Stormwater Site Plan

May 31, 2024

PROJECT

Butterworth Road Remodel
5330 Butterworth Rd
Mercer Island, WA 98040
Project No: 24004

OWNER/APPLICANT

Dan Buchser
MacPherson Construction & Design
21626 SE 28th Street
Sammamish, WA 98075

PREPARED BY

John Babb, EIT
Civil Designer

REVIEWED BY

Andy Epstein, PE
Civil Engineer

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Andy Epstein, PE
Civil Engineer

I hereby state that this Stormwater Site Plan for the Butterworth Road Remodel project has been prepared by me or under my supervision and meets the standard of care and expertise that is usual and customary in this community for professional engineers. I understand that the City of Mercer Island does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities prepared by me.

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Section 1 – Project Overview

The Butterworth Road Remodel project is a project that includes the demolition of portions of the onsite existing structure, construction of home renovations, and associated stormwater improvements.

The site address is 5330 Butterworth Rd in Mercer Island, Washington. The site consists of a single parcel, numbered 8661400040, which is approximately 1.89 acres in size. The parcel is in Township 24 North, Range 05, Section 19 East of the Willamette Meridian in King County, Washington. Refer to Exhibit A-1 in Appendix A for a Vicinity Map.

The parcel is bordered by single-family residential properties to the north and south, by Lake Washington to the east, and by Butterworth Road to the west of the site.

The site generally slopes from west to east, with a total elevation of about 26 feet. There is a man-made unnamed Type F stream located on the project parcel near the southern property line. This project proposes connections to the existing stormwater system on site through conveyance pipes.

The project is designed in accordance with the Department of Ecology *2019 Stormwater Management Manual for Western Washington (SMMWW)*, as adopted by the City of Mercer Island.

Section 2 – Existing Conditions Summary

The existing site consists of an existing structure, driveway, and tennis court. In total, the parcel is approximately 1.89 acres in size. There is an existing stormwater system which conveys stormwater throughout the site including existing downspouts to an outfall within Lake Washington along the eastern property line.

There are no other known wetlands or sensitive areas located on or downstream of the site. All work is outside of the shoreline and there are no other known area-specific requirements established in local plans, ordinances, regulations, or in Water Clean-Up Plans approved by the Department of Ecology. Refer to Exhibit A-3 in Appendix A for a Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM).

An NRCS report was also prepared for this project and it defines the soils in the project area as approximately 100% Kitsap silt loam, 15 to 30 percent slopes. Refer to Exhibit A-6 in Appendix A for the NRCS Soil Map.

Section 3 – Offsite Analysis Report

Qualitative Analysis

Define and map the study area

The project site is located on parcel 8661400040 in the City of Mercer Island. Refer to the standalone Civil Engineering Drawings which show the project site and surveyed background.

Study area information review

The following resources were reviewed and the following tasks were performed in order to determine the stormwater flow patterns and to identify any existing or potential problems in the study area:

1. Maps and record drawings from MacPherson Construction & Design were reviewed and show information related to the existing City storm network, discharge location, and any applicable drainage requirements.

2. A topographic survey performed by Cascade Land Surveying was reviewed and provided the basis of design for this project.

Study area field inspection

The project site was field inspected to determine the flow patterns and to identify potential drainage problems. The project area generally sloped from west to east and drains to localized existing yard drains that will be maintained following the completion of this project. No potential drainage problems were identified.

Drainage system description

Based on site observations, the site survey, and other research, stormwater from the project site is collected through roof drains, a stream, and yard drains all of which drain to Lake Washington through outfalls within the ordinary high water mark.

The downstream path was not analyzed because all stormwater runoff is directly discharged into Lake Washington. Based on existing and proposed grades, stormwater does not flow onto the project site from adjacent parcels.

Section 4 – Permanent Stormwater Control Plan

Existing Site Hydrology

Within the project site there is a total elevation change of approximately 26 feet. In general, the site slopes from west to east. Stormwater runoff is collected around the project site and conveyed to outfalls in Lake Washington. Refer to Exhibit A-4 in Appendix A for an existing conditions map.

Developed Site Hydrology

The proposed stormwater project improvements consist of a connections to the existing roof drainage system. Refer to Exhibit A-5 in Appendix A for a proposed conditions map detailing the location of the proposed improvements and storm connections. See also Table 1 for a summary of the proposed project improvement areas.

Table 1 – Proposed Area Summary

Surface Type	Proposed Site
New Pervious Area	0.00 acres
New Plus Replaced Hard Surface	0.14 acres
Total	0.14 acres

Performance Standards and Goals

All Minimum Requirements from the *SMMWW* apply to the new hard surfaces and the converted vegetation areas. This is based on Figure I-3.2 in the *SMMWW* as the project falls under redevelopment requirements. Refer to Exhibit A-2 in Appendix A for flow charts including the flowchart for determining MR 5 requirements.

Low Impact Development Features

The project implements BMP T5.13 Post-Construction Soil Quality and Depth for all disturbed landscape areas.

Flow Control System

The project proposes less than 10,000 square feet of new plus replaced hard surfaces and is flow control exempt, therefore flow control is not required.

Water Quality System

Project improvements do not include any pollution generating impervious surface; therefore, no water quality system is proposed.

Conveyance System

Conveyance calculations are not required due to the project size in relation to the existing project site areas and minimum nature of stormwater connections to the existing stormwater system sized for a larger existing impervious area.

Section 5 – Discussion of Minimum Requirements

MR 1 – Preparation of Stormwater Site Plans

This report provides the necessary Stormwater Site Plan narrative, exhibits, figures, and calculations. Standalone civil engineering plans are provided in the form of temporary erosion and sedimentation control plans and drainage plans.

MR 2 – Construction Stormwater Pollution Prevention Plan (SWPPP)

The proposed project is required to provide a Construction Stormwater Pollution Prevention Plan (SWPPP), including a narrative and Erosion Control Plans. The Construction SWPPP complies with the 12 elements identified in the *SMMWW*. The SWPPP is included in Appendix B.

MR 3 – Source Control of Pollution

All applicable, available, and reasonable source control Best Management Practices (BMPs) must be applied to the project. The temporary erosion and sedimentation control (TESC) plans for the project address all necessary BMPs. Source control BMPs must be selected, designed, and maintained according to the *SMMWW*. In addition to the source control BMPs applicable to all sites, other applicable BMPs include S407 BMPs for Dust Control at Disturbed Land Areas and Unpaved Roadways and Parking Lots, S411 BMPs for Landscaping and Lawn/Vegetation Management, and S417 BMPs for Maintenance of Stormwater Drainage and Treatment Systems. For source control BMPs during construction, refer to the Construction SWPPP in Appendix B.

MR 4 – Preservation of Natural Drainage Systems and Outfalls

Following project improvements, stormwater will continue to drain in existing patterns. Project improvements will therefore preserve the natural discharge location and will not cause an adverse impact to downstream receiving waters and downgradient properties.

MR 5 – On-Site Stormwater Management

This project discharges into a flow control exempt waterbody, Lake Washington, through an entirely man-made conveyance system with sufficient hydraulic capacity to convey stormwater for all developments onsite. Therefore, the project is flow control exempt. The project will not aim to meet

the LID Performance Standard outlined in the *SMMWW* section I-3.4.5; Therefore, the project is required to consider the BMPs in List #3 and use the first BMP that is considered feasible.

MR 6 – Runoff Treatment

This project proposes less than 5,000 SF of pollution generating impervious surface, and as such, is exempt from providing runoff treatment.

MR 7 – Flow Control

As discussed above the project meets requirements to be considered flow control exempt.

MR 8 – Wetlands Protection

There are no known wetlands on the project site or within the vicinity of the project. Therefore, wetland protection measures are not required.

MR 9 – Operation and Maintenance

The operations and maintenance requirements are discussed in Section 9. Refer to Appendix C for the Operations and Maintenance (O&M) manual.

Section 6 – Construction Stormwater Pollution Prevention Plan

A Construction SWPPP has been prepared and is included in Appendix B. The Construction SWPPP will address the 13 Elements outlined by Minimum Requirement 2 of the *SMMWW.* The intent of the Construction SWPPP is to minimize erosion and prevent sediment-laden runoff from discharging off the project site. BMPs outlined in Volume II of the *SMMWW* will be used to prevent or reduce the release of pollutants to the waters of Washington State.

Section 7 – Special Reports and Studies

No special reports or studies have been prepared as part of this report.

Section 8 – Other Permits

The permits that are expected to be required for the project include:

- City of Mercer Island Building Remodel Permit

Section 9 – Operation and Maintenance

Operations and maintenance of onsite stormwater facilities are the responsibility of the owner, MacPherson Construction & Design. Contact information for the owner is provided below:

Dan Buchser
dan@macphersonconstruction.com
MacPherson Construction & Design
21626 SE 28th Street
Sammamish, WA 98075

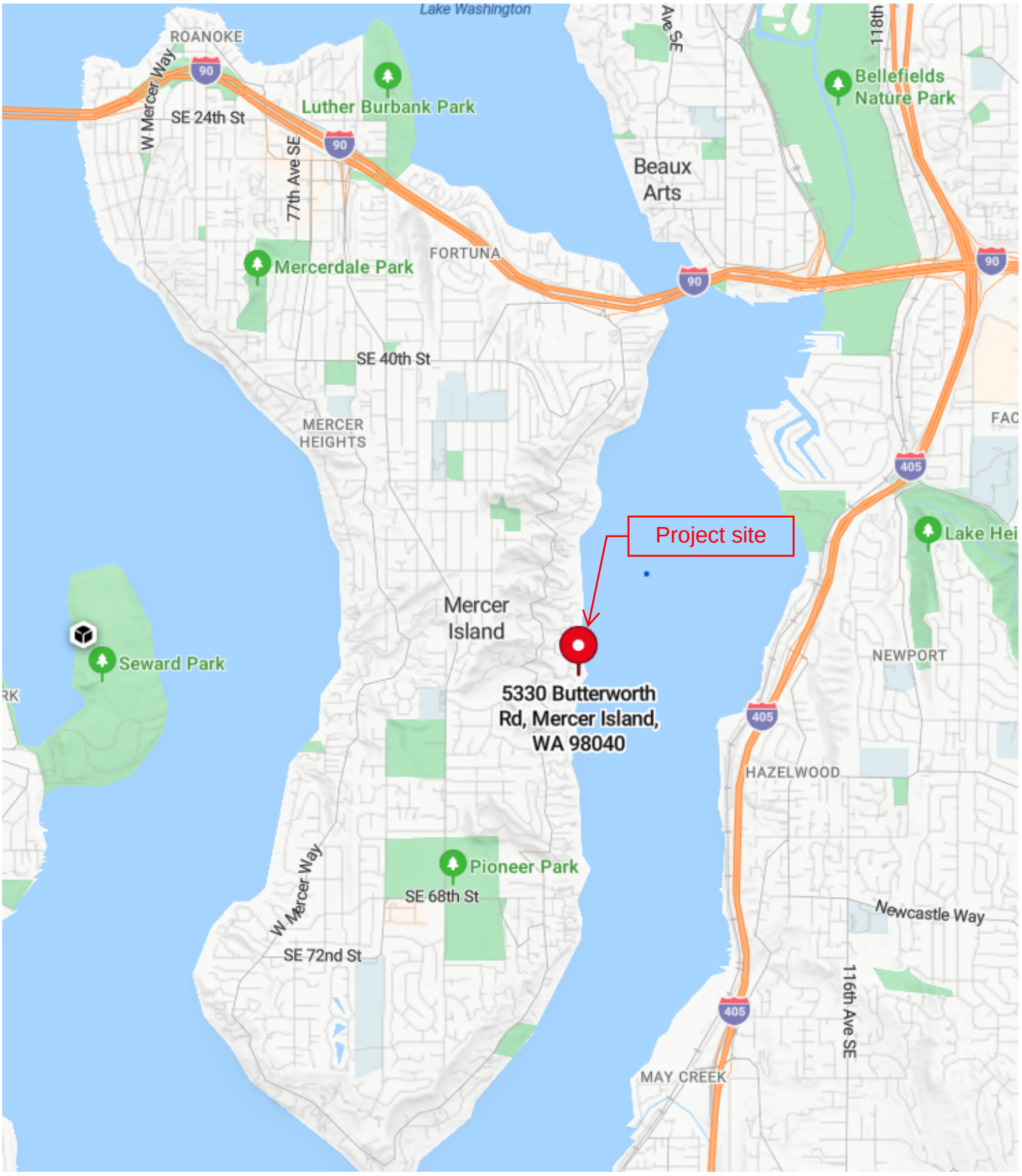
All stormwater facilities shall be maintained and operated in compliance with the City of Mercer Island and *SMMWW* maintenance standards.

Section 10 – Conclusion

This project is designed to meet the requirements of the Department of Ecology *2019 Stormwater Management Manual for Western Washington,* as adopted by the City of Mercer Island. This analysis is based on data and records either supplied to or obtained by Ethos Civil. The analysis has been prepared using procedures and practices within the standard accepted practices of the industry.

