

Northshore Drive, Edgewater Stormwater Improvements
Database ID No. 14-002

Construction Funding Year(s): 2020

Project Narrative:

System upgrades to improve water quality including water quality treatment and addition of check dams to reduce ditch erosion as needed.

Project Status:

Design in 2019 with construction in 2020.

Total Estimated Project Cost: \$620,000



Silver Beach Creek – Phase 1 and 2

Database ID No. 07-095

Construction Funding Year(s): 2021

Project Narrative:

Phase I: Install water quality treatment facility to treat runoff from adjacent subdivision – Design 2020, Construction 2021.

Phase II: Restoration of the main channel of Silver Beach Creek below Hillsdale using natural vegetation. Design 2022, Construction 2024.

Project Status:

Preliminary engineering design is anticipated to begin in 2020 for Phase I with construction to take place in the summer of 2021 during the Lake Whatcom watershed work window.

Total Estimated Project Cost: \$1,160,000



Sudden Valley Database ID No. 13-004

Construction Funding Year(s): 2022

Project Narrative:

Drainage system upgrades including bio-infiltration swales and media filter drains in Sudden Valley.

Project Status:

Preliminary engineering design is anticipated to begin in 2020. Construction will take place in the summer of 2022 during the Lake Whatcom watershed work window.

Total Estimated Project Cost: \$780,000



Lowell Drive and Cedarbrook Court Database ID No. 14-003

Construction Funding Year(s): 2023

Project Narrative:

End of pipe media filtration and natural drainage system improvements.

Project Status:

Design in 2021 with construction in 2023.

Total Estimated Project Cost: \$790,000



Glen Cove Lane and Lakeside Street Database ID No. 15-002

Construction Funding Year(s): 2024

Project Narrative:

System upgrade to improve water quality--bioinfiltration swales, filter vaults, media filter drains, and rain gardens.

Project Status:

Design in 2022 with construction in 2024.

Total Estimated Project Cost: \$620,000



Strawberry Point / Lake Whatcom Boulevard Database ID No. 17-001

Construction Funding Year(s): 2026

Project Narrative:

System upgrades to improve water quality (treatment vaults and bio-infiltration swales).

Project Status:

Design in 2024 with construction in 2026.

Total Estimated Project Cost: \$800,000



Harborview Road Drainage Improvements

Database ID No. 07-217

Construction Funding Year(s): 2020

Project Narrative:

This project involves upsizing the upland drainage system along Harborview Road from the intersection of Birch Bay Lynden Road to Birch Bay Drive, improving drainage along a portion of Birch Bay Drive, and connecting the existing drainage system into a new marine outfall into Birch Bay.

Project Status:

Design will be completed in 2018, permitting in 2019, construction in 2020.

Total Estimated Project Cost: \$1,610,000

Expenditures to Date: \$360,000



Semiahmoo Drive Drainage Improvements - North (BP-2) and South (BP-5) Database ID No. 18-009 & 18-010

Construction Funding Year(s): 2021

Project Narrative:

This project will improve the conveyance system along the east side of Semiahmoo Drive by upsizing pipes and reestablishing/deepening ditches to reduce flooding.

Project Status:

Design is anticipated in 2020 and construction scheduled to take place in 2021.

Total Estimated Project Cost: \$385,000



Lora Lane Drainage & Tide Gate Modifications (TC1-2)

Database ID No. 18-008

Construction Funding Year(s): 2022

Project Narrative:

The project involves replacing the existing flap gate structure with a self-regulating side-hinged tide gate that would aim to improve drainage from the ditch bordering Leisure Park at Lora Lane and improve fish passage. The embankment surrounding the tide gate would be repaired and stabilized and the culvert passing under Birch Bay Drive from the tide gate would be repaired and connected to a stormwater vault east side of Birch Bay Drive, which would allow access for maintenance.

Project Status:

Preliminary engineering design will begin in 2020 and be completed in 2021. Construction is scheduled to take place in 2022.

Total Estimated Project Cost: \$440,000



Holeman Avenue Storm Drain Improvements Database ID No. 07-242

Construction Funding Year(s): 2023

Project Narrative:

The project goal is to reduce roadway flooding on Holeman Avenue by replacing undersized pipe and catch basins and re-establish existing ditch to match pipe invert elevations. This area is particularly sensitive due to the steep, unstable bluff along the shoreline and the concern is that flooding could lead to bluff failure and property damage. This is a critical public safety issue.

Project Status:

Design is anticipated in 2021 and construction scheduled to take place in 2023.

Total Estimated Project Cost: \$255,000



Wooldridge Avenue & Sunset Drive Drainage Improvements (TC-2)

Database ID No. 13-007

Construction Funding Year(s): 2024

Project Narrative:

This project will improve the conveyance system along Wooldridge Avenue, Jackson Road and Sunset Drive by upsizing pipes, installing or replacing catch basins and culverts, reestablishing roadside ditches, installing a water quality filter vault and 100 linear feet of water quality treatment swale.

