersed rural development. It is forested and very hilly with a small flat floodplain area along the Duckabush River. Access is via Canal View and off Duckabush Rd off Hwy 101. The Duckabush River had recently flooded as evidenced by mud and dirt on the road and trees. Homes in the floodplain are almost all elevated. There is a high volume of water as evidenced by deep ditches and ravines in the hilly area. There are very few lawns or landscaping, especially in the hills. There is a logging operation and recent clear cut near Elk Road and Mountain Trail Road near the top of the hilled development. Canal Lane is across Hwy 101, directly on Hood Canal. There are perhaps a dozen homes along the waterfront and in the woods. It would be difficult to locate a spot to install a BMP, especially due to the terrain and the floodplain. The need for retrofit appears low and it appears that infiltration is high.

Ranking:	Low
Drains to Marine:	Via Duckabush River
Impervious surface:	Low
Potential WQ problems:	Unlikely (except for septic related issues)
Available space for BMP:	Y

Action: No action.

13b) Pleasant Harbor

Pleasant Harbor is similar to Worldmark in that both have narrow winding paved roads on steep hillsides. There are fewer buildings (no condos) at Pleasant Harbor and the areas not paved are left in native vegetation. The marina can hold up to 285 vessels. There is a pump station onsite. There is not a boat launch. There are sewer manhole covers near the water that look new. There is a large resort planned for the area. There isn't room or need now for rain gardens, but there could be if the resort gets off the ground.

Ranking:	Low – but may be high if resort is built
Drains to Marine:	Y
Impervious surface:	Low
Potential WQ problems:	Looks well managed
Available space for BMP:	N - except for permeable pavement options

Action: No action. Watch for opportunity if resort is built.

13c) Appalosa Neighborhood

Area of low density, dispersed rural residential development approximately 2 miles from Hood Canal on the Dosewallips River. Area is similar to Canal View, forested and hilly, with homes in the floodplain. There is evidence of recent flooding. Homes were not elevated for the most part. The need

for retrofit appears low, since concentrated flow areas into the river were not noticed and it appears that infiltration is high.

Ranking:	Low
Drains to Marine:	Via Dosewallips River
Impervious surface:	Low
Potential WQ problems:	Low
Available space for BMP:	N

Action: No action. Watch for opportunity if resort is built.

13d) Brinnon

The commercial area in Brinnon is a mix of buildings, paved and gravel parking lots, and vacant lots. We did not observe any direct outfalls. The Dosewallips River runs east/west on the south side of the town and the Dosewallips State Park is on the south side of the river. The State Park and another location – the Community Center on the north end of town were selected for the design phase of the Hood Canal Retrofit Project. Highway 101 runs between Brinnon and the Hood Canal. There are likely water quality issues from vehicle traffic, but surface water appears to disperse and infiltrate. There were no obvious areas that appeared to be good locations for BMPs. A more comprehensive study of the area would be necessary to select and rank locations.

Ranking:	Low
Drains to Marine:	Via Dosewallips River
Impervious surface:	Y
Potential WQ problems:	Y
Available space for BMP:	N

Action: No action.

13e) Brinnon Boat Launch

This boat launch, located off Hjelvick Rd, appears to be private. It has a gravel road and parking area. There were no obvious outfalls. While there is room for BMP the need appears to be low. The Yelvick General Store appears to be out of business. There is a large parking lot and building adjacent to a lagoon. If this business were in operation there could be opportunity

Ranking:	Low
Drains to Marine:	Y
Impervious surface:	Gravel
Potential WQ problems:	Low
Available space for BMP:	Y

Action: No action.

14. Herb Beck Marina

The Herb Beck Marina and Coast Shellfish are located at the end of Linger Longer Road. The marina is owned by the Port of Port Townsend and has 50 slips. There is also a boat launch, restroom, and hazardous waste station. There is a swimming raft in the summer and the park area is well used.

There are storm drains near Coast Shellfish but the remaining area toward the marina area is likely sheetflow. Coast Shellfish hatches 45 billion oyster larvae a year (extracted 12/1/2015 from coastseafoods.com).

Ranking:	High
Drains to Marine:	Y
Impervious surface:	Y
Potential WQ problems:	Likely
Available space for BMP:	Y - likely

Action: Contact Port about available space.

