APPENDIX F

Capital Improvement Program
Project Summary Sheets and Cost Estimates

This Appendix contains CIP Project Summary Sheets and conceptual cost estimates for ten CIP projects. Note that three additional CIP projects (2.23, 2.34, and 2.68) were identified after CIP project development, and are therefore not included in this Appendix.

CIP Project Summary Sheets

City of Sequim
Capital Improvement Program
Project Summary Sheet

Name: Sequim Area Stormwater- Watershed Plan
Site ID: 1.00
Project Priority: Top 10
Estimated Cost: $742,000

PROBLEM SUMMARY

Long history of flooding problems along the Bell Creek Corridor and in western Sequim. Stormwater input via active and abandoned irrigation conveyances adds to flooding across City, and future development may increase flooding in already flooded/ problem areas. It is an opportune time to implement a watershed wide solution while there is still available space to implement projects that will address water quantity and quality. The Plan would address problems 1.02, 1.04, 1.06, 1.07, 1.08, 1.09, 1.10, 2.17, 4.04, and 4.31.

PRIORITIZATION

Prioritization Criteria	Ranking	Justification
Risk	High	Regularly occurring problem with flooding of private and public property, erosion, habitat degradation and water quality impairment. Needs to occur before other projects.
Efficiency	High	Multiple interested stakeholders and multiple benefits if stormwater solution is coupled with irrigation storage solution
Funding Potential	High	Strong candidate for funding through: watershed planning, habitat enhancement, water resource management (storage for irrigation). High potential for cost sharing with County and irrigation district.
Public Sentiment	Moderate-Low	Limited interest from general public
Data Quality	High	Long history of frequent problems and multiple past studies
Overall Priority	**High**	**High risk problem, contender for grant funding and high project efficiency**

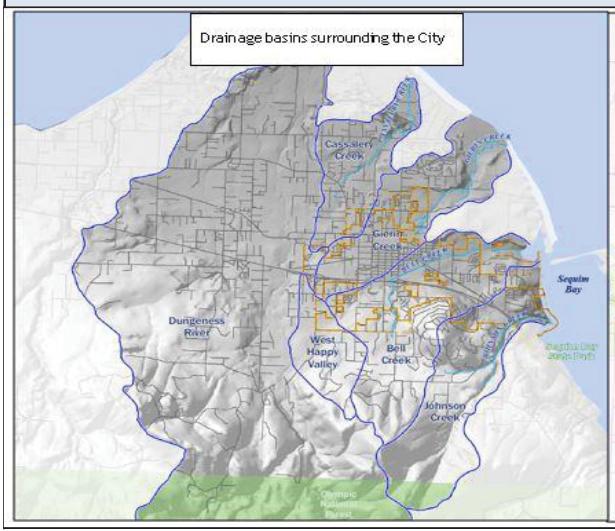
Flooding along Bell Creek at RM 1.55.

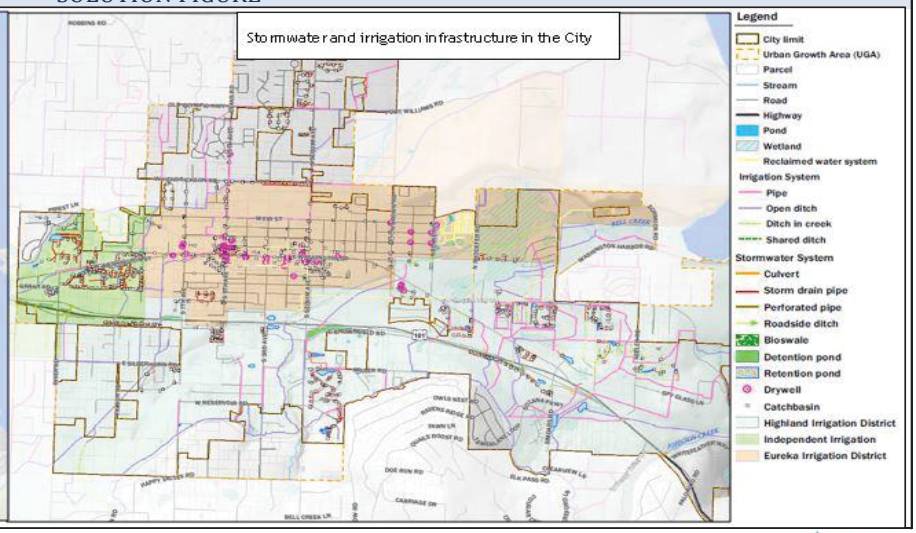
Flooding along Bell Creek at RM 1.8.

PROPOSED SOLUTION

Develop a Sequim Area Stormwater-Watershed Plan (Plan) that identifies a comprehensive strategy for optimizing infiltration opportunities and ensuring adequate surface water conveyance capacity to accommodate future growth, while improving water quality, preserving and enhancing habitat, and recharging groundwater – all in coordination with planning for future development. Irrigation systems and development in Clallam County areas and the UGA upstream of the City has a significant potential to affect flows in Bell Creek; therefore, the County and irrigation purveyors have an important role in developing goals and objectives for the Plan and subsequent projects for implementation. Project scope would include: 1) Confirm goals and objectives of the watershed plan, 2) Develop funding strategy and apply for grants, 3) Existing conditions assessment, 4) Future scenarios development, 5) Hydrologic and hydraulic modeling, 6) Draft and Final Plan, 7) Implementation.

SOLUTION FIGURE





HERRERA

City of Sequim
Capital Improvement Program
Project Summary Sheet

Name: Bell Creek Culvert Upgrade at Blake Ave (RM 1.5)
Site ID: 1.04
Project Priority: Top 10
Estimated Cost: $350,000

PROBLEM SUMMARY

Two culverts along Bell Creek used to convey creek flows under driveway to Carrie Blake Park (off of North Blake Ave.) do not have adequate hydraulic capacity to handle high flows. Flooding has been observed in the park entry and road.

PRIORITIZATION

Prioritization Criteria	Ranking	Justification
Risk	High	Occasionally (every 2 or 3 years) floods residential street and entrance to public park
Efficiency	Low	No known concurrent projects planned
Funding Potential	Moderate	Removal of fish passage barrier may be eligible for grant funding
Public Sentiment	Moderate	No current complaints but highly visible location next to park
Data Quality	Moderate	Risk well understood, but Sequim Area Stormwater- Watershed Plan recommendations unknown
Overall Priority	**High**	**Well documented high risk that may be grant eligible, located at downstream end of Bell Creek**

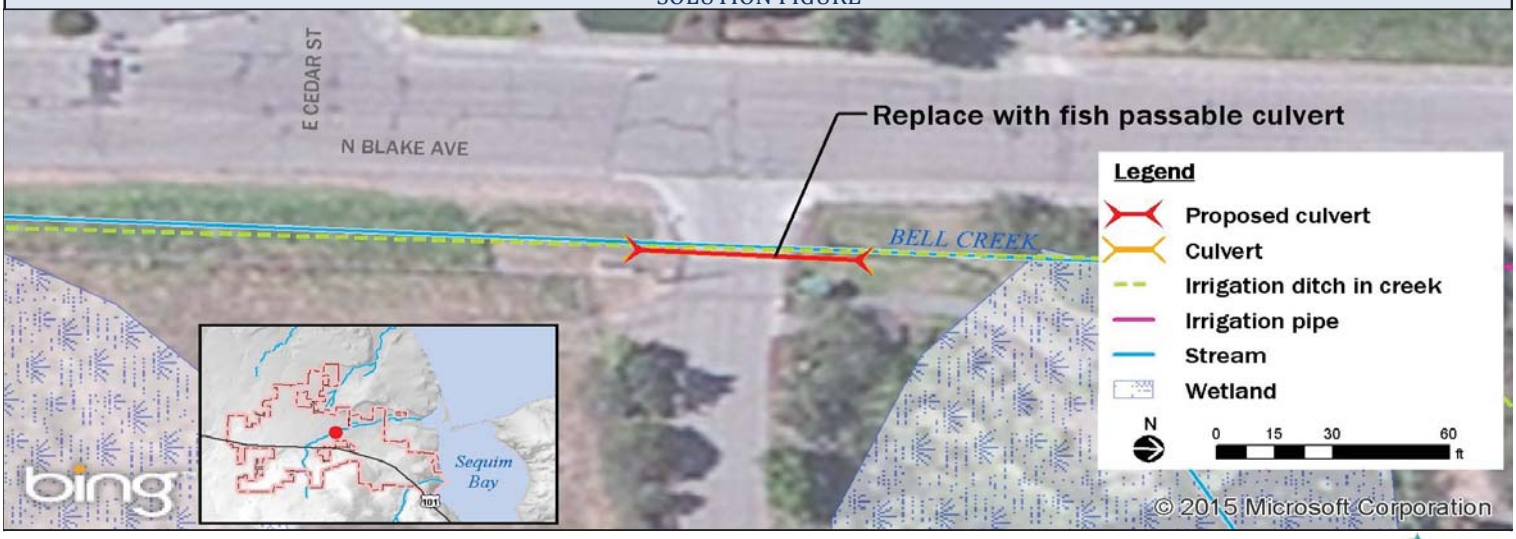
Double culvert under entrance to park facing downstream

Double culvert under entrance to park facing upstream

PROPOSED SOLUTION

Evaluate culvert as part of 1.00 (Sequim Area Stormwater- Watershed Plan) implementation. Replace existing 42" wide x 26" high and 40" wide x 28" high culvert with fish passable culvert. Cost estimate assumptions: Remove existing culverts. Install 30 LF± of new 12ft wide x 5ft high box culvert. Armor inlet and outlet. Remove and replace concrete driveway entrance.

SOLUTION FIGURE



HERRERA

City of Sequim
Capital Improvement Program
Project Summary Sheet

Name: Bell Creek Culvert Upgrade at Washington (RM 1.8)
Site ID: 1.07
Project Priority: Top 10
Estimated Cost: $980,000

PROBLEM SUMMARY

Existing culvert downstream of Culvert 1.08 along Bell Creek does not have adequate capacity and the roadway at intersection of S Brown and E Washington Streets floods during high flow events. Culvert starts out heading north, angles NE under E Washington and S Brown Intersection, then joins and 128 inch wide x 83 inch high culvert under Les Schwab driveway.