Appendix A

Exhibits



ETHOS CIVIL	**Butterworth Road Remodel**	A-1
	Vicinity Map	

Figure I-3.1: Flow Chart for Determining Requirements for New Development

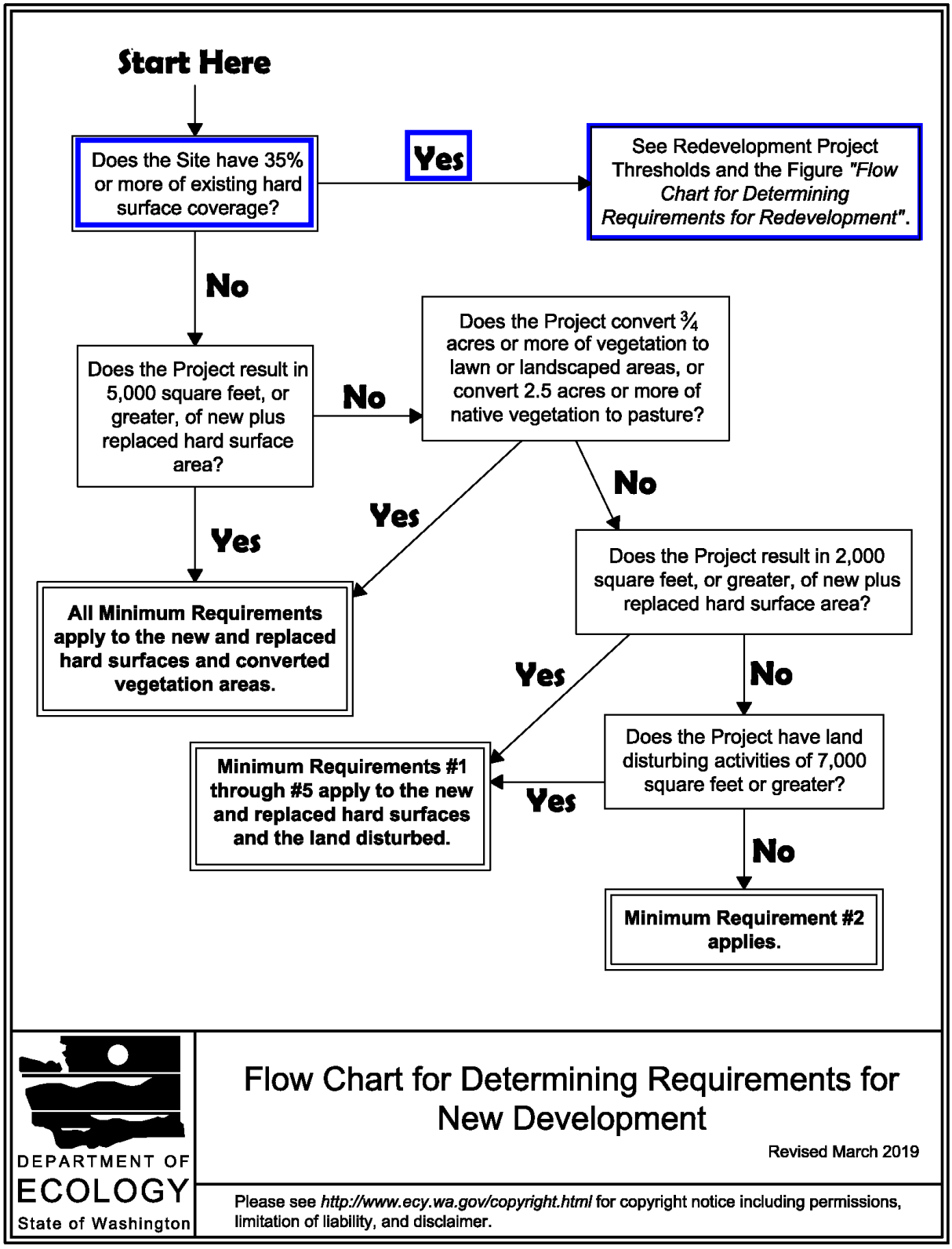


Figure I-3.2: Flow Chart for Determining Requirements for Redevelopment

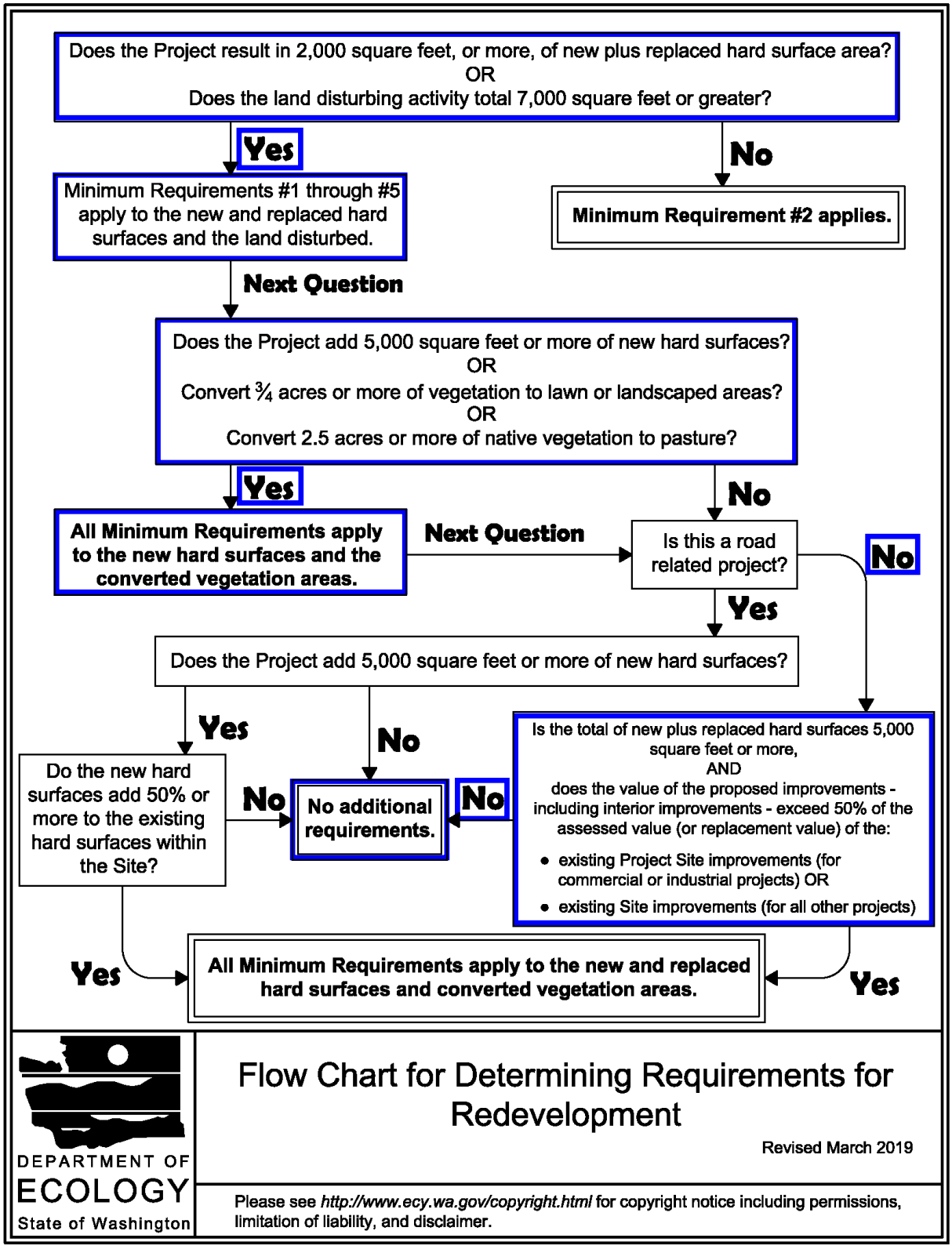
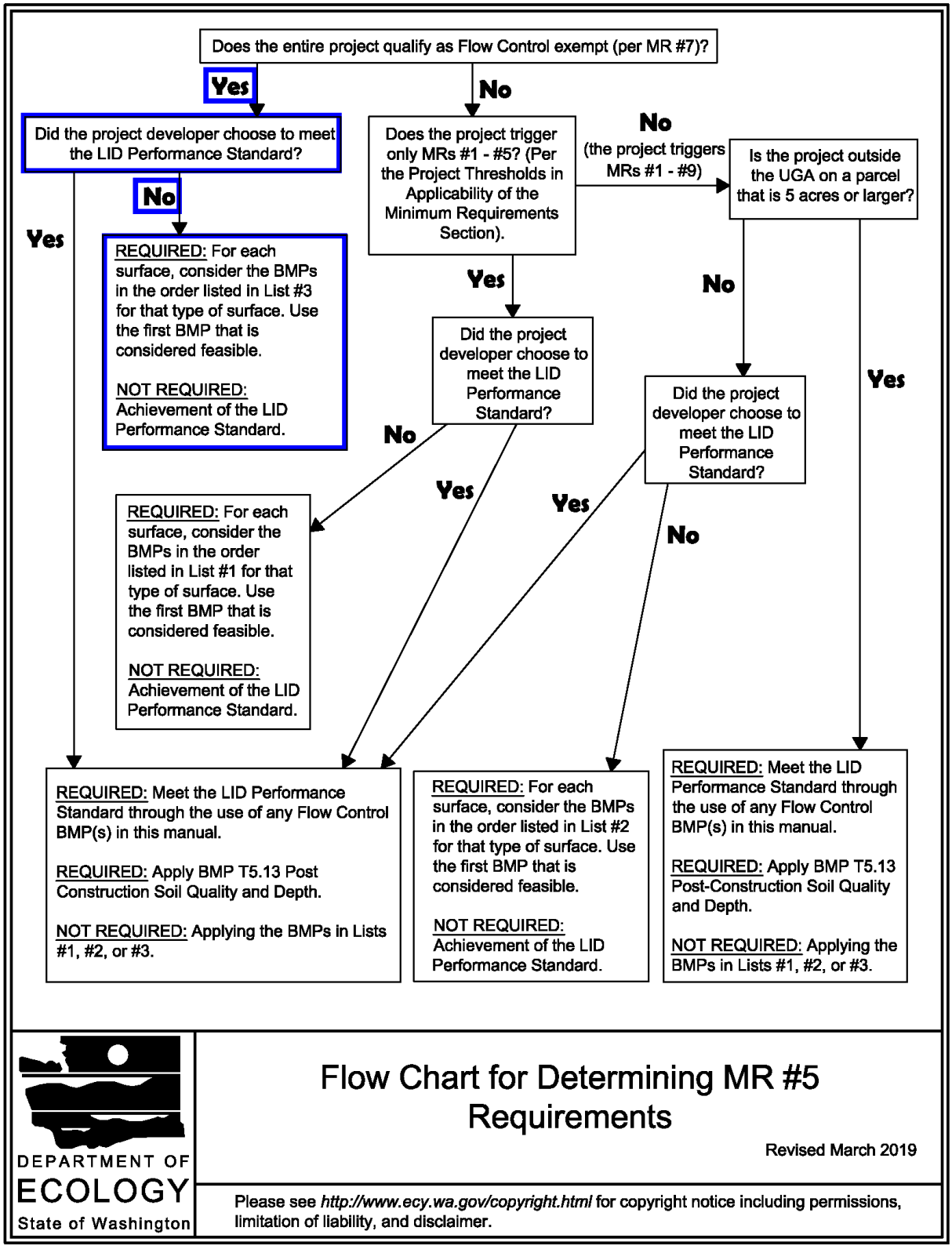


Figure I-3.3: Flow Chart for Determining MR #5 Requirements

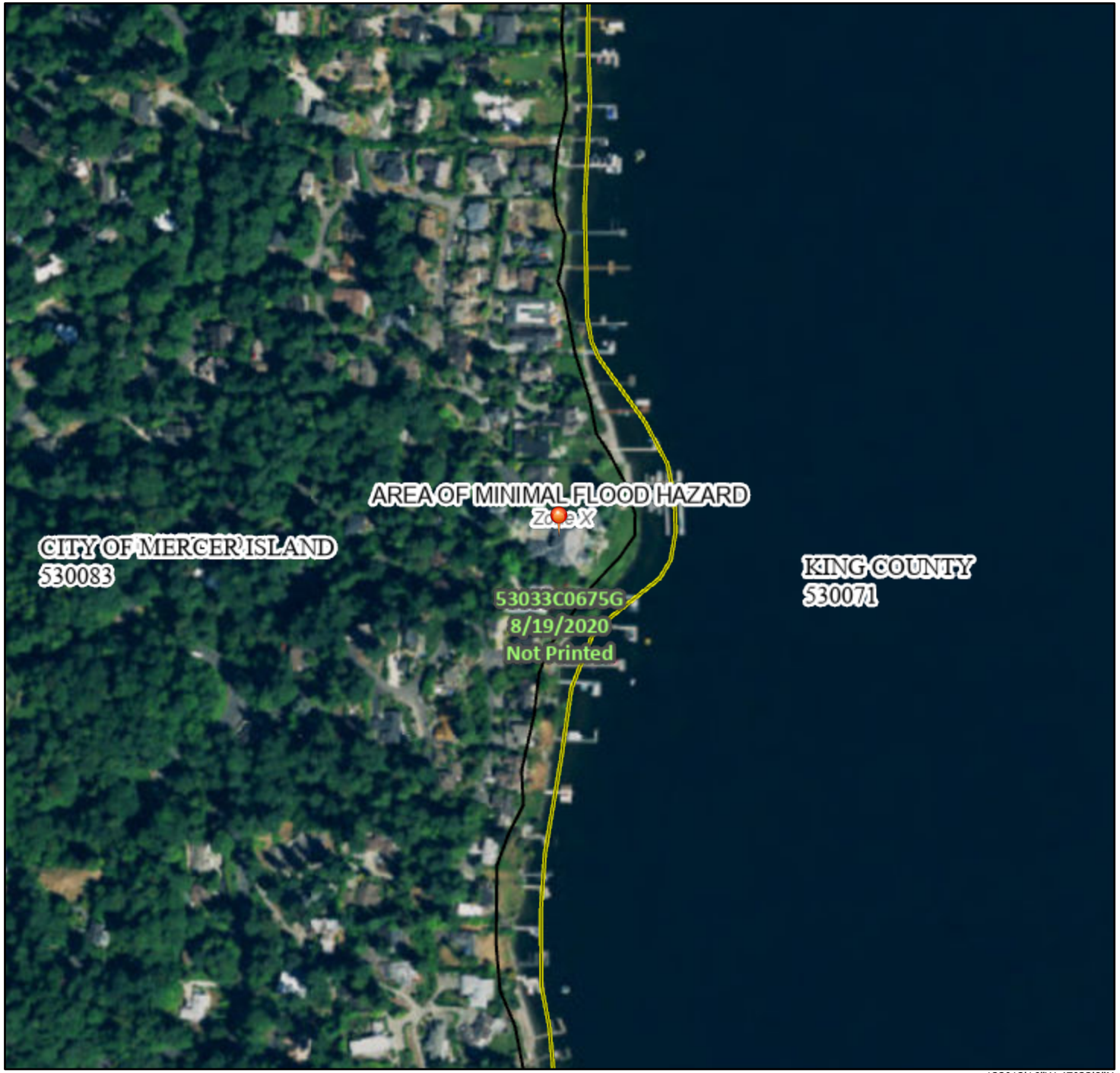


National Flood Hazard Layer FIRMette

A-3

FEMA

122°12'53"W 47°33'32"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

122°12'16"W 47°33'8"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/21/2024 at 5:28 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

A-4

GRAPHIC SCALE 1"=20'

20 0 20

BASIS OF BEARINGS:

THE CENTERLINE OF BUTTERWORTH ROAD, BEING NORTH 20°10'45" EAST PER THE PLAT OF TONJA ESTATES, ACCORDING TO THE PLAT THEREOF, RECORDED IN VOLUME 77 OF PLATS, PAGE 64, IN KING COUNTY, WASHINGTON.

VERTICAL DATUM:

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88)

BENCHMARK:

LAKE WASHINGTON WATER SURFACE ELEVATION PER U.S. ARMY CORPS OF ENGINEERS, SEATTLE DISTRICT, WATER MANAGEMENT. ELEVATION = 17.17 NAVD 88 ON MARCH 1, 2024 AT 10:30 A.M.

CONTOUR INTERVAL:

2 FEET

LEGAL DESCRIPTION:

(PER CHICAGO TITLE COMPANY OF WASHINGTON COMMITMENT NO. 0246999-ETU, THIRD, DATED JANUARY 11, 2024)

LOTS 3 AND 4, TONJA ESTATES, ACCORDING TO THE PLAT THEREOF, RECORDED IN VOLUME 77 OF PLATS, PAGE 64, IN KING COUNTY, WASHINGTON,

EXCEPT THAT PORTION OF SAID LOT 3, DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEAST CORNER OF SAID LOT 3;

THENCE SOUTH 01°35'04" WEST ALONG THE EASTERLY LINE OF LOT 3 A DISTANCE OF 75.31 FEET;

THENCE NORTH 10°03'02" WEST A DISTANCE OF 74.73 FEET;

THENCE NORTH 76°21'57" WEST A DISTANCE OF 10.15 FEET, MORE OR LESS, TO THE NORTH LINE OF SAID LOT 3;

THENCE SOUTH 88°24'56" EAST ALONG SAID NORTH LINE 25.00 FEET TO THE POINT OF BEGINNING, AND THE END OF THIS EXCEPTION;

TOGETHER WITH AN UNDIVIDED 1/7TH INTEREST IN LOT 1 OF SAID PLAT; AND

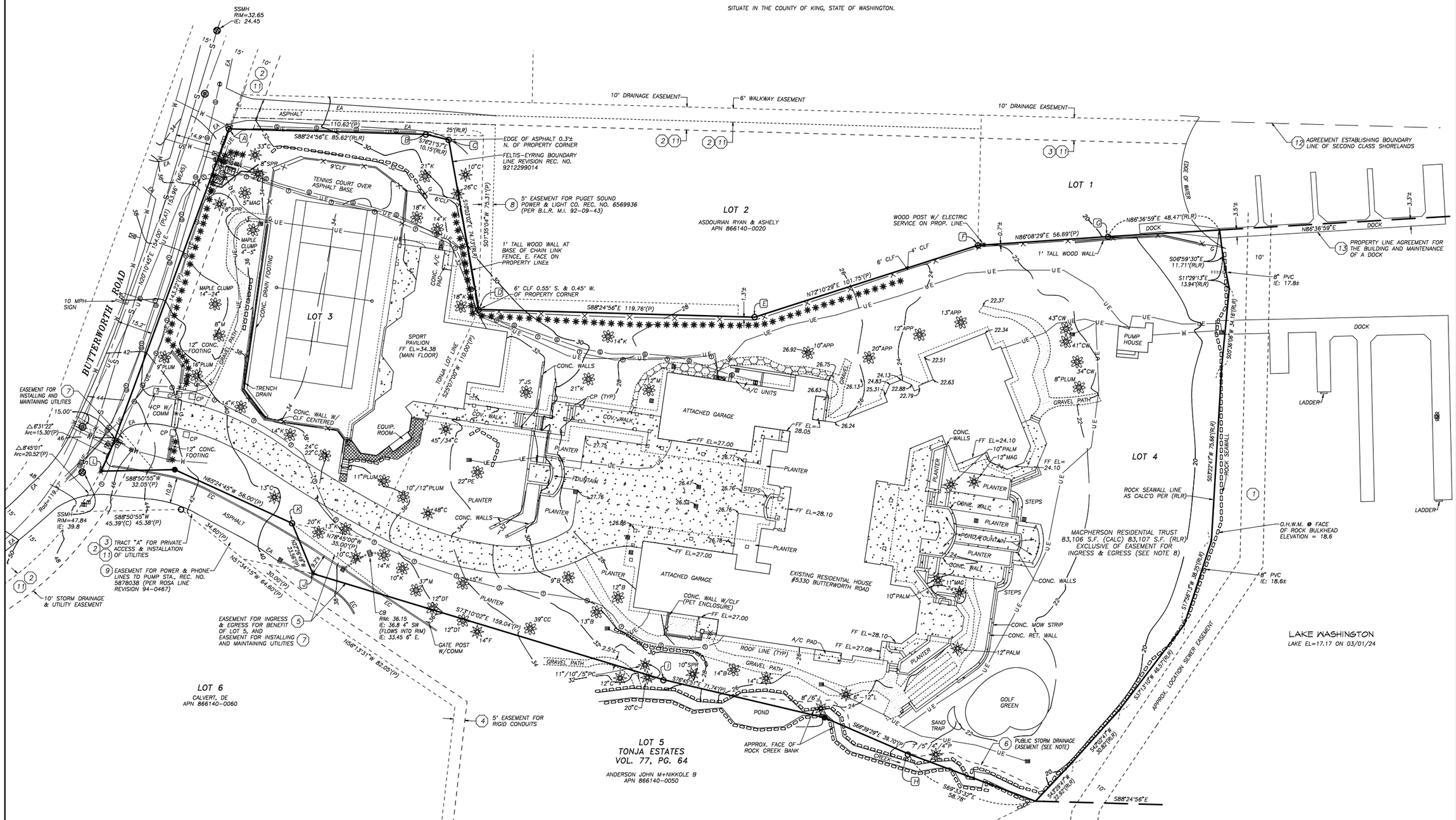
TOGETHER WITH AN UNDIVIDED 1/2 INTEREST IN TRACT A OF SAID PLAT;

(ALSO KNOWN AS THE ROSA LINE REVISION, CITY OF MERCER ISLAND FILE NO. 94-0467, RECORDED UNDER RECORDING NUMBER 9606139004).

