Stormwater Management Action Plan (SMAP) for the Barnes and Lower Massey Catchment – Des Moines, Washington

Prepared for

Des Moines WA
The Waterland City

March 2023

Prepared by

Parametrix

Stormwater Management Action Plan (SMAP) for the Barnes and Lower Massey Catchment – Des Moines, Washington

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TABLE OF CONTENTS

1. INTRODUCTION 1
1.1 Purpose 1
1.2 Selection of Priority Catchment Area 1

2. STORMWATER MANAGEMENT ACTIONS OVERVIEW 3

3. STORMWATER FACILITY RETROFITS 4
3.1 Requirement 4
3.2 Screening Methodology 4
3.3 Selected Projects 4
3.3.1 Short-Term 4
3.3.2 Long-Term 5

4. LAND MANAGEMENT AND DEVELOPMENT STRATEGIES 7
4.1 Requirement 7
4.2 Screening Methodology 7
4.3 Selected Actions 7
4.3.1 Short-Term 7
4.3.2 Long-Term 8

5. TAILORED STORMWATER MANAGEMENT PROGRAM 9
5.1 Requirement 9
5.2 Screening Methodology 9
5.3 Selection Actions 9
5.3.1 Short-Term 9
5.3.2 Long-Term 10

6. LONG-RANGE PLANS 11
6.1 Requirement 11
6.2 Identified Long-Range Plan Coordination 11

7. SCHEDULE AND BUDGET 12
7.1 Requirement 12
7.2 Estimated Schedules and Budgets 12
7.3 Potential Grant Funding 12

TABLE OF CONTENTS (CONTINUED)

8. FUTURE ASSESSMENT 14
8.1 SMAP Evaluation Schedule 14
8.2 SMAP Evaluation Process 14

9. CONCLUSION 15

10. REFERENCES 16

LIST OF FIGURES

Figure 1. Selected High-Priority Barnes and Lower Massey Catchment Area 2
Figure 2. Proposed Stormwater Facility Retrofit Locations 6

LIST OF TABLES

Table 1. Proposed Stormwater Management Actions 3
Table 2. Short-Term Stormwater Facility Retrofits 5
Table 3. Long-Term Stormwater Facility Retrofits 5
Table 4. Short-Term Land Management Action 7
Table 5. Long-Term Land Management Actions 8
Table 6. Short-Term Tailored Stormwater Management Program Actions 10
Table 7. Long-Term Tailored Stormwater Management Program Actions 10
Table 8. Potential Grant Opportunities Applicable to SMAs 13

APPENDICES

A Stormwater Retrofit Project Details

ACRONYMS AND ABBREVIATIONS

City	City of Des Moines
Ecology	Washington State Department of Ecology
GSI	Green Stormwater Infrastructure
IDDE	Illicit Discharge Detection and Elimination
NPDES	National Pollutant Discharge Elimination System
Permit	Ecology NPDES Western Washington Phase II Municipal Stormwater Permit
SMA	Stormwater Management Action
SMAP	Stormwater Management Action Plan

1. INTRODUCTION

1.1 Purpose

This report documents the City of Des Moines' (City's) Stormwater Management Action Plan (SMAP) for the Barnes and Lower Massey Catchment Area, which has been identified by the City as high priority. For this SMAP development process, the City has followed the elements outlined in the Washington State Department of Ecology (Ecology) National Pollutant Discharge Elimination System (NPDES) Western Washington Phase II Municipal Stormwater Permit (Permit) Section S5.C.1 – Stormwater Planning (Ecology 2019a).

The goal of the Barnes and Lower Massey SMAP is to address impacts from existing or planned development on priority receiving waters. The stormwater management action planning includes the following elements:

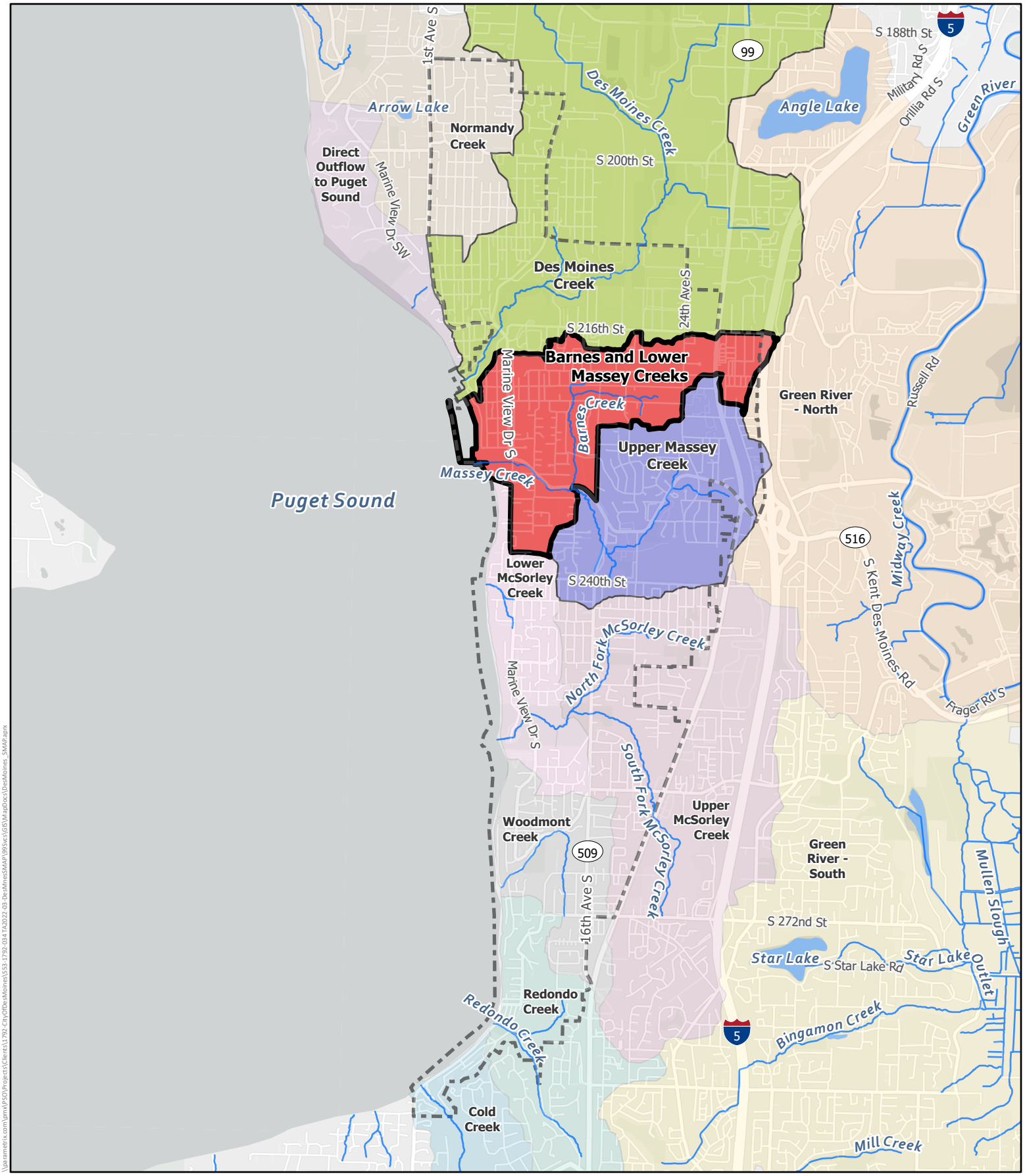
- Receiving Water Assessment in accordance with NPDES Phase II Permit Section S5.C.1.d.i.
- Receiving Water Prioritization in accordance with NPDES Phase II Permit Section S5.C.1.d.ii.
- Prepare a Stormwater Management Action Plan (SMAP) in accordance with NPDES Phase II Permit Section S5.C.1.d.iii.

The Receiving Water Assessment has been completed and the results documented in the Receiving Water Assessment (Des Moines 2022). The Receiving Water Prioritization has been completed and the results documented in the Receiving Water Prioritization Technical Memorandum (Parametrix 2022).