15. Quilcene

While there is a lot of pavement and traffic in and around Quilcene, we couldn't determine a location where stormwater drained to marine water. Similar to Brinnon, additional study would be needed to determine hotspots and opportunities.

Ranking:	Low
Drains to Marine:	Unsure, not obvious
Impervious surface:	Y
Potential WQ problems:	Unknown
Available space for BMP:	Likely

Action: No action.

Other Areas Visited

16. Paradise Bay

Date: 11/30/2015 11am - 5pm
Staff: Bob Simmons, Darcy McNamara

This community is along Oak Bay Road between Port Ludlow and Hwy 104. It appears to be a private development. It is similar in density to the South Ludlow area but with fewer trees or native vegetation. It is on a hillside above the water and there are deep drainage ditches. An outfall was noted that drains the road and homes above. Water could be heard but not seen in dense vegetation outfalling to riprap along the shoreline. There did not appear to be room for a BMP.

Ranking:	Med
Drains to Marine:	Y
Impervious surface:	Y
Potential WQ problems:	Unknown
Available space for BMP:	Unlikely

Action: No action.

17. Chimacum High School

Date: 11/30/2015 (and subsequently during rainfall events)
Staff: Bob Simmons, Darcy McNamara

There is a large settling pond at the entrance to the high school that appears to take up all of the runoff from the parking area. It is unknown if there are bio-retention based filtering soils in the pond. There doesn't appear to be an outflow. It could be possible to upgrade this facility to a higher standard to improve bio-filtration – if needed. There is a high educational value to this site as it is very visible. Runoff from this site does not reach surface waters, except perhaps in very extreme rainfall events. Site ranked high in the Hood Canal Retrofit Project but wasn't selected for design because of a staff change at the school. The area was revisited during moderate and moderately high rainfall events and the stormwater pond was infiltrating the runoff well.

Ranking:	Low
Drains to Marine:	N
Impervious surface:	Y
Potential WQ problems:	Y
Available space for BMP:	Y

Action: Check with school facility manager for plans of the pond.

18a. Fort Worden Pier
Date: Various dates 11/2015
Staff: Bob Simmons, Darcy McNamara

Water collects at the bottom of the hill coming down to the beach. The water collects at the edge of the pier, overflows around the pier and into the parking lot where is settled into 2 parking spaces. During heavy storms it has been observed to overflow the parking stalls and would enter marine water at high tide. There is a grassy area between the 2 parking stalls that could be used for a BMP, there is also one at the bottom of the hill on the right side before the pier. The boat launch is not operating now and won't until state permits are renewed.

Ranking:	Med High
Drains to Marine:	Y
Impervious surface:	Y
Potential WQ problems:	Y – assumed from vehicle traffic
Available space for BMP:	Y

Action: Explore further with State Parks and PTMSC.

18b. Fort Worden area

Waiting for old maps of stormdrains to determine if there is further need for analysis. There is some concern about drainage that may be flowing to Chinese Gardens.

Appendix C – ***Hood Canal Retrofit Project*****:** *Jefferson County Highlights*

The following locations were identified and prioritized by Herrera Environmental Consultants in 2014 for the Hood Canal Coordinating Council (HCCC). Full analysis is available in the *Hood Canal Regional Stormwater Retrofit Project* report. The following are the geographic areas, candidate sites, top candidates and final selected sites for Jefferson County. Figure 2 shows priority areas.

Geographic Areas Identified for Retrofit Opportunities

#	Geographic Area
J1	Area encompassing Brinnon and extending to Duckabush
J2	Port Ludlow southeast to Bywater Bay
J2.1	Area southeast of Port Ludlow
J3	Port Hadlock
J4	Chimacum area south of Port Townsend

Source: Table 1 Draft Hood Canal Regional Stormwater Retrofit Project, March 2014.

Retrofit Candidate Sites

#	Site Name	Shallow Infiltration Feasibility*	Deep Infiltration Feasibility**
32	Brinnon Parking Boat Launch	Fair	Unlikely
33	Real Estate Agent in Brinnon	Underdrain	Possible
34	State Park - Dosewallip	Fair	Unlikely
35	Geo Duck Restaurant	Fair	Unlikely
36	Brinnon Community Center	Fair	Unlikely
37	Port Ludlow Center & Chevron	Underdrain	Possible
38	Port Ludlow Place (Commercial)	Good	Possible
39	Port Ludlow Marina Parking	Fair	Unlikely
40	QFC Port Hadlock	Good	Possible
41	Post Office Port Hadlock	Good	Possible
42	Christie Road Apts & MH Park	Good	Possible
43	True Value Hadlock	Good	Possible
44	Jefferson County Library	Good	Possible
45	Chimacum Creek Primary School	Good	Possible
46	Sign Station	Good	Possible
47	Carl's Building Supply	Good	Possible
48	East Jefferson Baseball Fields	Fair	Unlikely
49	Chimacum High School	Good	Possible

Source: Table 2 Draft Hood Canal Regional Stormwater Retrofit Project, March 2014.