SITUATE IN THE COUNTY OF KING, STATE OF WASHINGTON.

FOUND/SET PROPERTY CORNER LEGEND:

- (A) FOUND 3/4" IRON PIPE & CAP "LS 20764" S49°E 0.09'
- (B) FOUND 3/4" IRON PIPE & CAP W/TACK "LS 20764" S38°W 0.09'
- (C) FOUND 1/2" REBAR & CAP "TERRANE 15025 56664 52088 57176"
- (D) FOUND 3/4" IRON PIPE & CAP W/TACK "LS 20764" S26°W 0.16'
- (E) FOUND 1/2" REBAR & CAP "TERRANE 15025 56664 52088 57176"
- (F) FOUND 3/4" IRON PIPE & CAP W/TACK "LS 20764" S51°E 0.08'
- (G) FOUND 3/4" IRON PIPE & CAP W/TACK "LS 20764" S4°W 0.17'
- (H) FOUND 3/4" IRON PIPE & CAP W/TACK "LS 20764" S34°W 0.41'
- (I) FOUND 3/4" IRON PIPE & CAP W/TACK "LS 20764" S22°W 0.22'
- (J) FOUND MAG NAIL & WASHER "37427" N49°E 0.09'
- (K) FOUND 1/2" REBAR & CAP "TRIAD ASSOC 19620 22335 21402 18094"
- (L) SET MAG NAIL & I.D. WASHER "LS 37540"



SURVEYOR'S CERTIFICATE

THIS MAP CORRECTLY REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECT SUPERVISION IN CONFORMANCE WITH THE REQUIREMENTS OF THE SURVEY RECORDING ACT AT THE REQUEST OF ROGER MACPHERSON RESIDENTIAL TRUST IN MAY, 2024 AND NANCY MACPHERSON RESIDENTIAL TRUST

Jeffrey Allen Peterson

P.L.S. CERTIFICATE NO. 37540

JEFFREY ALLEN PETERSON 37540 REGISTERED PROFESSIONAL LAND SURVEYOR STATE OF WASHINGTON

ALTA/NSPS LAND TITLE SURVEY

FOR: MACPHERSON RESIDENTIAL TRUST
5330 BUTTERWORTH ROAD
MERCER ISLAND, WA 98040

CASCADE LAND SURVEYING
Complete Land Surveying Services
16009 AP TUBBS RD E, BUCKLEY, WA 98321
PHONE: (253) 820-4016
Email: jeff@cascadels.com

DRAWN BY: JAO CHECKED BY: JAO SHEET: 2 OF 2 DATE: Thu, Mar. 21, 2024
JOB NO.: 2024-003 SCALE: 1"=20'

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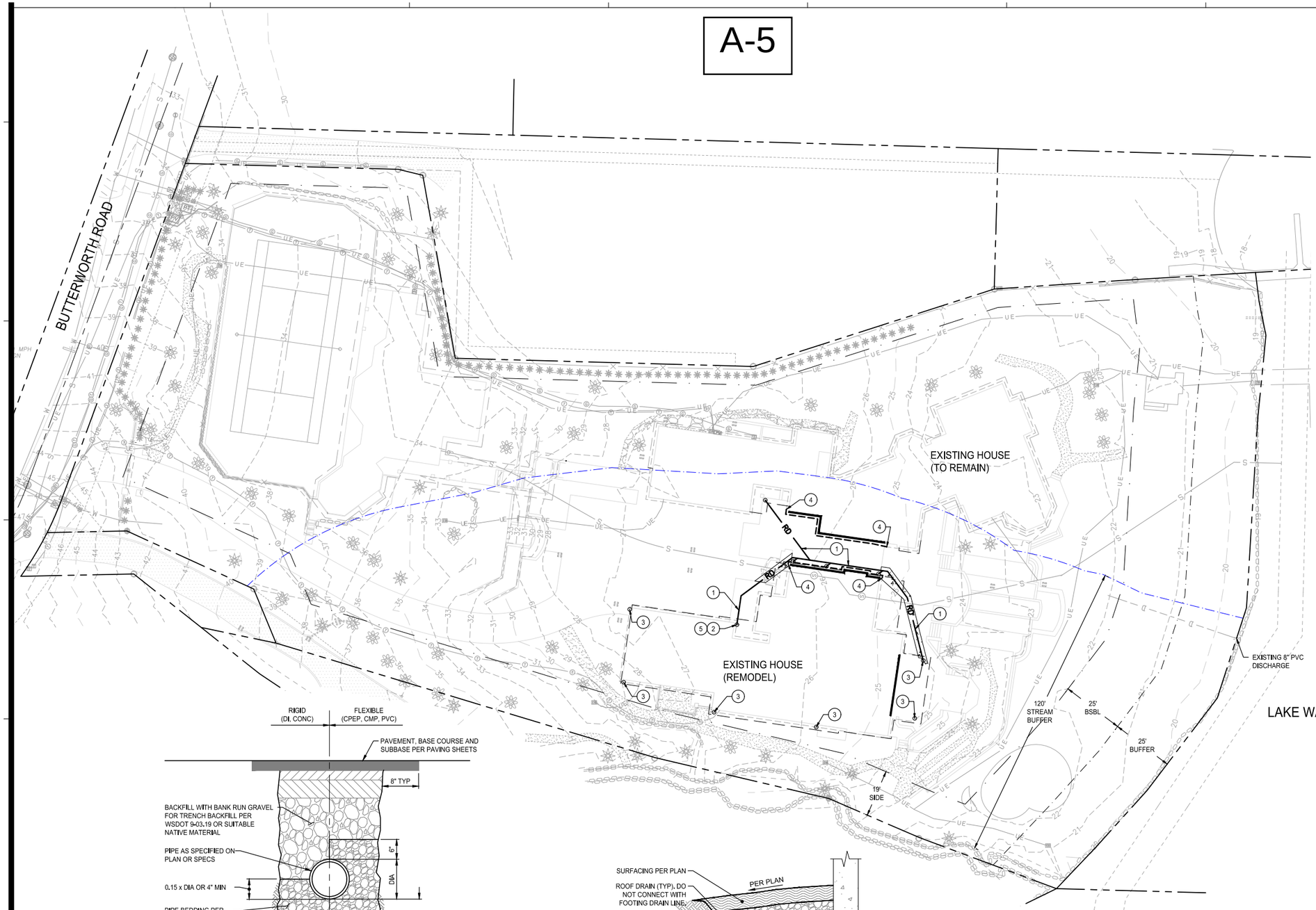
A-5



LEGEND

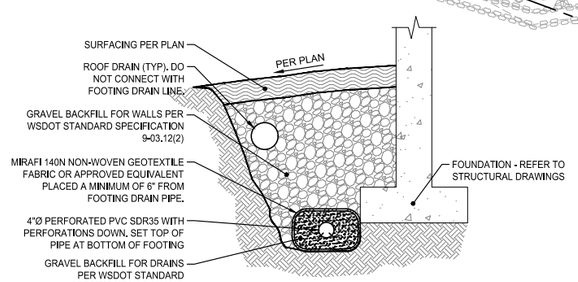
- RIGHT-OF-WAY/PROPERTY LINE
- PROPOSED BUILDING OUTLINE, REFER TO ARCHITECTURE PLAN
- BUILDING OVERHANG, REFER TO ARCHITECTURE PLAN
- PROPOSED CONCRETE REPLACEMENT, REPLACE IN-KIND WITH REMOVED EXISTING CONCRETE.
- RD — ROOF DRAIN LINE (1 / C1-1)
- FOOTING DRAIN (2 / C1-1)

KEYNOTES

1. 4" SDR 35 PVC @ 2.0% MIN.
2. DOWNSPOUT, TYP, PER ARCHITECTURE PLANS, REFER TO ARCHITECTURE PLAN FOR LOCATIONS AND QUANTITY OF DOWNSPOUTS. (1 / C1-1)
3. CONNECT TO EXISTING DRAIN LINE AT NEAREST EXISTING DOWNSPOUT WITH 4" SDR 35 PVC @ 2.0% MIN. FIELD LOCATE EXISTING DOWNSPOUT LOCATIONS.
4. CONNECT TO EXISTING FOOTING DRAIN
5. CONTRACTOR TO VERIFY IF THERE IS A CLOSER EXISTING DOWNSPOUT TO CONNECT, IF SO, CONNECT TO EXISTING DRAIN LINE AT NEAREST EXISTING DOWNSPOUT WITH 4" SDR 35 PVC @ 2.0% MIN.

NOTES:
1. BACKFILL MATERIAL SHALL NOT HAVE ROCKS OR PARTICLES LARGER THAN 1" WITHIN 12" OF THE PIPE. BACKFILL MATERIAL SHALL BE PLACED IN 8" MAXIMUM LOOSE LIFTS AND COMPACTED TO 95% MAXIMUM DRY DENSITY PER MODIFIED PROCTOR TEST (ASTM D-1557).
2. CONSTRUCT ALL STORM AND ROOF DRAINS IN CONFORMANCE WITH THIS DETAIL UNLESS NOTED OTHERWISE ON THE PLANS.
3. ALL TRENCH EXCAVATIONS SHALL BE SLOPED, SHORED, SHEETED, BRACED, OR OTHERWISE SUPPORTED IN COMPLIANCE WITH OSHA REGULATIONS AND LOCAL ORDINANCES.
4. IF ORGANIC MATERIAL IS ENCOUNTERED DURING UTILITY EXCAVATION, OVEREXCAVATE TRENCH TO INCREASE PIPE BEDDING DEPTH TO 18" OR MORE AS REQUIRED TO COMPACT BEDDING TO FIRM AND UNYIELDING CONDITION.

1 TRENCH SECTION
NOT TO SCALE



2 FOOTING DRAIN
NOT TO SCALE

Know what's **below.** **Call** before you dig.

N

20 10 0 20 40
SCALE IN FEET

PLOTTED: 5/30/2024 3:28:05 PM FILE: 24004-SHEETLEVG LAST SAVED BY: JOHNBAB

BUTTERWORTH ROAD REMODEL

5330 BUTTERWORTH ROAD
MERCER ISLAND, WA 98040

PERMIT SET

ETHOS CIVIL
Engineering Entitlement Project Management
ethosciv.com info@ethosciv.com 253.414.1989

05/31/2024

DESIGNED JTB
CHECKED ABE
DRAWN JTB
CHECKED ABE

#	DATE	DESCRIPTION

24004
05/31/2024

SITE PLAN

C1-1

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for King County Area, Washington

Butterworth Road Remodel

May 21, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

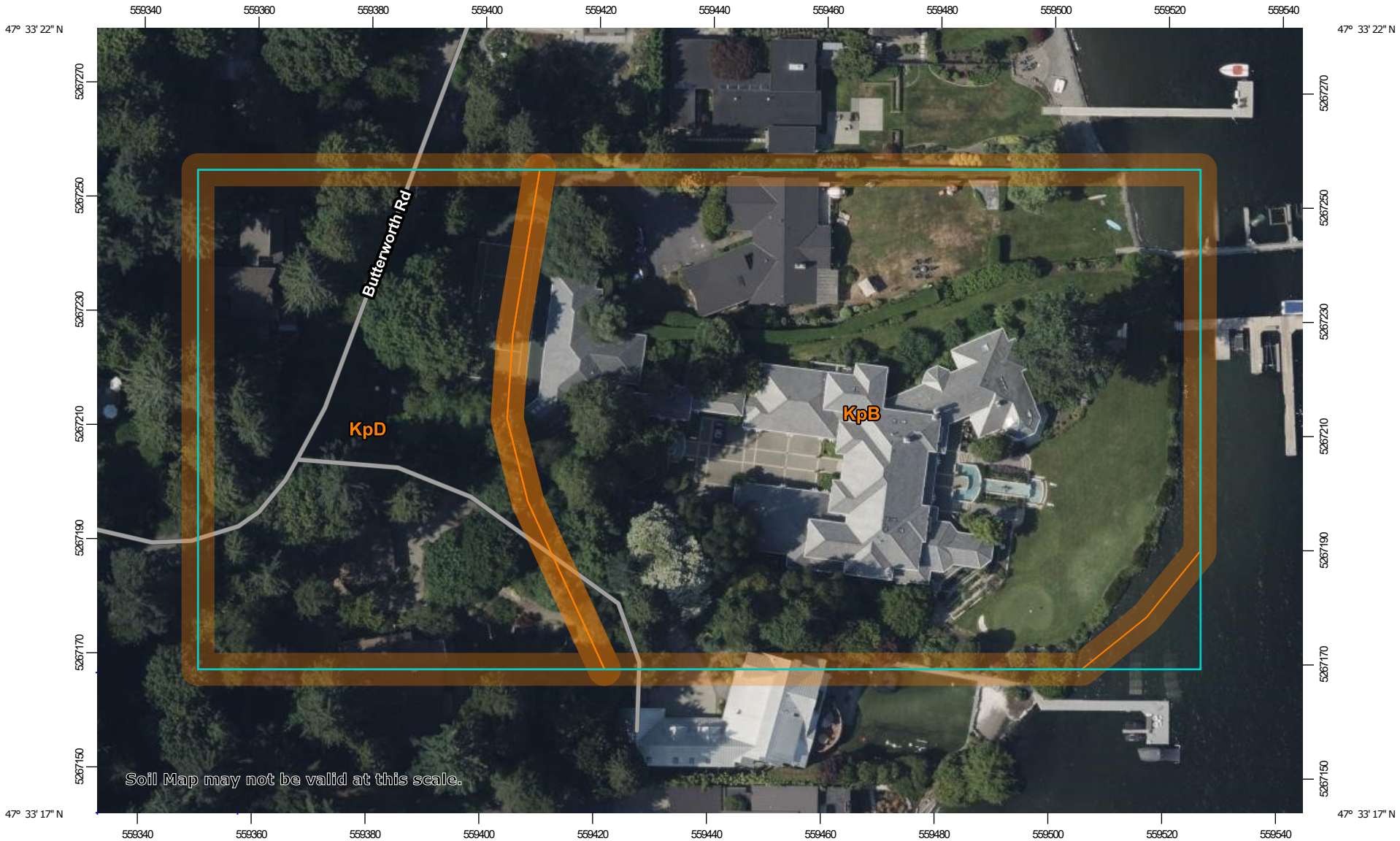
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map (Butterworth Road Remodel)



Map Scale: 1:968 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 10 20 40 60

Feet
0 45 90 180 270

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: King County Area, Washington
Survey Area Data: Version 19, Aug 29, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 1, 2023—Sep 1, 2023