Project Status:

Design is anticipated in 2022 and construction is scheduled to take place in 2024.

Total Estimated Project Cost:

DOE Water Quality Grant:	\$1,000,000*
BBWARM:	<u>\$220,000</u>
Total:	\$1,220,000

*Unsecured grant funding



Hillsdale Drainage Improvements, Phase 1 (HL-C-1)

Database ID No. 19-002

Construction Funding Year(s): 2025

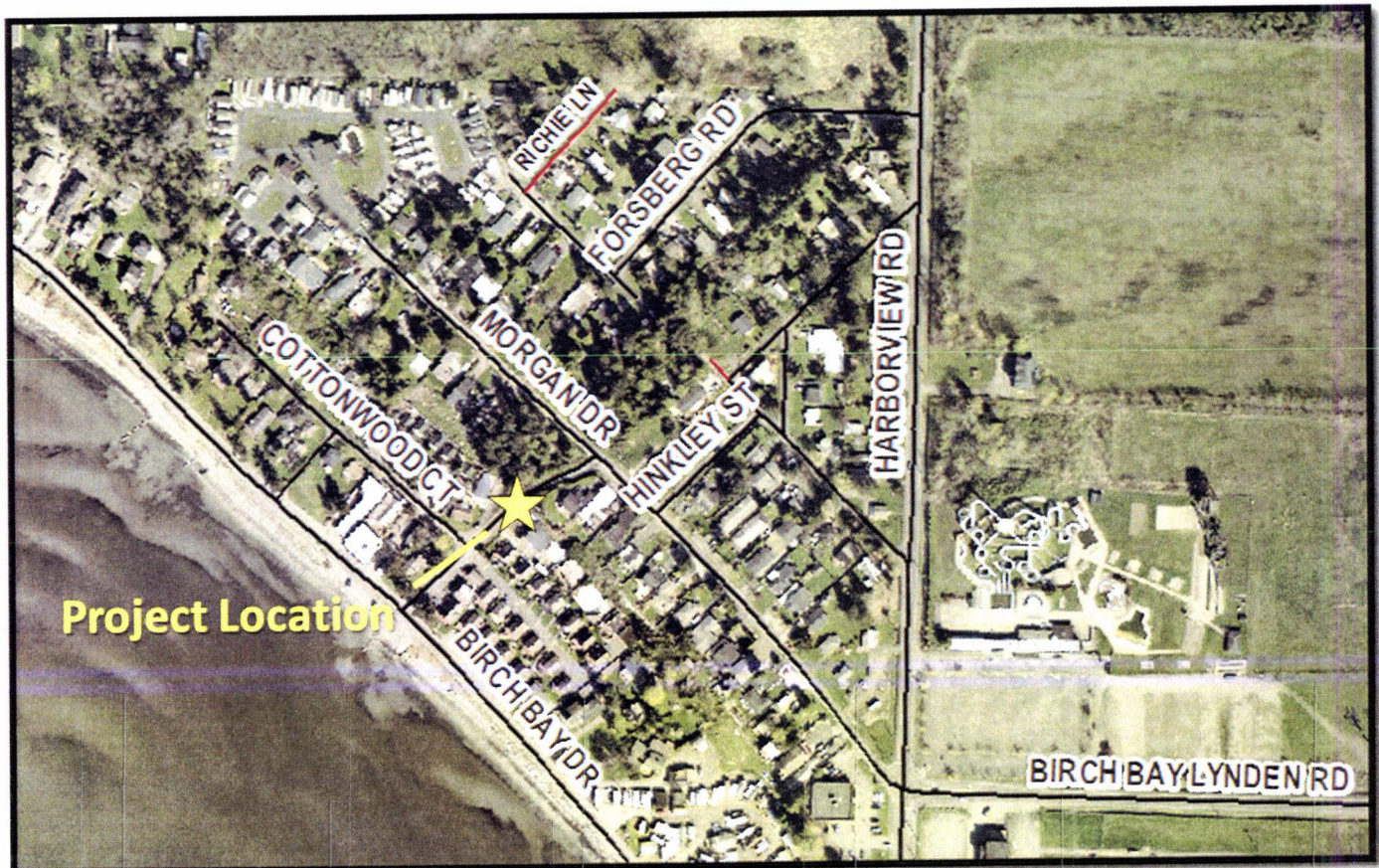
Project Narrative:

This project involves upsizing pipes, replacing catch basins, installing new drain line, and replacing blind tee connections on Morgan, Cottonwood and Birch Bay Drives to reduce flooding and allow for maintenance.

Project Status:

Pre-design was completed in 2014, final design will be completed in 2023 and construction of Phase 1 scheduled to take place in 2025.