1.2 Selection of Priority Catchment Area

The Receiving Water Prioritization Memo (Parametrix 2022) identified three high-priority catchment areas for the Stormwater Management Action Plan (SMAP), which also happen to be the northernmost catchments in the city: Des Moines Creek, Barnes and Lower Massey Creeks, and Upper Massey Creek. The candidate priority catchment areas were advertised for public comment and evaluated by the City's SMAP Interdisciplinary Team. Through review of all input, the City has selected Barnes and Lower Massey as the final SMAP high-priority catchment area (Figure 1). Key considerations regarding selection of the Barnes and Lower Massey catchment area are as follows:

- Ranked with a higher need for improvement compared to other priority catchments.
- There are a number of capital projects planned related to capacity and drainage improvements that may present opportunities for water quality and flow control upgrades, including:
  - Culvert replacement and pipe upgrades from Barnes /Massey Creek Confluence to mouth
  - Fish habitat improvement projects near mouth of Massey Creek
  - 223rd/ downtown Marina Steps – potential installation of water quality regional facility
- Marina Development area has the opportunity to add water quality treatment to planned pipe replacement projects.
- Commercial development near the waterfront presents potential for water quality retrofits
- Reviewing Barnes Creek Trail pre-design feasibility opportunities for potential off-site development and mitigation banking credits



Date: 3/27/2023
Sources: City of Des Moines, King County, ESRI
Disclaimer: This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes.

Streams
Des Moines City Limits

Selected Priority Catchment
Barnes and Lower Massey Creeks

Other Identified Priority Catchments
Des Moines Creek
Upper Massey Creek

0 1,000 2,000 4,000
Feet

Figure 1 - Selected High-Priority Catchment
Stormwater Management Action Plan (SMAP) for Barnes and Lower Massey Creeks

Des Moines, WA

2. STORMWATER MANAGEMENT ACTIONS OVERVIEW

The City's planned stormwater management actions (SMAs) for Barnes and Lower Massey are summarized below in Table 1 and described in detail in the following sections. All descriptions and details of the SMAs in this report are planning-level and may be updated as the SMA development progresses.

Table 1. Proposed Stormwater Management Actions

	Proposed SMA	Budget	Schedule	Future Assessment Frequency
Stormwater Facility Retrofits				
Short-Term	Marine View Dr S Pond – Option A	$861,000	2023 to 2029	Annual
Short-Term	Marine View Dr S Pond – Option B	$611,000	2023 to 2029	Annual
Short-Term	13th Ave S Bioswale	$215,000	2023 to 2029	Annual
Long-Term	220th Pond/ Wetland	$705,000	2030 to 2043	Every 2 years
Long-Term	S 222nd St & 24th Ave Green Stormwater Infrastructure (GSI)	$1.40 M	2030 to 2043	Every 2 years
Land Management/Development Strategies				
Short-Term	Tree and forest area protection area identifications	0.1 FTE	2023 to 2029	Annual
Short-Term	Study of additional long-term action feasibility (as part of next Surface Water Comprehensive Plan update in 2029)	0.2 FTE	2023 to 2029	Annual
Long-Term	(Contingent on findings of additional long-term action feasibility study)	TBD	2030 to 2043	Every 2 years
Tailored Stormwater Management Program				
Short-Term	Source Control – Inspection prioritization	0.2 FTE	2023 to 2029	Annual
Short-Term	O&M – Inspections of City stormwater outfalls	0.1 FTE	2023 to 2029	Annual
Short-Term	Illicit Discharge Detection and Elimination (IDDE) – Field screening of outfalls	0.1 FTE	2023 to 2029	Annual
Long-Term	Public Education and Outreach – Marina District	0.1 FTE	2030 to 2043	Every 2 years

3. STORMWATER FACILITY RETROFITS

3.1 Requirement

Permit Section S5.C.1.d.iii.(a) requires the SMAP to include:

> *A description of the stormwater facility retrofits needed for the area, including the BMP types and preferred locations.*

3.2 Screening Methodology

The City has selected stormwater facility retrofit projects for the Barnes and Lower Massey SMAP based on the following process:

Step 1. Stormwater Management Coverage Assessment

The City's existing stormwater management coverage was mapped against land cover, and gaps in the stormwater management were identified. Opportunities for retrofits were identified by prioritizing areas based on the following criteria:

- Developed tributary areas with no stormwater management or those with vintage stormwater management (mainly arterial roadways and historically developed neighborhoods with no existing stormwater management)
- Locations for potential retrofit facilities on land already owned by the City
- Tributary areas not identified as buildable land (and thus lacking the potential for stormwater management to be required as part of new development or redevelopment)

Pervious land cover mapping was also analyzed to identify canopy gaps in riparian buffers.

Step 2. Candidate Project Screening and Selection

A high-level feasibility screening was conducted by members of the City's Interdisciplinary Team to identify potential projects based on relative benefit, opportunity, and general ability to be executed with minimal delay (e.g. the land or facility is owned by the City), as well as rule out site locations that have known obstacles to project implementation at this time. Through this screening, preferred sites were selected for potential stormwater management retrofits. Capital project sheets were developed for the candidate projects to include background information, treatment area, concept BMP type, and planning level cost.

Step 3. Future Assessment

The pacing of implementation will be based on available staff resources, funding levels, grants, and total cost of the program over the short term 6-year and long term 20-year planning horizon. In general, the City will review the list of short-term stormwater facility retrofits at least once each year and long-term retrofits every 2 years and make revisions based on available funding and staff resources.

3.3 Selected Projects

3.3.1 Short-Term

Stormwater facility retrofits planned for the short-term horizon from 2023 to 2029 (0 to 6 years) are summarized below in Table 2, shown in the map in Figure 2, and detailed in Appendix A.

Table 2. Short-Term Stormwater Facility Retrofits

Project Name	Description of BMP	Tributary Area[1] (acres)	Cost & Potential Funding	Schedule	Future Assessment Considerations
Future Assessment note: All listed stormwater facility retrofits are contingent on site feasibility confirmation, permitting constraints, and staff and funding resources.					
Marine View Dr S Pond	Option A: Upgrade vintage (est. 1993) City-owned pond at Marine View Drive with enhanced water quality treatment system; project may also potentially address known flooding issues at a second upstream pond to the east along SR 516 (adjacent to Taco Time).	24	$861,000	2023 to 2029	• Marine View Drive pond optimization is the main focus. • Flooding issues at Taco Time pond are a secondary focus.
	Option B: Retrofit vintage (est. 1993) City-owned pond at Marine View Drive to function as a stormwater treatment wetland.	24	$611,000	2023 to 2029	• Marine View Drive pond optimization is the main focus.
13th Ave S Bioswale	Upgrade/ optimization of vintage existing vintage stormwater bioswale to provide additional treatment.	7.1	$215,000	2023 to 2029	• No additional

1. The goal of the facility retrofits is to treat as much of the tributary area as possible; however, the final treatment area will be determined through advanced project design based on available facility footprint.