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (Butterworth Road Remodel)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
KpB	Kitsap silt loam, 2 to 8 percent slopes	2.5	65.1%
KpD	Kitsap silt loam, 15 to 30 percent slopes	1.3	33.7%
Totals for Area of Interest		**3.8**	**100.0%**

Map Unit Descriptions (Butterworth Road Remodel)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate

pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

King County Area, Washington

KpB—Kitsap silt loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1hmt9
Elevation: 0 to 590 feet
Mean annual precipitation: 37 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 160 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Kitsap and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kitsap

Setting

Landform: Terraces
Parent material: Lacustrine deposits with a minor amount of volcanic ash

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 24 inches: silt loam
H3 - 24 to 60 inches: stratified silt to silty clay loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Soils with Few Limitations (G002XN502WA)
Other vegetative classification: Soils with Few Limitations (G002XN502WA)
Hydric soil rating: No

Minor Components

Alderwood

Percent of map unit: 10 percent
Hydric soil rating: No

Bellingham

Percent of map unit: 3 percent

Landform: Depressions
Other vegetative classification: Wet Soils (G002XN102WA)
Hydric soil rating: Yes

Tukwila

Percent of map unit: 1 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XN102WA)
Hydric soil rating: Yes

Seattle

Percent of map unit: 1 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XN102WA)
Hydric soil rating: Yes

KpD—Kitsap silt loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 1hmtc
Elevation: 0 to 590 feet
Mean annual precipitation: 37 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 160 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Kitsap and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kitsap

Setting

Landform: Terraces
Parent material: Lacustrine deposits with a minor amount of volcanic ash

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 40 inches: silt loam
H3 - 40 to 60 inches: stratified silt to silty clay loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None

Available water supply, 0 to 60 inches: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Sloping to Steep Soils (G002XN702WA)
Other vegetative classification: Sloping to Steep Soils (G002XN702WA)
Hydric soil rating: No

Minor Components

Tukwila

Percent of map unit: 1 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XN102WA)
Hydric soil rating: Yes

Bellingham

Percent of map unit: 1 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XN102WA)
Hydric soil rating: Yes

Seattle

Percent of map unit: 1 percent
Landform: Depressions
Other vegetative classification: Wet Soils (G002XN102WA)
Hydric soil rating: Yes

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Appendix B

Construction Stormwater Pollution Prevention Plan (CSWPPP)

Construction Stormwater Pollution Prevention Plan

May 31, 2024

PROJECT

Butterworth Road Remodel
5330 Butterworth Rd
Mercer Island, WA 98040
Project No: 24004

OWNER/APPLICANT

Dan Buchser
MacPherson Construction & Design
21626 SE 28th Street
Sammamish, WA 98075

PREPARED BY

John Babb, EIT
Civil Designer

REVIEWED BY

Andy Epstein, PE
Civil Engineer

ETHOS CIVIL

Construction Stormwater Pollution Prevention Plan

May 31, 2024

PROJECT

Butterworth Road Remodel
5330 Butterworth Rd
Mercer Island, WA 98040
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05/31/2024

OWNER/APPLICANT

Dan Buchser
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21626 SE 28th Street
Sammamish, WA 98075

PREPARED BY

John Babb, EIT
Civil Designer

REVIEWED BY

Andy Epstein, PE
Project Manager & Owner

I hereby state that this Construction Stormwater Pollution Prevention Plan for the Butterworth Road Remodel project has been prepared by me or under my supervision and meets the standard of care and expertise that is usual and customary in this community for professional engineers. I understand that the City of Mercer Island does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities prepared by me.

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- BMP 120 Temporary and Permanent Seeding
- BMP 123 Plastic Covering
- BMP 140 Dust Control
- BMP 220 Inlet Protection

Section 1 – Introduction

In 1972, Congress passed the Federal Water Pollution Control Act (FWPCA), also known as the Clean Water Act (CWA), to restore and maintain the quality of the nation's waterways. The ultimate goal was to make sure that rivers and streams were fishable, swimmable, and drinkable. In 1987, the Water Quality Act (WQA) added provisions to the CWA that allowed the Environmental Protection Agency (EPA) to govern stormwater discharges from construction sites. The National Pollutant Discharge Elimination System (NPDES) General Permit includes provisions for development of a Stormwater Pollution Prevention Plan (SWPPP) to maximize the potential benefits of pollution prevention, and sediment and erosion control measures at construction sites.

The proposed project will disturb less than 1 acre and is therefore not required to obtain an NPDES General Permit for Stormwater Associated with Construction Activities.

The 2019 Stormwater Management Manual for Western Washington requires a Construction SWPPP for projects that add or replace more than 2,000 square feet of impervious surface. The proposed project will exceed this threshold; therefore, a Construction SWPPP is required.

Development, implementation, and maintenance of the Construction SWPPP will provide the selected General Contractor with the framework for reducing soil erosion and minimizing pollutants in stormwater during construction of the Butterworth Road Remodel project. The SWPPP will:

- Define the characteristics of the site and the type of construction that will occur.
- Describe the practices that will be implemented to control erosion and the release of pollutants in stormwater.
- Create an implementation schedule to ensure that the practices described in this SWPPP are in fact implemented, and to evaluate the plan's effectiveness in reducing erosion, sediment, and pollutant levels in stormwater discharged from the site.
- Describe the final stabilization/termination design to minimize erosion and prevent stormwater impacts after construction is complete.

This Construction SWPPP:

- Identifies the SWPPP Coordinator with a description of this person's duties.
- Identifies the Stormwater Pollution Prevention Team (SWPP Team) that will assist in implementation of the SWPPP during construction.
- Describes the existing site conditions, including existing land use for the site, soil types at the site, as well as the location of surface waters that are located on or next to the site.
- Identifies the body or bodies of water that will receive runoff from the construction site, including the ultimate body of water that receives the stormwater.
- Identifies the drainage areas and potential stormwater contaminants.
- Describes the stormwater management controls and various Best Management Practices (BMPs) necessary to reduce erosion, sediment, and pollutants in stormwater discharge.
- Describes the facility monitoring plan and how controls will be coordinated with construction activities.
- Describes the implementation schedule and provisions for amendment of the plan.

Section 2 – Project Description

The Butterworth Road Remodel project is a project that includes the demolition of portions of the onsite existing structure, construction of home renovations, and associated stormwater improvements.

The site address is 5330 Butterworth Rd in Mercer Island, Washington. The site consists of a single parcel, numbered 8661400040, which is approximately 1.89 acres in size. The parcel is in Township 24 North, Range 05, Section 19 East of the Willamette Meridian in King County, Washington. Refer to Exhibit A-1 in Appendix A for a Vicinity Map. The parcel is bordered by single-family residential properties to the north and south, by Lake Washington to the east, and by Butterworth Road to the west of the site. The site generally slopes from west to east, with a total elevation of about 26 feet. There is a man-made unnamed Type F stream located on the project parcel near the southern property line. This project proposes connections to the existing stormwater system on site through conveyance pipes.

Section 3 – Erosion Control Specialist (ESC)

The General Contractor shall be required to provide an Erosion Control Specialist (ECS) prior to construction. Once this individual is identified, the City Inspector will be notified.

The duties of the ECS include:

- Implement the SWPPP/TESC plan with the aid of the SWPP Team.
- Oversee maintenance practices identified as BMPs in the Construction SWPPP.
- Conduct or provide for inspection and monitoring activities.
- Identify other potential pollutant sources and make sure they are added to the plan.
- Identify any deficiencies in the Construction SWPPP and make sure they are corrected.
- Ensure that any changes in construction plans are addressed in the Construction SWPPP.

To aid in the implementation of the Construction SWPPP, the members of the SWPP Team include the following: General Contractor, ECS, City of Mercer Island Inspector, CPSD facilities, and Ethos Civil LLC. The General Contractor will ensure that all housekeeping and monitoring procedures are implemented, while the ECS will ensure the integrity of the structural BMPs. The SWPP Team will observe construction and erosion control practices and recommend revisions or additions to the Construction SWPPP and drawings.

Section 4 – Existing Site Conditions

The existing site consists of an existing structure, driveway, and tennis court. In total, the parcel is approximately 1.89 acres in size. There is an existing stormwater system which conveys stormwater throughout the site including existing downspouts to an outfall within Lake Washington along the eastern property line. The existing system will be maintained and modified to connect the proposed improvements to the existing system. A survey of the site was completed by Cascade Land Surveying.

Existing utilities serving the project parcel include power, gas, sewer, water and communication lines. The existing utility services will be maintained.

Section 5 – Adjacent Areas

The parcel is bordered by single-family residential properties to the north and south, by Lake Washington to the east, and by Butterworth Road to the west of the site.

Section 6 – Critical Areas

There are no other known wetlands or sensitive areas located on or downstream of the site. There are no known area-specific requirements established in local plans, ordinances, regulations, or in Water Clean-Up Plans approved by the Department of Ecology.

Section 7 – Soils

An NRCS report was also prepared for this project and it defines the soils in the project area as approximately 100% Kitsap silt loam, 15 to 30 percent slopes. Refer to Exhibit A-6 in Appendix A of the SSP for an NRCS Soil Map.

Section 8 – Erosion Problem Areas

To our knowledge, there are no erosion problems on the project site.

Section 9 – Construction Stormwater Pollution Prevention Plan Elements

The purpose of this section is to describe how each of the 12 Construction SWPPP elements has been addressed, and to identify the type and location of BMPs used in the Temporary Erosion and Sedimentation Control (TESC) and demolition plans to satisfy the required element. If a Construction SWPPP element is not applicable to the project, a reason is provided.

Mark Clearing Limits

Prior to beginning land-disturbing activities, clearing limits will be marked with high visibility plastic or metal fence (BMP C103). Significant vegetation to remain will be marked and protected by fencing.

Establish Construction Access

The contractor shall use the existing site driveway for construction access. Construction vehicle ingress and egress will be limited to this entrance. If sediment tracking should occur, the contractor will be required to sweep the impacted roadways. Dump trucks hauling material to and from the site will be covered by a tarp.

Control Flow Rates

Flow rate control is not required for this project due to the small size of the project area and the project being flow control exempt.

Install Sediment Controls

Inlet Protection (BMP C220) is proposed for existing and proposed catch basins within the project area.

Stabilize Soils

To protect soils from the erosive forces of rainfall, surface runoff flow, and wind, all disturbed areas that are expected to remain exposed and unworked for more than 2 days from October 1 to March 31, or 7 days from April 1 to September 30, will be stabilized with the following BMPs:

- Temporary hydroseeding (C120).
- Topsoil stockpiles will be stabilized with plastic coverings (BMP C123).
- Dust control (BMP C140) will be provided by sprinkling the site with water.
- Permanent erosion control measures will include site paving and seeding or sodding of exposed soils.

Soil stabilization measures shall be appropriate for the time of year, site conditions, estimated duration of use, and potential water quality impacts that stabilization agents may have on downstream waters or groundwater.

Protect Slopes

Slope protection BMPs are unnecessary due to the project area not containing any significant slopes.

Protect Drain Inlets

All storm drain inlets made operable during construction shall be protected so that surface water runoff does not enter the conveyance system without first being filtered. Storm Drain Inlet Protection (BMP C220) is specified in the construction plans and shall be inspected weekly, at a minimum, and daily during storm events for sediment buildup, and shall be cleaned or removed and replaced as appropriate.

Stabilize Channels and Outlets

There are no channels or outlets requiring stabilization.

Control Pollutants

All waste materials will be collected and stored in a securely closed metal dumpster. All trash and construction debris from the site will be deposited in the dumpster. The dumpster will be emptied a minimum of once per week, and the trash will be hauled to the local landfill. No construction materials will be buried onsite. All personnel will be instructed regarding the correct procedure for waste disposal. All sanitary waste will be collected from the portable units a minimum of three times per week. Good housekeeping and spill control practices will be followed during construction to minimize stormwater contamination from petroleum products, fertilizers, and concrete.

Table 1 below lists several pollutants that are commonly found on construction sites that have the potential to contaminate storm runoff. These pollutants will be present, mainly in areas pavement construction. The Contractor and the SWPPP/TESC coordinator will be responsible for identifying areas where these pollutants are being used and will monitor runoff coming from these areas. Pollutant sources will be covered with plastic if contaminated runoff is observed from these areas. If contaminated runoff is found in sediment traps or soils, the ECS will direct the Contractor to remove the polluted water/soil and dispose of it in an approved area offsite.

Table 1: Potential Construction Site Stormwater Pollutants

Trade Name Material	Chemical/Physical Description[(1)]	Stormwater Pollutants[(1)]
Pesticides (insecticides, fungicides, herbicide, rodenticides)	Various colored to colorless liquid, powder, pellets, or grains	Chlorinated hydrocarbons, organophosphates, carbamates, arsenic
Fertilizer	Liquid or solid grains	Nitrogen, phosphorous
Plaster	White granules or powder	Calcium sulphate, calcium carbonate, sulfuric acid
Cleaning solvents	Colorless, blue, or yellow-green liquid	Perchloroethylene, methylene chloride, trichloroethylene, petroleum distillates
Asphalt	Black solid	Oil, petroleum distillates
Concrete	White solid	Limestone, sand
Glue, adhesives	White or yellow liquid	Polymers, epoxies
Paints	Various colored liquid	Metal oxides, Stoddard solvent, talc, calcium carbonate, arsenic
Curing compounds	Creamy white liquid	Naphtha
Wastewater from construction equipment washing	Water	Soil, oil & grease, solids
Wood preservatives	Clear amber or dark brown liquid	Stoddard solvent, petroleum distillates, arsenic, copper, chromium
Hydraulic oil/fluids	Brown oily petroleum hydrocarbon	Mineral oil
Gasoline	Colorless, pale brown or pink petroleum hydrocarbon	Benzene, ethyl benzene, toluene, xylene, MTBE
Diesel fuel	Clear, blue-green to yellow liquid	Petroleum distillate, oil & grease, naphthalene, xylenes
Kerosene	Pale yellow liquid petroleum hydrocarbon	Coal oil, petroleum distillates
Antifreeze/coolant	Clear green/yellow liquid	Ethylene glycol, propylene glycol, heavy metals (copper, lead, zinc)
Erosion	Solid Particles	Soil, Sediment

(1) Data obtained from MSDS when available.

The following BMPs or equivalent measures are required of all businesses and agencies during concrete pouring and asphalt application at temporary sites:

- Employees must be educated on the pollution hazards of concrete and asphalt application and cutting.
- Loose aggregate chunks and dust must be swept or shoveled and collected (not hosed down a storm drain) for recycling or proper disposal at the end of each work day, especially at work sites such as streets, driveways, parking lots, sidewalks, curbs, and gutters where rain can readily pick

up the loose material and carry it to the nearest stormwater conveyance. Small amounts of excess concrete, grout, and mortar can be disposed of in the trash.

- Storm drain covers or similarly effective containment devices must be placed over all nearby drains at the beginning of each day. Shovel or vacuum slurry and remove from the site. All accumulated runoff and solids must be collected and properly disposed at the end of each work day, or more often if necessary.

- Exposed aggregate washing, where the top layer of unhardened concrete is hosed or scraped off to leave a rough finish, must be done with a mechanism for containment and collection of the discarded concrete slurry (such as the storm drain covers mentioned above). The easiest way to contain the wash water will be to direct the washings to a hole in the ground where the water can percolate into the ground and the solids later covered with soil.

- Cleaning of concrete application and mixing equipment or concrete vehicles on the work site must be done in a designated area where the rinse water is controlled. The rinse water must either be collected for proper disposal or put into a hole in the ground where the water can percolate away, and the solids later covered with soil or recovered and disposed or recycled.

The use of any treatment BMP must not result in the violation of groundwater, surface water, or drinking water quality standards.

Control Dewatering

Large volumes of dewatering of construction areas or utility trenches are not anticipated because groundwater is not likely to be encountered at the proposed elevations of proposed utility construction for the project.

Maintain BMPs

Temporary and permanent erosion and sediment control BMPs shall be maintained and repaired as needed to assure performance of their intended functions.

Sediment control BMPs shall be inspected weekly or after a runoff-producing event. Temporary erosion and sediment control BMPs will be removed within 30 days after final site stabilization is achieved. The following inspection and maintenance practices will be used to maintain erosion and sediment controls:

- Temporary and permanent seeding will be inspected for bare spots, washouts, and healthy growth.