Top candidates in Hood Canal Action Area

Site #	Site Name	Score
36	Brinnon Community Center	25
49	Chimacum High School	21
34	Dosewallips State Park	21
63	Appaloosa Neighborhood	20
47	Carl's Building Supply	19
66	Port Ludlow Neighborhood	17
64	Brinnon Ln Neighborhood	16
40	QFC Port Hadlock	16
65	Canal View Neighborhood	15

Source: Table 3 Draft Hood Canal Regional Stormwater Retrofit Project, March 2014.

Final sites selections receiving preliminary site design:

- Brinnon Community Center
- Dosewallips State Park

The reasons for not selecting high ranking sites included high cost, inability to fund projects on private property, potential lack of landowner willingness and lack of funding potential including:

- Chimacum High School was not selected in the County's final consideration because the contact person at the school retired and a new contact person was not in place at a time when input was needed for this study to confirm some important issues to warrant moving forward with planning a retrofit on the school grounds.
- Carl's Building Supply and/or other private property sites were not selected because no clear funding source is available to fund retrofits on private property in Jefferson County. This situation would require the property owner to advance the project according to their willingness to fund and implement the design.
- The Port Ludlow Neighborhood site was not selected for retrofit predesign work due to high costs, the time needed to coordinate revisions to an existing storm drainage plan for the area, and the time and cost potentially needed for plat revisions to create space for retrofit facilities.

Figure 2: HCCC Project Area and priority areas identified for stormwater retrofits for the Hood Canal Action Area. For specific project locations see *Herrera*.

Map by Herrera with addition of WRIA boundaries (green) and extension of Action Area boundary (orange).

- *J1 Area encompassing Brinnon and extending to Duckabush*
- *J2 Port Ludlow southeast to Bywater Bay*
- *J2.1 Area southeast of Port Ludlow*
- *J3 Port Hadlock*
- *J4 Chimacum area south of Port Townsend*

Appendix D – Retrofit Site Visit Form

Retrofit Site Visit Form

Community:_____

Site Name/ID: _____Date_____

Contact/Address if any:_____

Surface water drains to marine or fresh water: **Y N** **1 2 3 4 5**
Presence, location, conveyance method, route, discharges to where.
Distance to water

Impervious surfaces: **Y N** **1 2 3 4 5**
Location, amount, type, drainage patterns. Land Use (Commercial / Residential)

Potential or known water quality problem? **Y N** **1 2 3 4 5**
Describe

Available space for BMP: **Y N** **1 2 3 4 5**
Size, location, ROW/ownership, constraints (parking, driveways)

BMP type recommended
Rain garden, swale, ditch, pond, bioretention, media filter, permeable pavement

What do we need to do next? **Total** _____

Use back for sketching area, indicate where photos are taken

Appendix E – Score Sheet Form

Prepared for review and use by JCMRC

Site ID	Site Name	Community	Total Score [1]	Water Quality [2]	Feasibility[3]	Educational Opportunity [4]	Treatment Potential [5]	Maintenance[6]	Local Acceptance [7]	Builds on other projects[8]	Environmental Factors[19]	Rank
				1-10	*1-3*	*1-3*	*1-3*	*1-3*	*1-3*	*1-3*	*1-3*	

Notes

1. Total score is the sum of all criteria with water quality weighted more heavily. Higher score = higher rank.
2. Water quality score using estimated amount and type of pollution and the impact to shellfish. High score = poor quality.
3. Project feasibility based on ease of completing project; available funding, partners.
4. Based on visibility, number of potential viewers, location.
5. Estimated amount of contaminants captured.
6. Ease and cost of maintenance.
7. Ease of completing project based on neighbors, user groups, landowners, other stakeholders.
8. Project builds on other completed or planned projects to treat a basin.
9. Based on benefits expected for shellfish, fish or habitat.