Total Estimated Project Cost: \$750,000



Morrison Ave & Terrill Drive Drainage Improvements (TC2-1)

Database ID No. 19-003

Construction Funding Year(s): 2026

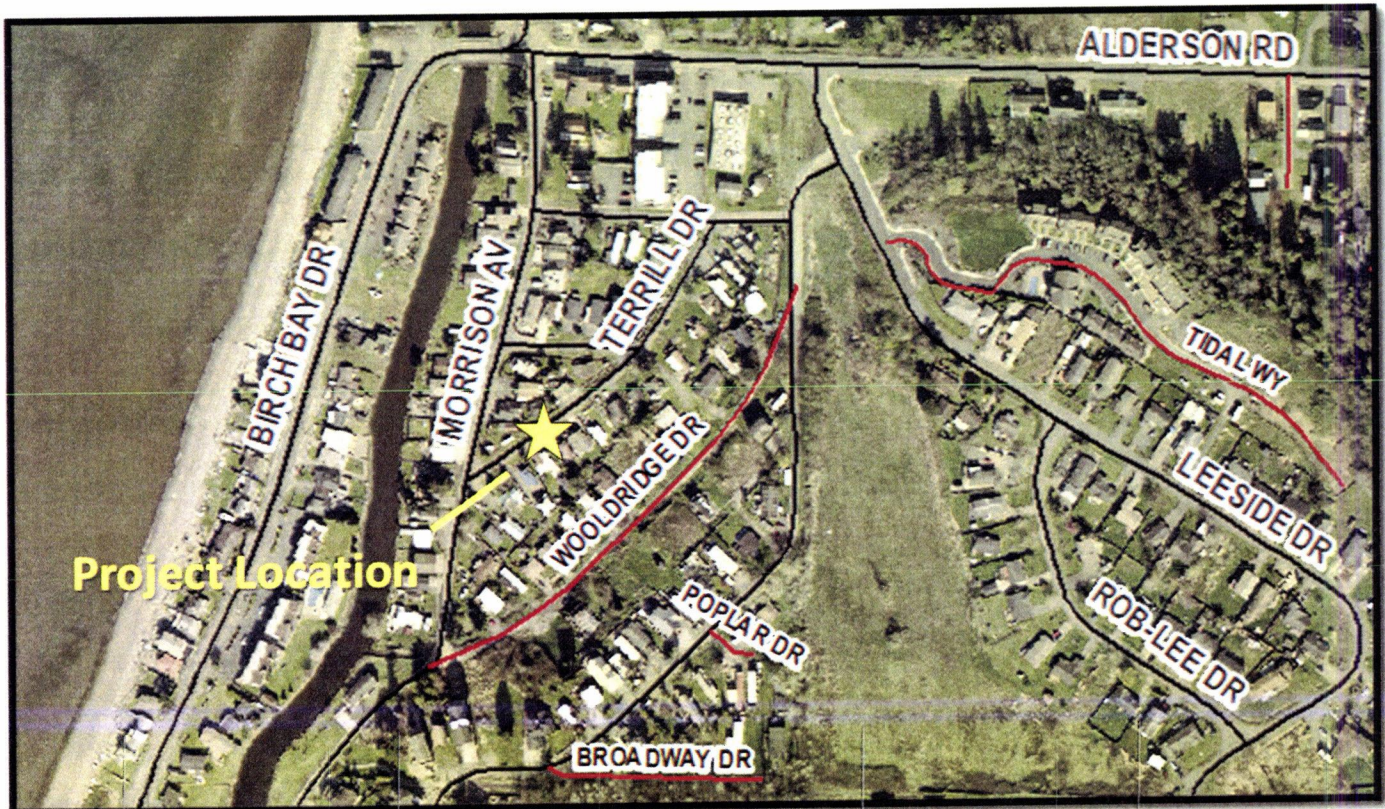
Project Narrative:

This project involves installing new storm drain line on Morrison Ave and Willow Drive, replacing and re-grading the storm drain system at Terrill Drive to reduce flooding and issues due to sediment build-up and subsidence.

Project Status:

Design is anticipated in 2024 and construction in 2026.