- The Contractor ESC Lead will provide erosion control inspection services and stormwater disposal monitoring through construction. The City of Mercer Island Inspector will be notified of daily construction activities and scheduled meetings between the Erosion Control Inspector and the Contractor.

The maintenance inspection report will be made after each inspection. Copies of the report forms to be completed by the SWPPP coordinator are attached as Exhibit 1 of this Construction SWPPP. Completed forms will be provided to the City Inspector and will also be maintained onsite during the entire construction project. If construction activities or design modifications are made to the site plan that could impact stormwater, or if Ethos Civil determines that the measures are not adequate to prevent

erosion and the discharge of sediment from the site (based on turbidity measurements), this Construction SWPPP will be amended appropriately. The amended Construction SWPPP will have a description of the new activities that contribute to the increased pollutant loading and the planned source control activities.

Manage the Project

The following practices will be required during construction to properly manage activities:

- Identify an Erosion Control Specialist (ECS).
- Comply with seasonal work limitations.
- Inspect, maintain, and repair BMPs.
- Maintain the Construction SWPPP onsite at all times, including narrative, logs, and plans.

Section 10 – Construction Phasing

Phased construction is anticipated for this project. A general sequence for construction is described briefly below:

1. Arrange and attend a pre-construction meeting with the City of Mercer Island.
2. Stake/flag clearing and construction limits.
3. Construct all temporary erosion control BMPs according to the plan.
4. Demolish existing site features indicated for removal.
5. Maintain erosion control measures in accordance with City of Mercer Island standards and manufacturer's recommendations.
6. Adjust temporary erosion control BMPs as necessary to match site conditions as construction progresses.
7. Apply erosion control mulch and seeding, straw mulch or equal, to areas that will not be brought to final grade or permanently vegetated within 2 days of exposure during the dry season, and 7 days of exposure during the wet season.
8. Construct utilities and storm drainage features. Construct storm drain inlet protection for all catch basins subject to onsite runoff.
9. Relocate erosion control measures or install new measures so that, as site conditions change, the erosion and sediment control is always in accordance with the City of Mercer Island Construction SWPPP minimum requirements.
10. Final grade site and construct final surfacing treatments. Ensure that surface water is positively directed toward proposed stormwater control facilities.

11. Remove the remaining temporary erosion control items once site has been stabilized and upon approval.

12. Complete final hydroseeding.

The sequence for the remaining phase(s) of construction will be provided as construction documentation for permit approval is finalized.

Section 11 – Construction Schedule

Construction of the Butterworth Road Remodel project will begin in the Summer of 2024 and is to be completed by Summer of 2025. Based on this schedule, construction will be ongoing during the wet season of 2024, however most all of the work is on the building and it will be roofed prior to the wet season.

Section 12 – Financial/Ownership Responsibilities

The property owner is the party responsible for initiation of bonds and other financial securities required for development of the site.

Exhibit 1

Inspection Logs

Butterworth Road Remodel

Stormwater Pollution Prevention Plan

Inspection and Maintenance Report Form

To be completed every 7 days and within 24 hours of a rainfall event of 0.5 inch or more

Inspector: Date:

Inspector's Qualifications:

Days since last rainfall: Amount of last rainfall: inches

Stabilization Measures

Drainage Area	Date Since Last Disturbance	Date of Next Disturbance	Stabilized (yes/No)	Stabilized With	Condition

Stabilization required:

To be performed by: _____ On or before: _____

Butterworth Road Remodel

Stormwater Pollution Prevention Plan

Inspection and Maintenance Report Form

Changes required to the pollution prevention plan:

Reasons for changes:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: _____ Date: _____

Exhibit 2

Best Management Practices (BMPs)

BMP 103 High Visibility Fence

BMP 120 Temporary and Permanent Seeding

BMP 123 Plastic Covering

BMP 140 Dust Control

BMP 220 Inlet Protection

burying and smothering vegetation.

- Vegetative buffer zones for streams, lakes or other waterways shall be established by the local permitting authority or other state or federal permits or approvals.

Maintenance Standards

Inspect the area frequently to make sure flagging remains in place and the area remains undisturbed. Replace all damaged flagging immediately. Remove all materials located in the buffer area that may impede the ability of the vegetation to act as a filter.

BMP C103: High-Visibility Fence

Purpose

High-visibility fencing is intended to:

- Restrict clearing to approved limits.
- Prevent disturbance of sensitive areas, their buffers, and other areas required to be left undisturbed.
- Limit construction traffic to designated construction entrances, exits, or internal roads.
- Protect areas where marking with survey tape may not provide adequate protection.

Conditions of Use

To establish clearing limits plastic, fabric, or metal fence may be used:

- At the boundary of sensitive areas, their buffers, and other areas required to be left uncleared.
- As necessary to control vehicle access to and on the site.

Design and Installation Specifications

High-visibility plastic fence shall be composed of a high-density polyethylene material and shall be at least four feet in height. Posts for the fencing shall be steel or wood and placed every 6 feet on center (maximum) or as needed to ensure rigidity. The fencing shall be fastened to the post every six inches with a polyethylene tie. On long continuous lengths of fencing, a tension wire or rope shall be used as a top stringer to prevent sagging between posts. The fence color shall be high-visibility orange. The fence tensile strength shall be 360 lbs/ft using the ASTM D4595 testing method.

If appropriate install fabric silt fence in accordance with BMP C233: Silt Fence to act as high-visibility fence. Silt fence shall be at least 3 feet high and must be highly visible to meet the requirements of this BMP.

Metal fences shall be designed and installed according to the manufacturer's specifications.

Metal fences shall be at least 3 feet high and must be highly visible.

Fences shall not be wired or stapled to trees.

Maintenance Standards

If the fence has been damaged or visibility reduced, it shall be repaired or replaced immediately and visibility restored.

BMP C105: Stabilized Construction Access

Purpose

Stabilized construction accesses are established to reduce the amount of sediment transported onto paved roads outside the project site by vehicles or equipment. This is done by constructing a stabilized pad of quarry spalls at entrances and exits for project sites.

Conditions of Use

Construction accesses shall be stabilized wherever traffic will be entering or leaving a construction site if paved roads or other paved areas are within 1,000 feet of the site.

For residential subdivision construction sites, provide a stabilized construction access for each residence, rather than only at the main subdivision entrance. Stabilized surfaces shall be of sufficient length/width to provide vehicle access/parking, based on lot size and configuration.

On large commercial, highway, and road projects, the designer should include enough extra materials in the contract to allow for additional stabilized accesses not shown in the initial Construction SWPPP. It is difficult to determine exactly where access to these projects will take place; additional materials will enable the contractor to install them where needed.

Design and Installation Specifications

See Figure II-3.1: Stabilized Construction Access for details. Note: the 100' minimum length of the access shall be reduced to the maximum practicable size when the size or configuration of the site does not allow the full length (100').

Construct stabilized construction accesses with a 12-inch thick pad of 4-inch to 8-inch quarry spalls, a 4-inch course of asphalt treated base (ATB), or use existing pavement. Do not use crushed concrete, cement, or calcium chloride for construction access stabilization because these products raise pH levels in stormwater and concrete discharge to waters of the State is prohibited.

A separation geotextile shall be placed under the spalls to prevent fine sediment from pumping up into the rock pad. The geotextile shall meet the standards listed in Table II-3.2: Stabilized Construction Access Geotextile Standards.

Table II-3.2: Stabilized Construction Access Geotextile Standards

Geotextile Property	Required Value
Grab Tensile Strength (ASTM D4751)	200 psi min.

Crushed rock, gravel base, etc., shall be added as required to maintain a stable driving surface and to stabilize any areas that have eroded.

Following construction, these areas shall be restored to pre-construction condition or better to prevent future erosion.

Perform street cleaning at the end of each day or more often if necessary.

BMP C120: Temporary and Permanent Seeding

Purpose

Seeding reduces erosion by stabilizing exposed soils. A well-established vegetative cover is one of the most effective methods of reducing erosion.

Conditions of Use

Use seeding throughout the project on disturbed areas that have reached final grade or that will remain unworked for more than 30 days.

The optimum seeding windows for western Washington are April 1 through June 30 and September 1 through October 1.

Between July 1 and August 30 seeding requires irrigation until 75 percent grass cover is established.

Between October 1 and March 30 seeding requires a cover of mulch or an erosion control blanket until 75 percent grass cover is established.

Review all disturbed areas in late August to early September and complete all seeding by the end of September. Otherwise, vegetation will not establish itself enough to provide more than average protection.

Mulch is required at all times for seeding because it protects seeds from heat, moisture loss, and transport due to runoff. Mulch can be applied on top of the seed or simultaneously by hydroseeding. See BMP C121: Mulching for specifications.

Seed and mulch all disturbed areas not otherwise vegetated at final site stabilization. Final stabilization means the completion of all soil disturbing activities at the site and the establishment of a permanent vegetative cover, or equivalent permanent stabilization measures (such as pavement, riprap, gabions, or geotextiles) which will prevent erosion. See BMP T5.13: Post-Construction Soil Quality and Depth.

Design and Installation Specifications

General

- Install channels intended for vegetation before starting major earthwork and hydroseed with a Bonded Fiber Matrix. For vegetated channels that will have high flows, install erosion control blankets over the top of hydroseed. Before allowing water to flow in vegetated channels, establish 75 percent vegetation cover. If vegetated channels cannot be established by seed

before water flow; install sod in the channel bottom — over top of hydromulch and erosion control blankets.

- Confirm the installation of all required surface water control measures to prevent seed from washing away.
- Hydroseed applications shall include a minimum of 1,500 pounds per acre of mulch with 3 percent tackifier. See BMP C121: Mulching for specifications.
- Areas that will have seeding only and not landscaping may need compost or meal-based mulch included in the hydroseed in order to establish vegetation. Re-install native topsoil on the disturbed soil surface before application. See BMP T5.13: Post-Construction Soil Quality and Depth.
- When installing seed via hydroseeding operations, only about 1/3 of the seed actually ends up in contact with the soil surface. This reduces the ability to establish a good stand of grass quickly. To overcome this, consider increasing seed quantities by up to 50 percent.
- Enhance vegetation establishment by dividing the hydromulch operation into two phases:
    - Phase 1- Install all seed and fertilizer with 25-30 percent mulch and tackifier onto soil in the first lift.
    - Phase 2- Install the rest of the mulch and tackifier over the first lift.

  Or, enhance vegetation by:
    - Installing the mulch, seed, fertilizer, and tackifier in one lift.
    - Spread or blow straw over the top of the hydromulch at a rate of 800-1000 pounds per acre.
    - Hold straw in place with a standard tackifier.

  Both of these approaches will increase cost moderately but will greatly improve and enhance vegetative establishment. The increased cost may be offset by the reduced need for:
    - Irrigation.
    - Reapplication of mulch.
    - Repair of failed slope surfaces.

  This technique works with standard hydromulch (1,500 pounds per acre minimum) and Bonded Fiber Matrix/ Mechanically Bonded Fiber Matrix (BFM/MBFMs) (3,000 pounds per acre minimum).
- Seed may be installed by hand if:
    - Temporary and covered by straw, mulch, or topsoil.
    - Permanent in small areas (usually less than 1 acre) and covered with mulch, topsoil, or erosion blankets.
- The seed mixes listed in Table II-3.4: Temporary and Permanent Seed Mixes include

recommended mixes for both temporary and permanent seeding.

- Apply these mixes, with the exception of the wet area seed mix, at a rate of 120 pounds per acre. This rate can be reduced if soil amendments or slow-release fertilizers are used. Apply the wet area seed mix at a rate of 60 pounds per acre.
- Consult the local suppliers or the local conservation district for their recommendations. The appropriate mix depends on a variety of factors, including location, exposure, soil type, slope, and expected foot traffic. Alternative seed mixes approved by the local authority may be used, depending on the soil type and hydrology of the area.

Table II-3.4: Temporary and Permanent Seed Mixes

Common Name	Latin Name	% Weight	% Purity	% Germination
Temporary Erosion Control Seed Mix A standard mix for areas requiring a temporary vegetative cover.				
Chewings or annual blue grass	*Festuca rubra var. commutata* or *Poa anna*	40	98	90
Perennial rye	*Lolium perenne*	50	98	90
Redtop or colonial bentgrass	*Agrostis alba* or *Agrostis tenuis*	5	92	85
White dutch clover	*Trifolium repens*	5	98	90
Landscaping Seed Mix A recommended mix for landscaping seed.				
Perennial rye blend	*Lolium perenne*	70	98	90
Chewings and red fescue blend	*Festuca rubra var. commutata* or *Festuca rubra*	30	98	90
Low-Growing Turf Seed Mix A turf seed mix for dry situations where there is no need for watering. This mix requires very little maintenance.				
Dwarf tall fescue (several varieties)	*Festuca arundinacea var.*	45	98	90
Dwarf perennial rye (Barclay)	*Lolium perenne var. barclay*	30	98	90
Red fescue	*Festuca rubra*	20	98	90
Colonial bentgrass	*Agrostis tenuis*	5	98	90
Bioswale Seed Mix A seed mix for bioswales and other intermittently wet areas.				
Tall or meadow fes-	*Festuca arundin-*	75-80	98	90

Table II-3.4: Temporary and Permanent Seed Mixes (continued)

Common Name	Latin Name	% Weight	% Purity	% Germination
cue	*acea* or *Festuca elatior*			
Seaside/Creeping bentgrass	*Agrostis palustris*	10-15	92	85
Redtop bentgrass	*Agrostis alba* or *Agrostis gigantea*	5-10	90	80
Wet Area Seed Mix A low-growing, relatively non-invasive seed mix appropriate for very wet areas that are not regulated wetlands. Consult Hydraulic Permit Authority (HPA) for seed mixes if applicable.				
Tall or meadow fescue	*Festuca arundinacea* or *Festuca elatior*	60-70	98	90
Seaside/Creeping bentgrass	*Agrostis palustris*	10-15	98	85
Meadow foxtail	*Alepocurus pratensis*	10-15	90	80
Alsike clover	*Trifolium hybridum*	1-6	98	90
Redtop bentgrass	*Agrostis alba*	1-6	92	85
Meadow Seed Mix A recommended meadow seed mix for infrequently maintained areas or non-maintained areas where colonization by native plants is desirable. Likely applications include rural road and utility right-of-way. Seeding should take place in September or very early October in order to obtain adequate establishment prior to the winter months. Consider the appropriateness of clover, a fairly invasive species, in the mix. Amending the soil can reduce the need for clover.				
Redtop or Oregon bentgrass	*Agrostis alba* or *Agrostis oregonensis*	20	92	85
Red fescue	*Festuca rubra*	70	98	90
White dutch clover	*Trifolium repens*	10	98	90

Roughening and Rototilling

- The seedbed should be firm and rough. Roughen all soil no matter what the slope. Track walk slopes before seeding if engineering purposes require compaction. Backblading or smoothing of slopes greater than 4H:1V is not allowed if they are to be seeded.
- Restoration-based landscape practices require deeper incorporation than that provided by a simple single-pass rototilling treatment. Wherever practical, initially rip the subgrade to improve long-term permeability, infiltration, and water inflow qualities. At a minimum,

permanent areas shall use soil amendments to achieve organic matter and permeability performance defined in engineered soil/landscape systems. For systems that are deeper than 8 inches complete the rototilling process in multiple lifts, or prepare the engineered soil system per specifications and place to achieve the specified depth.

Fertilizers

- Conducting soil tests to determine the exact type and quantity of fertilizer is recommended. This will prevent the over-application of fertilizer.
- Organic matter is the most appropriate form of fertilizer because it provides nutrients (including nitrogen, phosphorus, and potassium) in the least water-soluble form.
- In general, use 10-4-6 N-P-K (nitrogen-phosphorus-potassium) fertilizer at a rate of 90 pounds per acre. Always use slow-release fertilizers because they are more efficient and have fewer environmental impacts. Do not add fertilizer to the hydromulch machine, or agitate, more than 20 minutes before use. Too much agitation destroys the slow-release coating.
- There are numerous products available that take the place of chemical fertilizers. These include several with seaweed extracts that are beneficial to soil microbes and organisms. If 100 percent cottonseed meal is used as the mulch in hydroseed, chemical fertilizer may not be necessary. Cottonseed meal provides a good source of long-term, slow-release, available nitrogen.

