FORESITE
ENGINEERING

August 15, 2025

Bonner County Planning Department
1500 Highway 2
Sandpoint, ID 83864

RE: DAYTONA DRIVE SITE DISTURBANCE PLAN (SDP) SUBMITTAL

Dear Planners:

This Site Disturbance Plan (SDP) is part of a Subdivision application for the new Priest River Pines in Bonner County, located in Township 56 North, Range 05 West, Section 22. The site consists of four parcels totaling +/- 65 acres:

RP54N04W105401A (20 acres), RP54N04W106000A (20 acres), RP54N04W107050A (20 acres +/-)

Below are relevant written responses to county code requirements:

- **CONTENTS OF GRADING/STORMWATER MANAGEMENT PLAN 12-724.1**
    - See attached site plan in Attachment A that shows the existing drainage patterns, constraining environmental conditions and areas proposed or likely to be covered by impervious surfaces at completion of the project.
    - See attached site plan in Attachment A for construction quality drawings of all physical features of a proposed stormwater management system, that includes a grading plan with dimensions clearly shown for all conveyances, retention basins and swales designed for collection, treatment and infiltration of stormwater runoff.
    - See Attachment C for calculations which include: the extent of impervious surfaces, the capacity of conveyances and retention basins; and the design storm yield expected at the site.
    - The proposed construction schedule for the stormwater management system is September 2025 to November 2026.
    - See Attachment D for proposed maintenance of the various elements of the stormwater management system. There are no portions which are to be conveyed to a group, association or political subdivision for maintenance.
    - See attached site plan in Attachment A for an erosion control plan.
    - There are no proposed injection wells on this project therefore the provisions of title 42, chapter 39, Idaho Code is not applicable.
    - There are no proposed stream channel alterations on this project therefore the provisions of title 42, chapter 38, Idaho Code, that a permit for such alterations shall be obtained from the Idaho Department of Water Resources.
    - See Attachment D for the operation and maintenance plan.

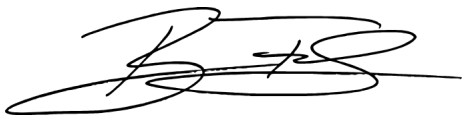
- **CONTENTS OF GRADING/EROSION CONTROL PLANS 12-724.2**

    - See Attachment A for drawings of an appropriate scale showing the area(s) of land disturbing activities, surface water bodies and watercourses, utilities, easements, areas subject to clearing, grading and for stockpiling of topsoil.
    - See Attachment A for location of temporary erosion and sedimentation control measures.
    - See Attachment A for location of permanent erosion and sedimentation control measures.
    - The proposed construction schedule for the stormwater management system is September 2025 to November 2026.
    - Maintenance and repair shall be the responsibility of the contractor and owner.
    - See Attachment C for calculations which include at a minimum the extent of impervious surfaces and the capacity of retention basins or other erosion and sedimentation control measures.

- **CONTENTS OF OPERATION AND MAINTENANCE PLANS (12-724.3)**
    - See Attachment D for an inspection schedule for the stormwater management system to assure its continued operation as designed.
    - The owner shall be responsible for the continued operation and maintenance of the stormwater management system.
    - The contact person(s): (Ord. 227, 5-28-1993)
        - Owner: Sanborn Creek Ventures Llc Jake Weimer 208-610-4425
        - Engineer: Foresite Engineering Ryan Fobes, PE 208-714-6866
    - The owner shall make financial arrangements for the support of continued maintenance of the stormwater management system as outlined in Attachment D. (Ord. 501, 11-18-2008)

Sincerely,

FORESITE ENGINEERING, PLLC



Ryan Fobes, P.E.

FORESITE
ENGINEERING

Attachment "A"

(Vicinity Map)

(Site Plan)

(Details)

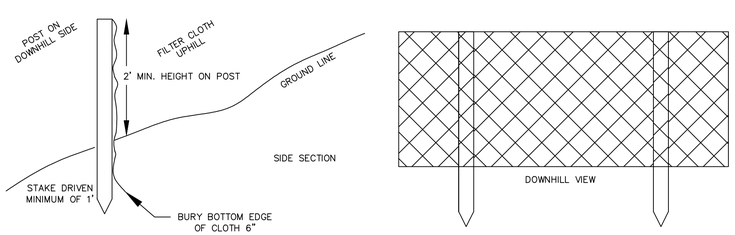
DAYTONA DRIVE SITE DISTURBANCE PLAN (SDP) / ROADWAY PLANS

NORTHWEST 1/4 OF THE SOUTHWEST 1/4 OF SECTION 22, TOWNSHIP 56 NORTH, RANGE 5 WEST, BOISE MERIDIAN, BONNER COUNTY, IDAHO

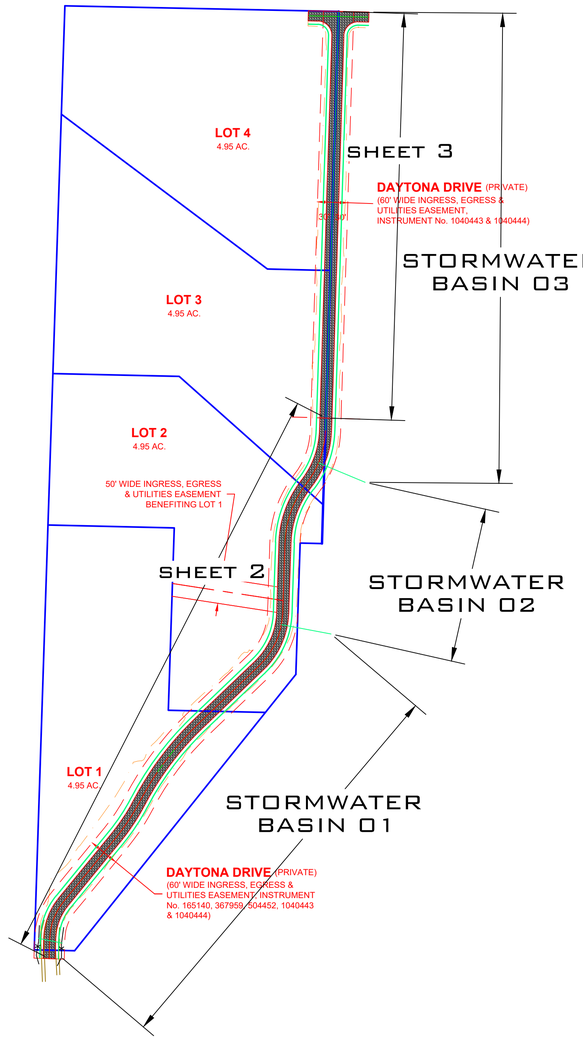
GENERAL NOTES:

1. CONSTRUCTION SHALL CONFORM TO THE STANDARDS SET FORTH IN THE BONNER COUNTY CODE, THE CURRENT EDITION OF THE IDAHO STANDARDS FOR PUBLIC WORKS CONSTRUCTION (ISPWC), AND THE ASSOCIATED HIGHWAY DISTRICT STANDARDS FOR ROAD CONSTRUCTION.
2. ANY CHANGES TO THE DESIGN AND/OR CONSTRUCTION SHALL BE APPROVED BY THE OWNER AND ENGINEER.
3. THE CONTRACTOR IS RESPONSIBLE TO VERIFY ALL EXISTING CONDITION MATERIAL TYPES, DIMENSIONS, ELEVATIONS AND CONDITIONS. VERIFY DESIGN DIMENSIONS IN THE FIELD PRIOR TO PROCEEDING WITH ANY WORK OR FABRICATION, ANY DISCREPANCY FOUND AMONG THE NOTES AND DRAWINGS SHALL BE REPORTED TO THE ENGINEER FOR CORRECTION AND/OR CLARIFICATION.
4. THE CONTRACTOR IS RESPONSIBLE FOR ALL BRACING, TEMPORARY SHORING, DEWATERING AND OTHER ENVIRONMENTAL CONTROLS REQUIRED DURING CONSTRUCTION TO ENSURE THE STABILITY AND SAFETY OF ALL CONSTRUCTION UNTIL COMPLETE AND SELF-SUPPORTING.
5. CONTRACTOR SHALL LOCATE AND PROTECT ALL ABOVE GROUND AND BELOW GROUND UTILITIES. ANTICIPATED UTILITIES INCLUDE BUT NOT LIMITED TO; WATER, POWER, GAS, TELEPHONE, AND IRRIGATION. CONTRACTOR SHALL REPAIR ANY UTILITIES DAMAGED DURING CONSTRUCTION AT OWN EXPENSE. CONTRACTOR SHALL PROVIDE 48 HOURS ADVANCE NOTICE AND COORDINATE ANY PLANNED DISRUPTION IN UTILITY SERVICE WITH PURVEYOR AND USER.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE SAFEGUARDS, SAFETY DEVICES, PROTECTIVE EQUIPMENT, FLAGGERS, AND ANY OTHER NEEDED ACTIONS TO PROTECT THE LIFE, HEALTH, AND SAFETY OF THE PUBLIC, AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK BY CONTRACTOR. ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE LATEST ADOPTED EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) PUBLISHED BY THE U.S. DEPARTMENT OF TRANSPORTATION.
7. ALL GRADING AND EROSION CONTROL MATERIALS, WORKMANSHIP AND METHODS OF CONSTRUCTION SHALL CONFORM TO THE CURRENT EDITION OF THE "CATALOG OF STORMWATER BEST MANAGEMENT PRACTICES" PREPARED BY THE IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY. EROSION CONTROL SHALL BE PER THE SPECIFICATIONS AND DETAILS CONTAINED THEREIN AND SHALL TAKE PRECEDENCE OVER OTHER STANDARDS AND SPECIFICATIONS.
8. THE IMPLEMENTATION OF EROSION AND SEDIMENT CONTROL (ESC) DEVICES AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF ESC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND PERMANENT STABILIZATION IS ACHIEVED.
9. HYDROMULCH ALL DISTURBED AREAS WITH DRYLAND SEED MIX EXCEPT WHERE OTHERWISE NOTED. SUBMIT DRYLAND SEED MIX DESIGN FOR APPROVAL PRIOR TO APPLICATION.
10. THE IMPLEMENTATION OF THIS PLAN AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS APPROVED.
11. THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES IN SUCH A MANNER AS TO ENSURE THAT SEDIMENT-LADEN WATER DOES NOT ENTER THE DRAINAGE SYSTEM, LEAVE THE SITE, OR VIOLATE APPLICABLE WATER STANDARDS, AND MUST BE INSTALLED AND IN OPERATION PRIOR TO ANY GRADING OR LAND CLEARING. WHEREVER POSSIBLE, MAINTAIN NATURAL VEGETATION FOR EROSION CONTROL.
12. THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS.
13. THE ESC FACILITIES SHALL BE INSPECTED AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONING.
14. THE ESC FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE A WEEK OR WITHIN 48 HOURS FOLLOWING A STORM EVENT.
15. STABILIZED CONSTRUCTION ENTRANCES AND WASH PADS SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES MAY BE REQUIRED TO ENSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
16. THE ESC FACILITIES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE DETAILS ON THE APPROVED PLANS. LOCATIONS MAY BE MOVED TO SUIT FIELD CONDITIONS, SUBJECT TO APPROVAL BY THE ENGINEER AND THE CITY OF PONDERAY INSPECTOR.
17. A COPY OF THE APPROVED EROSION CONTROL PLANS MUST BE ON THE JOB SITE WHENEVER CONSTRUCTION IS IN PROGRESS.
18. IF ANY PART(S) OF THE CLEARING LIMIT BOUNDARY OR TEMPORARY EROSION / SEDIMENTATION CONTROL PLAN IS/ARE DAMAGED, IT SHALL BE REPAIRED IMMEDIATELY.
19. ALL PROPERTIES ADJACENT TO THE PROJECT SITE SHALL BE PROTECTED FROM SEDIMENT DEPOSITION AND RUNOFF.
20. DO NOT FLUSH CONCRETE BYPRODUCTS OR TRUCKS NEAR OR INTO THE STORM DRAINAGE SYSTEM.
21. ENTITIES OR INDIVIDUALS RESPONSIBLE FOR MAINTENANCE AND UPKEEP OF BOTH TEMPORARY AND PERMANENT EROSION CONTROL MEASURES:

    CONTRACTOR AND/OR OWNERS.



SILT FENCE DETAIL
N.T.S.



VICINITY MAP
N.T.S.

PROJECT SUMMARY:

THIS ROADWAY / SITE DISTURBANCE PLAN IS FOR THE DAYTONA DRIVE EXTENSION IF RELATION TO THE PRIEST RIVER PINES FIRST ADDITION PLAT. THE PLAT IS SHOWN FOR REFERENCE ONLY. SEE PLAT FOR ACTUAL SURVEY INFORMATION.

INSTALL SILT FENCE OR OTHER IDEQ BMP'S TO MITIGATE EROSION FROM LEAVING THE ROAD EASEMENT AREA.

CONSTRUCTION SCHEDULE; BEGIN UPON APPROVAL, COMPLETION OCTOBER 2025.

CIVIL ENGINEER:

RYAN FOBES, PE
FORESITE ENGINEERING, PLLC
418 E. LAKESIDE AVE. #01
ATHOL, IDAHO 83814
P# 208-714-6866
RYAN@FORESITE.SOLUTIONS

SHEET INDEX:

LOCATES (2 WORKING DAYS NOTICE REQUIRED PRIOR TO EXCAVATION)
811

CALL BEFORE YOU DIG

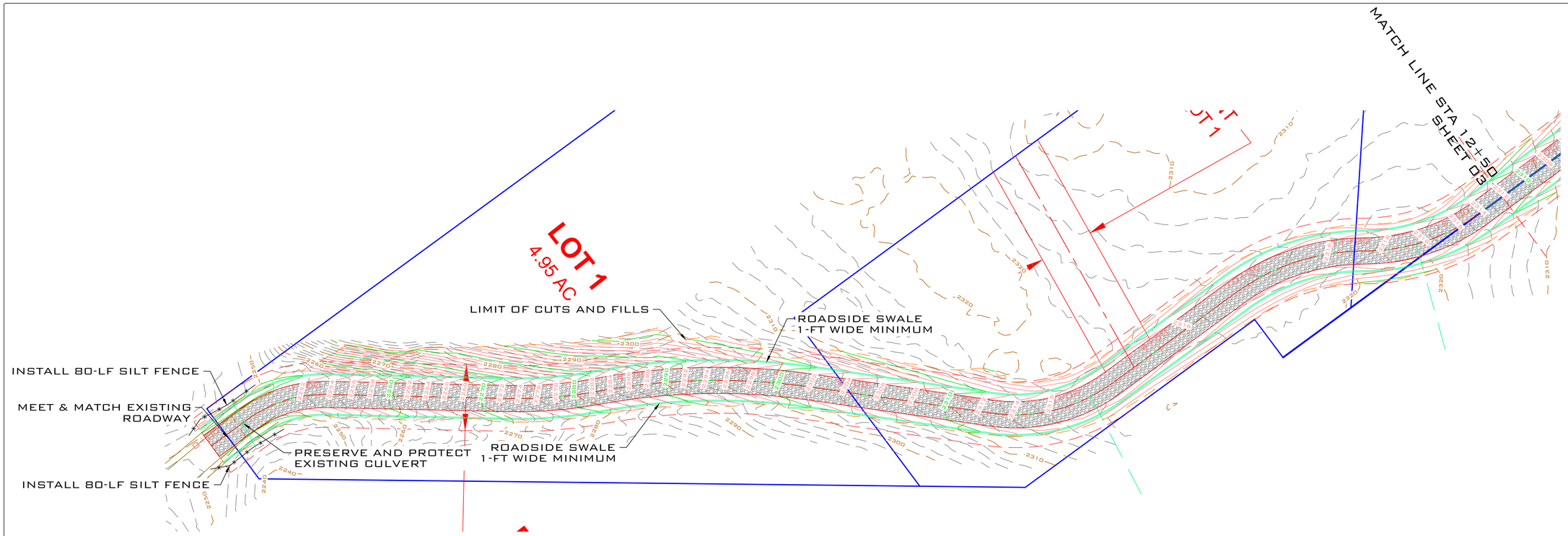
PROFESSIONAL ENGINEER REGISTERED 12498 STATE OF IDAHO RYAN FOBES
08-15-2025

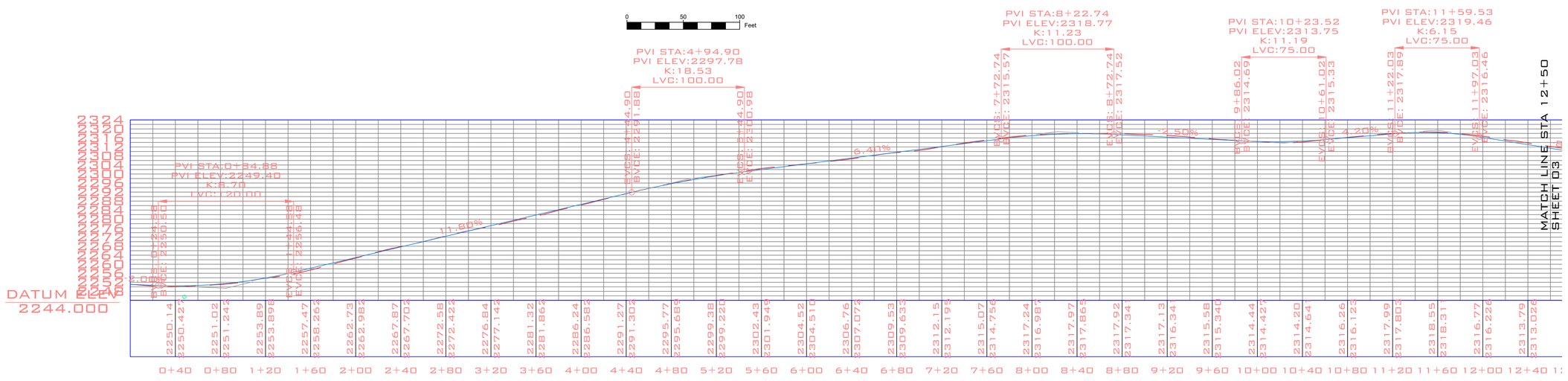
FORESITE ENGINEERING
418 E. LAKESIDE AVE. #01
COEUR D'ALENE, IDAHO 83814

PRIEST RIVER PINES SDP AND ROADWAY PLANS
BONNER COUNTY, IDAHO

JOB #:
SCALE: AS SHOWN
DATE: 08-15-2025
SHEET 01

1-INCH AT 22 X 34





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PRIEST RIVER PINES SDP AND ROADWAY PLANS

BONNER COUNTY, IDAHO

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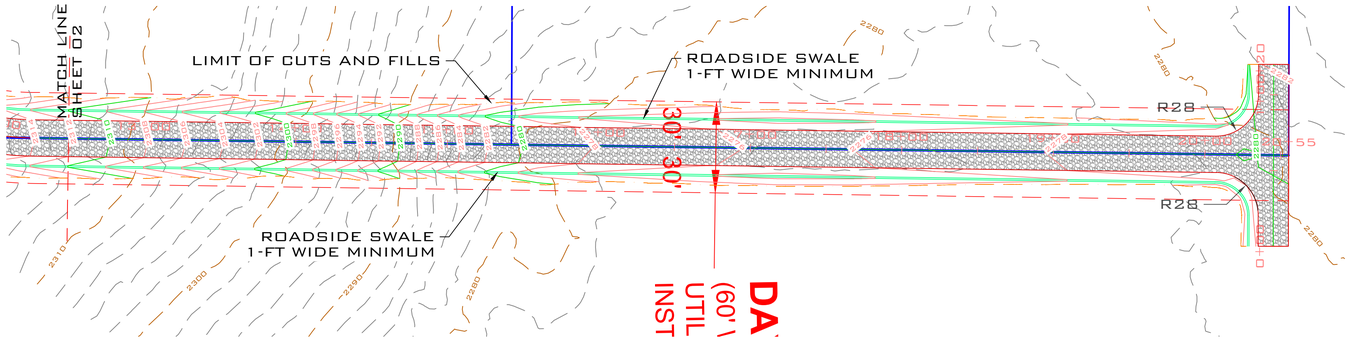
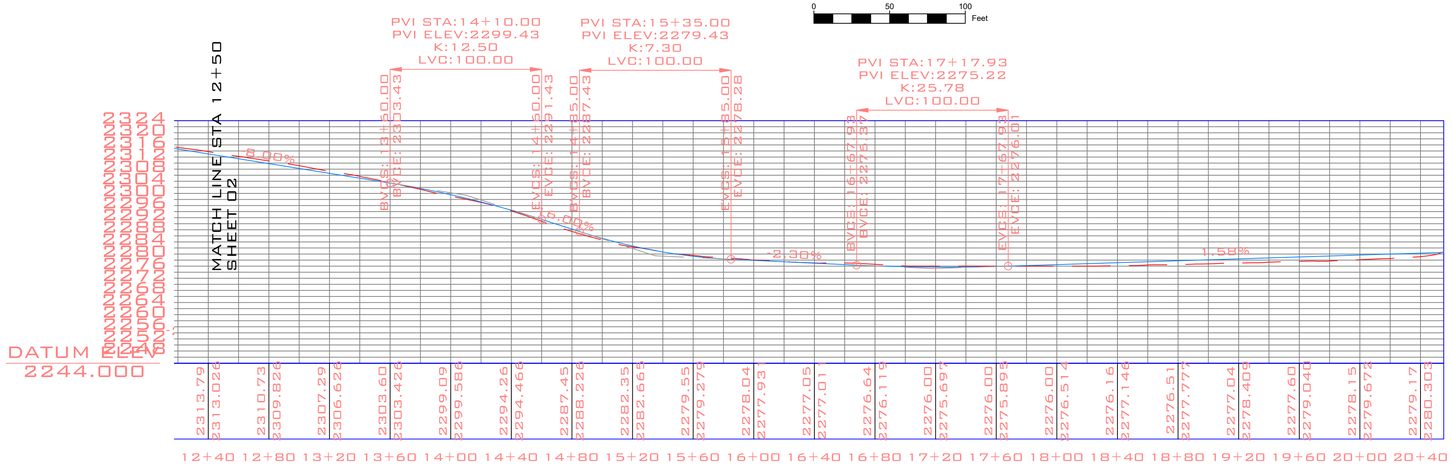
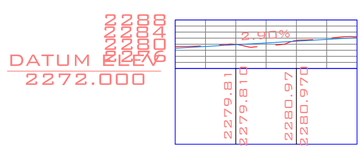
SHEET D1