Total Estimated Project Cost: \$750,000



Normar Place Drainage Improvements (BP-1) Database ID No. 19-004

Construction Funding Year(s): 2028

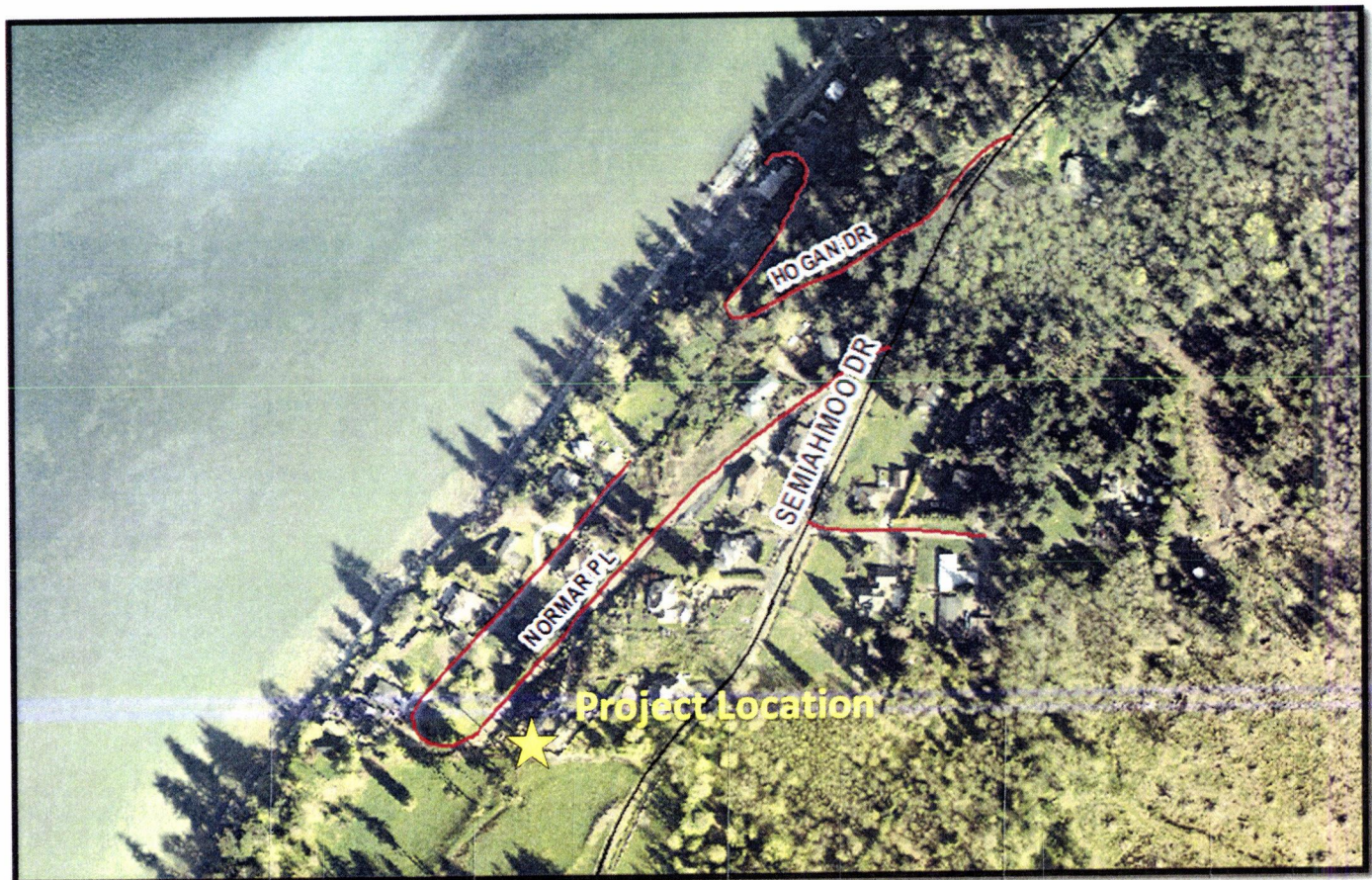
Project Narrative:

This project involves upsizing pipes, replacing catch basins and installing an outfall pipe over the bluff with an energy dissipater at Normar Place to reduce roadway flooding, scour and sediment transport.

Project Status:

Design is anticipated in 2025 and construction in 2028.

Total Estimated Project Cost: \$250,000



Birch Bay Drive and Pedestrian Facility

Database ID No: 07-030

Construction Funding Year(s): 2019-2021

Project Narrative:

This project is located parallel to Birch Bay Drive from Cedar Avenue to the mouth of Terrell Creek. This is an approximate 1.5 mile natural beach berm with pedestrian facility to provide soft-shore erosion protection, habitat enhancement, and encourage pedestrian use along Birch Bay Drive. This multi-beneficial project is included in the Six-Year WRIP to reflect contributions from TAP road funds, STP road funds, WC Road fund, BBWARM, REET, and EDI.

Project Status:

Construction is scheduled to begin 2019 with completion spring of 2021. To lessen impacts to the tourist economy and aquatic habitat issues, the construction window will begin after Labor Day and suspend prior to Memorial Day.

Total Estimated Project Cost:

STP Road	\$2,550,000
TAP Road	\$620,000
WC Road	\$6,785,000
REET	\$745,000
EDI	\$500,000
BBWARM:	<u>\$250,000</u>
Total:	\$11,450,000