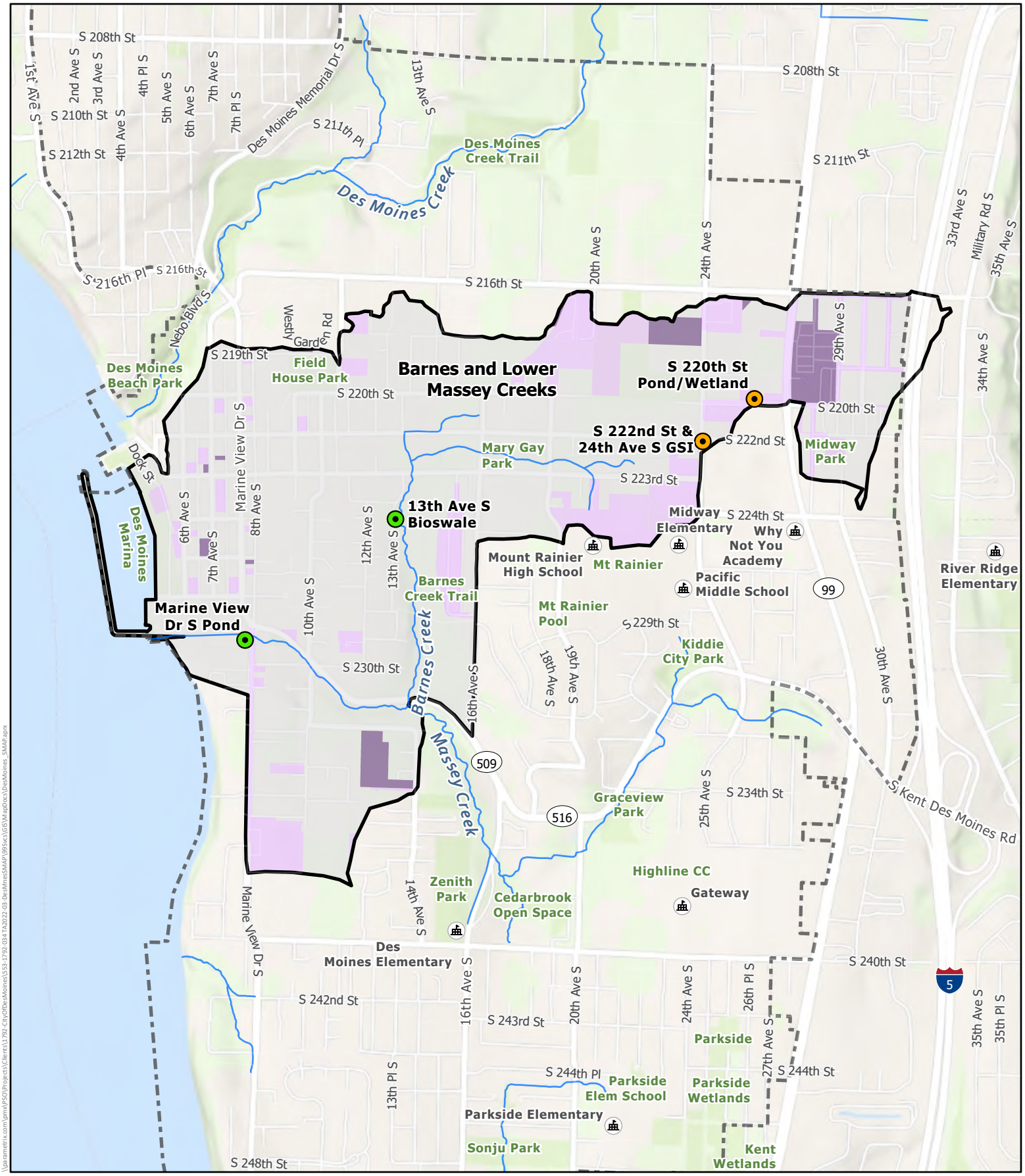
3.3.2 Long-Term

Stormwater facility retrofits planned for the long-term horizon from 2030 to 2043 (7-20 years) are summarized below in Table 3, shown in the map in Figure 2, and detailed in Appendix A.

Table 3. Long-Term Stormwater Facility Retrofits

Project Name	Description of BMP	Tributary Area[1] (acres)	Cost & Potential Funding	Schedule	Future Assessment Considerations
Future Assessment note: All listed stormwater facility retrofits are contingent on site feasibility confirmation, permitting constraints, and staff and funding resources.					
S 220th Pond/ Wetland	Upgrade/ optimization of existing vintage (est. 2003) City-owned stormwater wetland.	62	$705,000	2030 to 2043	• Potentially incorporate into next Surface Water Comprehensive Plan update (2029)
S 222nd St & 24th Ave GSI	Expand planned conveyance system upgrades along 10th Ave S to include water quality treatment for additional tributary area. Potentially add a vegetated bioretention area or bioswale in the right of way at the southeast corner of the intersection.	33	$1.40 M	2033-2042	• Contingent on Transportation project to reconstruct roadway from Marine View Drive to Pacific Highway South. • Potentially incorporate into next Surface Water Comprehensive Plan update (2029)

1. The goal of the facility retrofits is to treat as much of the tributary area as possible; however, the final treatment area will be determined through advanced project design based on available facility footprint.



Date: 3/27/2023
Sources: City of Des Moines, King County, ESRI
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Streams
Des Moines City Limits
Barnes and Lower Massey Creeks
Short-Term Project
Long-Term Project

Existing Treatment Cover
No Stormwater Management
Vintage Standards
Current Standards

0 500 1,000 2,000 Feet

Figure 2 - Proposed Stormwater Retrofit Locations
Stormwater Management Action Plan (SMAP) for Barnes and Lower Massey Creeks

Des Moines, WA

4. LAND MANAGEMENT AND DEVELOPMENT STRATEGIES

4.1 Requirement

Permit Section S5.C.1.d.iii.(b) requires the SMAP to include:

> *Land management/development strategies and/or actions identified for water quality management.*

4.2 Screening Methodology

Members of the City's Interdisciplinary Team reviewed potential land management and development strategies and selected actions that could most readily and reasonably be implemented to benefit the Barnes and Lower Massey catchment area.

The land management and development strategies were screened based on the following priorities:

- Identify lands to protect from impervious surface conversions
- Identify lands to protect from native vegetation removal
- Identify lands to restore native vegetation
- Change future purchasing, zoning, or land use policies
- Change zoning/land use policy to restrict current designated uses

4.3 Selected Actions

4.3.1 Short-Term

The land and development management action planned for the short-term horizon from 2023 to 2029 (0 to 6 years) is summarized below in Table 4.

Table 4. Short-Term Land Management Action

Action	Cost	Schedule	Future Assessment Considerations
Future Assessment note: All listed actions are contingent on staff and funding resources.			
Study potential opportunities that will lead to the protection, restoration, or expansion of trees and/or forested areas. Actions to be reviewed will include new policy, codes, ordinances, and/or programs. Study collaboration opportunities include the next updates to the following plans: • Surface Water Comprehensive Plan (2029) • City-wide Comprehensive Plan • Recreation (Parks) and Senior Services Master Plan • Transportation Improvement Plan	0.1 FTE	2023 to 2029	• Contingent on updates to other departmental plans taking place within SMAP planning window.
Study of additional long-term action feasibility (as part of next Surface Water Comprehensive Plan update in 2029)	0.2 FTE	2023 to 2029	• Contingent on Surface Water Comprehensive Plan update within SMAP planning window.

4.3.2 Long-Term

Land development management actions planned for the long-term horizon from 2030 to 2043 (7 to 20 years) are summarized below in Table 5.

Table 5. Long-Term Land Management Actions

Action	Cost	Schedule	Future Assessment Considerations
Future Assessment note: All listed actions are contingent on staff and funding resources.			
Contingent on findings of additional long-term action feasibility study.	TBD	2030 to 2043	• No additional

5. TAILORED STORMWATER MANAGEMENT PROGRAM

5.1 Requirement

Permit Section S5.C.1.d.iii.(c) requires the SMAP to include:

> *Targeted, enhanced, or customized implementation of stormwater management actions related to permit sections within S5, including:*
>
> - *IDDE field screening,*
> - *Prioritization of Source Control inspections,*
> - *O&M inspections or enhanced maintenance, or*
> - *Public Education and Outreach behavior change programs.*
>
> *Identified actions shall support other specifically identified stormwater management strategies and actions for the basin overall, or for the catchment area in particular.*

5.2 Screening Methodology

The City's Surface Water Management Department staff reviewed the existing stormwater management program components and selected elements that could most readily and reasonably be tailored or enhanced to benefit the Barnes and Lower Massey catchment area. Elements reviewed by the City included those listed Permit Section S5.C.1.d.iii.(c).

5.3 Selection Actions

5.3.1 Short-Term

Tailored stormwater management program actions planned for the short-term horizon from 2023 to 2029 (0 to 6 years) are summarized below in Table 6.