Bonded Fiber Matrix and Mechanically Bonded Fiber Matrix

- On steep slopes use Bonded Fiber Matrix (BFM) or Mechanically Bonded Fiber Matrix (MBFM) products. Apply BFM/MBFM products at a minimum rate of 3,000 pounds per acre with approximately 10 percent tackifier. Achieve a minimum of 95 percent soil coverage during application. Numerous products are available commercially. Most products require 24-36 hours to cure before rainfall and cannot be installed on wet or saturated soils. Generally, products come in 40-50 pound bags and include all necessary ingredients except for seed and fertilizer.
- Install products per manufacturer's instructions.
- BFMs and MBFMs provide good alternatives to blankets in most areas requiring vegetation establishment. Advantages over blankets include:
    - BFM and MBFMs do not require surface preparation.
    - Helicopters can assist in installing BFM and MBFMs in remote areas.
    - On slopes steeper than 2.5H:1V, blanket installers may require ropes and harnesses for safety.
    - Installing BFM and MBFMs can save at least $1,000 per acre compared to blankets.

Maintenance Standards

Reseed any seeded areas that fail to establish at least 75 percent cover (100 percent cover for areas that receive sheet or concentrated flows). If reseeding is ineffective, use an alternate method such as sodding, mulching, nets, or blankets.

- Reseed and protect by mulch any areas that experience erosion after achieving adequate cover. Reseed and protect by mulch any eroded area.
- Supply seeded areas with adequate moisture, but do not water to the extent that it causes run-off.

Approved as Functionally Equivalent

Ecology has approved products as able to meet the requirements of this BMP. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept these products, or may require additional testing prior to consideration for local use. Products that Ecology has approved as functionally equivalent are available for review on Ecology's website at:

https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Stormwater-permittee-guidance-resources/Emerging-stormwater-treatment-technologies

BMP C121: Mulching

Purpose

Mulching soils provides immediate temporary protection from erosion. Mulch also enhances plant establishment by conserving moisture, holding fertilizer, seed, and topsoil in place, and moderating soil temperatures. There are a variety of mulches that can be used. This section discusses only the most common types of mulch.

Conditions of Use

As a temporary cover measure, mulch should be used:

- For less than 30 days on disturbed areas that require cover.
- At all times for seeded areas, especially during the wet season and during the hot summer months.
- During the wet season on slopes steeper than 3H:1V with more than 10 feet of vertical relief.

Mulch may be applied at any time of the year and must be refreshed periodically.

For seeded areas, mulch may be made up of 100 percent:

- cottonseed meal;
- fibers made of wood, recycled cellulose, hemp, or kenaf;

BMP C123: Plastic Covering

Purpose

Plastic covering provides immediate, short-term erosion protection to slopes and disturbed areas.

Conditions of Use

Plastic covering may be used on disturbed areas that require cover measures for less than 30 days, except as stated below.

- Plastic is particularly useful for protecting cut and fill slopes and stockpiles. However, the relatively rapid breakdown of most polyethylene sheeting makes it unsuitable for applications greater than six months.
- Due to rapid runoff caused by plastic covering, do not use this method upslope of areas that might be adversely impacted by concentrated runoff. Such areas include steep and/or unstable slopes.
- Plastic sheeting may result in increased runoff volumes and velocities, requiring additional on-site measures to counteract the increases. Creating a trough with wattles or other material can convey clean water away from these areas.
- To prevent undercutting, trench and backfill rolled plastic covering products.
- Although the plastic material is inexpensive to purchase, the cost of installation, maintenance, removal, and disposal add to the total costs of this BMP.
- Whenever plastic is used to protect slopes, install water collection measures at the base of the slope. These measures include plastic-covered berms, channels, and pipes used to convey clean rainwater away from bare soil and disturbed areas. Do not mix clean runoff from a plastic covered slope with dirty runoff from a project.
- Other uses for plastic include:
    - Temporary ditch liner.
    - Pond liner in temporary sediment pond.
    - Liner for bermed temporary fuel storage area if plastic is not reactive to the type of fuel being stored.
    - Emergency slope protection during heavy rains.
    - Temporary drainpipe (“elephant trunk”) used to direct water.

Design and Installation Specifications

- Plastic slope cover must be installed as follows:
    1. Run plastic up and down the slope, not across the slope.
    2. Plastic may be installed perpendicular to a slope if the slope length is less than 10 feet.

3. Provide a minimum of 8-inch overlap at the seams.
4. On long or wide slopes, or slopes subject to wind, tape all seams.
5. Place plastic into a small (12-inch wide by 6-inch deep) slot trench at the top of the slope and backfill with soil to keep water from flowing underneath.
6. Place sand filled burlap or geotextile bags every 3 to 6 feet along seams and tie them together with twine to hold them in place.
7. Inspect plastic for rips, tears, and open seams regularly and repair immediately. This prevents high velocity runoff from contacting bare soil, which causes extreme erosion.
8. Sandbags may be lowered into place tied to ropes. However, all sandbags must be staked in place.

- Plastic sheeting shall have a minimum thickness of 0.06 millimeters.
- If erosion at the toe of a slope is likely, a gravel berm, riprap, or other suitable protection shall be installed at the toe of the slope in order to reduce the velocity of runoff.

Maintenance Standards

- Torn sheets must be replaced and open seams repaired.
- Completely remove and replace the plastic if it begins to deteriorate due to ultraviolet radiation.
- Completely remove plastic when no longer needed.
- Dispose of old tires used to weight down plastic sheeting appropriately.

Approved as Functionally Equivalent

Ecology has approved products as able to meet the requirements of this BMP. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept these products, or may require additional testing prior to consideration for local use. Products that Ecology has approved as functionally equivalent are available for review on Ecology's website at:

https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Stormwater-permittee-guidance-resources/Emerging-stormwater-treatment-technologies

BMP C124: Sodding

Purpose

The purpose of sodding is to establish turf for immediate erosion protection and to stabilize drainage paths where concentrated overland flow will occur.

BMP C140: Dust Control

Purpose

Dust control prevents wind transport of dust from disturbed soil surfaces onto roadways, drainage ways, and surface waters.

Conditions of Use

Use dust control in areas (including roadways) subject to surface and air movement of dust where on-site or off-site impacts to roadways, drainage ways, or surface waters are likely.

Design and Installation Specifications

- Vegetate or mulch areas that will not receive vehicle traffic. In areas where planting, mulching, or paving is impractical, apply gravel or landscaping rock.
- Limit dust generation by clearing only those areas where immediate activity will take place, leaving the remaining area(s) in the original condition. Maintain the original ground cover as long as practical.
- Construct natural or artificial windbreaks or windscreens. These may be designed as enclosures for small dust sources.
- Sprinkle the site with water until the surface is wet. Repeat as needed. To prevent carryout of mud onto the street, refer to BMP C105: Stabilized Construction Access and BMP C106: Wheel Wash.
- Irrigation water can be used for dust control. Irrigation systems should be installed as a first step on sites where dust control is a concern.
- Spray exposed soil areas with a dust palliative, following the manufacturer's instructions and cautions regarding handling and application. Used oil is prohibited from use as a dust suppressant. Local governments may approve other dust palliatives such as calcium chloride or PAM.
- PAM (BMP C126: Polyacrylamide (PAM) for Soil Erosion Protection) added to water at a rate of 0.5 pounds per 1,000 gallons of water per acre and applied from a water truck is more effective than water alone. This is due to increased infiltration of water into the soil and reduced evaporation. In addition, small soil particles are bonded together and are not as easily transported by wind. Adding PAM may reduce the quantity of water needed for dust control. Note that the application rate specified here applies to this BMP, and is not the same application rate that is specified in BMP C126: Polyacrylamide (PAM) for Soil Erosion Protection, but the downstream protections still apply.

  Refer to BMP C126: Polyacrylamide (PAM) for Soil Erosion Protection for conditions of use. PAM shall not be directly applied to water or allowed to enter a water body.
- Contact your local Air Pollution Control Authority for guidance and training on other dust control measures. Compliance with the local Air Pollution Control Authority constitutes

compliance with this BMP.

- Use vacuum street sweepers.
- Remove mud and other dirt promptly so it does not dry and then turn into dust.
- Techniques that can be used for unpaved roads and lots include:
    - Lower speed limits. High vehicle speed increases the amount of dust stirred up from unpaved roads and lots.
    - Upgrade the road surface strength by improving particle size, shape, and mineral types that make up the surface and base materials.
    - Add surface gravel to reduce the source of dust emission. Limit the amount of fine particles (those smaller than .075 mm) to 10 to 20 percent.
    - Use geotextile fabrics to increase the strength of new roads or roads undergoing reconstruction.
    - Encourage the use of alternate, paved routes, if available.
    - Apply chemical dust suppressants using the admix method, blending the product with the top few inches of surface material. Suppressants may also be applied as surface treatments.
    - Limit dust-causing work on windy days.
    - Pave unpaved permanent roads and other trafficked areas.

Maintenance Standards

Respray area as necessary to keep dust to a minimum.

BMP C150: Materials on Hand

Purpose

Keep quantities of erosion prevention and sediment control materials on the project site at all times to be used for regular maintenance and emergency situations such as unexpected heavy rains. Having these materials on-site reduces the time needed to replace existing or implement new BMPs when inspections indicate that existing BMPs are not meeting the Construction SWPPP requirements. In addition, contractors can save money by buying some materials in bulk and storing them at their office or yard.

Conditions of Use

- Construction projects of any size or type can benefit from having materials on hand. A small commercial development project could have a roll of plastic and some gravel available for immediate protection of bare soil and temporary berm construction. A large earthwork project, such as highway construction, might have several tons of straw, several rolls of plastic, flexible

thickness is 2 feet.

- For outlets at the base of steep slope pipes (pipe slope greater than 10 percent), use an engineered energy dissipator.
- Filter fabric or erosion control blankets should always be used under riprap to prevent scour and channel erosion. See BMP C122: Nets and Blankets.

- Bank stabilization, bioengineering, and habitat features may be required for disturbed areas. This work may require a Hydraulic Project Approval (HPA) from the Washington State Department of Fish and Wildlife. See I-2.11 Hydraulic Project Approvals.

Maintenance Standards

- Inspect and repair as needed.
- Add rock as needed to maintain the intended function.
- Clean energy dissipator if sediment builds up.

BMP C220: Inlet Protection

Purpose

Inlet protection prevents coarse sediment from entering drainage systems prior to permanent stabilization of the disturbed area.

Conditions of Use

Use inlet protection at inlets that are operational before permanent stabilization of the disturbed areas that contribute runoff to the inlet. Provide protection for all storm drain inlets downslope and within 500 feet of a disturbed or construction area, unless those inlets are preceded by a sediment trapping BMP.

Also consider inlet protection for lawn and yard drains on new home construction. These small and numerous drains coupled with lack of gutters can add significant amounts of sediment into the roof drain system. If possible, delay installing lawn and yard drains until just before landscaping, or cap these drains to prevent sediment from entering the system until completion of landscaping. Provide 18-inches of sod around each finished lawn and yard drain.

Table II-3.10: Storm Drain Inlet Protection lists several options for inlet protection. All of the methods for inlet protection tend to plug and require a high frequency of maintenance. Limit contributing drainage areas for an individual inlet to one acre or less. If possible, provide emergency overflows with additional end-of-pipe treatment where stormwater ponding would cause a hazard.

Table II-3.10: Storm Drain Inlet Protection

Type of Inlet Protection	Emergency Overflow	Applicable for Paved/ Earthen Surfaces	Conditions of Use
Drop Inlet Protection			
Excavated drop inlet protection	Yes, temporary flooding may occur	Earthen	Applicable for heavy flows. Easy to maintain. Large area requirement: 30'x30'/acre
Block and gravel drop inlet protection	Yes	Paved or Earthen	Applicable for heavy concentrated flows. Will not pond.
Gravel and wire drop inlet protection	No	Paved or Earthen	Applicable for heavy concentrated flows. Will pond. Can withstand traffic.
Catch basin filters	Yes	Paved or Earthen	Frequent maintenance required.
Curb Inlet Protection			
Curb inlet protection with wooden weir	Small capacity overflow	Paved	Used for sturdy, more compact installation.
Block and gravel curb inlet protection	Yes	Paved	Sturdy, but limited filtration.
Culvert Inlet Protection			
Culvert inlet sediment trap	N/A	N/A	18 month expected life.

Design and Installation Specifications

Excavated Drop Inlet Protection

Excavated drop inlet protection consists of an excavated impoundment around the storm drain inlet. Sediment settles out of the stormwater prior to entering the storm drain. Design and installation specifications for excavated drop inlet protection include:

- Provide a depth of 1-2 ft as measured from the crest of the inlet structure.
- Slope sides of excavation should be no steeper than 2H:1V.
- Minimum volume of excavation is 35 cubic yards.
- Shape the excavation to fit the site, with the longest dimension oriented toward the longest inflow area.
- Install provisions for draining to prevent standing water.
- Clear the area of all debris.

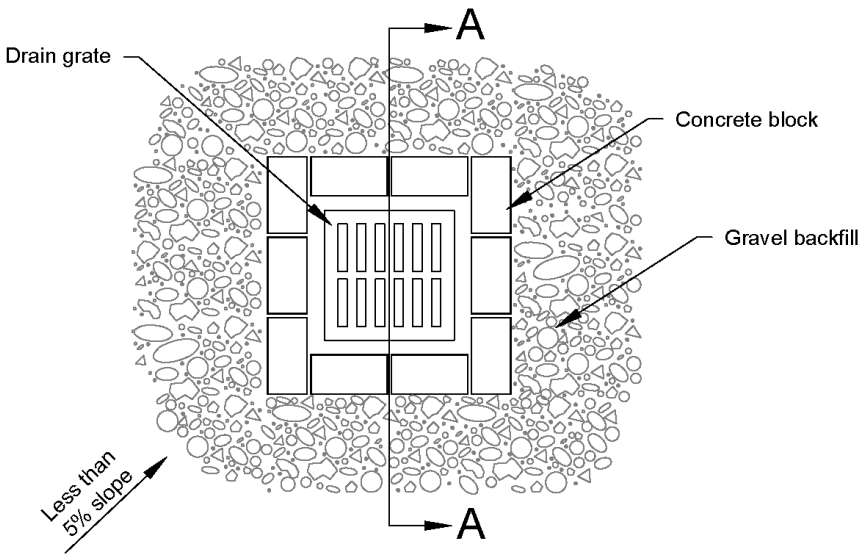
- Grade the approach to the inlet uniformly.
- Drill weep holes into the side of the inlet.
- Protect weep holes with screen wire and washed aggregate.
- Seal weep holes when removing structure and stabilizing area.
- Build a temporary dike, if necessary, to the down slope side of the structure to prevent bypass flow.

Block and Gravel Filter

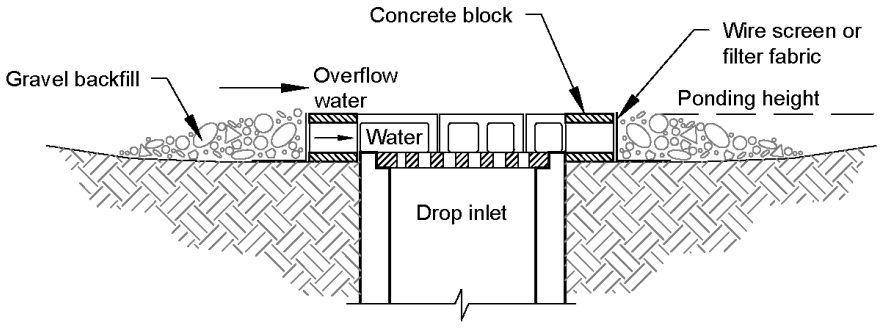
A block and gravel filter is a barrier formed around the inlet with standard concrete blocks and gravel. See Figure II-3.17: Block and Gravel Filter. Design and installation specifications for block gravel filters include:

- Provide a height of 1 to 2 feet above the inlet.
- Recess the first row of blocks 2-inches into the ground for stability.
- Support subsequent courses by placing a pressure treated wood 2x4 through the block opening.
- Do not use mortar.
- Lay some blocks in the bottom row on their side to allow for dewatering the pool.
- Place hardware cloth or comparable wire mesh with ½-inch openings over all block openings.
- Place gravel to just below the top of blocks on slopes of 2H:1V or flatter.
- An alternative design is a gravel berm surrounding the inlet, as follows:
    - Provide a slope of 3H:1V on the upstream side of the berm.
    - Provide a slope of 2H:1V on the downstream side of the berm.
    - Provide a 1-foot wide level stone area between the gravel berm and the inlet.
    - Use stones 3 inches in diameter or larger on the upstream slope of the berm.
    - Use gravel ½- to ¾-inch at a minimum thickness of 1-foot on the downstream slope of the berm.