Shallow Shore Drive Drainage Improvements Database ID No. 18-007

Construction Funding Year(s): 2022

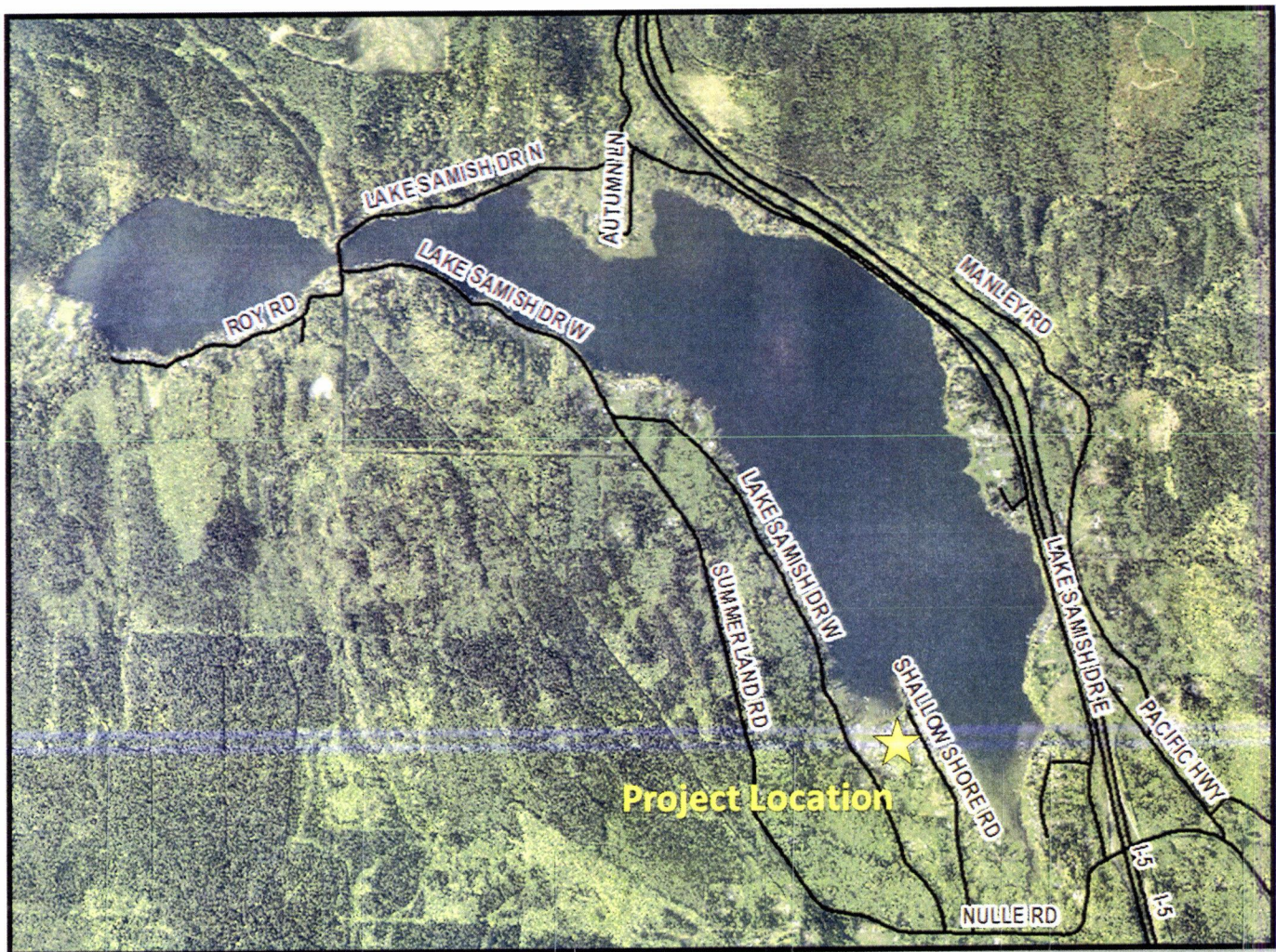
Project Narrative:

This project will improve the conveyance system from Shallow Shore Drive to Lake Samish by relocating the outfall to an existing right-of-way and include water quality treatment.

Project Status:

Design is anticipated in 2020 and construction scheduled to take place in 2022.

Total Estimated Project Cost: \$230,000



Marietta Acquisition Database ID No. 07-002

Construction Funding Year(s): 2001 - Present

Project Narrative:

Acquire residential properties in the frequently-flooded repetitive flood loss area of Marietta. Remove existing structures and restore properties with native vegetation.

Project Status:

Property acquisition began in 2001 and is ongoing. As properties are acquired through tax title sales, purchases are funded with hazard mitigation, habitat restoration grants, and FCZD funding, structures are removed and native vegetation is planted. All acquisitions are voluntary and the project is ongoing as current property owners decide to sell their properties. Estimated project cost includes some funding for cleanup of up to four former gas stations, though the exact nature of the work is still undefined.

Total Estimated Project Cost: \$3,500,000

Expenditures to Date: \$2,180,000



Truck Road Emergency Erosion Protection Database ID No. 18-002

Construction Funding Year(s): 2018-2019

Project Narrative:

The project is located along Truck Road about 0.3 miles easterly from Mt. Baker Highway (SR 542). During high-water events of the 2017/2018 winter, the North Fork Nooksack River eroded the unprotected bank of Truck Road to within 13 feet of the roadway surface. This prompted an emergency proclamation on February 9, 2018, to facilitate the immediate protection of the roadway. Work included construction of a passive (buried) 350 foot long riprap revetment along the riverward edge of the existing roadway. The new revetment ties into an existing revetment located immediately upstream of the project. The work also included placement of two passive habitat structures in the floodplain between the river and the revetment along the downstream 175 foot segment.