Table 6. Short-Term Tailored Stormwater Management Program Actions

Permit Category	Action	Cost	Schedule	Future Assessment Considerations
Future Assessment note: All listed actions are contingent on staff and funding resources.				
Source Control Inspections	In the first year, required source control inspections will all be within the priority catchment area. In subsequent years a minimum of 20 percent of the businesses inspected will be within the catchment area.	1 FTE	2023-2029	• Spot check a percentage of businesses if all required inspections are completed before the end of the 5-year cycle.
O&M inspections or enhanced maintenance	Annual screening of stormwater outfalls in the catchment during the short-term period.	.25 FTE	2023-2029	• No additional
IDDE	Prioritize IDDE field-screening of City stormwater outfalls in the catchment.	.25 FTE	2023-2029	• No additional

5.3.2 Long-Term

The tailored stormwater management program action planned for the long-term horizon from 2030 to 2043 (7 to 20 years) is summarized below in Table 7.

Table 7. Long-Term Tailored Stormwater Management Program Actions

Permit Category	Action	Cost	Schedule	Future Assessment Considerations
Future Assessment note: All listed actions are contingent on staff and funding resources.				
Public Education and Outreach	Examine the feasibility of launching a Public Education Campaign specific for the Marina Redevelopment area. Include opportunities to collaborate with local businesses and institutions in and around the Marina area.	0.2 FTE	2030-2043	• No additional

6. LONG-RANGE PLANS

6.1 Requirement

Permit Section S5.C.1.d.iii.(e) requires the SMAP to include:

> *Identification of changes needed to local long-range plans, to address SMAP priorities.*

6.2 Identified Long-Range Plan Coordination

The City has identified the following long-range plans needed for coordination throughout implementation to address SMAP priorities:

- City-wide Comprehensive Plan
- Surface Water Comprehensive Plan
- Transportation Improvement Plan
- Recreation (Parks) and Senior Services Master Plan

7. SCHEDULE AND BUDGET

7.1 Requirement

Permit Section S5.C.1.d.iii.(e) requires the SMAP to include:

A proposed implementation schedule and budget sources for:

- Short-term actions (i.e., actions to be accomplished within six years, or from 2023 to 2029), and
- Long-term actions (i.e., actions to be accomplished within seven to 20 years, or from 2030 to 2043).

7.2 Estimated Schedules and Budgets

Estimated schedules and budgets are listed above for each proposed SMA in Sections 3 through 5 of this report.

7.3 Potential Grant Funding

The City is tracking the grant opportunities outlined below in Table 8 and may apply for funding for projects identified in this SMAP.

Table 8. Potential Grant Opportunities Applicable to SMAs

Program Name	Description
Washington State Department of Ecology	
Coastal Protection Fund- Terry Husseman Account	Support locally-sponsored projects that restore or enhance the environment and provide primary benefits to public land or water resources and affiliated infrastructure.
Streamflow Restoration Competitive Grants	Help state and local agencies, Tribal governments, and non-profit organizations implement local watershed plans and projects to improve streamflow and aquatic resources.
Water Quality Combined Funding Program	Integrated funding program for projects that improve and protect water quality. The program combines grants and loans from state and federal funding sources, and provides technical assistance in navigating the process.
Integrated Planning Grants	These grants provide funding to local governments to conduct assessments of brownfield properties and develop integrated project plans for their cleanup and adaptive reuse.
Stormwater Capacity Grants Program	Awarded to NPDES municipal stormwater permittees to implement their municipal stormwater programs as outlined in the municipal stormwater permits.
Washington State Recreation and Conservation Office	
Aquatic Lands Enhancement Account	Used for the acquisition, improvement, or protection of aquatic lands for public purposes. They also may be used to provide or improve public access to the waterfront.
Habitat Conservation Projects- Washington Wildlife and Recreation Program	Funding for a broad range of land conservation efforts.
Land and Water Conservation Fund	The Land and Water Conservation Fund provides funding to preserve and develop outdoor recreation resources, including parks, trails, and wildlife lands.
Recreation Projects - Washington Wildlife and Recreation Program	Provides funding for a broad range of land protection and outdoor recreation, including park acquisition and development, habitat conservation, farmland preservation, and construction of outdoor recreation facilities.
Salmon Recovery and Puget Sound Acquisition and Restoration	Used to restore degraded salmon habitat and protect existing, high-quality habitat to increase the amount and overall health of the places salmon live.
King County Parks	
2020-2025 Parks, Recreation, Trails and Open Space Levy Biennial Grant	Programs opportunities include: • Aquatic Facilities • Parks Capital and Open Space • Open Space – River Corridors • Healthy Communities and Parks Fund

8. FUTURE ASSESSMENT

Permit Section S5.C.1.d.iii.(f) requires the SMAP to include:

> *A process and schedule to provide future assessment and feedback to improve the planning process and implementation of procedures or projects.*

8.1 SMAP Evaluation Schedule

Each SMA identified in this plan will be reviewed based on the schedule outlined in Table 1.

8.2 SMAP Evaluation Process

During each review, the Future Assessment considerations listed in Tables 2 through 7 for each SMA will be evaluated. In addition, the status of the following progress metrics will be reviewed and documented:

1. Is the action still feasible and effective based on ongoing research/action exploration? If not, should the action be removed from the SMAP process?
2. Are there any adjustments that should be made to the review frequency in Table 1?
3. Are there any adjustments that should be made to the Future Assessment considerations where the SMA is listed in Tables 2 through 7?
4. What portion of the action has taken place?
5. How much of the catchment area has been addressed?
6. What portion of the budget has been spent?
7. What changes in funding needs or opportunities have been identified?
8. Are there elements of the previous SMAP development process that should be updated in the future based on this SMA's progress?
9. Is there an opportunity for monitoring associated with this SMA?

9. CONCLUSION

The City has identified the SMAs in this Barnes and Lower Massey SMAP to address impacts from existing or planned development on priority receiving waters. All descriptions and details of the SMAs in this report are planning-level and may change as development of the SMAs progress. Therefore, implementation of these proposed actions will be tracked, evaluated, and updated through the future assessment process described above in the previous section to support continued progress toward restoration/protection of the Barnes and Lower Massey catchment area.

10. REFERENCES

Des Moines, City of. 2022. Receiving Water Assessment. City of Des Moines, WA. March 2022.

Ecology (Washington State Department of Ecology). 2019a. Western Washington Phase II Municipal Stormwater Permit – National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit for discharges from Small Municipal Separate Storm Sewers in Western Washington. State of Washington Department of Ecology. Olympia, Washington. Issuance Date: July 1, 2019; Effective Date: August 1, 2019; Expiration Date: July 31, 2024.

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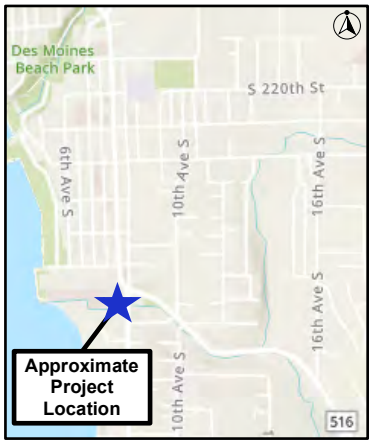
Appendix A