Figure II-3.17: Block and Gravel Filter



Plan View



Section A-A

Notes:

1. Drop inlet sediment barriers are to be used for small, nearly level drainage areas. (less than 5%)
2. Excavate a basin of sufficient size adjacent to the drop inlet.
3. The top of the structure (ponding height) must be well below the ground elevation downslope to prevent runoff from bypassing the inlet. A temporary dike may be necessary on the downslope side of the structure.

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State of Washington

Block and Gravel Filter

Revised June 2016

Gravel and Wire Mesh Filter

Gravel and wire mesh filters are gravel barriers placed over the top of the inlet. This method does not provide an overflow. Design and installation specifications for gravel and wire mesh filters include:

- Use a hardware cloth or comparable wire mesh with ½-inch openings.
    - Place wire mesh over the drop inlet so that the wire extends a minimum of 1-foot beyond each side of the inlet structure.
    - Overlap the strips if more than one strip of mesh is necessary.
- Place coarse aggregate over the wire mesh.
    - Provide at least a 12-inch depth of aggregate over the entire inlet opening and extend at least 18-inches on all sides.

Catch Basin Filters

Catch basin filters are designed by manufacturers for construction sites. The limited sediment storage capacity increases the amount of inspection and maintenance required, which may be daily for heavy sediment loads. To reduce maintenance requirements, combine a catch basin filter with another type of inlet protection. This type of inlet protection provides flow bypass without overflow and therefore may be a better method for inlets located along active rights-of-way. Design and installation specifications for catch basin filters include:

- Provides 5 cubic feet of storage.
- Requires dewatering provisions.
- Provides a high-flow bypass that will not clog under normal use at a construction site.
- Insert the catch basin filter in the catch basin just below the grating.

Curb Inlet Protection with Wooden Weir

Curb inlet protection with wooden weir is an option that consists of a barrier formed around a curb inlet with a wooden frame and gravel. Design and installation specifications for curb inlet protection with wooden weirs include:

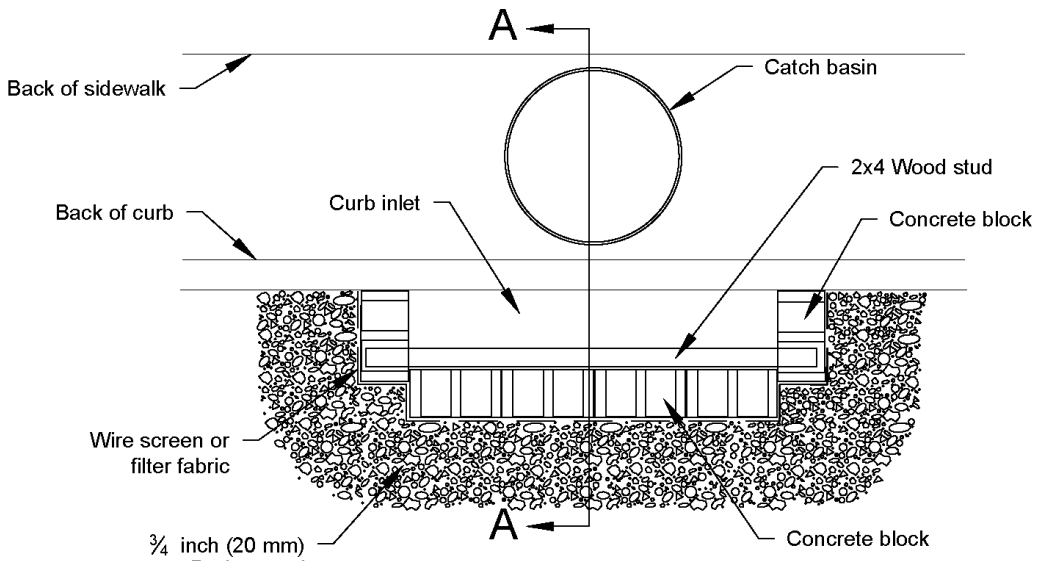
- Use wire mesh with ½-inch openings.
- Use extra strength filter cloth.
- Construct a frame.
- Attach the wire and filter fabric to the frame.
- Pile coarse washed aggregate against the wire and fabric.
- Place weight on the frame anchors.

Block and Gravel Curb Inlet Protection

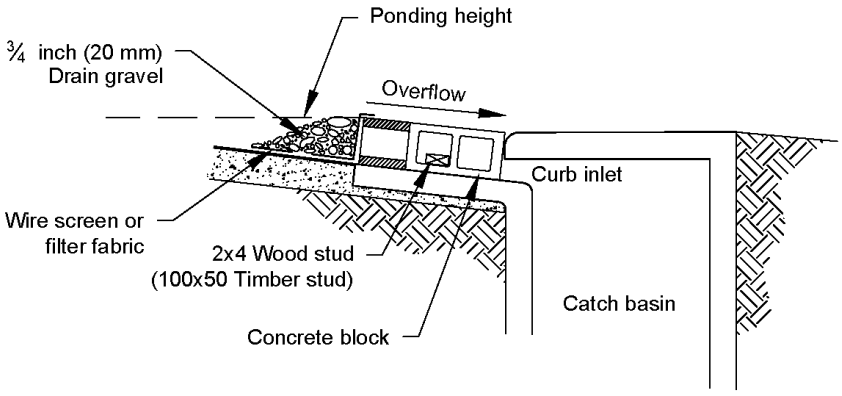
Block and gravel curb inlet protection is a barrier formed around a curb inlet with concrete blocks and gravel. See Figure II-3.18: Block and Gravel Curb Inlet Protection. Design and installation specifications for block and gravel curb inlet protection include:

- Use wire mesh with ½-inch openings.
- Place two concrete blocks on their sides abutting the curb at either side of the inlet opening. These are spacer blocks.
- Place a 2x4 stud through the outer holes of each spacer block to align the front blocks.
- Place blocks on their sides across the front of the inlet and abutting the spacer blocks.
- Place wire mesh over the outside vertical face.
- Pile coarse aggregate against the wire to the top of the barrier.

Figure II-3.18: Block and Gravel Curb Inlet Protection



Plan View



Section A-A

Notes:

1. Use block and gravel type sediment barrier when curb inlet is located in gently sloping street segment, where water can pond and allow sediment to separate from runoff.
2. Barrier shall allow for overflow from severe storm event.
3. Inspect barriers and remove sediment after each storm event. Sediment and gravel must be removed from the traveled way immediately.

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Block and Gravel Curb Inlet Protection

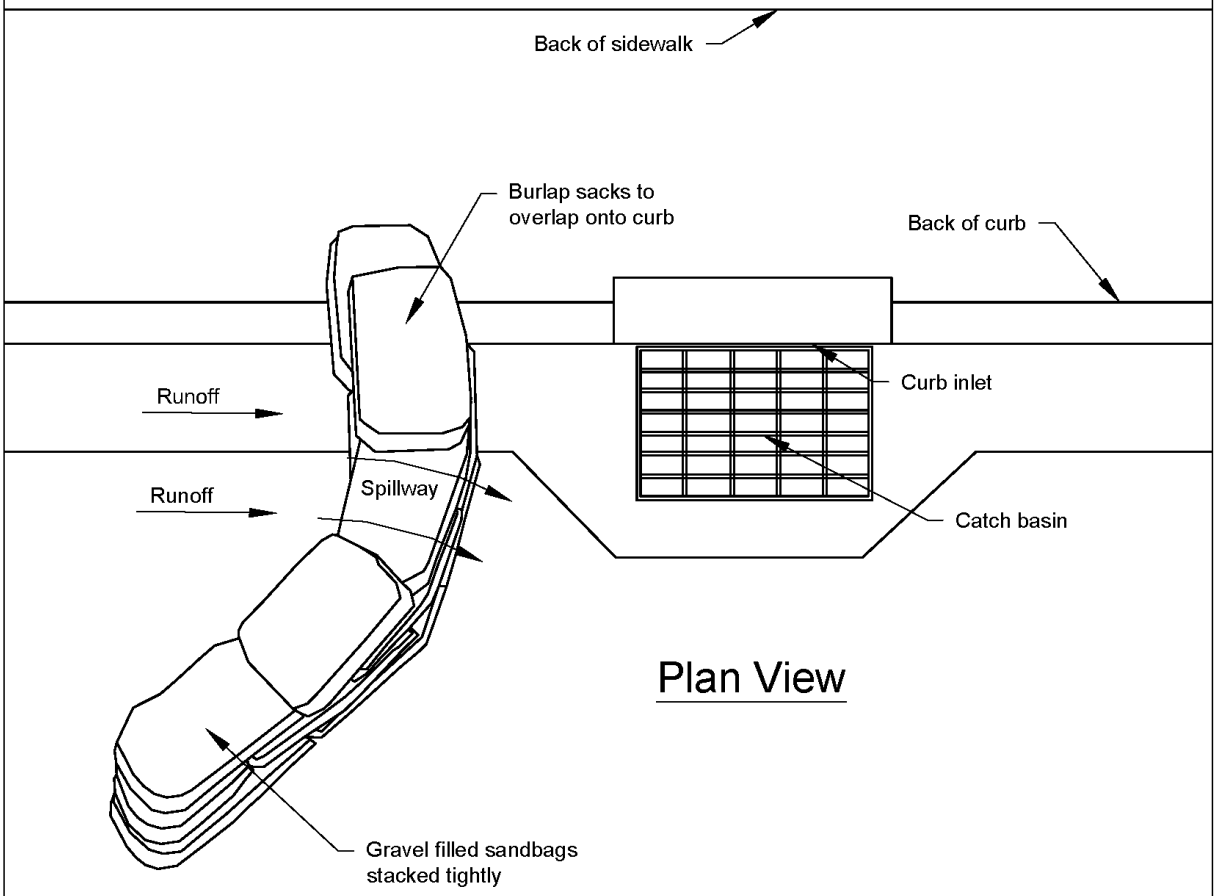
Revised June 2016

Curb and Gutter Sediment Barrier

Curb and gutter sediment barrier is a sandbag or rock berm (riprap and aggregate) 3 feet high and 3 feet wide in a horseshoe shape. See Figure II-3.19: Curb and Gutter Barrier. Design and installation specifications for curb and gutter sediment barrier include:

- Construct a horseshoe shaped berm, faced with coarse aggregate if using riprap, 3 feet high and 3 feet wide, at least 2 feet from the inlet.
- Construct a horseshoe shaped sedimentation trap on the upstream side of the berm. Size the trap to sediment trap standards for protecting a culvert inlet.

Figure II-3.19: Curb and Gutter Barrier



Notes:

1. Place curb type sediment barriers on gently sloping street segments, where water can pond and allow sediment to separate from runoff.
2. Sandbags of either burlap or woven 'geotextile' fabric, are filled with gravel, layered and packed tightly.
3. Leave a one sandbag gap in the top row to provide a spillway for overflow.
4. Inspect barriers and remove sediment after each storm event. Sediment and gravel must be removed from the traveled way immediately.

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DEPARTMENT OF ECOLOGY
State of Washington

Curb and Gutter Barrier

Revised June 2016

Maintenance Standards

- Inspect all forms of inlet protection frequently, especially after storm events. Clean and replace clogged catch basin filters. For rock and gravel filters, pull away the rocks from the inlet and clean or replace. An alternative approach would be to use the clogged rock as fill and put fresh rock around the inlet.
- Do not wash sediment into storm drains while cleaning. Spread all excavated material evenly over the surrounding land area or stockpile and stabilize as appropriate.

Approved as Functionally Equivalent

Ecology has approved products as able to meet the requirements of this BMP. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept these products, or may require additional testing prior to consideration for local use. Products that Ecology has approved as functionally equivalent are available for review on Ecology's website at:

https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Stormwater-permittee-guidance-resources/Emerging-stormwater-treatment-technologies

BMP C231: Brush Barrier

Purpose

The purpose of brush barriers is to reduce the transport of coarse sediment from a construction site by providing a temporary physical barrier to sediment and reducing the runoff velocities of overland flow.

Conditions of Use

- Brush barriers may be used downslope of disturbed areas that are less than one-quarter acre.
- Brush barriers are not intended to treat concentrated flows, nor are they intended to treat substantial amounts of overland flow. Any concentrated flows must be directed to a sediment trapping BMP. The only circumstance in which overland flow can be treated solely by a brush barrier, rather than by a sediment trapping BMP, is when the area draining to the barrier is small.
- Brush barriers should only be installed on contours.

Design and Installation Specifications

- Height: 2 feet (minimum) to 5 feet (maximum).
- Width: 5 feet at base (minimum) to 15 feet (maximum).
- Filter fabric (geotextile) may be anchored over the brush berm to enhance the filtration ability of the barrier. Ten-ounce burlap is an adequate alternative to filter fabric.

Appendix C

Operations and Maintenance Manual

Operations and Maintenance Manual

May 31, 2024

PROJECT

Butterworth Road Remodel
5330 Butterworth Rd
Mercer Island, WA 98040
Project No: 24004

OWNER/APPLICANT

Dan Buchser
MacPherson Construction & Design
21626 SE 28th Street
Sammamish, WA 98075

PREPARED BY

John Babb, EIT
Civil Designer

REVIEWED BY

Andy Epstein, PE
Civil Engineer

ETHOS CIVIL

Operations and Maintenance Manual

May 31, 2024

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REVIEWED BY

Andy Epstein, PE
Civil Engineer

05/31/2024

I hereby state that this Operations and Maintenance Manual for the Butterworth Road Remodel project has been prepared by me or under my supervision and meets the standard of care and expertise that is usual and customary in this community for professional engineers. I understand that the City of Mercer Island does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities prepared by me.

Table of Contents

Section 1 – Introduction

The Butterworth Road Remodel project is a project that includes the demolition of portions of the onsite existing structure, construction of home renovations, and associated stormwater improvements.

The site address is 5330 Butterworth Rd in Mercer Island, Washington. The site consists of a single parcel, numbered 8661400040, which is approximately 1.89 acres in size. The parcel is in Township 24 North, Range 05, Section 19 East of the Willamette Meridian in King County, Washington. Refer to Exhibit A-1 in Appendix A for a Vicinity Map.

The site generally slopes from west to east, with a total elevation of about 26 feet. There is a man-made unnamed Type F stream located on the project parcel near the southern property line. This project proposes connections to the existing stormwater system on site through conveyance pipes.

The owner shall be responsible for maintaining the project stormwater facilities.

This report presents a maintenance program that meets the requirements of the Department of Ecology *2019 Stormwater Management Manual for Western Washington (SMMWW)*. It is vitally important that the owner maintains these facilities in a timely and conscientious manner to avoid operational difficulties in the future. If catch basins are not adequately inspected and kept free of debris, it could lead to flooding and surcharging of the stormwater system. Siltation, debris, or lack of maintenance can reduce the capabilities of the system.

Section 2 – Responsibility

The project improvements will be owned and maintained by the property owner.

Section 3 – Maintenance Schedule

Maintenance of the stormwater facilities shall follow the schedule specified in the *SMMWW.* Additional maintenance may be required to respond to unusual storm events or reduced performance of the stormwater treatment system. A copy of the recommended maintenance schedule is included in Appendix C and may be photocopied and used for inspection records. Periodic stormwater facility maintenance should include sediment removal and vegetation management. Permanent erosion and sedimentation controls should be maintained as needed. Inspection records should be kept on file at the project site.

Section 4 – Cost

The following is an estimate of the average annual cost of maintenance for the stormwater facilities within the scope of this project.

Personnel at $50/hour x 1 hour	$50
Total Estimated Annual Cost	**$50**

Section 5 – Vegetation Management Plan

The attached maintenance schedule provides guidance on vegetation control and management. Irrigation and other maintenance shall be provided as necessary to ensure that vegetation remains viable and that a hardy root structure forms in the first year. Vegetation planting shall be provided as described in the construction documents.

Section 6 – Source Control

All proposed new plus replaced impervious surfaces are non-pollution generating. Source control is therefore not required.

Section 7 – Instructions for Person Maintaining Stormwater System

Appendix C contains a Stormwater Facility Maintenance Schedule. A checklist should be completed for all system components per the following schedule:

- Monthly from November through April
- Once in late summer (preferably September)
- After any major storm event

Using photocopies of the pages in Appendix C, check off the problems that are noted each time the item is inspected. Document comments on problems found and the corrective action taken. The inspection checklist sheets should be kept on file. Use the Department of Ecology suggested inspection frequency at the left of each item as an inspection guide.