PRIORITIZATION

Prioritization Criteria	Ranking	Justification
Risk	High	Annually floods arterial street and driveways to businesses
Efficiency	Low	Possible implementation with South Brown improvements
Funding Potential	Moderate	Removal of documented fish passage barrier may be eligible for grant funding
Public Sentiment	High	Strong public opinion that this is an important problem
Data Quality	Moderate	Risk well understood, but Sequim Area Stormwater-Watershed Plan recommendations unknown
Overall Priority	**High-Moderate**	**Well documented high risk that may be grant eligible**

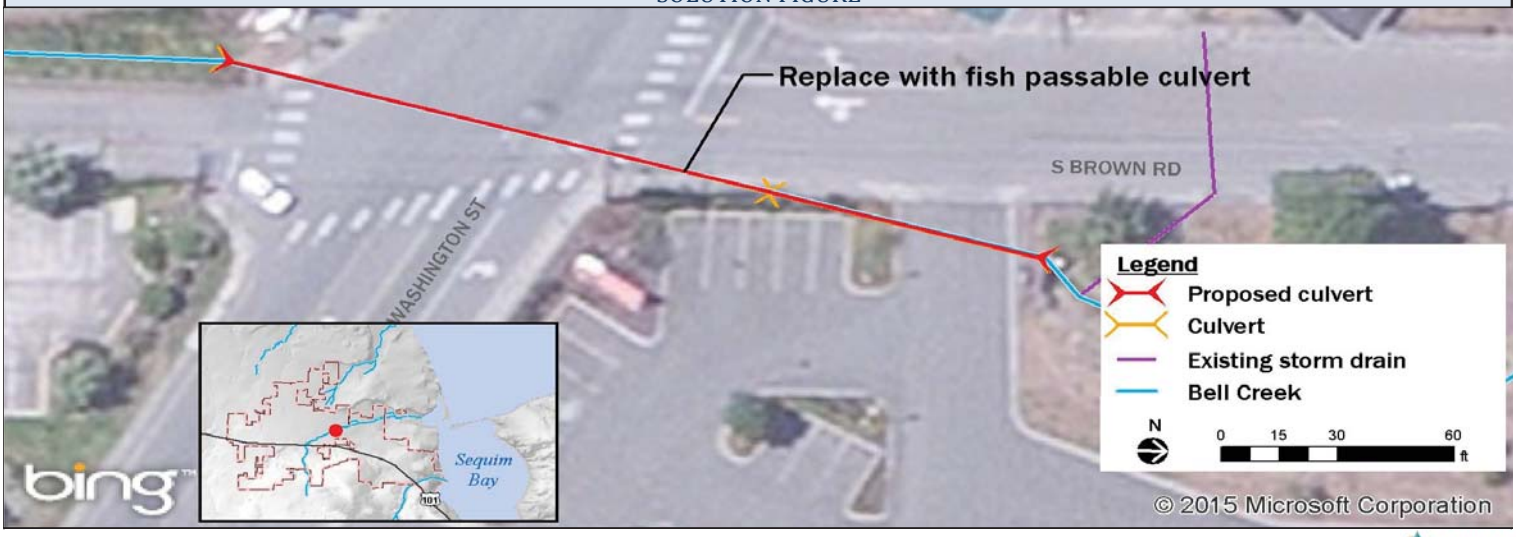
Culvert to be replaced at intersection of S Brown and E Washington Streets, facing north

Downstream culvert, facing south

PROPOSED SOLUTION

Evaluate culvert as part of 1.00 (Sequim Area Stormwater- Watershed Plan) implementation. Replace existing 48" dia. culvert with fish passable culvert. Cost estimate assumptions: Remove existing 48" culvert and culvert under Les Schwab driveway. Install 220 LF of 128" wide x 83" high arch culvert to match dimensions of existing culvert under the Les Schwab driveway. Install a concrete headwall on the upstream end of the culvert to maintain existing channel width and adjacent roadway alignments. Install approximately 1 ft cobble in the base of the culvert to meet fish passibility criteria. Adjust 2 water mains that currently cross the culvert. Existing culvert under Les Schwab driveway will not be reused based on utility conflicts with the existing alignment.

SOLUTION FIGURE



HERRERA

City of Sequim
Capital Improvement Program
Project Summary Sheet

Name: Middle Reach Bell Creek Corridor Planning
Site ID: 1.09
Project Priority: Top 10
Estimated Cost: $365,000

PROBLEM SUMMARY

Bell Creek, Highland irrigation ditch, and culverts along Bell Creek corridor receive stormwater runoff from upland areas during storm events, causing flooding in the undeveloped middle reach of Bell Creek and in downstream culverts. Specific reaches of lower and middle Bell Creek are listed as impaired water bodies on Ecology's 303(d) list due to high fecal coliform bacteria concentrations dissolved oxygen, and benthic-Index of Biological Integrity (B-IBI); a total maximum daily load (TMDL) study and water quality implementation plan may be required to address impairments. If not managed properly, future development will increase storm flows and exacerbate existing flooding and water quality problems, and an important source of groundwater recharge will be lost. This project would also address problems 2.17/2.29 and 1.02, 1.04, 1.06, 1.07, 1.08, 1.10.

PRIORITIZATION

Prioritization Criteria	Ranking	Justification
Risk	High	Regularly occurring problem with flooding of private and public property, erosion, habitat degradation and water quality impairment. Needs to occur before other projects.
Efficiency	High	Multiple interested stakeholders and multiple benefits
Funding Potential	High	Strong candidate for funding through: watershed planning, habitat enhancement, and water resource management (aquifer storage)
Public Sentiment	High-Moderate	General public interest in restoration of this area
Data Quality	High	Long history of frequent problems and multiple past studies
Overall Priority	**High**	**Multiple high risk projects are dependent on this plan**

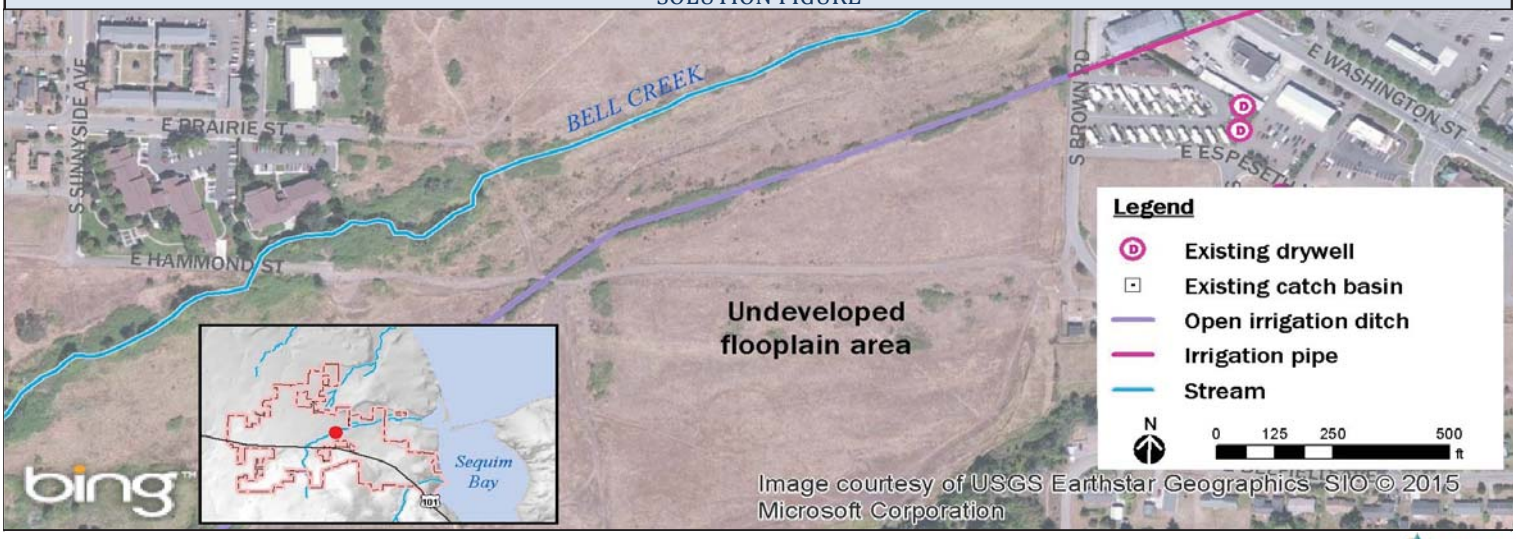
Flooding on undeveloped floodplain area facing west

Bell Creek running along the north edge of the undeveloped floodplain area, facing

PROPOSED SOLUTION

Identify a strategy for optimizing infiltration opportunities and ensuring adequate surface water conveyance capacity to accommodate future growth, while improving water quality, preserving and enhancing habitat, and recharging groundwater – all in coordination with planning for future development. Development in Clallam County areas and the UGA upstream of the City has a significant potential to affect flows in Bell Creek; therefore, the County and irrigation purveyors have an important role in developing goals and objectives for the Plan and subsequent projects for implementation. Project scope would include: 1) Confirm goals and objectives of the watershed plan, 2) Develop funding strategy and apply for grants, 3) Existing conditions assessment, 4) Future scenarios development, 5) Hydrologic and hydraulic modeling, 6) Draft and Final Plan, 7) Implementation.

SOLUTION FIGURE



HERRERA

City of Sequim
Capital Improvement Program
Project Summary Sheet

Name: S 3rd Avenue (west ROW south of Bypass) Drainage
Site ID: 2.04
Project Priority: Top 10
Estimated Cost: $70,000

PROBLEM SUMMARY

Storm water runoff from South 3rd Avenue downstream of the Hideaway Homes Mobile Home Park and from the park itself flows down the steep slope on the west side of South 3rd Avenue and onto the Sequim School District Transportation Facility property, intermittently causing localized flooding. A poorly defined ditch runs along the base of the road fill slope to a culvert under the entry drive into the transportation facility; this ditch is filled with silt, sand, and gravel eroded from the South 3rd Avenue fill slope. Discharge from entry drive culvert flows to a catch basin approximately 10 feet north of the outlet end of the culvert; the catch basin is covered with silt, sand, and gravel eroded from the South 3rd Avenue fill slope.

PRIORITIZATION

Prioritization Criteria	Ranking	Justification
Risk	Moderate	High frequency flooding on private property could escalate to property damage
Efficiency	Low	No known concurrent projects planned
Funding Potential	Low	Limited water quality improvements
Public Sentiment	Moderate	Low visibility site but a concern for commercial and school property owners
Data Quality	High	Field observations and flood response by City staff
Overall Priority	**High-Moderate**	**Moderate risk flooding problem on private property, eroding City ROW**

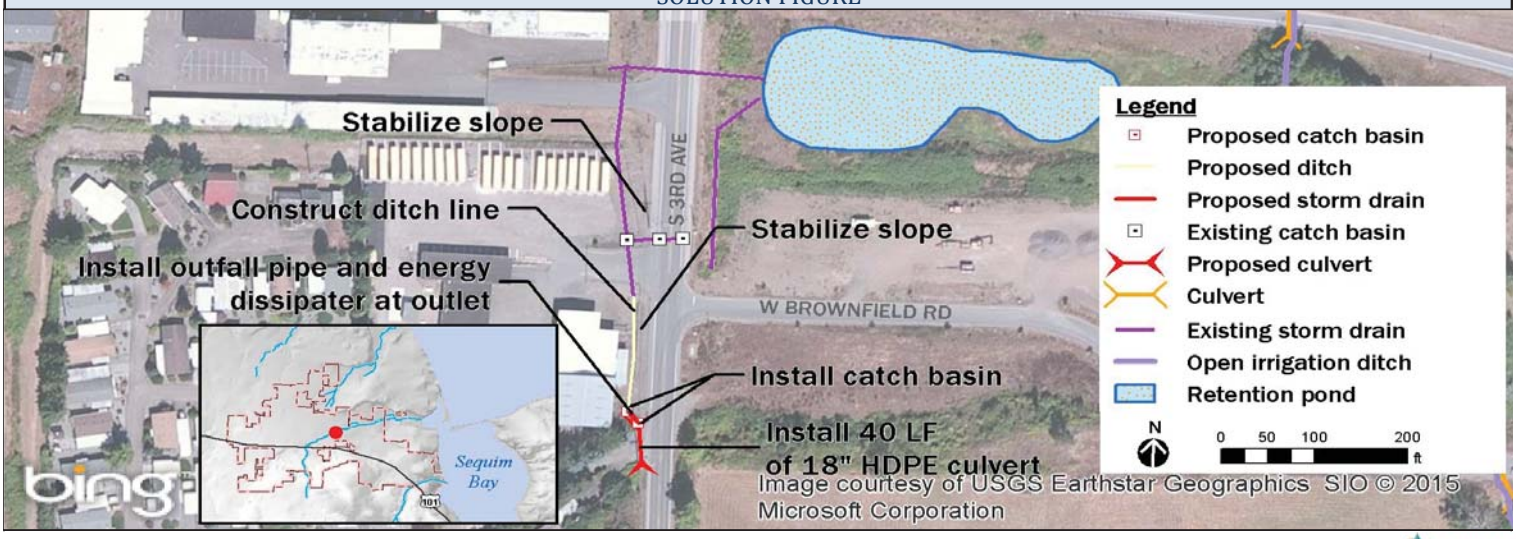
Erosion of fill slope along 3rd Ave facing south.