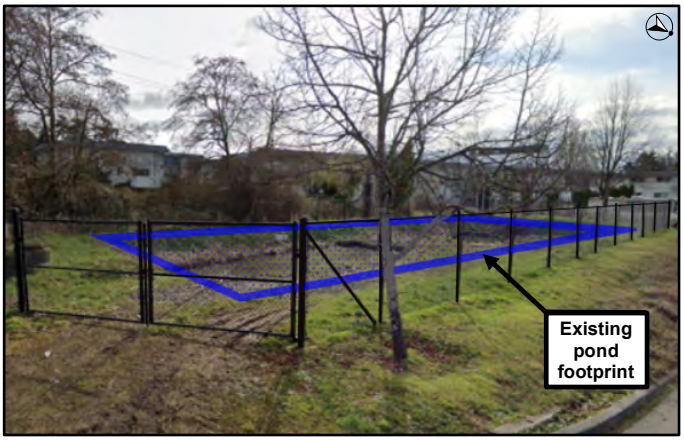
Stormwater Retrofit Project Details

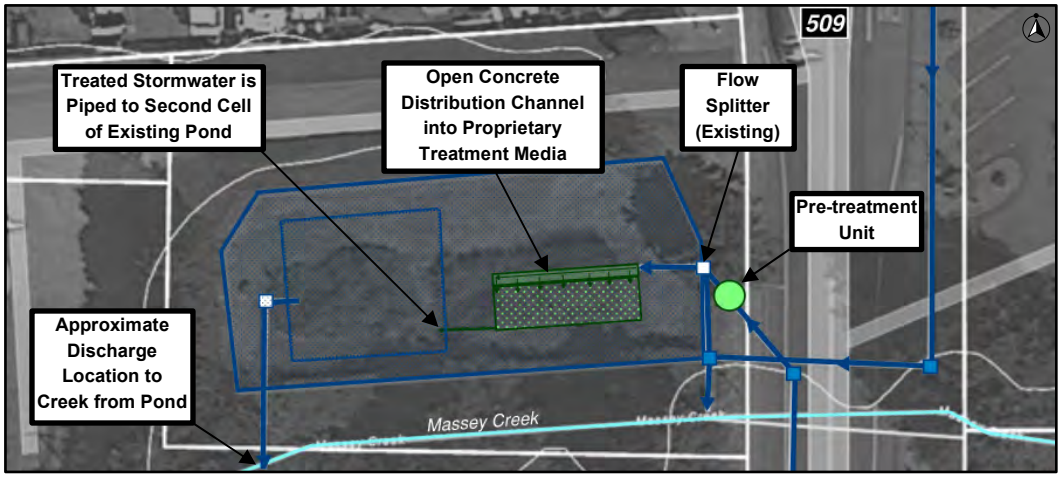
Parametrix

Retrofit Site: Marine View Dr S Pond Option A

Water Quality Retrofit







RETROFIT TYPE	Water Quality Treatment System
LOCATION	22741 Marine View Dr S
WATERSHED	Barnes & Lower Massey Creeks Basin
EXISTING USE	Vintage Stormwater Pond
PROPOSED USE	Optimized pond with water quality treatment system
SITING NOTES	At grade system placed within existing pond cell
TRIBUTARY DRAINAGE AREA	23.7 Acres Total 11.3 Acres Impervious 12.3 Acres Pervious
PROPOSED FOOTPRINT	500 square feet
TOTAL COST	$861,000

Project Description

This project proposes adding a water quality component to the existing vintage stormwater pond at 22741 Marine View Dr S. Water quality treatment is a priority at this location as it is adjacent to its receiving water and does not have space to increase its footprint for flow control. Therefore, the retrofit proposes to provide enhanced stormwater treatment using a large at grade custom sized proprietary water quality treatment system. A pre-treatment unit upstream of the vault will provide coarse sediment removal to extend the maintenance interval of the treatment media. The existing flow diversion structure would be modified to divert the water quality flow rate to the treatment system and bypass peak events directly to the existing pond. An open concrete distribution channel containing a series of openings will be placed upstream of the treatment media to deliver the influent to all parts of the treatment unit. The proprietary media will be installed in concrete lidless vaults along with plants, mulch, and underdrain stone. Final size, placement, and configuration of the project components may be adjusted as the design progresses.

Site Benefits

- Site uses city right-of-way (ROW) and existing pond for retrofit, likely no property acquisition required.
- Treats a large amount of currently untreated pollution generating impervious area based on current standards prior to direct discharge to Massey Creek.
- Potential educational opportunity incorporating stormwater signage.

Site Challenges

- Contingent upon securing grant funding.

Marine View Dr S Pond Option A Opinion (Estimate) of Probable Cost

		Project No.	Date
		553-1792-034	March 09, 2023
Project Name	Marine View Dr S Option A - Water Quality Retrofit - Des Moines SMAP		
Location	22741 Marine View Dr S		
Owner	City of Des Moines		
Estimated By:	A. Van Kirk	**Checked By:** R. Sayles	**Approved By:**
Date:	3/9/2023	**Date:** 3/21/23	**Date:**

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL COST
	SITE PREP AND CONSTRUCTION				
1	MOBILIZATION (10%)	10%	% of lines 6-13		$37,976
2	CONTRACTOR PROVIDED SURVEY (3%)	3%	% of lines 6-13		$11,393
3	DEWATERING (2%)	2%	% of lines 6-13		$7,595
4	TESC (5%)	5%	% of lines 6-13		$18,988
5	PROJECT TEMPORARY TRAFFIC CONTROL (5%)	5%	% of lines 6-13		$18,988
6	MEDIA TREATMENT SYSTEM (GRAVITY)	1	LS	$294,000	$294,000
7	STRUCTURE EXCAVATION CLASS A INCL. HAUL	225	CY	$54	$12,150
8	SHORING	1	LS	$6,000	$6,000
9	CRUSHED SURFACING BASE COURSE	32	TON	$48	$1,559
10	PRE-TREATMENT UNIT	1	EACH	$54,570	$54,570
11	CONNECTION TO DRAINAGE STRUCTURE	2	EACH	$2,140	$4,280
12	SCHEDULE A STORM SEWER PIPE 12 IN. DIAM.	27	LF	$161	$4,347
13	RECORD DRAWINGS	1	LS	$2,850	$2,850
				Lines 6 - 13 Subtotal	$379,756

CONSTRUCTION		
Construction Cost Subtotal		$474,695
Construction Management	15%	$71,204
Project Contingency	30%	$142,408
Construction Total		**$688,308**

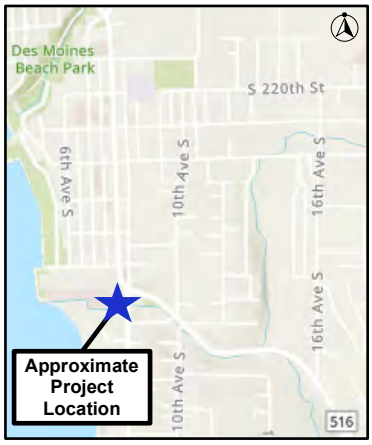
DESIGN		
Design Cost	15%	$103,246
Permitting	5%	$34,415
City Project Management	5%	$34,415
Design Total		**$172,077**