Project Status:

Emergency work started on February 16 and was finished on March 12, 2018. The roadway within the construction zone is still not surfaced pending anticipated settling of the roadway. The downstream 175 feet of revetment was fully mitigated by installing the two habitat structures. Mitigation for the upstream 175 feet of revetment will be through a contribution to a habitat restoration project.

Total Estimated Cost:	\$521,000
Expenditures to Date:	\$471,000



Abbott Levee Erosion Protection

Database ID No. 18-005

Construction Funding Year - 2020

Project Narrative:

The project is located along Abbott Road about 1.7 miles east of Hannegan Road. Recent erosion along the Nooksack River has removed a section of riprap that previously protected the land adjacent to the Abbott Road Levee and Abbott Road. Ongoing erosion has reduced the room to construct a passive revetment in front of the levee so interim measures to slow erosion and an emergency response plan will be developed.

Project Status:

The project is currently in the engineering design phase. Construction is planned for summer of 2020 if permits can be secured in time and if a flood fight is not initiated before then.

Total Estimated Cost:	\$535,000
Expenditures to Date:	\$75,000



Red River Levee Stabilization

Database ID No. 16-004

Construction Funding Year(s): 2020

Project Narrative:

The Red River Levee protects portions of the Lummi Reservation, including Haxton Way and other public roadways. The levee is occasionally used as emergency access to and from the Lummi Reservation during floods. Riprap is missing on approximately 200 feet of the levee, and erosion is starting to cause sloughing of the levee prism. These areas need to be repaired for the levee to remain eligible in the Public Law (PL) 84-99 Program.

Project Status:

Detailed design and specifications have been developed and permitting is underway. Construction is planned for 2020, though an interlocal agreement with Lummi Nation who will contract the construction was executed in 2019 (included in previous expenditures amount).

Total Estimated Cost: \$258,000

Expenditures to Date: \$228,000



Construction Funding Year(s):	2021
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The Twin View Levee is located upstream of Everson and provides flood protection to commercial, residential and agricultural properties and a state highway. Widening and backsloping of a 200 foot long section just upstream of the Everson bridge is included in the System-wide Improvement Framework (SWIF) to address deficiencies identified by the US Army Corps of Engineers. Recent inspections identified the upstream 500 ft of levee as deficient as well due to tree stumps in the levee prism.

A conceptual design for the downstream site has been developed as part of the SWIF planning process. Detailed design has not been initiated yet.

Expenditures to Date: \$0



Lynden Levee Improvement Database ID No. 16-003

Construction Funding Year(s): 2021

Project Narrative:

One 24" culvert and one 48" culvert are located less than 50 feet apart providing interior drainage through the Lynden Levee. One of the pipes drains a channel that flows through the City of Lynden's wastewater treatment plant. The levee has overtopped where the culverts are located, damaging the levee backslope and the small berm that separates the drainage channel from a water treatment settling pond. The conceptual design developed as part of the System-wide Improvement Framework (SWIF) planning process includes relocating the treatment plant drainage channel through a forested area further away from the pond, connecting the two drainages, and replacing the two culverts with a single larger fish-passable culvert with a side-hinge flood gate.

Project Status:

Preliminary design of the channel portion of the project is underway by the County; the culvert replacement will be constructed by the USACE as part of a levee rehabilitation project so design and construction needs to be coordinated between the FCZD and the USACE. Currently construction is expected in 2021. Total project cost includes USACE construction direct contribution.

Total Estimated Cost: \$2,000,000

Expenditures to Date: \$50,000



Bertrand Creek Levee Stabilization

Database ID No. 16-005

Construction Funding Year(s): 2022

Project Narrative:

The Bertrand Creek Right and Left Bank Levees are designed to overtop during larger floods, but provide protection to agricultural land during the growing season. The left bank levee has a 250 foot long section where erosion is starting to threaten the levee prism. The right bank levee face is sloughing at three locations with a total length of approximately 250 feet. The levees will have to be repaired to remain eligible for rehabilitation through the Public Law (PL) 84-99 program.

Project Status:

A conceptual design has been developed as part of the System-wide Improvement Framework (SWIF) planning process. Detailed design has not been initiated yet.

Total Estimated Cost: \$190,000

Expenditures to Date: \$0



Jones Creek Debris Flow Protection

Database ID No. 07-105

Construction Funding Year(s):

2021 - 2022

Project Narrative:

Acquire residential properties in the high hazard area of the Jones Creek alluvial fan and construct setback deflection berm to route debris flows around the town of Acme. Project includes potential realignment and bridge improvements at Turkington Road.

Project Status:

Property acquisition began in 2005 and additional properties are being pursued. Preliminary design has been performed for the deflection berm and a preferred alternative for Turkington Road has been selected. Detailed design is underway.