Sequim School District Transportation Facility property facing north.

PROPOSED SOLUTION

Pipe flows to base of the fill slope and route the runoff via ditches across the property. Install an 18" diameter culvert under the Hideaway Homes Mobile Home Park driveway and a catch basin at the discharge end of the culvert. Install an outfall pipe down the steep slope with an energy dissipater at the outlet. Construct a new ditch line along the base of the fill slope (this ditch with be on School District property; an easement will be needed for these improvements). Construct a short ditch section from the end of the culvert under the Transportation Facility entry drive to the catch basin at the base of the roadway fill. Stabilize the fill slopes with quarry spall slope protection to prevent further erosion of the fill. Cost estimate assumptions: 60 LF 18 inch diameter storm pipe. 1 Type 1 catch basin, 1 Type 1 catch basin with energy dissipater. 150 LF ditch excavation. 150 CY quarry spalls for slope protection.

SOLUTION FIGURE



HERRERA

City of Sequim
Capital Improvement Program
Project Summary Sheet

Name: N 5th Street Structure Upgrade
Site ID: 2.05
Project Priority: Top 10
Estimated Cost: $120,000

PROBLEM SUMMARY

Drywell at south east corner of W Cedar and N 5th Ave intersection floods at inlet. Flooding extends along cross walk and up ramp, imposing risk to pedestrians (especially when icy). Maintenance was recently performed but the structure still does not provide adequate drainage.

PRIORITIZATION

Prioritization Criteria	Ranking	Justification
Risk	Moderate	Frequently floods crosswalk creating hazardous condition for pedestrians
Efficiency	Low	No known concurrent projects planned
Funding Potential	Low	Limited water quality improvements
Public Sentiment	Moderate	Corrects deficiency at moderately visible site
Data Quality	High	Field observations made by City staff and complaints received
Overall Priority	**High-Moderate**	**Moderate risk flooding of public crosswalk, well known problem and documented complaints**

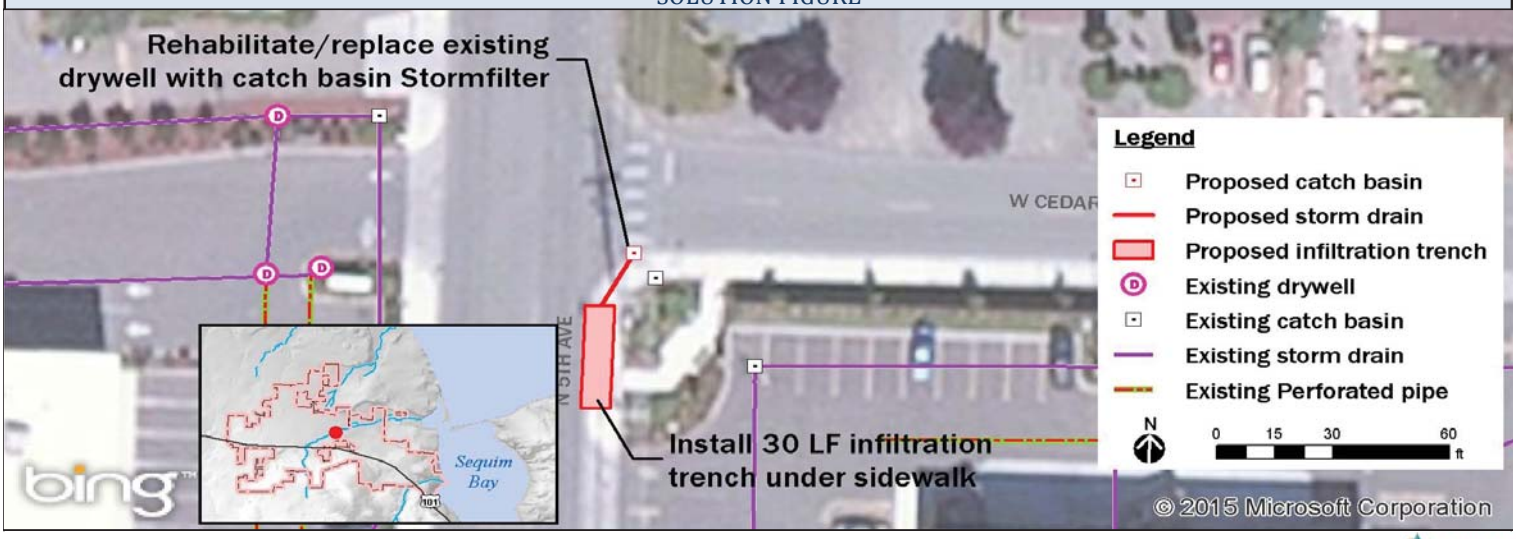
Crosswalk facing north

Drywell on south side of crosswalk, facing west

PROPOSED SOLUTION

Rehabilitate infiltration facility (drywell) to restore capacity. Empty drywell to clean and inspect facility. If drywell is compromised, install an infiltration trench and stormwater treatment unit. Cost estimate assumptions: Remove existing drywell. Install 2-cartridge Contech Catch Basin Stormfilter. Install 30 LF infiltration trench. Remove/replace 30 LF sidewalk.

SOLUTION FIGURE



HERRERA

City of Sequim
Capital Improvement Program
Project Summary Sheet

Name: 7th Street and Washington Upgrade
Site ID: 2.12
Project Priority: Top 10
Estimated Cost: $180,000

PROBLEM SUMMARY

Flooding at south west inlet at intersection of S 7th Ave and W Washington St. Structure is full of sediment. Maintenance was recently performed but the structure still does not drain fast enough.

PRIORITIZATION

Prioritization Criteria	Ranking	Justification
Risk	High	Frequently floods major arterial intersection.
Efficiency	Low	No known concurrent projects planned
Funding Potential	Low	Limited water quality improvements
Public Sentiment	High-Moderate	Corrects deficiency at highly visible site
Data Quality	High	Field observations made by City staff and complaints received
Overall Priority	**High-Moderate**	**High risk flooding of arterial, well known problem and documented complaints**

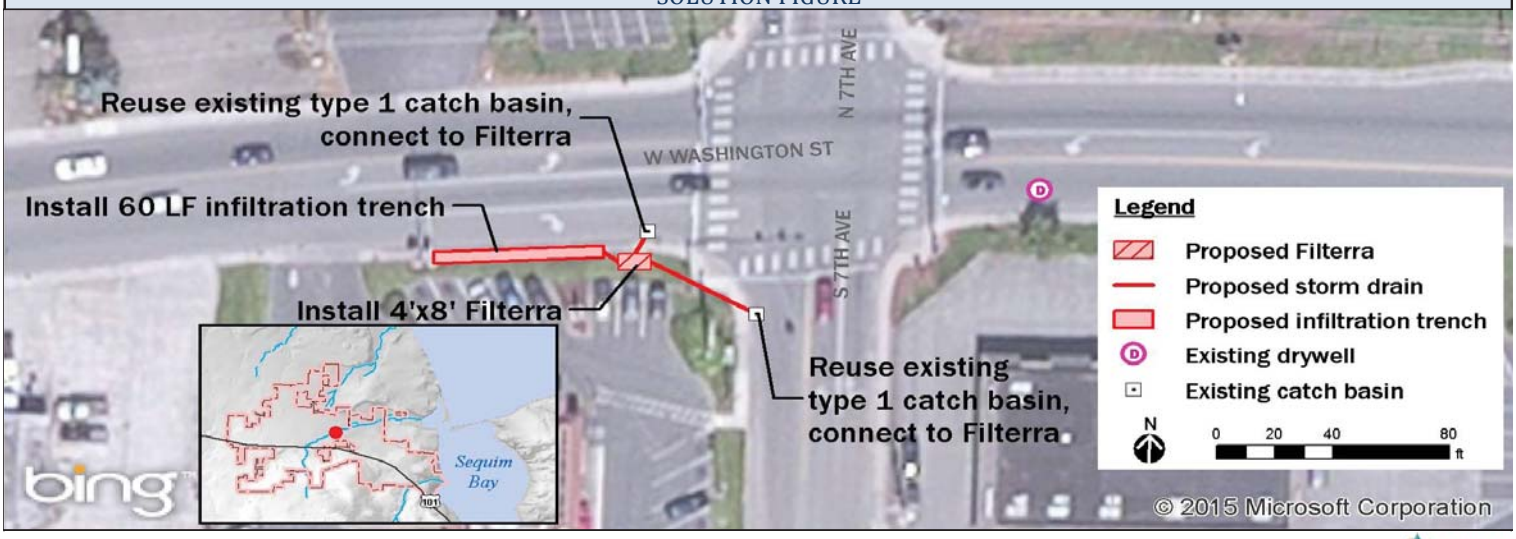
Drywell on west side of intersection

Drywell on south east side of intersection

PROPOSED SOLUTION

Install Filterra bio-filtration unit for treatment of runoff and protection of the infiltration facility, tie existing catch basins into Filterra, install infiltration trench for infiltration of runoff. Cost estimate assumptions: Reuse existing type 1 catch basins. Install 60 LF 8 inch diameter storm pipe. Install 60 LF infiltration trench. Remove/replace 60 LF sidewalk.

SOLUTION FIGURE



HERRERA

City of Sequim
Capital Improvement Program
Project Summary Sheet

Name: Etta Street Infiltration and Inflow Investigation
Site ID: 2.25
Project Priority: Top 10
Estimated Cost: $91,000

PROBLEM SUMMARY

Surface runoff from alley drains to two existing catch basins and it is unclear where the catch basins drain (infiltration trench, drywell, or sanitary sewer). It appears that most of the runoff flows into a catch basin located out of the City ROW. Downspout connection appears to tie into sanitary sewer (actual connections to be confirmed).