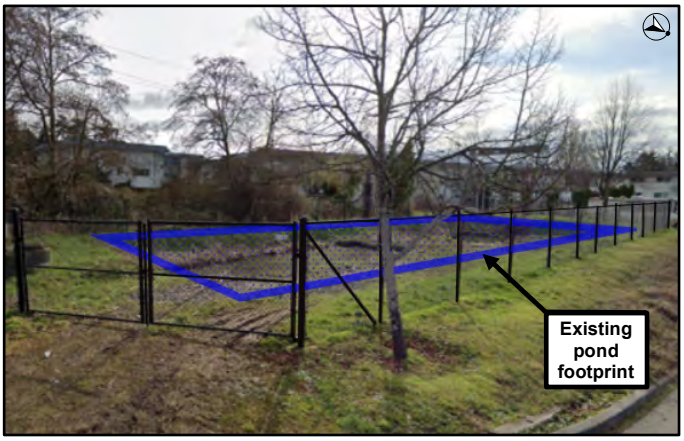
TOTAL PROJECT COST		**$861,000**

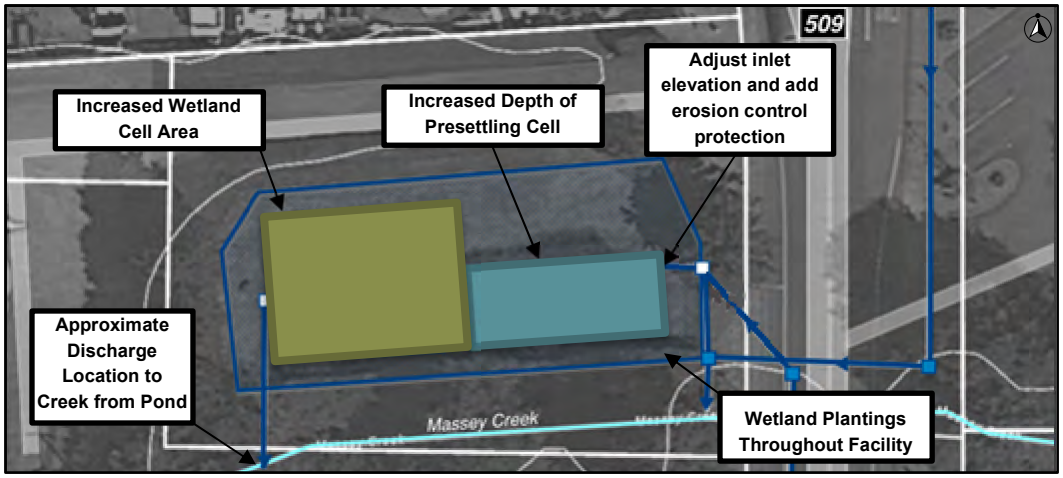
Parametrix

Retrofit Site: Marine View Dr S Pond Option B

Water Quality Retrofit







RETROFIT TYPE	Stormwater Wetland Retrofit
LOCATION	22741 Marine View Dr S
WATERSHED	Barnes & Lower Massey Creeks Basin
EXISTING USE	Vintage wet pond
PROPOSED USE	Stormwater treatment wetland
SITING NOTES	Placed within existing wet pond footprint
TRIBUTARY DRAINAGE AREA	23.6 Acres Total 11.3 Acres Impervious 12.3 Acres Pervious
PROPOSED FOOTPRINT	6,000 square feet
TOTAL COST	$611,000

Project Description

This project proposes retrofitting the existing vintage stormwater pond at 22741 Marine View Dr S. The retrofit proposes to modify the existing pond to simulate a stormwater treatment wetland. The access road may be reduced to provide additional area to the wetland cell. In addition, the forebay may be deepened to increase the settling volume. The pipe inlet elevation may need to be adjusted to accommodate the increased depth. The wetland will be lined with a low permeability liner and topped with native soil to ensure sufficient water retention for the wetland plants. Final size, placement, and configuration of the project components may be adjusted as the design progresses.

Site Benefits

- Site uses existing pond area for retrofit, likely no property acquisition required.
- Treats a large amount of currently untreated pollution generating impervious area based on current standards prior to direct discharge to Massey Creek.
- Potential educational opportunity incorporating stormwater signage.

Site Challenges

- Contingent upon securing grant funding.

Marine View Dr S Pond Option B Opinion (Estimate) of Probable Cost

		Project No.	Date
		553-1792-034	March 09, 2023
Project Name	Marine View Dr S Option B - Water Quality Retrofit - Des Moines SMAP		
Location	22741 Marine View Dr S.		
Owner	City of Des Moines		
Estimated By:	A. Van Kirk	**Checked By:** R. Sayles	**Approved By:**
Date:	3/9/2023	**Date:** 3/28/23	**Date:**

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL COST
	SITE PREP AND CONSTRUCTION				
1	MOBILIZATION (10%)	10%	% of lines 5-12		$27,393
2	CONTRACTOR PROVIDED SURVEY (3%)	3%	% of lines 5-12		$8,218
3	TESC (5%)	5%	% of lines 5-12		$13,696
4	PROJECT TEMPORARY TRAFFIC CONTROL (5%)	5%	% of lines 5-12		$13,696
5	CHANNEL EXCAVATION INCL. HAUL	212	CY	$40	$8,480
6	SCHEDULE A STORM SEWER PIPE 12 IN. DIAM.	25	LF	$161	$4,025
7	CONNECTION TO DRAINAGE STRUCTURE	1	EACH	$2,140	$2,140
8	RECORD DRAWINGS	1	LS	$2,850	$2,850
9	QUARRY SPALLS	107	TON	$70	$7,521
10	GEOMEMBRANE LINER	662	SY	$125	$82,750
11	TOPSOIL TYPE A	662	SY	$71	$47,002
12	PLANTING	662	SY	$180	$119,160
				Lines 5 - 12 Subtotal	$273,928

CONSTRUCTION		
Construction Cost Subtotal		$336,931
Construction Management	15%	$50,540
Project Contingency	30%	$101,079
Construction Total		**$488,550**

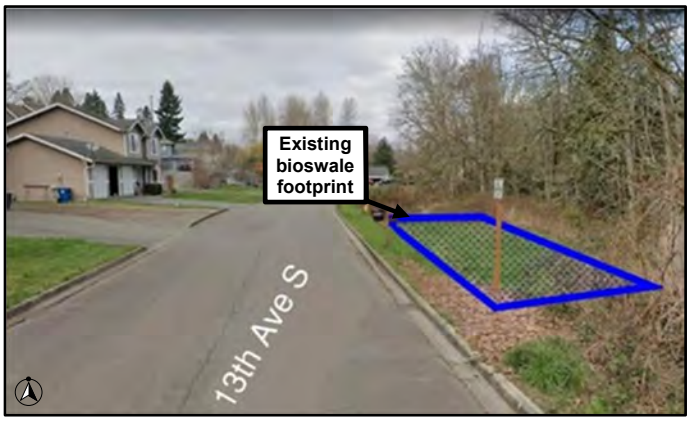
DESIGN		
Design Cost	15%	$73,282
Permitting	5%	$24,427
City Project Management	5%	$24,427
Design Total		**$122,137**

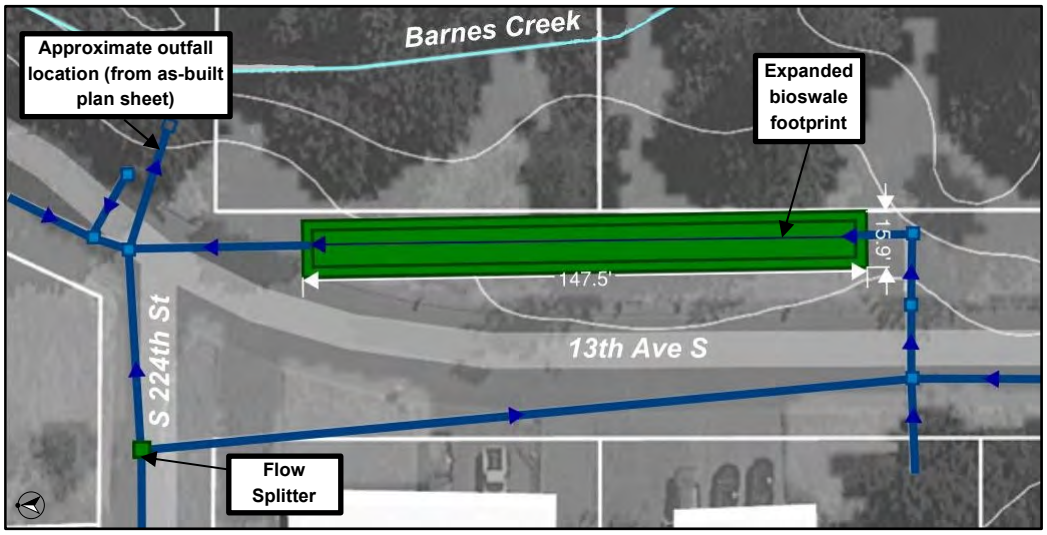
TOTAL PROJECT COST		**$611,000**

Parametrix

Retrofit Site: 13th Ave S Bioswale

Water Quality Retrofit





RETROFIT TYPE
Retrofit Existing Bioswale
LOCATION
22440 13th Ave S
WATERSHED
Barnes & Lower Massey Creeks Basin
EXISTING USE
Existing Bioswale
PROPOSED USE
Optimized Bioswale
SITING NOTES
Existing biofiltration swale located approx. 400 ft south of S. 223rd St.
TRIBUTARY DRAINAGE AREA
7.1 Acres Total 2.8 Acres Impervious 4.3 Acres Pervious
PROPOSED FOOTPRINT
2,350 square feet
TOTAL COST
$215,000

Project Description

This project will retrofit an existing vintage stormwater biofiltration swale, expanding the width and length to provide current level basic treatment of the **7.1 acres** before discharging into Barnes Creek. The footprint of the existing swale will be increased and biortention soil mix will be amended to increase treatment capacity. Flow spreaders will likely be used at the inlet and along the length of the swale to dissipate energy and evenly distrobute flow along the bottom of the swale. A flow splitter will be added upstream of the facility at S 224th St. Final size, placement, and configuration of the project components may be adjusted as the design progresses.