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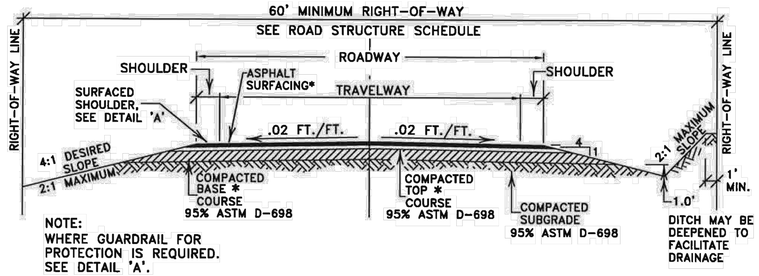


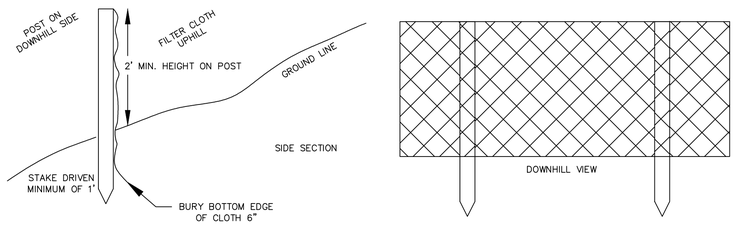
NOTE:
WHERE GUARDRAIL FOR PROTECTION IS REQUIRED. SEE DETAIL 'A'.

ROAD STRUCTURE SCHEDULE *

CLASS OF ROAD	TOP COURSE	BASE COURSE	TRAVELWAY WIDTH (FT.)	ROADWAY WIDTH (FT.)
LOCAL ROAD 'B'	4"	12"	22'	24'

NOTES:
1). AT A MINIMUM, RIGHT-OF-WAY SHALL BE CLEARED FROM TOE OF SLOPE TO TOP OF CUT.
2). UTILITY CORRIDOR CLEARING MAY BE REQUIRED.
3). GEOTEXTILE PRODUCTS MAY BE REQUIRED WITH CERTAIN SUBGRADES.
4). EXPOSED SLOPES SHALL BE RESEEDED AS SOON AS POSSIBLE AFTER CONSTRUCTION COMPLETION.

Sieve Size	Percent Passing
6 inch	100
3 inch	98 -- 100
2 inch	75 -- 100
1 inch	40 -- 80
#4	25 -- 60
#200	5 -- 12



SILT FENCE DETAIL
N.T.S.

NOTES:
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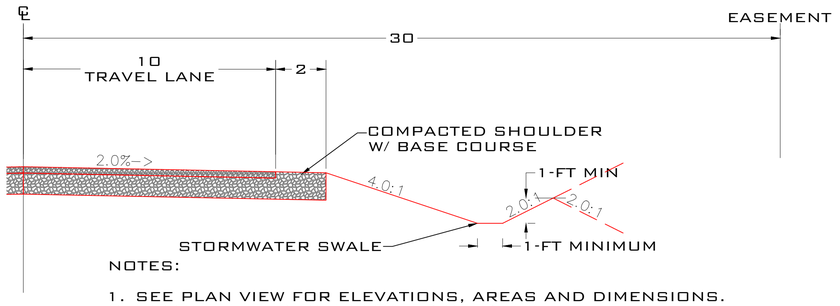

NOTES:
1. SEE PLAN VIEW FOR ELEVATIONS, AREAS AND DIMENSIONS.
2. IRRIGATE WITH NON-IRRIGATED SEED MIX
3. EACH SWALE SHALL BE MEASURED AT THE BOTTOM EFFECTIVE AREA
4. BACK FILL IN THE LOCATION OF SWALES SHALL NOT BE COMPACTED MORE THAN 85 PERCENT FROM BOTTOM OF SWALE TO TOP OF NATIVE SOIL.

TYPICAL ROADSIDE SWALE

LOCATES (2 WORKING DAYS NOTICE REQUIRED PRIOR TO EXCAVATION)
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SHEET 01

1-INCH AT 22 X 34

Attachment "B"

(Site Soils Data)

Physical Soil Properties

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

Report—Physical Soil Properties

Physical Soil Properties–Bonner County Area, Idaho, Parts of Bonner and Boundary Counties														
Map symbol and soil name	**Depth**	**Sand**	**Silt**	**Clay**	**Moist bulk density**	**Saturated hydraulic conductivity**	**Available water capacity**	**Linear extensibility**	**Organic matter**	**Erosion factors**			**Wind erodibility group**	**Wind erodibility index**
										Kw	**Kf**	**T**		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
2—Bonner gravelly ashy silt loam, 0 to 4 percent slopes														
Bonner	0-1	—	—	—	0.10-0.30	50.00-700.00	0.15-0.45	—	65.0-95.0			3	3	86
	1-6	32-35- 38	54-60- 66	2- 5- 8	0.70-0.95	9.00-15.00	0.15-0.19	0.4-0.8	3.0-6.0	.17	.37			
	6-22	32-35- 45	48-60- 66	2- 5- 8	0.70-0.95	9.00-15.00	0.14-0.18	0.4-0.8	1.0-3.0	.20	.43			
	22-30	45-47- 50	42-46- 50	2- 7- 8	1.35-1.55	3.00-120.00	0.10-0.14	0.2-0.9	0.5-1.0	.20	.43			
	30-60	75-80- 95	4-18- 24	1- 2- 5	1.30-1.55	150.00-600.00	0.02-0.06	0.0-0.5	0.0-0.5	.05	.17			
3—Bonner gravelly silt loam, 30 to 65 percent slopes														
Bonner	0-1	-35-	-50-	0-15- 25	0.10-0.30	42.00-705.00	0.30-0.60	—	60.0-95.0			3	3	86
	1-6	-37-	-58-	2- 5- 8	0.70-0.95	4.00-14.00	0.14-0.16	0.0-2.9	3.0-6.0	.17	.37			
	6-22	-37-	-58-	2- 5- 8	0.70-0.95	4.00-14.00	0.14-0.20	0.0-2.9	1.0-3.0	.20	.43			
	22-30	-49-	-46-	2- 5- 8	1.35-1.55	4.00-42.00	0.08-0.12	0.0-2.9	0.5-1.0	.24	.49			
	30-60	-81-	-16-	0- 3- 5	1.30-1.55	42.00-141.00	0.03-0.05	0.0-2.9	0.0-0.5	.05	.15			

Physical Soil Properties–Bonner County Area, Idaho, Parts of Bonner and Boundary Counties														
Map symbol and soil name	**Depth**	**Sand**	**Silt**	**Clay**	**Moist bulk density**	**Saturated hydraulic conductivity**	**Available water capacity**	**Linear extensibility**	**Organic matter**	**Erosion factors**			**Wind erodibility group**	**Wind erodibility index**
										Kw	**Kf**	**T**		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
28—Lenz-Rock outcrop association, 30 to 65 percent slopes														
Lenz, stony surface	0-7	-69-	-24-	5- 8- 10	1.30-1.50	14.00-42.00	0.07-0.09	0.0-2.9	1.0-3.0	.10	.20	2	5	56
	7-24	-69-	-24-	5- 8- 10	1.30-1.50	14.00-42.00	0.04-0.06	0.0-2.9	0.5-1.0	.10	.32			
	24-34	—	—	—	—	—	—	—	—					
Rock outcrop	0-60	—	—	—	—	—	—	—	—					
30—Melder loam, 35 to 65 percent slopes														
Melder	0-9	-47-	-44-	8- 9- 10	1.30-1.50	4.00-14.00	0.16-0.18	0.0-2.9	1.0-3.0	.43	.43	4	5	56
	9-33	-38-	-42-	10-20- 30	1.45-1.60	1.40-4.00	0.09-0.15	3.0-5.9	0.5-1.0	.20	.43			
	33-60	-67-	-19-	8-14- 20	1.50-1.65	14.00-42.00	0.04-0.06	0.0-2.9	0.0-0.5	.05	.24			
43—Rathdrum silt loam, 0 to 2 percent slopes														
Rathdrum	0-1	-35-	-50-	0-15- 25	0.10-0.30	42.00-705.00	0.30-0.60	—	60.0-95.0			5	2	134
	1-18	-37-	-59-	2- 4- 6	0.65-0.90	4.00-14.00	0.19-0.21	0.0-2.9	4.0-8.0	.37	.37			
	18-39	-37-	-59-	2- 4- 6	0.65-0.90	4.00-14.00	0.15-0.21	0.0-2.9	1.0-2.0	.55	.55			
	39-60	-37-	-59-	2- 4- 6	0.85-1.30	4.00-14.00	0.11-0.21	0.0-2.9	0.0-0.5	.64	.64			