PRIORITIZATION

Prioritization Criteria	Ranking	Justification
Risk	High-Moderate	Continuous stormwater flow to sewer. Added water to sewer increases risk/ lowers resiliency.
Efficiency	High	Etta St on CIP for 2016
Funding Potential	Low	Limited water quality improvements but sewer benefits
Public Sentiment	Moderate-Low	Affects businesses with access off Etta St.
Data Quality	Moderate	Field observations made by City staff, but extent of connections unknown
Overall Priority	**High-Moderate**	**High-Moderate risk problem**

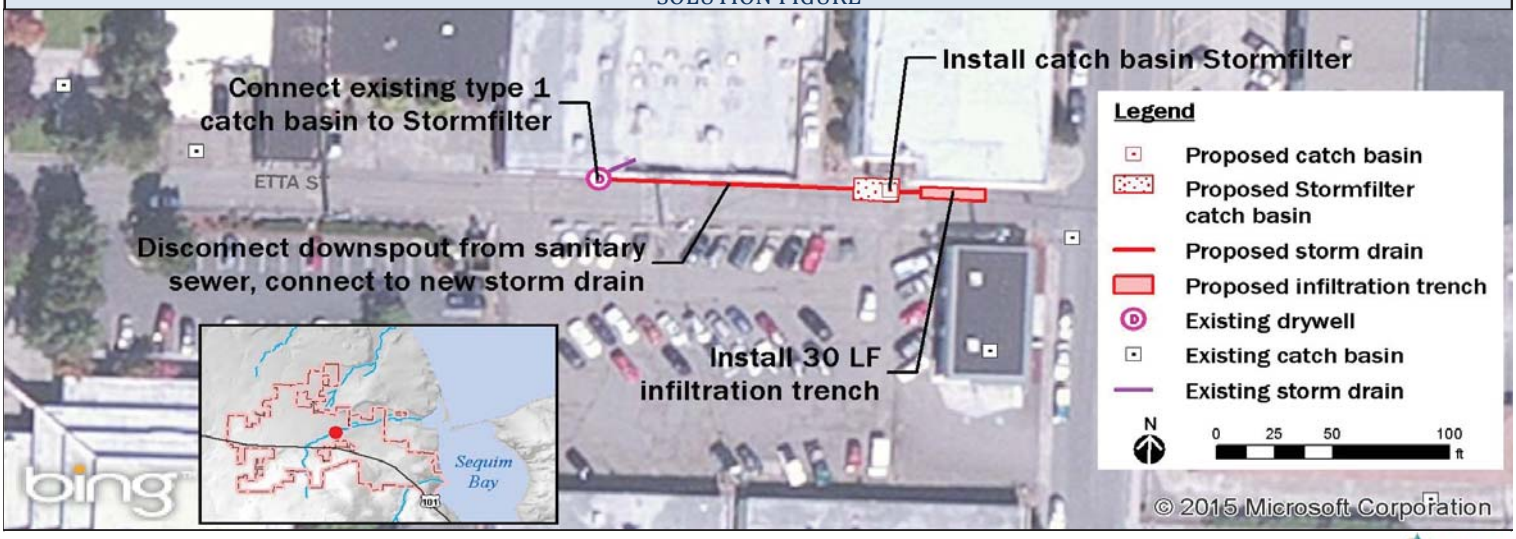
Etta Street, facing west

Potential location of connection to sewer on the east end of Etta Street

PROPOSED SOLUTION

Perform testing and investigations to confirm discharge locations of downspouts and catch basins. Divert downspouts and catch basins to Contech Stormfilter. Regrade parts of the alley to direct the stormwater to the existing catch basins or the Stormfilter. Install infiltration trench to dispose of surface runoff. Cost estimate assumptions: Install 2-cartridge Contech Catch Basin Stormfilter. Install 100 LF of 8 inch diameter storm pipe. Install 30 LF infiltration trench. Remove/replace 400 square feet of pavement.

SOLUTION FIGURE



HERRERA

City of Sequim
Capital Improvement Program
Project Summary Sheet

Name: River Road Storage Project
Site ID: 2.26
Project Priority: Top 10
Estimated Cost: $46,000,000

PROBLEM SUMMARY

Flooding of private property within the UGA caused by runoff from west Happy Valley (outside of the UGA) entering Eureka ditch north of Mockingbird Lane. Would address problems 4.11, 4.14, and 4.36.

PRIORITIZATION

Prioritization Criteria	Ranking	Justification
Risk	High	High flow in irrigation canal contributing to multiple high risk flooding problems in City and receiving waters
Efficiency	High	Multiple interested stakeholders and multiple benefits if stormwater solution is coupled with irrigation storage solution
Funding Potential	High	Strong candidate for funding through: watershed planning, habitat enhancement, water resource management (storage for irrigation). High potential for cost sharing with County and irrigation district.
Public Sentiment	Moderate-Low	Limited interest from general public
Data Quality	High	Long history of frequent problems and multiple past studies; feasibility information available from irrigation managers
Overall Priority	**High**	**High risk problem, contender for grant funding and high project efficiency**

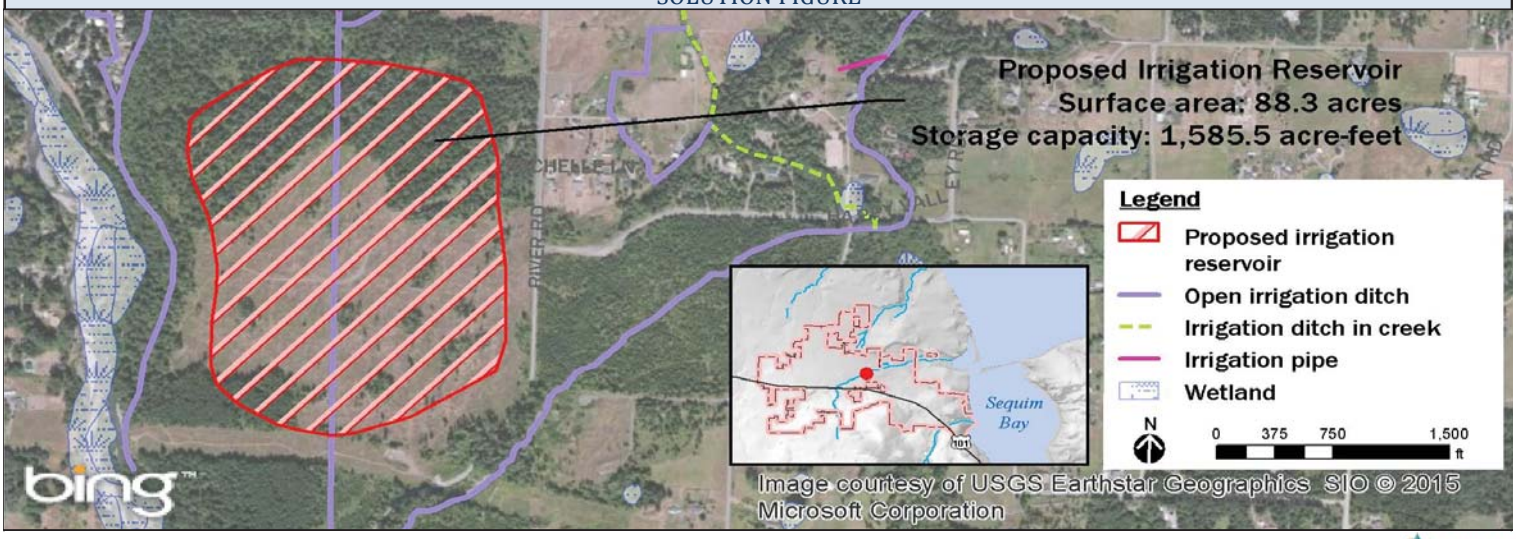
Culvert along Eureka Ditch, where flooding has been observed

Mockingbird Lane, where ponding has been observed

PROPOSED SOLUTION

Construct a large storage facility to provide stormwater detention by storing water during high flows for use by the Dungeness Water Users Association during the low flow period. To provide stormwater benefits during the wet season, the facility would need to be operated in a manner that would reduce flow to downstream irrigation conveyance through the City of Sequim during storm events. The storage facility is one option under consideration by the Dungeness River Flow Enhancement Project. Project should consider stormwater conveyance for future developments as well as the potential to provide flow control to offset increased from existing and future development.. Cost estimate assumptions: The project would construct a storage facility of approximately 100 acres in size with a storage volume of approximately 1,600 acre feet. Work would include over 700,000 cubic yards of cut and fill.

SOLUTION FIGURE



HERRERA

City of Sequim
Capital Improvement Program
Project Summary Sheet

Name: W Prairie Street Green Street Upgrade
Site ID: 2.63
Project Priority: Top 10
Estimated Cost: $130,000

PROBLEM SUMMARY

Typical of this area and type of development, no storm water management infrastructure exists. The streets have typically been paved to a nominal width of 24 feet and storm water runoff from the roadway flows to the roadside area and infiltrates into the porous subsoil. During periods of intense rainfall intermittent flooding can occur. In addition, oils and grease contained in the runoff can infiltrate into the porous subsoil and potentially enter the groundwater untreated.

PRIORITIZATION

Prioritization Criteria	Ranking	Justification
Risk	Moderate	Street runoff enters private property and ponds or infiltrates
Efficiency	High	Street and utility also upgrades
Funding Potential	High-Moderate	Potential pilot project; combine with utility upgrades
Public Sentiment	High	Neighborhood revitalization is a Council goal
Data Quality	High	Field observations made by City staff and complaints received
Overall Priority	**High**	**High project efficiency, sentiment, and funding potential**

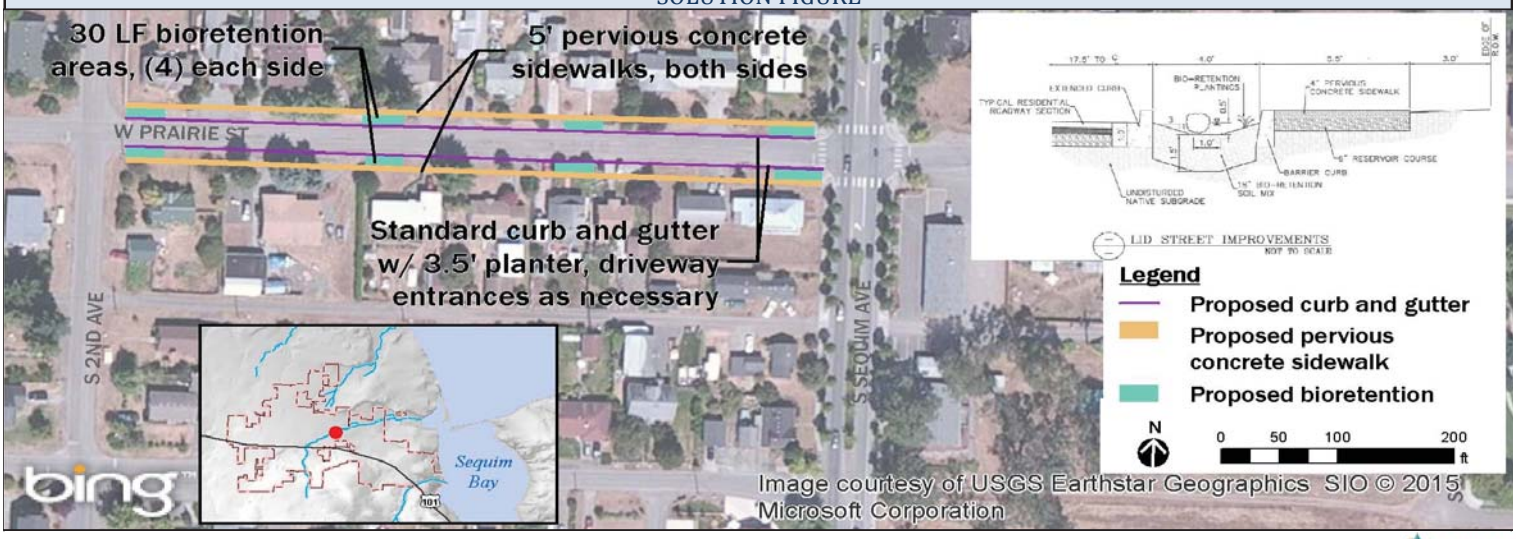
Prairie Street. No existing curbs, gutters, or planters.

Aerial of Prairie Street

PROPOSED SOLUTION

Provide a demonstration facility for the management of stormwater runoff from fully developed residential streets. The final street configuration would consist of 32 feet of pavement with curb and gutter and porous pavement sidewalks on both sides. Bioretention cells would be constructed between the back of the curb and the sidewalk at intervals along the roadway. For each City block, a total bioretention cell length of 120 feet would be required on each side of the street. Small cells, approximately 30 feet in length, would be constructed at several points along the roadway to avoid driveways and minimize roadway grading. Cost estimate assumptions: 240 LF extruded curb, 310 LF barrier curb. 70 CY pervious sidewalk. 240 LF bioretention (8 cells, 30 LF per cell).