Site Benefits

- Site uses city right of way (ROW) for retrofit, likely no property acquisition required.
- Expands existing bioswale based on current standards for contributing area prior to direct discharge to Barnes Creek.

Site Challenges

- Contingent upon securing grant funding.
- Adjacent utilities will likely require coordination (sewer, water, gas, and communications) and may constrain placement locations of the treatment systems.
- Located in geological hazard area and close to steep slopes.

13th Ave S Bioswale Opinion (Estimate) of Probable Cost

		Project No.	Date
		553-1792-034	March 08, 2023
Project Name	13th Ave S Bioswale - Water Quality Retrofit - Des Moines SMAP		
Location	22440 13th Ave S		
Owner	City of Des Moines		
Estimated By:	A. Van Kirk	**Checked By:** R. Sayles	**Approved By:**
Date:	3/8/2023	**Date:** 3/21/23	**Date:**

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL COST
	SITE PREP AND CONSTRUCTION				
1	MOBILIZATION (10%)	10%	% of lines 5-22		$9,608
2	CONTRACTOR PROVIDED SURVEY (3%)	3%	% of lines 5-22		$2,882
3	TESC (5%)	5%	% of lines 5-22		$4,804
4	PROJECT TEMPORARY TRAFFIC CONTROL (5%)	5%	% of lines 5-22		$4,804
5	CHANNEL EXCAVATION INCL. HAUL	178	CY	$40	$7,119
6	STRUCTURE EXCAVATION CLASS A INCL. HAUL	56	CY	$54	$3,024
7	SHORING	1	LS	$2,000	$2,000
8	CRUSHED SURFACING BASE COURSE	7	CF	$8	$57
9	SAWCUT	3	LF	$7	$21
10	REMOVE ASPHALT PAVEMENT	18	SY	$18	$324
11	HMA CL. 1/2 IN. PG	6	TON	$179	$1,062
12	CATCH BASIN TYPE 2 54 INCH DIAM. W/ FR	1	EACH	$10,000	$10,000
13	CONNECTION TO DRAINAGE STRUCTURE	2	EACH	$2,140	$4,280
14	MEDIUM COMPOST	260	SY	$131	$34,099
15	TOPSOIL TYPE A	260	CF	$8	$2,082
16	SEEDING, FERTILIZING, AND MULCHING	260	SY	$62	$16,138
17	COIR NET	260	SY	$10	$2,603
18	FLOW SPREADER	6	EACH	$900	$5,400
19	QUARRY SPALLS	2	TON	$70	$128
20	CLEARING AND GRUBBING	0.1	ACRE	$46,911	$4,389
21	RECORD DRAWINGS	1	LS	$2,850	$2,850
22	TRASH RACK	1	EACH	$500	$500
				Lines 5 - 22 Subtotal	$96,077

CONSTRUCTION		
Construction Cost Subtotal		$118,175
Construction Management	15%	$17,726
Project Contingency	30%	$35,452
Construction Total		**$171,353**

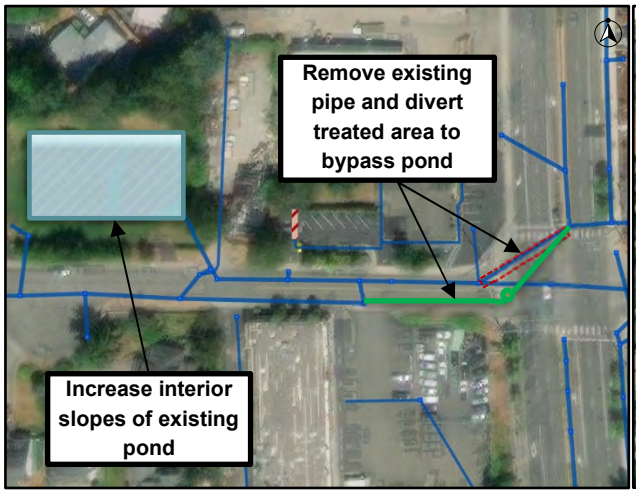
DESIGN		
Design Cost	15%	$25,703
Permitting	5%	$8,568
City Project Management	5%	$8,568
Design Total		**$42,838**

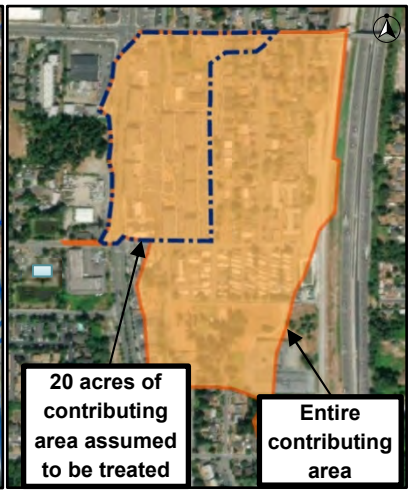
TOTAL PROJECT COST		**$215,000**

Parametrix

Retrofit Site: S 220th St Pond

Water Quality Retrofit





RETROFIT TYPE	
	Pond Retrofit
LOCATION	
	2454 S 220th St
WATERSHED	
	Barnes & Lower Massey Creeks Basin
EXISTING USE	
	Vintage wet pond
PROPOSED USE	
	Optimized wet pond
SITING NOTES	
	Approximately 20.0 acres of contributing area is treated.
TRIBUTARY DRAINAGE AREA	
	61.8 Acres Total
	41.0 Acres Impervious
	21.3 Acres PGIS
AREA AVAILABLE FOR TREATMENT	
	0.5 Acre Pond
TOTAL COST	
	$705,000

Project Description

This project proposes an optimization of the existing vintage wet pond at 2454 South 220th St. Approximately 61.8 acres appear to drain toward S 220th St from the northeastern corner of the Barnes & Lower Massy basin towards the vintage pond for treatment. The project proposes to divert flow from approximately 20.0 of the 61.8 acres that is believed to have water quality treatment to current standards elsewhere. Removing this area prevents double water quality treatment for the 20.0 acres and allows for more capacity in the pond for currently untreated area. In addition, the interior slopes of the pond may be augmented to increase the potential volume for water quality treatment. The overall goal is to treat the remaining 41.8 acres for water quality in this location based on current standards. Final size, placement, and configuration of the project components may be adjusted as the design progresses.

Site Benefits

- Site uses city right-of-way (ROW) and existing pond for retrofit, likely no property acquisition required.
- Treats a large amount of currently untreated pollution generating impervious area based on current standards prior to discharge to Barnes Creek.

Site Constraints/Difficulties

- Contingent upon securing grant funding.
- Adjacent utilities may require coordination (sewer, water, gas, and communications) and may constrain placement locations of the treatment systems.