Physical Soil Properties–Bonner County Area, Idaho, Parts of Bonner and Boundary Counties														
Map symbol and soil name	**Depth**	**Sand**	**Silt**	**Clay**	**Moist bulk density**	**Saturated hydraulic conductivity**	**Available water capacity**	**Linear extensibility**	**Organic matter**	**Erosion factors**			**Wind erodibility group**	**Wind erodibility index**
										Kw	**Kf**	**T**		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
62—Vay-Ardtoo association, 20 to 35 percent slopes														
Vay	0-1	-35-	-50-	0-15- 25	0.10-0.30	42.00-705.00	0.30-0.60	—	60.0-95.0			4	3	86
	1-7	-36-	-58-	4- 6- 8	0.65-0.85	4.00-14.00	0.14-0.16	0.0-2.9	2.0-4.0	.20	.43			
	7-17	-36-	-58-	4- 6- 8	0.65-0.85	4.00-14.00	0.14-0.16	0.0-2.9	1.0-2.0	.32	.55			
	17-26	-48-	-46-	4- 6- 8	1.20-1.45	14.00-42.00	0.06-0.12	0.0-2.9	0.5-1.0	.15	.49			
	26-43	-67-	-30-	2- 4- 5	1.40-1.55	14.00-42.00	0.03-0.06	0.0-2.9	0.0-0.5	.10	.43			
	43-53	—	—	—	—	—	—	—	—					
Ardtoo	0-2	-35-	-50-	0-15- 25	0.10-0.30	42.00-705.00	0.30-0.60	—	60.0-95.0			4	5	56
	2-5	-69-	-24-	4- 7- 10	1.30-1.50	14.00-42.00	0.07-0.09	0.0-2.9	2.0-4.0	.10	.17			
	5-16	-69-	-24-	4- 7- 10	1.30-1.50	14.00-42.00	0.07-0.09	0.0-2.9	2.0-4.0	.15	.24			
	16-49	-65-	-29-	2- 6- 10	1.30-1.60	14.00-42.00	0.04-0.09	0.0-2.9	0.0-0.5	.10	.32			
	49-59	—	—	—	—	—	—	—	—					

Physical Soil Properties–Bonner County Area, Idaho, Parts of Bonner and Boundary Counties														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
63—Vay-Ardtoo association, 35 to 65 percent slopes														
Vay	0-1	-35-	-50-	0-15- 25	0.10-0.30	42.00-705.00	0.30-0.60	—	60.0-95.0			4	3	86
	1-7	-36-	-58-	4- 6- 8	0.65-0.85	4.00-14.00	0.14-0.16	0.0-2.9	2.0-4.0	.20	.43			
	7-17	-36-	-58-	4- 6- 8	0.65-0.85	4.00-14.00	0.14-0.16	0.0-2.9	1.0-2.0	.32	.55			
	17-26	-48-	-46-	4- 6- 8	1.20-1.45	14.00-42.00	0.06-0.12	0.0-2.9	0.5-1.0	.15	.49			
	26-43	-67-	-30-	2- 4- 5	1.40-1.55	14.00-42.00	0.03-0.06	0.0-2.9	0.0-0.5	.10	.43			
	43-53	—	—	—	—	—	—	—	—					
Ardtoo	0-2	-35-	-50-	0-15- 25	0.10-0.30	42.00-705.00	0.30-0.60	—	60.0-95.0			4	5	56
	2-5	-69-	-24-	4- 7- 10	1.30-1.50	14.00-42.00	0.07-0.09	0.0-2.9	2.0-4.0	.10	.17			
	5-16	-69-	-24-	4- 7- 10	1.30-1.50	14.00-42.00	0.07-0.09	0.0-2.9	2.0-4.0	.15	.24			
	16-49	-65-	-29-	2- 6- 10	1.30-1.60	14.00-42.00	0.04-0.09	0.0-2.9	0.0-0.5	.10	.32			
	49-59	—	—	—	—	—	—	—	—					

Data Source Information

Soil Survey Area: Bonner County Area, Idaho, Parts of Bonner and Boundary Counties
Survey Area Data: Version 20, Aug 22, 2024

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic soil group is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Percentage of rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Engineering Properties–Bonner County Area, Idaho, Parts of Bonner and Boundary Counties														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
2—Bonner gravelly ashy silt loam, 0 to 4 percent slopes														
Bonner	85	B	0-1	Slightly decomposed plant material	PT	A-8	0- 0- 0	0- 0- 0	—	—	—	—	—	—
			1-6	Gravelly ashy silt loam	GM	A-2-4, A-4, A-1-b	0- 0- 0	0- 9- 17	58-60-68	35-45-65	31-42-62	24-33-49	30-35 -40	NP-2 -5
			6-22	Gravelly ashy silt loam, gravelly ashy loam, ashy silt loam	SM, ML	A-2-4, A-4, A-1-b	0- 0- 0	0- 9- 17	64-70-86	33-48-65	27-40-57	23-35-55	30-35 -40	NP-2 -5
			22-30	Gravelly loam, gravelly sandy loam	SC-SM, SM	A-2-4, A-4, A-1-b	0- 0- 0	0- 7- 12	67-72-84	46-58-76	28-37-50	24-32-44	0-20 -21	NP-4 -4
			30-60	Very gravelly loamy sand, extremely gravelly coarse sand, very gravelly sand	GP-GM, SM, GP	A-1-a, A-1-b	0- 0- 0	0-11- 18	40-52-64	13-38-45	9-29- 43	3-11- 16	0-0 -17	NP-0 -2