SOLUTION FIGURE



HERRERA

CIP Project Cost Estimates

Sequim Surface Water Master Plan
Herrera Project #14-05826-000

Project: Sequim SMP CIP Program - Project 1.04 (CARRIE BLAKE PARK ENTRANCE)
Prepared by: Steve Zenovic
Checked by: Seth Rodman
Updated: 22-May-15

Note: This cost estimate is approximate. Actual construction bids may vary significantly from this statement of probable costs due to timing of construction, changed conditions, labor rate changes, or other factors beyond the control of the engineers.

ESTIMATED COST OF PROJECT IMPLEMENTATION AT PRELIMINARY DESIGN STAGE

NO.	QUANT.	UNIT	ITEM	UNIT COST	AMOUNT	BASIS OF QUANTITY AND UNIT COST
1	1	LS	MOBILIZATION	10%	$ 10,400	
2	1	LS	EROSION/WATER POLLUTION CONTROL	5%	$ 5,200	
3	1	LS	PROJECT TEMPORARY TRAFFIC CONTROL	5%	$ 5,200	
4	80	SY	DEMOLISH AND REMOVE CONCRETE PAVEMENT	$ 15	$ 1,200	20' ENTRY + CURB; PORT ANGELES WTIP
5	1	LS	REMOVE EXISTING 40" CULVERTS (2)	$ 4,000	$ 4,000	
6	1	LS	REMOVAL OF STRUCTURE AND OBSTRUCTION	$ 1,500	$ 1,500	MISCELLANEOUS FENCING, GRASS
7	30	CY	DEMOLISH AND REMOVE A-C PAVEMENT	$ 10	$ 300	10' EAST OF ENTRY; PORT ANGELES WATERFRONT PH.2 2014
8	360	CY	STRUCTURE EXCAVATION CLASS B INCL. HAUL	$ 25	$ 9,000	PORT ANGELES WATERFRONT PH.2 2014
9	1	LS	5' X 12' X 30 LF BOX CULVERT	$ 54,000	$ 54,000	BASED ON STATE OF IDAHO BOX CULVERT COST ANALYSIS
10	60	TN	STREAMBED COBBLES	$ 30	$ 1,800	2' DEEP IN CULVERT; PORT ANGELES WATERFRONT PH. 2 2014
11	30	CY	CEMENT CONCRETE PAVEMENT	$ 315	$ 9,450	PORT ANGELES WATERFRONT PH.2 2014
12	80	LF	SPLIT RAIL ENTRY FENCE	$ 10	$ 800	PORT ANGELES WATERFRONT PH.2 2014
13	1	LS	STREAM ENHANCEMENT	$ 20,000	$ 20,000	LARGE WOOD PIECES, BOULDERS, GRAVEL, AND BANK PLANTINGS
14	1	LS	SITE RESTORATION	$ 2,000	$ 2,000	
			SUBTOTAL OF DIRECT COSTS		**$ 124,850**	
			SALES TAX (DIRECT COSTS)	**8.4%**	**$ 10,487**	
			TOTAL CONSTRUCTION COST		**$ 135,300**	
			ALLIED COSTS			
			ITEM	**UNIT COST**	**AMOUNT**	**BASIS OF QUANTITY AND UNIT COST**
			PROJECT ADMIN./MANAGEMENT	10%	$ 13,530	
			SURVEY	LS	$ 5,000	
			GEOTECHNICAL ANALYSIS	LS	$ -	NO REPORT ANTICIPATED
			DESIGN	20%	$ 27,060	
			PERMITTING	LS	$ 40,000	LOCAL PERMITS, ONLINE HPA, JARPA FOR CORPS PERMIT, CRITICAL AREAS REPORT, BIOLOGICAL NO EFFECT LETTER
			PROPERTY ACQUISITION	LS	$ -	WITHIN CITY R-O-W OR CITY PARK
			CONSTRUCTION MANAGEMENT	20%	$ 27,060	
			SUBTOTAL OF ALLIED COSTS		**$ 112,700**	
			SUMMARY			
			SUBTOTAL OF DIRECT COSTS		$ 124,850	
			SUBTOTAL OF ALLIED COST		$ 112,700	
			SALES TAX (ON DIRECT COSTS)		$ 10,487	
			CONTINGENCY - AVERAGE	40%	$ 99,000	
			TOTAL ESTIMATED COST		**$ 350,000**	

Sequim Surface Water Master Plan
Herrera Project #14-05826-000

Project: Sequim SMP CIP Program - Project 1.07 (BELL CREEK AT BROWN & WASHINGTON)
Prepared by: Steve Zenovic
Checked by: Seth Rodman
Updated: 22-May-15

Note: This cost estimate is approximate. Actual construction bids may vary significantly from this statement of probable costs due to timing of construction, changed conditions, labor rate changes, or other factors beyond the control o the engineers.

ESTIMATED COST OF PROJECT IMPLEMENTATION AT PRELIMINARY DESIGN STAGE

NO.	QUANT.	UNIT	ITEM	UNIT COST	AMOUNT	BASIS OF QUANTITY AND UNIT COST
1	1	LS	MOBILIZATION	10%	$ 35,600	
2	1	LS	EROSION/WATER POLLUTION CONTROL	5%	$ 17,800	
3	1	LS	PROJECT TEMPORARY TRAFFIC CONTROL	5%	$ 17,800	
4	1	LS	REMOVAL OF STRUCTURE AND OBSTRUCTION	$ 5,000	$ 5,000	200 LF CURB, 300 SF SIDEWALK, CURB RAMP
5	1	LS	REMOVE EXISTING CULVERTS	$ 10,000	$ 10,000	50 LF OF 48" CONCRETE & 50 LF ARCH CULVERT
6	600	SY	DEMOLISH AND REMOVE A-C PAVEMENT	$ 9	$ 5,400	PORT ANGELES WTIP
7	2000	CY	STRUCTURE EXCAVATION CLASS B INCL. HAUL	$ 25	$ 50,000	PORT ANGELES WTIP
8	1100	CY	GRAVEL BASE	$ 30	$ 33,000	PORT ANGELES WTIP
9	550	TN	BALLAST	$ 25	$ 13,750	PORT ANGELES WTIP
10	65	TN	CRUSHED SURFACING TOP COURSE	$ 30	$ 1,950	PORT ANGELES WTIP
11	135	TN	HMA CL 1/2" PG 64-22	$ 150	$ 20,250	PORT ANGELES WTIP
12	220	LF	128" X 83" PIPE ARCH CULVERT	$ 700	$ 154,000	BASED ON 2X MATERIAL COST FROM SUPPLIERS
13	305	TN	STREAMBED COBBLES	$ 40	$ 12,200	PORT ANGELES WTIP; ADJUSTED FOR PIPE LENGTH
14	200	LF	CEMENT CONCRETE CURB AND GUTTER	$ 30	$ 6,000	PORT ANGELES WTIP
15	40	SY	CEMENT CONCRETE SIDEWALK	$ 50	$ 2,000	PORT ANGELES WTIP
16	1	LS	ADJUST WATER LINES	$ 10,000	$ 10,000	2 WATER LINE CROSSINGS @ 50 LF EA
17	1	LS	CONCRETE INLET HEADWALL	$ 7,500	$ 7,500	ASSUME STRUCTURAL CONCRETE AT $1,000 PER CY
18	1	LS	STREAM ENHANCEMENT	$ 20,000	$ 20,000	LARGE WOOD PIECES, BOULDERS, GRAVEL, AND BANK PLANTINGS
19	1	LS	RESTORATION PLANTINGS	$ 5,000	$ 5,000	
			SUBTOTAL OF DIRECT COSTS		**$ 427,250**	
			SALES TAX (DIRECT COSTS)	**8.4%**	**$ 35,889**	
			TOTAL CONSTRUCTION COST		**$ 463,100**	
			ALLIED COSTS			
			ITEM	**UNIT COST**	**AMOUNT**	**BASIS OF QUANTITY AND UNIT COST**
			PROJECT ADMIN./MANAGEMENT	10%	$ 42,725	
			SURVEY	LS	$ 5,000	
			GEOTECHNICAL ANALYSIS	LS	$ -	NO REPORT ANTICIPATED
			DESIGN	15%	$ 64,088	
			PERMITTING	LS	$ 40,000	LOCAL PERMITS, ONLINE HPA, JARPA FOR CORPS PERMIT, CRITICAL AREAS REPORT, BIOLOGICAL NO EFFECT LETTER
			PROPERTY ACQUISITION	LS	$ -	NONE ANTICIPATED
			CONSTRUCTION MANAGEMENT	20%	$ 85,450	
			SUBTOTAL OF ALLIED COSTS		**$ 237,300**	
			SUMMARY			
			SUBTOTAL OF DIRECT COSTS		$ 427,250	
			SUBTOTAL OF ALLIED COST		$ 237,300	
			SALES TAX (ON DIRECT COSTS)		$ 35,889	
			CONTINGENCY - AVERAGE	40%	$ 280,000	
			TOTAL ESTIMATED COST		**$ 980,000**	

Sequim Surface Water Master Plan
Herrera Project #14-05826-000

Project: Sequim SMP CIP Program - SITE 2.04 (3rd Ave. south of Highway 101)
Prepared by: Steve Zenovic
Checked by: Seth Rodman
Updated: 22-May-15

Note: This cost estimate is approximate. Actual construction bids may vary significantly from this statement of probable costs due to timing of construction, changed conditions, labor rate changes, or other factors beyond the control of the engineers.

ESTIMATED COST OF PROJECT IMPLEMENTATION AT PRELIMINARY DESIGN STAGE

NO.	QUANT.	UNIT	ITEM	UNIT COST	AMOUNT	BASIS OF QUANTITY AND UNIT COST
1	1	LS	MOBILIZATION	20%	$ 4,300	
2	1	LS	EROSION/WATER POLLUTION CONTROL	5%	$ 1,100	
3	1	LS	PROJECT TEMPORARY TRAFFIC CONTROL	10%	$ 2,200	
4	20	SY	DEMOLISH AND REMOVE A-C PAVEMENT	$ 20	$ 400	CITY OF PORT ANGELES WATERFRONT PH. 2 2014
5	1	LS	REMOVAL OF STRUCTURE AND OBSTRUCTION	$ 500	$ 500	EXISTING DRYWELL, 8' CURB, GUTTER, AND SIDEWALK
6	1	EA	CATCH BASIN TYPE 1	$ 1,500	$ 1,500	CITY OF PORT ANGELES LAURIDSEN BRIDGE 2014
7	1	EA	CATCH BASIN TYPE 1 W/ENERGY DISSIPATER	$ 2,000	$ 2,000	CITY OF PORT ANGELES LAURIDSEN BRIDGE 2014
8	60	LF	18" HDPE PIPING	$ 40	$ 2,400	WSDOT UNIT BID COST ANALYSIS 2014
9	50	CY	DITCH EXCAVATION INCLUDING HAUL	$ 40	$ 2,000	WSDOT UNIT BID COST ANALYSIS 2014
10	3	TN	HMA CL 1/2" PG 64-22	$ 500	$ 1,500	CITY OF PORT ANGELES WATERFRONT PH. 2 2014 - SMALL QUANTITY
11	150	CY	QUARRY SPALLS FOR SLOPE PROTECTION	$ 75	$ 11,250	WSDOT UNIT BID COST ANALYSIS 2014
			SUBTOTAL OF DIRECT COSTS		**$ 29,150**	
			SALES TAX (DIRECT COSTS)	**8.4%**	**2448.60**	
			TOTAL CONSTRUCTION COST		**$ 31,600**	
			ALLIED COSTS			
			ITEM	**UNIT COST**	**AMOUNT**	**BASIS OF QUANTITY AND UNIT COST**
			PROJECT ADMIN./MANAGEMENT	20%	$ 6,320	
			SURVEY	LS	$ 2,500	
			GEOTECHNICAL ANALYSIS	LS	$ -	NO REPORT ANTICIPATED
			DESIGN	25%	$ 7,900	
			PERMITTING	LS	$ -	NO PERMITS ANTICIPATED
			PROPERTY ACQUISITION	LS	$ 2,500	WILL REQUIRE EASEMENT FROM SEQUIM SCHOOL DISTRICT
			CONSTRUCTION MANAGEMENT	20%	$ 6,320	
			SUBTOTAL OF ALLIED COSTS		**$ 25,500**	
			SUMMARY			
			SUBTOTAL OF DIRECT COSTS		$ 29,150	
			SUBTOTAL OF ALLIED COST		$ 25,500	
			SALES TAX (ON DIRECT COSTS)		$ 2,449	
			CONTINGENCY - LOW	30%	$ 17,000	
			TOTAL ESTIMATED COST		**$ 70,000**	

Sequim Surface Water Master Plan
Herrera Project #14-05826-000

Project: Sequim SMP CIP Program - SITE 2.05 (CEDAR AT 5TH)
Prepared by: Steve Zenovic
Checked by: Seth Rodman
Updated: ########

Note: This cost estimate is approximate. Actual construction bids may vary significantly from this statement of probable costs due to timing of construction, changed conditions, labor rate changes, or other factors beyond the control of the engineers.