Total Estimated Cost: \$6,636,000

Expenditures to Date: \$1,151,000



Abbott Levee Upstream Tie-In

Database ID No. 16-007

Construction Funding Year(s): 2023

Project Narrative:

The upstream end of the Abbott Levee ties into a small berm along Abbott Road. The berm is narrow, with little erosion protection, and overtops frequently. This project is designed to improve the upstream tie-in by extending and realigning the levee to run under Abbott Road. The improved section will be designed to maintain the overflow as this is an area where floodwaters can access the floodplain with low potential for damage.

Project Status:

A conceptual design has been developed as part of the System-wide Improvement Framework (SWIF) planning process. Detailed design has not been initiated yet.

Total Estimated Cost: \$2,830,000

Expenditures to Date: \$140,000



Neevel Levee Bank Stabilization

Database ID No. 16-008

Construction Funding Year(s): 2023

Project Narrative:

The Neevel Levee provides varying levels of protection to a significant amount of agricultural land. Approximately 250 feet of the levee running along Cougar Creek is over-steepened and experiencing sloughing of the riverward face. A stabilization project incorporating large woody debris at the toe and reducing the slope of the riverward face is proposed in the System-wide Improvement Framework (SWIF) to resolve the deficiency identified by the US Army Corps of Engineers and keep the levee eligible for repair under the Public Law (PL) 84-99 Program.

Project Status:

A conceptual design has been developed as part of the SWIF planning process. Detailed design has not been initiated yet.

Total Estimated Cost: \$190,000

Expenditures to Date: \$0



Devries Levee Improvements

Database ID No. 19-001

Construction Funding Year(s): 2023

Project Narrative:

The Devries Levee provides varying levels of protection to a significant amount of agricultural land. The levee crest is undulating and does not meet standards. Improvements were proposed in the System-wide Improvement Framework (SWIF) to smooth the and widen the levee crest to resolve the deficiency identified by the US Army Corps of Engineers and keep the levee eligible for repair under the Public Law (PL) 84-99 Program.

Project Status:

A conceptual design has been developed as part of the SWIF planning process. Detailed design has not been initiated yet.

Total Estimated Cost: \$250,000

Expenditures to Date: \$0



Upper Hampton Levee Improvements Database ID No. 16-006

Construction Funding Year(s): 2025

Project Narrative:

Several deficiencies were identified by the US Army Corps of Engineers on the Upper Hampton Levee. Improvements to the levee geometry are proposed in two locations and improvement to address seepage is proposed at a third location.

Project Status:

A conceptual design has been developed as part of the System-wide Improvement Framework (SWIF) planning process. Detailed design has not been initiated yet.

Total Estimated Cost: \$700,000

Expenditures to Date: \$0



Ferndale Levee Improvement Project

Database ID No. 07-104

Construction Funding Year(s):

2024 - 2026

Project Narrative:

Two levee segments, one sponsored by the City of Ferndale and one by the FCZD and Diking District #1, provide protection to the three treatment facilities along Ferndale Road. The US Army Corps of Engineers has identified several deficiencies along these two levee segments, including a gap in which super sacks filled with sand have been placed. The 1999 Comprehensive Flood Hazard Management Plan recommended improving these levees to provide 100-year protection to the City and the treatment facilities. The System-wide Improvement Framework (SWIF) also includes this project to address the identified levee deficiencies.

Project Status:

This project has been laid out at the conceptual level only; outside funding will likely be needed to fully implement this project. Preliminary engineering including analysis of design alternatives is being initiated in late 2019.

Total Estimated Design Cost: \$1,175,000

Expenditures to Date: \$0



Glacier-Gallup Creeks Alluvial Fan Restoration

Database ID No. 18-006

Construction Funding Year(s): 2026

Project Narrative:

The Glacier Creek Levee on the left (west) bank of the creek was constructed in the 1960s to prevent overflows into Gallup Creek and damage to State Route (SR) 542. Since construction, the levee has been subject to ongoing damage. Constriction of the Glacier-Gallup channel migration zone (CMZ) has exacerbated aggradation upstream of SR 542 and severely degraded fish habitat. WSDOT replaced the Gallup Creek bridge and is working to construct a new bridge over Glacier Creek and the alluvial fan between the two creeks. The FCZD is developing a project in coordination with WSDOT and is evaluating the feasibility of full or partial removal of levees blocking natural channel migration on the Glacier and Gallup Creeks alluvial fan and construction of a setback levee on Gallup Creek to protect the Community of Glacier.

Project Status:

A feasibility study and alternatives analysis for evaluating levee removal and setback alternatives was initiated in late 2018. Preliminary design of the preferred alternative will be initiated once the preferred alternative is selected. Construction of the levee removal and setback is anticipated to occur concurrently with the Glacier Creek bridge replacement in 2026.