Engineering Properties–Bonner County Area, Idaho, Parts of Bonner and Boundary Counties														
Map unit symbol and soil name	**Pct. of map unit**	**Hydrologic group**	**Depth**	**USDA texture**	**Classification**		**Pct Fragments**		**Percentage passing sieve number—**				**Liquid limit**	**Plasticity index**
					Unified	**AASHTO**	**>10 inches**	**3-10 inches**	**4**	**10**	**40**	**200**		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
3—Bonner gravelly silt loam, 30 to 65 percent slopes														
Bonner	80	B	0-1	Slightly decomposed plant material	PT	A-8	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	60-75-1 00	50-65- 90	—	—
			1-6	Gravelly ashy silt loam	GM, ML, SM	A-4	0- 0- 0	0- 8- 15	55-65- 75	50-60- 70	45-58- 70	40-53- 65	30-35 -40	NP-3 -5
			6-22	Gravelly silt loam, gravelly loam, silt loam	GM, ML, SM	A-4	0- 0- 0	0- 8- 15	60-75- 90	55-70- 85	50-65- 80	40-55- 70	30-35 -40	NP-3 -5
			22-30	Gravelly loam, gravelly sandy loam	GM, SM	A-4, A-2	0- 0- 0	0- 8- 15	55-68- 80	50-63- 75	40-53- 65	30-40- 50	15-18 -20	NP
			30-60	Very gravelly loamy sand, extremely gravelly coarse sand, very gravelly sand	GM, GP, GP-GM	A-1	0- 0- 0	0-15- 30	20-35- 50	15-30- 45	10-20- 30	0- 8- 15	0-0 -0	NP
28—Lenz-Rock outcrop association, 30 to 65 percent slopes														
Lenz, stony surface	45	B	0-7	Gravelly sandy loam	SM	A-1, A-2	5- 8- 10	5- 8- 10	65-73- 80	60-68- 75	35-43- 50	15-23- 30	0-8 -15	NP
			7-24	Very gravelly sandy loam, extremely gravelly sandy loam, very cobbly sandy loam	GP-GM, GM	A-1, A-2	5-10- 15	5-20- 35	30-43- 55	25-38- 50	15-28- 40	10-20- 30	0-8 -15	NP
			24-34	Bedrock	—	—	—	—	—	—	—	—	—	—
Rock outcrop	25	D	0-60	Bedrock	—	—	—	—	—	—	—	—	—	—

Engineering Properties–Bonner County Area, Idaho, Parts of Bonner and Boundary Counties														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
30—Melder loam, 35 to 65 percent slopes														
Melder	80	C	0-9	Loam	ML	A-4	0- 0- 0	0- 0- 0	85-93-100	80-90-100	65-78-90	50-63-75	15-18-20	NP
			9-33	Very gravelly clay loam, gravelly loam, very gravelly loam	CL, GC, GC-GM, SC, SC-SM	A-7, A-2, A-4, A-6	0- 0- 0	0- 8- 21	56-70-85	54-68-85	43-61-84	32-47-66	23-33-43	6-14-21
			33-60	Very gravelly sandy loam, very cobbly sandy loam, very stony sandy loam	GC, GC-GM	A-2, A-1	0-15- 30	15-35-55	40-48-55	35-43-50	25-30-35	20-23-25	20-25-30	5-8 -10
43—Rathdrum silt loam, 0 to 2 percent slopes														
Rathdrum	80	B	0-1	Slightly decomposed plant material	PT	A-8	0- 0- 0	0- 0- 0	100-100-100	100-100-100	60-75-100	50-65-90	—	—
			1-18	Ashy silt loam	MH, ML	A-4, A-5	0- 0- 0	0- 0- 0	95-98-100	90-95-100	80-90-100	65-78-90	40-50-60	NP-3 -5
			18-39	Silt loam, very fine sandy loam	MH, ML	A-4, A-5	0- 0- 0	0- 0- 0	95-98-100	90-95-100	80-90-100	50-65-80	40-50-60	NP-3 -5
			39-60	Very fine sandy loam, gravelly silt loam, silt loam	GM, MH, ML, SM	A-4, A-5	0- 5- 10	0-10- 20	65-80-95	60-75-90	50-65-80	40-55-70	40-50-60	NP-3 -5

Engineering Properties–Bonner County Area, Idaho, Parts of Bonner and Boundary Counties														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
62—Vay-Ardtoo association, 20 to 35 percent slopes														
Vay	40	B	0-1	Slightly decomposed plant material	PT	A-8	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	60-75-1 00	50-65- 90	—	—
			1-7	Gravelly medial silt loam	MH, GM, ML	A-2, A-4, A-5	0- 0- 0	0- 0- 0	55-60- 65	50-55- 60	45-53- 60	30-43- 55	30-40 -50	NP-3 -5
			7-17	Gravelly silt loam, cobbly silt loam	MH, GM, ML, SM	A-2, A-4, A-5	0- 0- 0	0-15- 30	55-68- 80	50-63- 75	45-55- 65	30-43- 55	30-40 -50	NP-3 -5
			17-26	Very gravelly loam, very gravelly sandy loam, very cobbly sandy loam	GW-GM, GM	A-1, A-2	0- 8- 15	0-18- 35	35-45- 55	30-40- 50	15-30- 45	10-20- 30	15-18 -20	NP
			26-43	Extremely gravelly coarse sandy loam, very cobbly coarse sandy loam	GP-GM, GM	A-1	0- 0- 0	0- 8- 41	19-28- 53	16-25- 51	10-16- 33	6- 9- 20	0-16 -19	NP-1 -2

Engineering Properties–Bonner County Area, Idaho, Parts of Bonner and Boundary Counties														
Map unit symbol and soil name	**Pct. of map unit**	**Hydrologic group**	**Depth**	**USDA texture**	**Classification**		**Pct Fragments**		**Percentage passing sieve number—**				**Liquid limit**	**Plasticity index**
					Unified	**AASHTO**	**>10 inches**	**3-10 inches**	**4**	**10**	**40**	**200**		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
			43-53	Bedrock	—	—	—	—	—	—	—	—	—	—
Ardtoo	35	A	0-2	Slightly decomposed plant material	PT	A-8	0- 0- 0	0- 0- 0	100-100-100	100-100-100	60-75-100	50-65-90	—	—
			2-5	Gravelly sandy loam	SM	A-1, A-2	0- 0- 0	0- 0- 0	65-73-80	60-68-75	35-43-50	15-23-30	15-18-20	NP
			5-16	Gravelly sandy loam	SM	A-1, A-2	0- 0- 0	0- 0- 0	65-73-80	60-68-75	35-43-50	15-23-30	15-18-20	NP
			16-49	Very gravelly coarse sandy loam, very cobbly sandy loam, extremely cobbly sandy loam	GP-GM, GM, SM	A-1, A-2, A-3	0- 0- 0	0-20- 40	45-60-75	40-55-70	20-38-55	10-23-35	0-0 -0	NP
			49-59	Bedrock	—	—	—	—	—	—	—	—	—	—