ESTIMATED COST OF PROJECT IMPLEMENTATION AT PRELIMINARY DESIGN STAGE

NO.	QUANT.	UNIT	ITEM	UNIT COST	AMOUNT	BASIS OF QUANTITY AND UNIT COST
1	1	LS	MOBILIZATION	10%	$ 4,600.00	
2	1	LS	EROSION/WATER POLLUTION CONTROL	5%	$ 2,200.00	
3	1	LS	PROJECT TEMPORARY TRAFFIC CONTROL	10%	$ 3,900.00	WILL REQUIRE CLOSURE OF CEDAR STREET
4	175	SY	DEMOLISH AND REMOVE A-C PAVEMENT	$ 10	$ 1,750	PORT ANGELES WTIP
5	1	LS	REMOVAL OF STRUCTURE AND OBSTRUCTION	$ 5,000	$ 5,000	EXISTING DRYWELL, 8' CURB, GUTTER, AND SIDEWALK
6	200	CY	STRUCTURE EXCAVATION CLASS B	$ 15	$ 3,000	PORT ANGELES WTIP
7	1	LS	4' X 6' FILTERRA INTERNAL BYPASS UNIT	$ 24,000	$ 24,000	PORT ANGELES LAURIDSEN BRIDGE PROJECT
8	40	LF	6" PVC PIPING		$ -	PORT ANGELES WTIP
9	35	TN	GRAVEL BACKFILL FOR DRAINS		$ -	PORT ANGELES WTIP
10	30	TN	HMA CL 1/2" PG 64-22	$ 200	$ 6,000	PORT ANGELES WTIP
11	125	CY	GRAVEL BASE (ON- SITE NATIVE)	$ 15	$ 1,875	PORT ANGELES WTIP
12	90	TN	BALLAST	$ 25	$ 2,250	
13	30	TN	CRUSHED SURFACING TOP COURSE	$ 30	$ 900	
14	1	EA	CATCH BASIN TYPE 1	$ 1,000	$ 1,000	
			SUBTOTAL OF DIRECT COSTS		**$ 56,475**	
			SALES TAX (DIRECT COSTS)	**0%**	**0.00**	**PUBLIC ROAD CONSTRUCTION EXEMPT FROM SALES TAX**
			TOTAL CONSTRUCTION COST		**$ 56,500**	
			ALLIED COSTS			
			ITEM	**UNIT COST**	**AMOUNT**	**BASIS OF QUANTITY AND UNIT COST**
			PROJECT ADMIN./MANAGEMENT	10%	$ 5,650	
			SURVEY	LS	$ 2,500	
			GEOTECHNICAL ANALYSIS	LS	$ -	NO REPORT ANTICIPATED
			DESIGN	20%	$ 11,300	
			PERMITTING	LS	$ -	NO PERMITS ANTICIPATED
			PROPERTY ACQUISITION	LS	$ -	WITHIN CITY R-O-W
			CONSTRUCTION MANAGEMENT	20%	$ 11,300	
			SUBTOTAL OF ALLIED COSTS		**$ 30,800**	
			SUMMARY			
			SUBTOTAL OF DIRECT COSTS		$ 56,475	
			SUBTOTAL OF ALLIED COST		$ 30,800	
			SALES TAX (ON DIRECT COSTS)		$ -	PUBLIC ROAD CONSTRUCTION EXEMPT FROM SALES TAX
			CONTINGENCY - AVERAGE	40%	$ 35,000	
			TOTAL ESTIMATED COST		**$ 120,000**	

Sequim Surface Water Master Plan
Herrera Project #14-05826-000

Project: Sequim SMP CIP Program - SITE 2.12 (WASHINGTON AT 7TH)
Prepared by: Steve Zenovic
Checked by: Seth Rodman
Updated: ########

Note: This cost estimate is approximate. Actual construction bids may vary significantly from this statement of probable costs due to timing of construction, changed conditions, labor rate changes, or other factors beyond the control of the engineers.

ESTIMATED COST OF PROJECT IMPLEMENTATION AT PRELIMINARY DESIGN STAGE

NO.	QUANT.	UNIT	ITEM	UNIT COST	AMOUNT	BASIS OF QUANTITY AND UNIT COST
1	1	LS	MOBILIZATION	10%	$ 6,700.00	
2	1	LS	EROSION/WATER POLLUTION CONTROL	5%	$ 3,400.00	
3	1	LS	PROJECT TEMPORARY TRAFFIC CONTROL	10%	$ 6,700.00	WILL REQUIRE CLOSURE OF CEDAR STREET
4	240	SY	DEMOLISH AND REMOVE A-C PAVEMENT	$ 10	$ 2,400	PORT ANGELES WTIP
5	1	LS	REMOVAL OF STRUCTURE AND OBSTRUCTION	$ 5,000	$ 5,000	EXISTING DRYWELL, 20' CURB, GUTTER, AND SIDEWALK
6	350	CY	STRUCTURE EXCAVATION CLASS B INCL. HAUL	$ 15	$ 5,250	PORT ANGELES WTIP
7	1	LS	6' X 8' FILTERRA INTERNAL BYPASS UNIT	$ 30,000	$ 30,000	PORT ANGELES LAURIDSEN BRIDGE PROJECT
8	80	LF	SOILD/PERFORATED PVC STORM SEWER PIPE 6"	$ 30	$ 2,400	PORT ANGELES WTIP
9	40	CY	GRAVEL BACKFILL FOR DRAINS	$ 40	$ 1,600	PORT ANGELES WTIP
10	45	TN	HMA CL 1/2" PG 64-22	$ 200	$ 9,000	PORT ANGELES WTIP
11	175	CY	GRAVEL BASE (ON-SITE NATIVE)	$ 15	$ 2,625	PORT ANGELES WTIP
12	125	TN	BALLAST	$ 20	$ 2,500	PORT ANGELES WTIP
13	45	TN	CRUSHED SURFACING TOP COURSE	$ 30	$ 1,350	PORT ANGELES WTIP
14	2	EA	CATCH BASIN TYPE 1	$ 1,500	$ 3,000	PORT ANGELES WTIP
15	20	LF	CEMENT CONCRETE CURB AND GUTTER	$ 50	$ 1,000	PORT ANGELES WTIP; SMALL QUANTITY PREMIUM
16	15	SY	CEMENT CONCRETE SIDEWALK	$ 70	$ 1,050	PORT ANGELES WTIP; SMALL QUANTITY PREMIUM
			SUBTOTAL OF DIRECT COSTS		**$ 83,975**	
			SALES TAX (DIRECT COSTS)	**0.0%**	**$ -**	**PUBLIC ROAD CONSTRUCTION EXEMPT FROM SALES TAX**
			TOTAL CONSTRUCTION COST		**$ 84,000**	
			ALLIED COSTS			
			ITEM	**UNIT COST**	**AMOUNT**	**BASIS OF QUANTITY AND UNIT COST**
			PROJECT ADMIN./MANAGEMENT	10%	$ 8,400	
			SURVEY	LS	$ 3,500	
			GEOTECHNICAL ANALYSIS	LS	$ -	NO REPORT ANTICIPATED
			DESIGN	20%	$ 16,800	
			PERMITTING	LS	$ -	NO PERMITS ANTICIPATED
			PROPERTY ACQUISITION	LS	$ -	WITHIN CITY R-O-W
			CONSTRUCTION MANAGEMENT	20%	$ 16,800	
			SUBTOTAL OF ALLIED COSTS		**$ 45,500**	
			SUMMARY			
			SUBTOTAL OF DIRECT COSTS		$ 83,975	
			SUBTOTAL OF ALLIED COST		$ 45,500	
			SALES TAX (ON DIRECT COSTS)		$ -	PUBLIC ROAD CONSTRUCTION EXEMPT FROM SALES TAX
			CONTINGENCY - AVERAGE	40%	$ 52,000	
			TOTAL ESTIMATED COST		**$ 180,000**	

Sequim Surface Water Master Plan
Herrera Project #14-05826-000

Project: Sequim SMP CIP Program - SITE 2.25 (ETTA STREET BETWEEN SEQUIM AVENUE AND SUNNYSIDE)
Prepared by: Steve Zenovic
Checked by: Seth Rodman
Updated: 22-May-15

Note: This cost estimate is approximate. Actual construction bids may vary significantly from this statement of probable costs due to timing of construction, changed conditions, labor rate changes, or other factors beyond the control o the engineers.