S 220th St Pond Opinion (Estimate) of Probable Cost

		Project No.	Date
		553-1792-034	March 21, 2023

Project Name	S 220th St Pond - Water Quality Retrofit - Des Moines SMAP
Location	2454 S 220th St
Owner	City of Des Moines

Estimated By:	A. Van Kirk	**Checked By:**	R. Sayles	**Approved By:**	
Date:	3/21/2023	**Date:**	3/22/23	**Date:**	

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL COST
	SITE PREP AND CONSTRUCTION				
1	MOBILIZATION (10%)	10%	% of lines 5-17		$31,597
2	CONTRACTOR PROVIDED SURVEY (3%)	3%	% of lines 5-17		$9,479
3	TESC (5%)	5%	% of lines 5-17		$15,798
4	PROJECT TEMPORARY TRAFFIC CONTROL (5%)	5%	% of lines 5-17		$15,798
5	CHANNEL EXCAVATION INCL. HAUL	665	CY	$40	$26,600
6	STRUCTURE EXCAVATION CLASS A INCL. HAUL	313	CY	$54	$16,902
7	SHORING	1	LS	$9,000	$9,000
8	SCHEDULE A STORM SEWER PIPE 12 IN. DIAM.	240	LF	$161	$38,640
9	CATCH BASIN TYPE 2 48 IN. DIAM.	1	EACH	$6,025	$6,025
10	CONNECTION TO DRAINAGE STRUCTURE	2	EACH	$2,140	$4,280
11	CRUSHED SURFACING BASE COURSE	7	TON	$48	$316
12	SAWCUT	79	LF	$7	$553
13	REMOVE ASPHALT PAVEMENT	149	SY	$18	$2,682
14	HMA CL. 1/2 IN. PG	51	TON	$179	$9,068
15	SEEDING, FERTILIZING, AND MULCHING	2776	SY	$62	$172,140
16	RECORD DRAWINGS	1	LS	$2,850	$2,850
17	CLEARING AND GRUBBING	1	ACRE	$46,911	$26,910
				Lines 5 - 17 Subtotal	$315,965

CONSTRUCTION		
Construction Cost Subtotal		$388,637
Construction Management	15%	$58,296
Project Contingency	30%	$116,591
Construction Total		**$563,524**

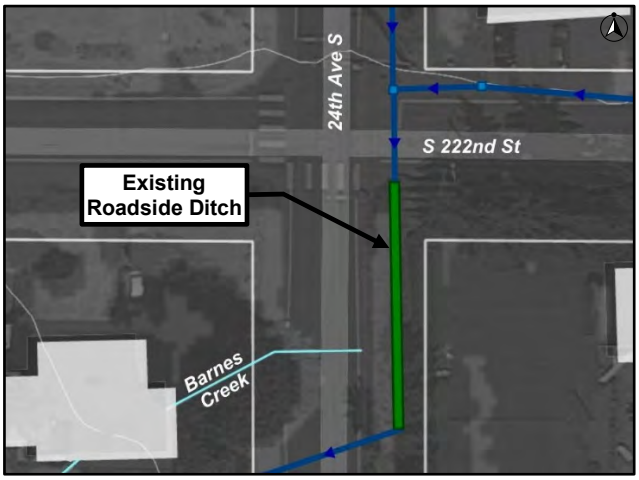
DESIGN		
Design Cost	15%	$84,529
Permitting	5%	$28,176
City Project Management	5%	$28,176
Design Total		**$140,881**

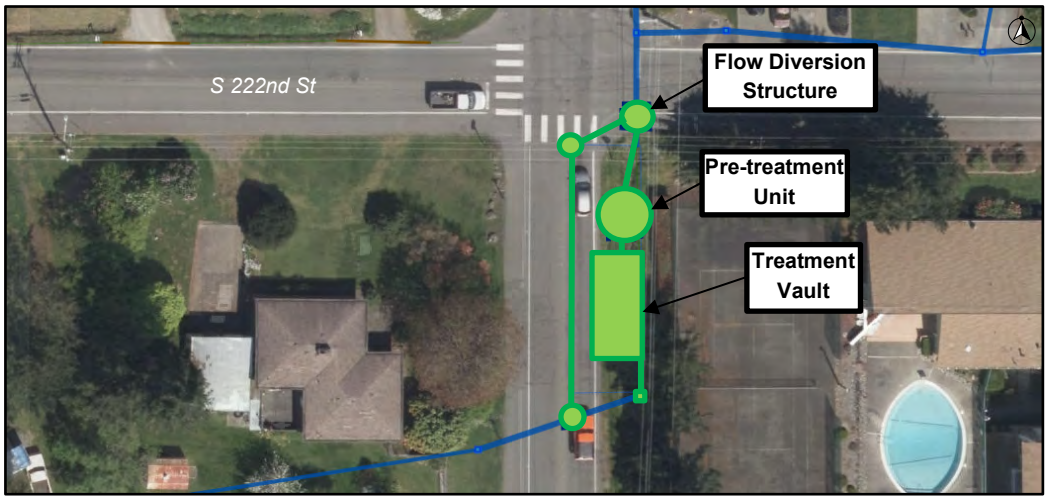
TOTAL PROJECT COST		**$705,000**

Parametrix

Retrofit Site: S 222nd St and 24th Ave S GSI

Water Quality Retrofit





RETROFIT TYPE
Water Quality Treatment Vault
LOCATION
Southeastern corner of S 222nd St and 24th Ave S
WATERSHED
Barnes & Lower Massey Creeks Basin
EXISTING USE
Roadside Ditch
PROPOSED USE
Underground Treatment Vault
TRIBUTARY DRAINAGE AREA
33.1 Acres Total 16.4 Acres Impervious 16.7 Acres PGIS
AREA AVAILABLE FOR TREATMENT
475 square feet
TOTAL COST
$1,398,000

Project Description

This project includes a water quality retrofit to an existing conveyance system near the southeastern corner of S 222nd St and 24th Ave S. The City's planned improvement project along S 222nd St will leave little to no available right-of-way (ROW) as lawn, therefore the proposed treatment will be underground in a vault. A flow diversion structure will divert water quality flows that currently travel through an existing roadside ditch to a water quality treatment vault. A hydrodynamic separator will provide pre-treatment upstream of the vault. A bypass route from the flow splitter around the treatment system ensures that only the water quality flow rate is treated and all greater flows are bypassed. Final size, placement, and configuration of the project components may be adjusted as the design progresses.

Site Benefits

- Site uses city ROW and existing pond for retrofit, likely no property acquisition required.

Site Constraints/Difficulties

- Transportation projects on S 222nd St and 24th Ave S will likely impact treatment placement and require future coordination.

S 222nd St and 24th Ave S GSI Opinion (Estimate) of Probable Cost

		Project No. 553-1792-034	**Date** March 21, 2023
Project Name	S 222nd St and 24th Ave S GSI - Water Quality Retrofit - Des Moines SMAP		
Location	Southeastern corner of S 222nd St and 24th Ave S		
Owner	City of Des Moines		
Estimated By:	A. Van Kirk	**Checked By:** R. Sayles	**Approved By:**
Date:	3/21/2023	**Date:** 3/22/23	**Date:**

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL COST
	SITE PREP AND CONSTRUCTION				
1	MOBILIZATION (10%)	10%	% of lines 6-18		$61,696
2	CONTRACTOR PROVIDED SURVEY (3%)	3%	% of lines 6-18		$18,509
3	TESC (5%)	5%	% of lines 6-18		$30,848
4	DEWATERING (2%)	2%	% of lines 6-18		$12,339
5	PROJECT TEMPORARY TRAFFIC CONTROL (5%)	5%	% of lines 6-18		$30,848
6	MEDIA TREATMENT SYSTEM (GRAVITY)	1	LS	$441,000	$441,000
7	SCHEDULE A STORM SEWER PIPE 12 IN. DIAM.	188	LF	$161	$30,268
8	STRUCTURE EXCAVATION CLASS A INCL. HAUL	647	CY	$54	$34,938
9	SHORING	1	LS	$18,000	$18,000
10	CRUSHED SURFACING BASE COURSE	6	TON	$48	$266
11	SAWCUT	35	LF	$7	$245
12	REMOVE ASPHALT PAVEMENT	81	SY	$18	$1,458
13	HMA CL. 1/2 IN. PG	27	TON	$179	$4,896
14	CATCH BASIN TYPE 2 54 INCH DIAM. W/ FR	1	EACH	$10,000	$10,000
15	CONNECTION TO DRAINAGE STRUCTURE	3	EACH	$2,140	$6,420
16	RECORD DRAWINGS	1	LS	$2,850	$2,850
17	PRE-TREATMENT UNIT	1	EACH	$54,570	$54,570
18	CATCH BASIN TYPE 2 48 IN. DIAM.	2	EACH	$6,025	$12,050
				Lines 6 - 18 Subtotal	$616,960

CONSTRUCTION		
Construction Cost Subtotal		$771,200
Construction Management	15%	$115,680
Project Contingency	30%	$231,360
Construction Total		**$1,118,240**

DESIGN		
Design Cost	15%	$167,736
Permitting	5%	$55,912
City Project Management	5%	$55,912
Design Total		**$279,560**

TOTAL PROJECT COST		**$1,398,000**