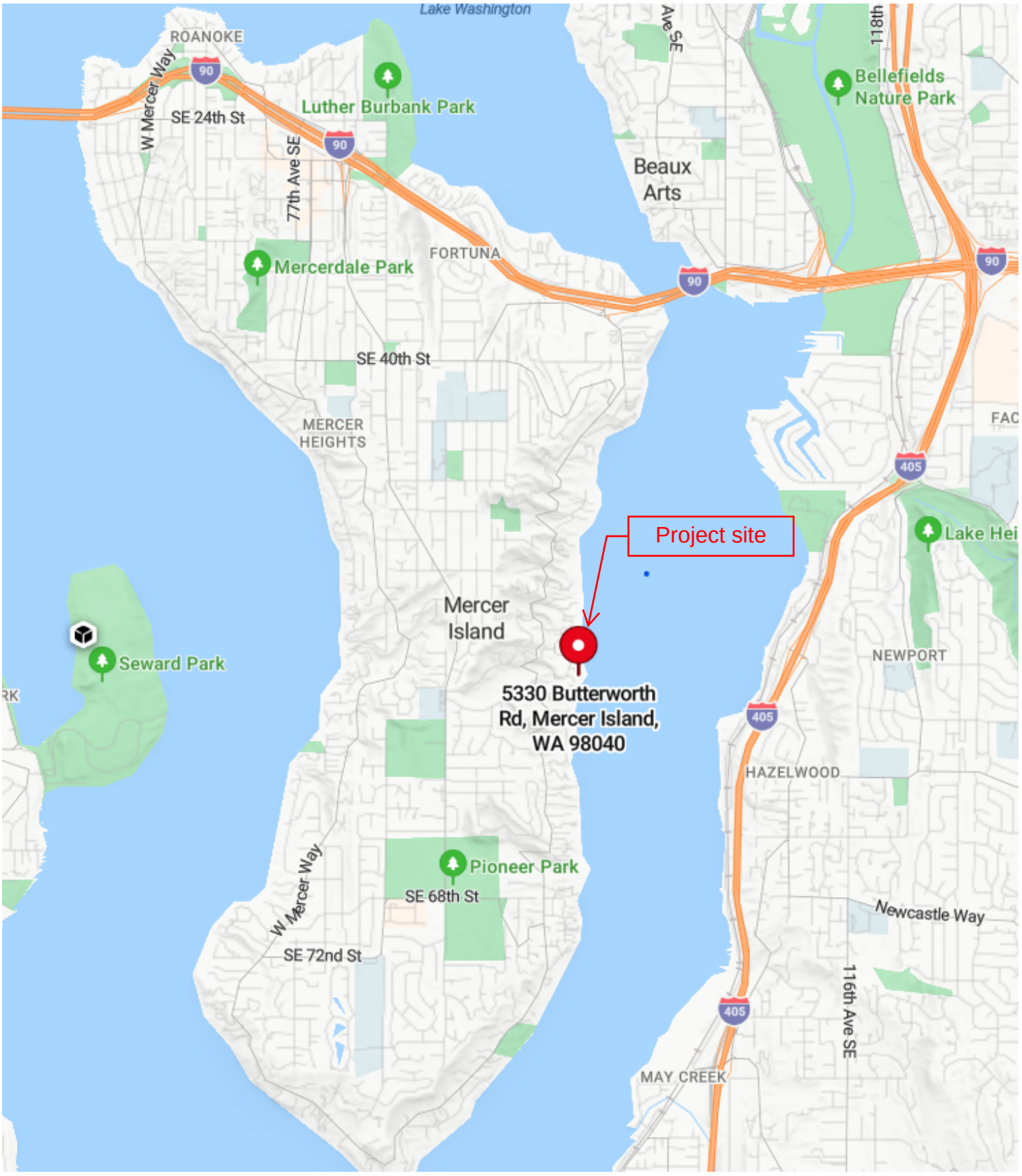
For questions, contact the Washington State Department of Ecology.

Section 8 – Conclusion

This maintenance plan is developed for the Butterworth Road Remodel project. The maintenance plan has been prepared within the guidelines of the Department of Ecology *2019 Stormwater Management Manual for Western Washington.* IF this plan is implemented, the owner can expect the stormwater conveyance system to function as designed.
This analysis is based on data and records either supplied to or obtained by Ethos Civil. These documents are referenced within the text of the analysis. The analysis has been prepared using procedures and practices within the standard accepted practices of the industry.

Appendix A

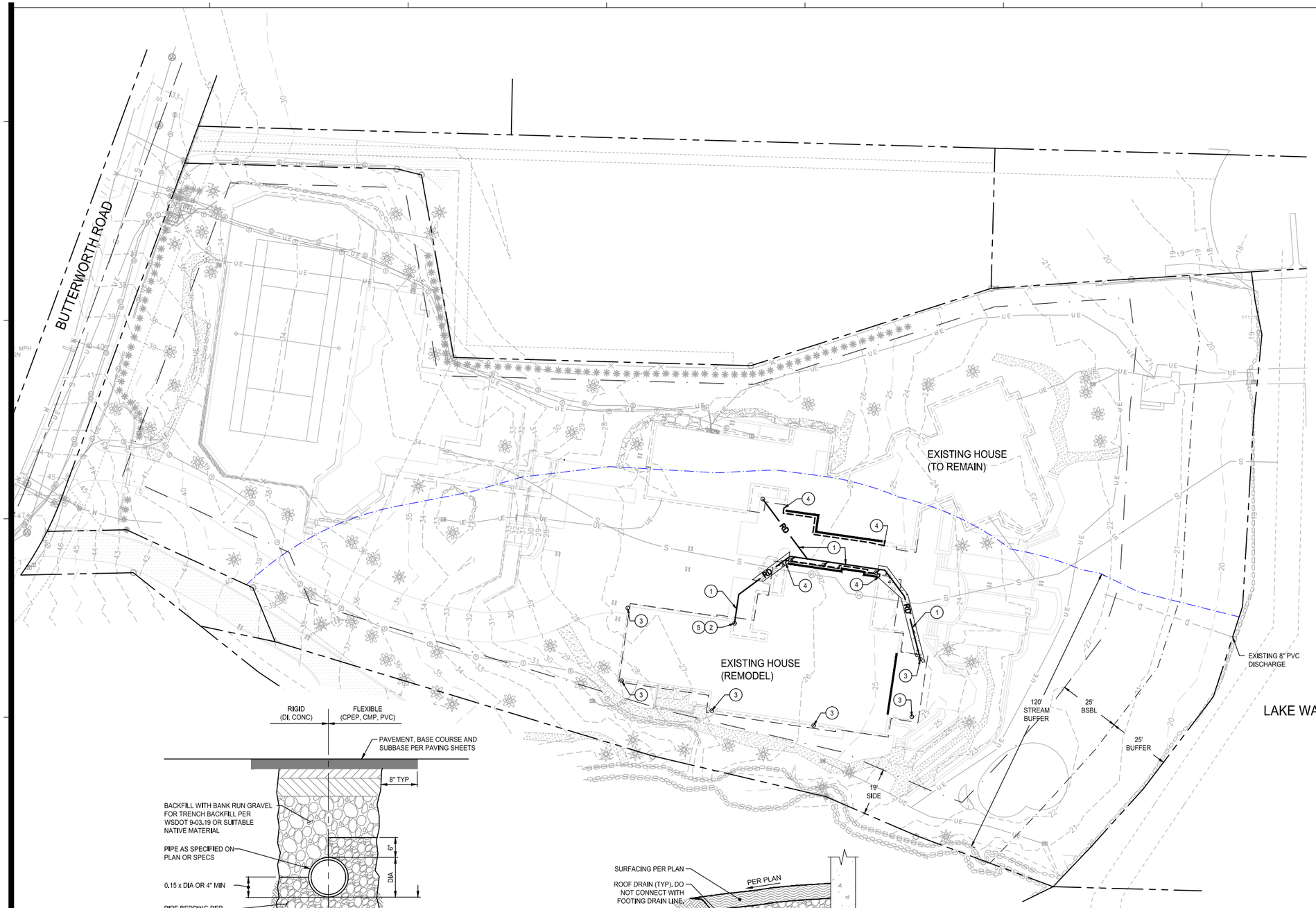
Vicinity Map



ETHOS CIVIL	**Butterworth Road Remodel**	A-1
	Vicinity Map	

Appendix B

Civil Plan Sheets



LEGEND

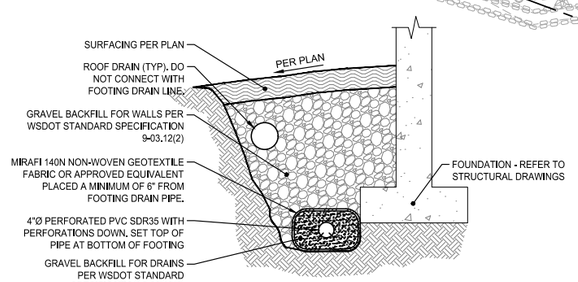
- RIGHT-OF-WAY/PROPERTY LINE
- PROPOSED BUILDING OUTLINE, REFER TO ARCHITECTURE PLAN
- BUILDING OVERHANG, REFER TO ARCHITECTURE PLAN
- PROPOSED CONCRETE REPLACEMENT, REPLACE IN-KIND WITH REMOVED EXISTING CONCRETE.
- RD — ROOF DRAIN LINE (1 / C1-1)
- FOOTING DRAIN (2 / C1-1)

KEYNOTES

1. 4" SDR 35 PVC @ 2.0% MIN.
2. DOWNSPOUT, TYP, PER ARCHITECTURE PLANS, REFER TO ARCHITECTURE PLAN FOR LOCATIONS AND QUANTITY OF DOWNSPOUTS. (1 / C1-1)
3. CONNECT TO EXISTING DRAIN LINE AT NEAREST EXISTING DOWNSPOUT WITH 4" SDR 35 PVC @ 2.0% MIN. FIELD LOCATE EXISTING DOWNSPOUT LOCATIONS.
4. CONNECT TO EXISTING FOOTING DRAIN
5. CONTRACTOR TO VERIFY IF THERE IS A CLOSER EXISTING DOWNSPOUT TO CONNECT, IF SO, CONNECT TO EXISTING DRAIN LINE AT NEAREST EXISTING DOWNSPOUT WITH 4" SDR 35 PVC @ 2.0% MIN.

NOTES:
1. BACKFILL MATERIAL SHALL NOT HAVE ROCKS OR PARTICLES LARGER THAN 1" WITHIN 12" OF THE PIPE. BACKFILL MATERIAL SHALL BE PLACED IN 8" MAXIMUM LOOSE LIFTS AND COMPACTED TO 95% MAXIMUM DRY DENSITY PER MODIFIED PROCTOR TEST (ASTM D-1557).
2. CONSTRUCT ALL STORM AND ROOF DRAINS IN CONFORMANCE WITH THIS DETAIL UNLESS NOTED OTHERWISE ON THE PLANS.
3. ALL TRENCH EXCAVATIONS SHALL BE SLOPED, SHORED, SHEETED, BRACED, OR OTHERWISE SUPPORTED IN COMPLIANCE WITH OSHA REGULATIONS AND LOCAL ORDINANCES.
4. IF ORGANIC MATERIAL IS ENCOUNTERED DURING UTILITY EXCAVATION, OVEREXCAVATE TRENCH TO INCREASE PIPE BEDDING DEPTH TO 18" OR MORE AS REQUIRED TO COMPACT BEDDING TO FIRM AND UNYIELDING CONDITION.

1 TRENCH SECTION
NOT TO SCALE



2 FOOTING DRAIN
NOT TO SCALE

Know what's **below.** **Call** before you dig.

N

20 10 0 20 40
SCALE IN FEET

PLOTTED: 5/30/2024 3:28:05 PM FILE: 24004-SHEETS.DWG LAST SAVED BY: JOHNBAB

BUTTERWORTH ROAD REMODEL

5330 BUTTERWORTH ROAD
MERCER ISLAND, WA 98040

PERMIT SET

ETHOS CIVIL
Engineering Entitlement Project Management
ethosciv.com info@ethosciv.com 253.414.1989

05/31/2024

DESIGNED JTB
CHECKED ABE
DRAWN JTB
CHECKED ABE

#	DATE	DESCRIPTION

24004
05/31/2024

SITE PLAN

C1-1

Appendix C

Stormwater Facility Maintenance Schedule
SMMWW Maintenance Standards

Butterworth Road Remodel
Inspection Frequencies

Asset	Preferred Month	Interval
Storm Catch Basins/Yard Drains/Cleanouts		Annually
Storm Drainage Pipes		Annually
Landscaping	March – April September – October	Semi-annually

Butterworth Road Remodel
Maintenance Activity Log

Storm Drainage Pipes

Date	Initials	Current Condition	Action Taken	Condition After Maintenance

Maintenance to be performed:

- Sediment shall be removed from pipes annually.

Result expected when maintenance performed:

- Pipe contains no sediment.

To be performed by: On or before:

Butterworth Road Remodel
Maintenance Activity Log

Catch Basin

Date	Initials	Current Condition	Action Taken	Condition After Maintenance

Maintenance to be performed:

- Sediment shall be removed from basin annually.
- Trash or debris shall be removed from basin annually.
- Grout cracks and adjust frame to sit flush with surface.
- Remove vegetation growing across or blocking basin opening and inlet/outlet pipes.

Result expected when maintenance performed:

- No sediment in the catch basin.
- No trash or debris in the catch basin.
- Pipes and top slab are secure and free from cracks. Frame is flush with the surface.
- No vegetation blocking opening to basin.

To be performed by: On or before:

Table V-A.5: Maintenance Standards - Catch Basins

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
General	Trash & Debris	Trash or debris which is located immediately in front of the catch basin opening or is blocking inletting capacity of the basin by more than 10%. Trash or debris (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of six inches clearance from the debris surface to the invert of the lowest pipe. Trash or debris in any inlet or outlet pipe blocking more than 1/3 of its height. Dead animals or vegetation that could generate odors that could cause complaints or dangerous gases (e.g., methane).	No Trash or debris located immediately in front of catch basin or on grate opening. No trash or debris in the catch basin. Inlet and outlet pipes free of trash or debris. No dead animals or vegetation present within the catch basin.
	Sediment	Sediment (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the sediment surface to the invert of the lowest pipe.	No sediment in the catch basin
	Structure Damage to Frame and/or Top Slab	Top slab has holes larger than 2 square inches or cracks wider than 1/4 inch. (Intent is to make sure no material is running into basin). Frame not sitting flush on top slab, i.e., separation of more than 3/4 inch of the frame from the top slab. Frame not securely attached	Top slab is free of holes and cracks. Frame is sitting flush on the riser rings or top slab and firmly attached.
	Fractures or Cracks in Basin Walls/ Bottom	Maintenance person judges that structure is unsound. Grout fillet has separated or cracked wider than 1/2 inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	Basin replaced or repaired to design standards. Pipe is regrouted and secure at basin wall.
	Settlement/ Misalignment	If failure of basin has created a safety, function, or design problem.	Basin replaced or repaired to design standards.
	Vegetation	Vegetation growing across and blocking more than 10% of the basin opening. Vegetation growing in inlet/outlet pipe joints that is more than six inches tall and less than six inches apart.	No vegetation blocking opening to basin. No vegetation or root growth present.
	Contamination and Pollution	See Table V-A.1: Maintenance Standards - Detention Ponds	No pollution present.
Catch Basin Cover	Cover Not in Place	Cover is missing or only partially in place. Any open catch basin requires maintenance.	Cover/grate is in place, meets design standards, and is secured
	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 1/2 inch of thread.	Mechanism opens with proper tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. (Intent is keep cover from sealing off access to maintenance.)	Cover can be removed by one maintenance person.
Ladder	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, not securely attached to basin wall, misalignment, rust, cracks, or sharp edges.	Ladder meets design standards and allows maintenance person safe access.
Metal Grates (If Applicable)	Grate opening Unsafe	Grate with opening wider than 7/8 inch.	Grate opening meets design standards.
	Trash and Debris	Trash and debris that is blocking more than 20% of grate surface inletting capacity.	Grate free of trash and debris.
	Damaged or Missing.	Grate missing or broken member(s) of the grate.	Grate is in place, meets the design standards, and is installed and aligned with the flow path.