ESTIMATED COST OF PROJECT IMPLEMENTATION AT PRELIMINARY DESIGN STAGE

NO.	QUANT.	UNIT	ITEM	UNIT COST	AMOUNT	BASIS OF QUANTITY AND UNIT COST
1	1	LS	MOBILIZATION	10%	$ 3,300	
2	1	LS	EROSION/WATER POLLUTION CONTROL	5%	$ 1,700	
3	1	LS	PROJECT TEMPORARY TRAFFIC CONTROL	5%	$ 1,700	WILL REQUIRE CLOSURE OF ETTA STREET
4	110	SY	DEMOLISH AND REMOVE A-C PAVEMENT	$ 10	$ 1,100	PORT ANGELES WTIP
5	1	LS	REMOVAL OF STRUCTURE AND OBSTRUCTION	$ 1,000	$ 1,000	EXISTING CATCH BASIN
6	110	CY	STRUCTURE EXCAVATION CLASS B	$ 15	$ 1,650	PORT ANGELES WTIP
7	1	LS	2 CARTRIDGE STORMFILTER CATCH BASIN	$ 13,000	$ 13,000	PENINSULA BEHAVIORAL HEALTH PARKING LOT
8	200	LF	SOLID/PERFORATED PVC STORM SEWER PIPE 6"	$ 30	$ 6,000	PORT ANGELES WTIP
9	35	TN	GRAVEL BACKFILL FOR DRAINS	$ 40	$ 1,400	PORT ANGELES WTIP
10	20	TN	HMA CL 1/2" PG 64-22	$ 200	$ 4,000	PORT ANGELES WTIP
11	60	CY	GRAVEL BASE (ON-SITE NATIVE)	$ 15	$ 900	PORT ANGELES WTIP
12	55	TN	BALLAST	$ 20	$ 1,100	PORT ANGELES WTIP
13	20	TN	CRUSHED SURFACING TOP COURSE	$ 30	$ 600	PORT ANGELES WTIP
14	45	LF	CEMENT CONCRETE CURB AND GUTTER	$ 50	$ 2,250	PORT ANGELES WTIP; SMALL QUANTITY PREMIUM
			SUBTOTAL OF DIRECT COSTS		**$ 39,700**	
			SALES TAX (DIRECT COSTS)	**0.0%**	**$ -**	**PUBLIC ROAD CONSTRUCTION EXEMPT FROM SALES TAX**
			TOTAL CONSTRUCTION COST		**$ 39,700**	
			ALLIED COSTS			
			ITEM	**UNIT COST**	**AMOUNT**	**BASIS OF QUANTITY AND UNIT COST**
			PROJECT ADMIN./MANAGEMENT	10%	$ 3,970	
			SURVEY	LS	$ 3,000	
			GEOTECHNICAL ANALYSIS	LS	$ -	NO REPORT ANTICIPATED
			DESIGN	25%	$ 9,925	
			PERMITTING	LS	$ -	NO PERMITS ANTICIPATED
			PROPERTY ACQUISITION	LS	$ -	WITHIN CITY R-O-W
			CONSTRUCTION MANAGEMENT	20%	$ 7,940	
			SUBTOTAL OF ALLIED COSTS		**$ 24,800**	
			SUMMARY			
			SUBTOTAL OF DIRECT COSTS		$ 39,700	
			SUBTOTAL OF ALLIED COST		$ 24,800	
			SALES TAX (ON DIRECT COSTS)		$ -	PUBLIC ROAD CONSTRUCTION EXEMPT FROM SALES TAX
			CONTINGENCY - AVERAGE	40%	$ 26,000	
			TOTAL ESTIMATED COST		**$ 91,000**	

Sequim Surface Water Master Plan
Herrera Project #14-05826-000

Project: A2.26 River Road Storage Project
Prepared by: A. Sytsma
Checked by: M. Fontaine
Updated: 12-May-15

Note: This cost estimate is approximate. Actual construction bids may vary significantly from this statement of probable costs due to timing of construction, changed conditions, labor rate changes, or other factors beyond the control of the engineers.

ESTIMATED COST OF PROJECT IMPLEMENTATION AT PRELIMINARY DESIGN STAGE

NO.	QUANT.	UNIT	ITEM	UNIT COST	AMOUNT	BASIS OF QUANTITY AND UNIT COST
1	1	LS	CONSTRUCTION OF RESERVOIR	$ 23,376,800.00	$ 23,376,800	Cost estimate from Anchor QEA, River Road Storage Project Technical Memorandum Attachment D-4 (April 2014).Construction costs do not include cost of conveying stormwater flows from West Happy Valley to storage reservoir.
			SUBTOTAL OF DIRECT COSTS		**$ 23,376,800**	
			SALES TAX (DIRECT COSTS)	**8.4%**	**$ 1,963,651**	
			TOTAL CONSTRUCTION COST		**$ 25,340,500**	
			ALLIED COSTS			
			ITEM	**UNIT COST**	**AMOUNT**	**BASIS OF QUANTITY AND UNIT COST**
			PROJECT ADMIN / MANAGEMENT	10%	$ 2,500,000	10% of construction.
			SURVEY	LS	$ 25,000	Base mapping.
			GEOTECHNICAL ANALYSES	LS	$ 40,000	Preliminary Geotechnical Engineering Recommendations Memorandum completed by Anchor QEA. Supplementary borings and geotechnical report.
			DESIGN	10%	$ 2,500,000	10% of construction.
			PERMITTING AND MITIGATION	LS	$ 250,000	Geotechnical borings did not encounter groundwater so assume no/minimal wetlands are present onsite and mitigation requirements are minimal.
			PROPERTY ACQUISITION	LS	$ -	Assume no cost.
			CONSTRUCTION MANAGEMENT	10%	$ 2,500,000	10% of construction.
			SUBTOTAL OF ALLIED COSTS		**$ 7,800,000**	
			SUMMARY			
			SUBTOTAL OF DIRECT COSTS		$ 23,376,800	
			SUBTOTAL OF ALLIED COST		$ 7,800,000	
			SALES TAX (ON DIRECT COSTS)		$ 1,963,651	
			CONTINGENCY - AVERAGE	40%	$ 13,000,000	
			TOTAL ESTIMATED COST		**$ 46,000,000**	

Sequim Surface Water Master Plan
Herrera Project #14-05826-000

Project: Sequim SMP CIP Program - SITE A2.63 (PRAIRIE STREET BETWEEN SEQUIM AVENUE AND 2ND AVENUE)
Prepared by: Steve Zenovic
Checked by: Seth Rodman
Updated: 19-May-15

Note: This cost estimate is approximate. Actual construction bids may vary significantly from this statement of probable costs due to timing of construction, changed conditions, labor rate changes, or other factors beyond the control of the engineers.

ESTIMATED COST OF PROJECT IMPLEMENTATION AT PRELIMINARY DESIGN STAGE

NO.	QUANT.	UNIT	ITEM	UNIT COST	AMOUNT	BASIS OF QUANTITY AND UNIT COST
1	1	LS	MOBILIZATION	10%	$ 5,600	
2	1	LS	EROSION/WATER POLLUTION CONTROL	5%	$ 2,700	
3	240	LF	EXTENDED CURB COST INCREASE	$ 5	$ 1,200	
4	310	LF	BARRIER CURB	$ 25	$ 7,750	CITY OF SEQUIM 2014 WATER PROJECT
5	70	CY	POROUS CONCRETE SIDEWALK	$ 350	$ 24,500	CITY OF PORT ANGELES 18TH STREET SIDEWALK IMPROVEMENTS
6	200	TON	PERMEABLE BALLAST FOR RESERVOIR COURSE	$ 35	$ 7,000	CITY OF PORT ANGELES GREEN ALLEYS PROJECT (ESTIMATE)
7	60	CY	BIORETENTION SOIL	$ 60	$ 3,600	CITY OF PORT ANGELES WATERFRONT PH.2 2014
8	960	SF	BIORETENTION PLANTINGS	$ 12	$ 11,520	CITY OF PORT ANGELES WATERFRONT PH. 1 2013
			SUBTOTAL OF DIRECT COSTS		**$ 63,870**	
			SALES TAX (DIRECT COSTS)	**8.4%**	**$ 5,365**	
			TOTAL CONSTRUCTION COST		**$ 69,200**	
			ALLIED COSTS			
			ITEM	**UNIT COST**	**AMOUNT**	**BASIS OF QUANTITY AND UNIT COST**
			PROJECT ADMIN./MANAGEMENT	10%	$ 6,920	
			SURVEY	LS	$ -	
			GEOTECHNICAL ANALYSIS	LS	$ -	NO REPORT ANTICIPATED
			DESIGN	20%	$ 13,840	
			PERMITTING	LS	$ -	NO PERMITS ANTICIPATED
			PROPERTY ACQUISITION	LS	$ -	WITHIN CITY R-O-W
			CONSTRUCTION MANAGEMENT	20%	$ 13,840	
			SUBTOTAL OF ALLIED COSTS		**$ 34,600**	
			SUMMARY			
			SUBTOTAL OF DIRECT COSTS		$ 63,870	
			SUBTOTAL OF ALLIED COST		$ 34,600	
			SALES TAX (ON DIRECT COSTS)		$ 5,365	
			CONTINGENCY - LOW	30%	$ 31,000	
			TOTAL ESTIMATED COST		**$ 130,000**	

Programmatic CIP Scopes and Budgets

PROGRAMMATIC CIP PROJECTS

CIP Project #1.00 – Sequim Area Stormwater-Watershed Plan

- **Problem Description:** There is a long history of flooding problems along the Bell Creek Corridor and in several areas of town where irrigation systems pass through the City. In addition, Sequim Bay and the lower reaches of Bell Creek and Johnson Creek are all listed as impaired water bodies on Ecology's 303(d) list for one or more parameters (high fecal coliform bacteria concentrations, low dissolved oxygen, high temperature, and low benthic-Index of Biological Integrity (B-IBI)); a total maximum daily load (TMDL) study and water quality implementation plan may be required to address impairments. If not managed properly, future development will increase storm flows and exacerbate existing flooding and water quality problems, and an important source of groundwater recharge will be lost. Now is an opportune time to plan for strategic stormwater, floodplain, and habitat management in each watershed that affects the City. The Sequim Area Watershed Plan could be used to address problems 1.02, 1.04, 1.06, 1.07, 1.08, 1.09, 1.10, 2.17, 4.04, and 4.31.

- **Project Solution:** Develop a Sequim Area Stormwater-Watershed Plan (Plan) that identifies a comprehensive strategy for optimizing infiltration opportunities and ensuring adequate surface water conveyance capacity to accommodate future growth, while improving water quality, preserving and enhancing habitat, and recharging groundwater – all in coordination with planning for future development. The scope of the Plan would include portions of Bell Creek, Johnson Creek, Cassalery Creek, and Gierin Creek – the exact geographic extents may depend on participation and financial contribution from involved stakeholders, but in order to address problems within the City limits, the upstream flow contributions from outside the City must be considered. The project will include an assessment of existing conditions and will develop a Plan for maintaining and improving stormwater conveyance, infiltration, and resource protection. Modeling would be performed to better understand the causes of flooding in the stormwater system and develop effective long term solutions. Irrigation systems and development in Clallam County areas and the UGA upstream of the City has a significant potential to affect flows in all the small streams; therefore, the County and irrigation purveyors have an important role in developing goals and objectives for the Plan and subsequent projects for implementation. Finally, adoption (by parties with responsibilities under the plan) and implementation of a watershed plan may allow the City additional flexibility in its regulation of new development (Ecology 2014).
    - <u>Task 1 – Confirm goals and objectives of the stormwater-watershed plan</u>: Confirm the goals of the Plan based on input from City departments, irrigation purveyors, and Clallam County DCD and Public Works. The goals of the Plan may include:
        i. Groundwater resource protection (aquifer recharge and groundwater quality)
        ii. A water pollution control plan to address water quality impairments and eliminate the need for a TMDL study

iii. Reduction of existing flooding problems while providing adequate conveyance and stormwater management for future build-out conditions

iv. Habitat protection and enhancement

v. To the extent feasible, protection (and potential augmentation) of stream flows in the Dungeness watershed

vi. Meeting goals for development density and open space

- Task 2 – Develop funding strategy and apply for grants – Evaluate grant opportunities related to the goals and objectives defined in Task 1, which may include grant funding for broader watershed planning, water quality improvement, land acquisition, habitat improvement, flood control, public involvement, and other objectives.
- Task 3 – Existing conditions assessment: Assess existing conditions in the watershed including: land use, soils, geology, topography, surface water, stormwater and irrigation conveyance network, natural resources performing important ecosystem services (e.g., wetlands, stream habitat, buffers, floodplains, recharge areas), and water quality. Data that is available in the existing GIS database and previous studies will be supplemented with field data collection to develop a comprehensive geodatabase. This data will also provide the necessary inputs for hydrologic and hydraulic modeling including development of impervious area coverage using recent aerial imagery.
- Task 4 – Future scenarios development: Future scenarios would be identified to achieve the goals and objectives that are established in Tasks 1 and 2. The scenarios may include acquisition of lands performing valuable ecosystem services, identifying areas of more intensive development, defining projects to expand or upgrade the stormwater management system (e.g. larger culverts, regional detention/infiltration projects, water quality treatment, or new collection systems), and setting watershed specific stormwater management requirements for new development.
- Task 5 – Hydrologic, hydraulic and hydrogeologic modeling: A hydrologic and hydraulic model as well as a hydrogeologic (groundwater) model would be used to better understand the causes of flooding in the stormwater system and develop effective long-term solutions. This task would be revisited as part of Task 1 to ensure the level of effort is aligned with the project objectives and goals, and to reconfirm the process will provide the information needed to support management decisions.