Total Estimated Project Cost: TBD
Expenditures to Date: \$310,000



Floodplain Acquisition Database ID No. 07-002

Acquisition Funding Year(s): 2017- TBD

Project Narrative:

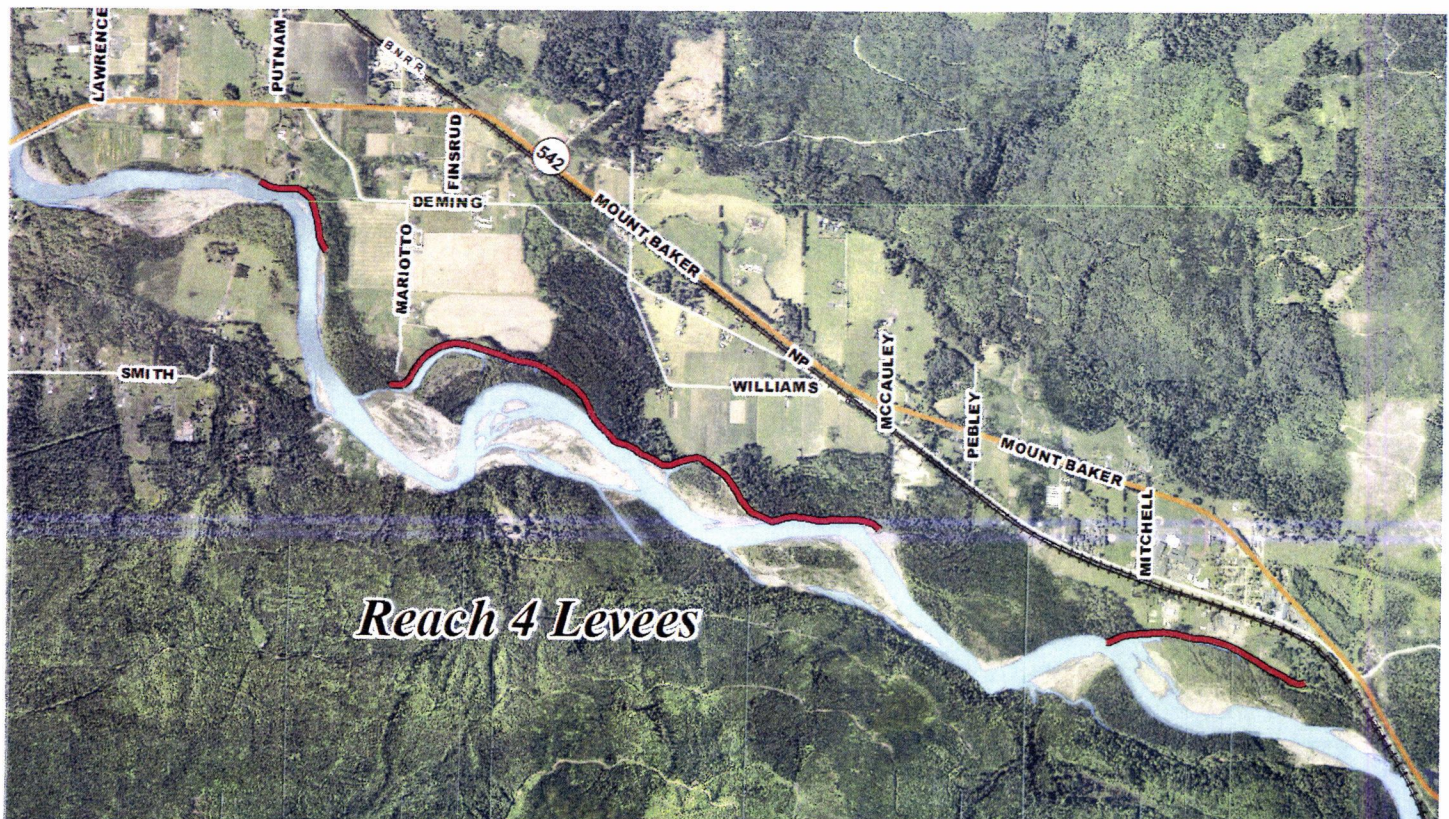
Reach-scale projects to reconfigure flood infrastructure are being evaluated through the integrated planning processes that started with the System-wide Improvement Framework (SWIF) and has transitioned into the Floodplain Integrated Planning (FLIP) process. The goal of this work is to reduce flood risk and expenditures and restore habitat and the processes that form it.

Voluntary acquisition of lands is proposed to enable future levee reconfigurations to reduce flood risk and future levee repairs, while improving habitat.

Project Status:

Three alternative levee configurations in upper Reach 4 were developed as part of the System-wide Improvement Framework (SWIF) planning process. Several of the key landowners are considering selling portions of their properties if funding can be secured and a favorable purchase price can be negotiated.

Total Estimated Cost:	TBD
Expenditures to Date:	\$100,000



Emergency/New Projects
Database ID No. 08-003

Construction Funding Year(s): 2020 - 2025

Project Narrative:

This item provides funding to address unanticipated projects resulting from new damage to flood control facilities.

Project Status:

Design and construction to occur as necessary.

Total Estimated Project Cost: \$425,000

Expenditures to Date: N/A

Due to the nature of this item, no map exists. Board of Supervisors review and prioritization will be sought at the appropriate time.