    i. Task 5A –Hydrologic and hydraulic modeling – The storm and surface water conveyance system within and upstream of Sequim is very complex due to the irrigation system. The irrigation system serves as a collection system during the wet season and significant effort will likely be necessary to improve on the current assessment of the amount of water that it collects to facilitate calibration of the hydrologic and hydraulic model. This task assumes the following work:

        1. Develop baseline model from existing GIS data

        2. Augment existing flow data collected in 2015 with field reconnaissance of conveyance system

3. Field survey key stream channel reaches

4. One wet season of continuous flow monitoring at multiple locations

5. Model calibration and validation

6. Evaluation of future scenarios (i.e. alternatives analysis iterations)

ii. Task 5B – Hydrogeologic Modeling – A local-watershed-scale groundwater model based on the 2008 Ecology groundwater flow model will allow the stormwater program to assess the cumulative and simultaneous effects of existing and proposed stormwater system features on groundwater and surface water conditions. This task may include the following work:

1. Assess groundwater mounding beneath existing and proposed stormwater infiltration features on the groundwater table, stormwater infiltration capacity, and groundwater discharge to stream features

2. Support outreach and education by identifying areas where irrigation ditches and/or groundwater conditions affect stormwater system performance

3. Trace routes of illicit discharge using groundwater flow path or contaminant transport analysis

4. Assess effects of underground injection, whether for stormwater, remediation, or geothermal purposes

5. Simulate climate-change scenarios to assess stormwater system development

- Task 6 – Draft and final Plan: The Plan will summarize Tasks 1-5 and the results of the hydrologic and hydraulic modeling including future scenario evaluation. It will also provide the strategy, including project sequencing and timing, for carrying out the activities or projects identified during Task 4 and 5. The Plan will contain an implementation schedule and funding strategy, identify milestones, and tie-in to other scheduled capital improvement and transportation projects/plans in the project areas. Costs will be developed for site-specific structural strategies to establish Capital Improvement Program (CIP) input for future City planning. Bell Creek culvert replacement projects in the current Storm and Surface Water Master Plan are examples of these projects and cost estimate. To meet Ecology's Basin Plan requirements, the Plan will also recommend:

  i. Stormwater requirements in sub-areas for new and re-development

  ii. Confirmation of existing critical area designations and other land use and utility plans, standards, and regulations

  iii. Source control activities including residential and commercial public outreach

  iv. Monitoring

- Task 7 – Implementation: This specific scope and cost for this task will be defined in Task 6 above.
  - Benefits:
    - Reduce flooding
    - Improve water quality
    - Improve groundwater recharge
    - Protect and enhance habitat
    - Improve instream flows
    - Plan for future growth, density, and open space
  - Project Priority: High

Table F-1. Cost Estimate for CIP Project #1.00— Sequim Area Stormwater-Watershed Plan.							
	Cost in 2015 Dollars ($)						
Task	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**Total**
Task 1 – Develop goals and objectives of the watershed plan		7,000					7,000
Task 2 – Develop funding strategy and apply for grants		15,000					15,000
Task 3 – Existing conditions assessment		10,000	60,000				70,000
Task 4 – Future scenarios development			70,000	30,000			100,000
Task 5 – Hydrologic, hydraulic, and hydrogeologic modeling[a]			170,000	280,000			450,000
Task 6 – Draft and final plan				40,000	60,000		100,000
Task 7 – Implementation							To Be Determined
TOTAL EXPENSES		32,000	300,000	350,000	60,000		742,000

[a] Includes budget for Task 5A ($300,000) and 5B ($150,000).

PROGRAMMATIC CIP PROJECTS

CIP Project #1.09 – Middle-Reach Bell Creek Basin Plan

- **Problem Description:** Bell Creek, Highland irrigation ditch, and culverts along Bell Creek corridor receive stormwater runoff from upland areas during storm events, causing flooding in the undeveloped middle reach of Bell Creek and in downstream culverts. Specific reaches of lower and middle Bell Creek are listed as impaired water bodies on Ecology's 303(d) list for 2012 due to high fecal coliform bacteria concentrations, low dissolved oxygen, high temperature, and low benthic-Index of Biological Integrity (B-IBI); a total maximum daily load (TMDL) study and water quality implementation plan may be required to address impairments. If not managed properly, future development will increase storm flows and exacerbate existing flooding and water quality problems, and an important source of groundwater recharge will be lost. Now is an opportune time to plan for strategic stormwater, floodplain, and habitat management for the only stream that runs through the City. This project would also address problems 2.17/2.29 and 1.02, 1.04, 1.06, 1.07, 1.08, 1.10.

- **Project Solution:** If 1.00 (Sequim Area Stormwater-Watershed Plan) is not implemented, Project 1.09 would identify a strategy for optimizing infiltration opportunities and ensuring adequate surface water conveyance capacity to accommodate future growth, while improving water quality, preserving and enhancing habitat, and recharging groundwater – all in coordination with planning for future development. The scope of the project would be specific to the middle reach of Bell Creek and address issues related to the undeveloped floodplain area that functions like a sponge to absorb stormwater. In order to adequately characterize the existing conditions and evaluate potential future scenarios, the project would need to account for development upstream of the city limits in upper Bell Creek as well as irrigation system components that are, or could be, tributary to Bell Creek. The project will include an assessment of existing conditions and will develop a plan for maintaining and improving stormwater conveyance, infiltration, and resource protection. Modeling would be performed to better understand the causes of flooding in the stormwater system and develop effective long term solutions. Development in Clallam County areas and the UGA upstream of the City has a significant potential to affect flows in Bell Creek; therefore, the County and irrigation purveyors have an important role in developing goals and objectives for the Plan and subsequent projects for implementation. Finally, adoption (by parties with responsibilities under the plan) and implementation of a basin plan may allow the City additional flexibility in its regulation of new development (Ecology 2014).

    - <u>Task 1 – Confirm goals and objectives of the basin plan</u>: Confirm the goals of the basin planning effort based on input from City departments, irrigation purveyors, and Clallam County DCD and Public Works. The goals may include:

        i. Groundwater resource protection (aquifer recharge and groundwater quality)

ii. A water pollution control plan to address water quality impairments and eliminate the need for a TMDL study

iii. Reduction of existing flooding problems while providing adequate conveyance and stormwater management for future build-out conditions

iv. Habitat protection and enhancement

v. To the extent feasible, protection (and potential augmentation) of stream flows in the Dungeness watershed

vi. Meeting goals for development density and open space

- Task 2 – Develop funding strategy and apply for grants – Evaluate grant opportunities related to the goals and objectives defined in Task 1, which may include grant funding for broader watershed planning, water quality improvement, habitat improvement, land acquisition, flood control, public involvement, and other objectives.
- Task 3 – Existing conditions assessment: Assess existing conditions in the watershed: land use, soils, geology, topography, surface water, stormwater and irrigation conveyance network, natural resources performing important ecosystem services (e.g., wetlands, stream habitat, buffers, floodplains, recharge areas), and water quality. Data that is available in the existing GIS and previous studies will be supplemented with field data collection to develop a comprehensive geodatabase. This data will also provide the necessary inputs for hydrologic and hydraulic modeling including development of impervious area coverage using recent aerial imagery.
- Task 4 – Future scenarios development: Future scenarios would be identified to achieve the goals and objectives that are established in Tasks 1 and 2. The scenarios may include acquisition of lands performing valuable ecosystem services, identifying areas of more intensive development, defining projects to expand or upgrade the stormwater management system (e.g. larger culverts, regional detention/infiltration projects, water quality treatment, or new collection systems), and setting sub-basin specific stormwater management requirements for new development.
- Task 5 – Hydrologic, hydraulic, and hydrogeologic modeling: A hydrologic and hydraulic model as well as a hydrogeologic (groundwater) model would be used to better understand the causes of flooding in the stormwater system and develop effective long-term solutions. This task would be revisited as part of Task 1 to ensure the level of effort is aligned with the project objectives and goals, and to reconfirm the process will provide the information needed to support management decisions.

    i. Task 5A – Hydrologic and hydraulic modeling – The storm and surface water conveyance system within and upstream of Sequim is very complex due to the irrigation system. The irrigation system serves as a collection system during the wet season and significant effort will likely be necessary to improve on the current assessment of the amount of water that it collects to facilitate calibration of the hydrologic and hydraulic model. This task assumes the following work:

1. Develop baseline model from existing GIS data

2. Augment existing flow data collected in 2015 with field reconnaissance of conveyance system

3. Field survey key stream channel reaches

4. One wet season of continuous flow monitoring at multiple locations

5. Model calibration and validation

6. Evaluation of future scenarios (i.e. alternatives analysis iterations)

ii. Task 5B – Hydrogeologic Modeling – A site-scale groundwater model of the middle reach of Bell Creek will allow the stormwater program to assess the effects of alternative stormwater system improvements to address flooding. Examples of potential benefits of a site-scale groundwater model include the following:

1. Assess groundwater mounding or groundwater flooding based on site-specific soil and groundwater conditions;

2. Support feasibility analysis of alternative enhanced stormwater features such as a meandering channel, an infiltration trench, or a deep infiltration well; and

3. Support final design of the selected enhanced stormwater feature.

- Task 6 – Draft and final Plan: The Plan will summarize Tasks 1 through 5 and the results of the hydrologic and hydraulic modeling and hydrogeologic modeling including future scenario evaluation. It will also provide the strategy, including project sequencing and timing, for carrying out the activities or projects identified during Task 4 and 5. The Plan will contain an implementation schedule and funding strategy, identify milestones, and tie-in to other scheduled capital improvement and transportation projects/plans in the project areas. Costs will be developed for site-specific structural strategies to establish Capital Improvement Program (CIP) input for future City planning. Bell Creek culvert replacement projects in the current Storm and Surface Water Master Plan are examples of these projects and cost estimate. To meet Ecology's Basin Plan requirements, the Plan will also recommend:

  i. Stormwater requirements in sub-areas for new and re-development

  ii. Confirmation of existing critical area designations and other land use and utility plans, standards, and regulations

  iii. Source control activities including residential and commercial public outreach

  iv. Monitoring

- Task 7 – Implementation: This specific scope and cost for this task will be defined in Task 6 above.
  - Benefits:
    - Reduce flooding
    - Improve water quality
    - Improve groundwater recharge
    - Protect and enhance habitat
    - Instream flow enhancement
    - Plan for future growth, density, and open space
  - Project Priority: High

Table F-2. Cost Estimate for CIP Project #1.09 — Middle-Reach Bell Creek Basin Plan.							
	Cost in 2015 Dollars ($)						
Task	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**Total**
Task 1 – Develop goals and objectives of the watershed plan		5,000					5,000
Task 2 – Develop funding strategy and apply for grants		10,000					10,000
Task 3 – Existing conditions assessment		10,000	40,000				50,000
Task 4 – Future scenarios development			40,000	20,000			60,000
Task 5 – Hydrologic, hydraulic, and hydrogeologic modeling[a]			70,000	120,000			190,000
Task 6 – Draft and final plan				20,000	30,000		50,000
Task 7 – Implementation							To Be Determined
TOTAL EXPENSES		25,000	150,000	160,000	30,000		365,000

[a] Includes budget for Task 5A ($150,000) and 5B ($40,000).