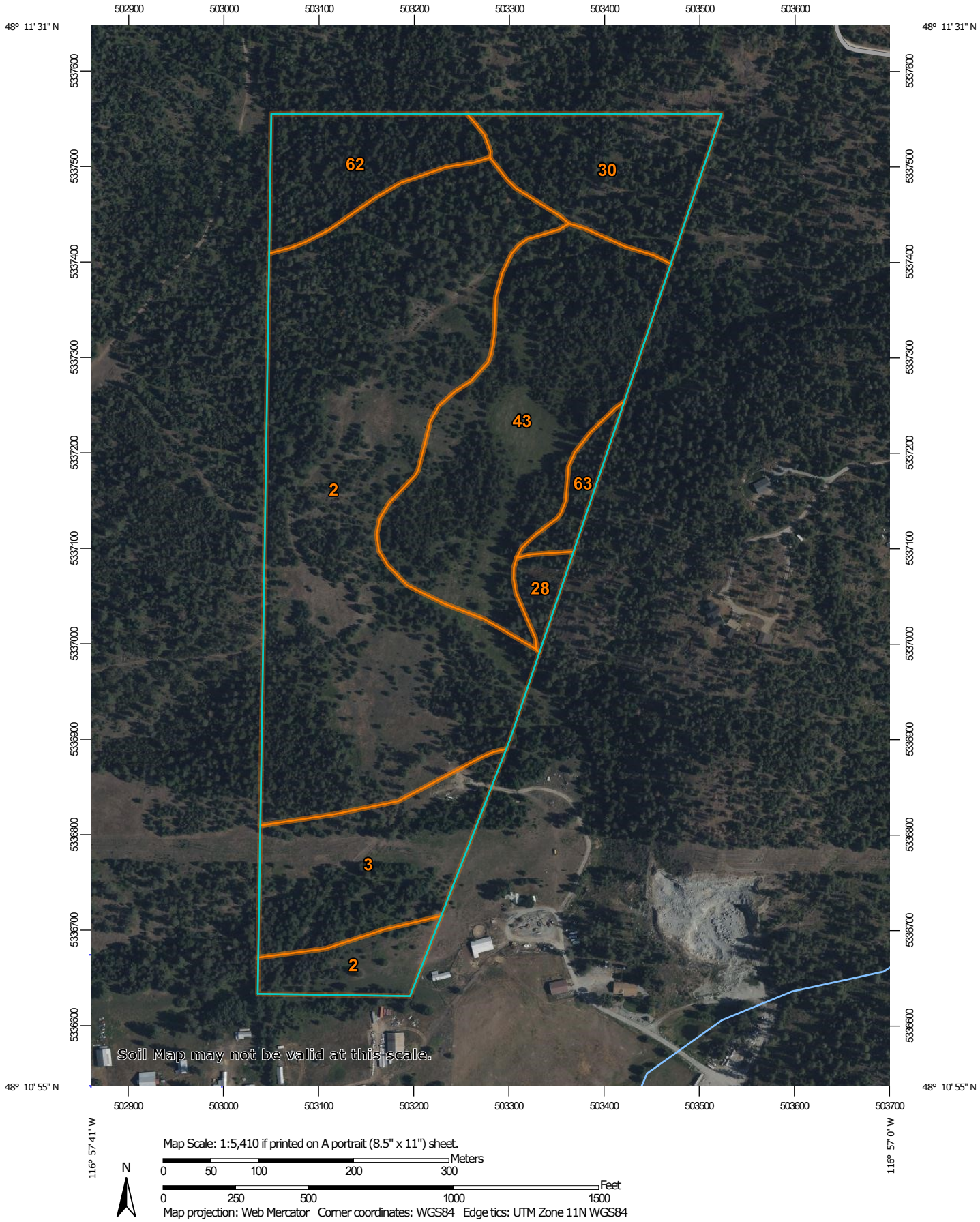
Engineering Properties–Bonner County Area, Idaho, Parts of Bonner and Boundary Counties														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
63—Vay-Ardtoo association, 35 to 65 percent slopes														
Vay	40	B	0-1	Slightly decomposed plant material	PT	A-8	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	60-75-100	50-65-90	—	—
			1-7	Gravelly medial silt loam	MH, GM, ML	A-2, A-4, A-5	0- 0- 0	0- 0- 0	55-60-65	50-55-60	45-53-60	30-43-55	30-40 -50	NP-3 -5
			7-17	Gravelly silt loam, cobbly silt loam	MH, GM, ML, SM	A-2, A-4, A-5	0- 0- 0	0-15- 30	55-68-80	50-63-75	45-55-65	30-43-55	30-40 -50	NP-3 -5
			17-26	Very gravelly loam, very gravelly sandy loam, very cobbly sandy loam	GW-GM, GM	A-1, A-2	0- 8- 15	0-18- 35	35-45-55	30-40-50	15-30-45	10-20-30	15-18 -20	NP
			26-43	Extremely gravelly coarse sandy loam, very cobbly coarse sandy loam	GP-GM, GM	A-1	0- 0- 0	0- 8- 41	19-28-53	16-25-51	10-16-33	6- 9- 20	0-16 -19	NP-1 -2

Engineering Properties–Bonner County Area, Idaho, Parts of Bonner and Boundary Counties														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
			43-53	Bedrock	—	—	—	—	—	—	—	—	—	—
Ardtoo	35	A	0-2	Slightly decomposed plant material	PT	A-8	0- 0- 0	0- 0- 0	100-100-100	100-100-100	60-75-100	50-65-90	—	—
			2-5	Gravelly sandy loam	SM	A-1, A-2	0- 0- 0	0- 0- 0	65-73-80	60-68-75	35-43-50	15-23-30	15-18-20	NP
			5-16	Gravelly sandy loam	SM	A-1, A-2	0- 0- 0	0- 0- 0	65-73-80	60-68-75	35-43-50	15-23-30	15-18-20	NP
			16-49	Very gravelly coarse sandy loam, very cobbly sandy loam, extremely cobbly sandy loam	SM, GM, GP-GM	A-1, A-2, A-3	0- 0- 0	0-20- 40	45-60-75	40-55-70	20-38-55	10-23-35	0-0 -0	NP
			49-59	Bedrock	—	—	—	—	—	—	—	—	—	—

Data Source Information

Soil Survey Area: Bonner County Area, Idaho, Parts of Bonner and Boundary Counties
Survey Area Data: Version 20, Aug 22, 2024

Soil Map—Bonner County Area, Idaho, Parts of Bonner and Boundary Counties



Map Scale: 1:5,410 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N 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: Bonner County Area, Idaho, Parts of Bonner and Boundary Counties
Survey Area Data: Version 20, Aug 22, 2024

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

Date(s) aerial images were photographed: Jul 14, 2023—Aug 13, 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.

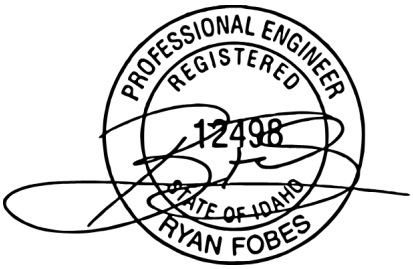
Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2	Bonner gravelly ashy silt loam, 0 to 4 percent slopes	36.5	49.5%
3	Bonner gravelly silt loam, 30 to 65 percent slopes	7.7	10.5%
28	Lenz-Rock outcrop association, 30 to 65 percent slopes	0.9	1.2%
30	Melder loam, 35 to 65 percent slopes	6.5	8.8%
43	Rathdrum silt loam, 0 to 2 percent slopes	15.7	21.4%
62	Vay-Ardtoo association, 20 to 35 percent slopes	5.1	7.0%
63	Vay-Ardtoo association, 35 to 65 percent slopes	1.2	1.6%
Totals for Area of Interest		**73.7**	**100.0%**

Attachment "C"

(Stormwater Calculations)

DAYTONA DRIVE
PRIEST RIVER PINES
STORMWATER CALCULATIONS



DATE:
8/15/2025

PREPARED BY:
RYAN FOBES, P.E.
FORESITE ENGINEERING PLLC

BASIN #1 Stormwater Calculation

Pre-Developed Condition

Area (acres)	0.45
Pre-Developed "C" Factor	0.15
Design Storm Intensity (in/hr)	2.85
Pre-Developed Outflow (c.f.s.)	0.19

Developed Condition

Time Increment (min)	5.00
# of 600 Gallon Dry Wells	0
# of 1000 Gallon Dry Wells	0
Post-Developed Outflow (cfs)	1.16
Design Year Flow (yr)	25.00
Area (acres)	0.45
Developed "C" Factor	0.90
Area x "C"	0.41
Soil infiltration rate (in/hr)	0.57

Flow Calcs:

$Q_{INFILTRATE}$	0.02	CFS
$Q_{DRYWELL}$	0.00	CFS

#1 Time Inc. (min.)	#2 t Time Inc. (sec.) (#1*60)	#3 Intensity (in./hr.)	#4 Q_{dev} (cfs) (see below)	#5 $\not{V}_{in}$ (1) (ft^3) (see below)	#6 $\not{V}_{out}$ (ft^3)	Required Storage Volume (ft^3)
0	0.00	0	0	0	0	0
5	300.00	2.85	1.14	459	58	401
10	600.00	2.21	0.88	708	90	618
15	900.00	1.87	0.74	893	114	779
20	1,200.00	1.68	0.66	1001	137	864
25	1,500.00	1.49	0.58	1059	152	907
30	1,800.00	1.29	0.51	1069	158	911
35	2,100.00	1.22	0.47	1143	174	970
40	2,400.00	1.14	0.44	1198	185	1013
45	2,700.00	1.06	0.41	1233	194	1039
50	3,000.00	0.98	0.38	1249	199	1050
55	3,300.00	0.90	0.34	1246	202	1044
60	3,600.00	0.82	0.31	1223	201	1022
65	3,900.00	0.79	0.30	1270	210	1060
70	4,200.00	0.77	0.29	1311	219	1092
75	4,500.00	0.74	0.28	1345	226	1119
80	4,800.00	0.71	0.27	1372	232	1140
85	5,100.00	0.68	0.26	1393	237	1156
90	5,400.00	0.66	0.25	1407	241	1166
95	5,700.00	0.63	0.24	1415	244	1171
100	6,000.00	0.60	0.22	1416	246	1170
105	6,300.00	0.58	0.21	1410	247	1164
110	6,600.00	0.55	0.20	1398	246	1152
115	6,900.00	0.52	0.19	1379	245	1134
120	7,200.00	0.49	0.18	1354	242	1112

(1) $\not{V}_{in} = 1.34 * Q_{Dev} * t$ for $t < T_c$

$\not{V}_{in} = (Q_{Dev} * t) + (.34 * Q_{Dev} * T_c)$ for $t > T_c$

$Q_{dev} = CIA - Q_{DRYWELL} - Q_{INFILTRATE}$

Pre-Development:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Trees/Brush	19,744.80	0.45	55	0.15
Gravel	0.00	0.00	76	0.55
Pavement	0.00	0.00	98	0.9
Grass	0.00	0.00	50	0.5
0	0.00	0.00	0	0
Totals:	19,744.80	0.45	55	0.15

Post-Development:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Sidewalk	0.00	0.00	98	0.9
Grass	0.00	0.00	50	0.6
Roof	0.00	0.00	98	0.9
Driveway	19,744.80	0.45	98	0.9
Parking Area	0.00	0.00	98	0.9
0	0.00	0.00	0	0
Totals:	19,744.80	0.45	98	0.90

Impervious Area:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)
Totals:	19,744.80	0.45
0.00	0.00	0.00
Totals:	19,744.80	0.45

Required treatment volume calculated for treatment of first 1/2" of a rain event

Required Treatment Area (ft^2)
1,645.40

GIA Treatment Capacity	
Bottom Area (ft^2)	1,646.00

→ GIA Capacity is Adequate

Storm Attenuation:

Stormwater Detention Basin Area (ft^2)	1,646.00
Detention Basin Depth (ft)	1.00
Detention Basin Storage Volume (ft^3)	1,646.00

Pre-Developed Flow (cfs)	0.19
Post-Developed Flow (cfs)	1.16
Required Storage Volume (ft^3)	1,204.83
Storage Volume (ft^3)	1,646.00

} Capacity is Adequate

BASIN #2 Stormwater Calculation

Pre-Developed Condition

Area (acres)	0.19
Pre-Developed "C" Factor	0.15
Design Storm Intensity (in/hr)	2.85
Pre-Developed Outflow (c.f.s.)	0.08

Developed Condition

Time Increment (min)	5.00
# of 600 Gallon Dry Wells	0
# of 1000 Gallon Dry Wells	0
Post-Developed Outflow (cfs)	0.48
Design Year Flow (yr)	25.00
Area (acres)	0.19
Developed "C" Factor	0.90
Area x "C"	0.17
Soil infiltration rate (in/hr)	0.57

Flow Calcs:

$Q_{INFILTRATE}$	0.01	CFS
$Q_{DRYWELL}$	0.00	CFS

#1 Time Inc. (min.)	#2 t Time Inc. (sec.) (#1*60)	#3 Intensity (in./hr.)	#4 Q_{dev} (cfs) (see below)	#5 $\not{V}_{in}$ (1) (ft^3) (see below)	#6 $\not{V}_{out}$ (ft^3)	Required Storage Volume (ft^3)
0	0.00	0	0	0	0	0
5	300.00	2.85	0.47	188	24	164
10	600.00	2.21	0.36	271	37	234
15	900.00	1.87	0.30	319	47	272
20	1,200.00	1.68	0.27	367	56	311
25	1,500.00	1.49	0.24	395	62	333
30	1,800.00	1.29	0.21	405	65	340
35	2,100.00	1.22	0.19	437	71	366
40	2,400.00	1.14	0.18	462	76	386
45	2,700.00	1.06	0.17	478	79	399
50	3,000.00	0.98	0.15	487	82	405
55	3,300.00	0.90	0.14	488	83	405
60	3,600.00	0.82	0.13	480	82	398
65	3,900.00	0.79	0.12	500	86	414
70	4,200.00	0.77	0.12	518	89	428
75	4,500.00	0.74	0.11	532	92	440
80	4,800.00	0.71	0.11	544	95	449
85	5,100.00	0.68	0.11	554	97	457
90	5,400.00	0.66	0.10	560	99	461
95	5,700.00	0.63	0.10	564	100	464
100	6,000.00	0.60	0.09	565	101	464
105	6,300.00	0.58	0.09	564	101	463
110	6,600.00	0.55	0.08	559	101	458
115	6,900.00	0.52	0.08	552	100	452
120	7,200.00	0.49	0.07	542	99	443

(1) $\not{V}_{in} = 1.34 * Q_{Dev} * t$ for $t < T_c$

$\not{V}_{in} = (Q_{Dev} * t) + (.34 * Q_{Dev} * T_c)$ for $t > T_c$

$Q_{dev} = CIA - Q_{DRYWELL} - Q_{INFILTRATE}$

Pre-Development:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Trees/Brush	8,083.20	0.19	55	0.15
Gravel	0.00	0.00	76	0.55
Pavement	0.00	0.00	98	0.9
Grass	0.00	0.00	50	0.5
0	0.00	0.00	0	0
Totals:	8,083.20	0.19	55	0.15

Post-Development:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Sidewalk	0.00	0.00	98	0.9
Grass	0.00	0.00	50	0.6
Roof	0.00	0.00	98	0.9
Driveway	8,083.20	0.19	98	0.9
Parking Area	0.00	0.00	98	0.9
0	0.00	0.00	0	0
Totals:	8,083.20	0.19	98	0.90

Impervious Area:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)
Totals:	8,083.20	0.19
0.00	0.00	0.00
Totals:	8,083.20	0.19

Required treatment volume calculated for treatment of first 1/2" of a rain event

Required Treatment Area (ft^2)
673.60

GIA Treatment Capacity	
Bottom Area (ft^2)	674.00

→ GIA Capacity is Adequate

Storm Attenuation:

Stormwater Detention Basin Area (ft^2)	674.00
Detention Basin Depth (ft)	1.00
Detention Basin Storage Volume (ft^3)	674.00

Pre-Developed Flow (cfs)	0.08
Post-Developed Flow (cfs)	0.48
Required Storage Volume (ft^3)	484.06
Storage Volume (ft^3)	674.00

} Capacity is Adequate

BASIN #3 Stormwater Calculation

Pre-Developed Condition

Area (acres)	0.49
Pre-Developed "C" Factor	0.15
Design Storm Intensity (in/hr)	2.85
Pre-Developed Outflow (c.f.s.)	0.21

Developed Condition

Time Increment (min)	5.00
# of 600 Gallon Dry Wells	0
# of 1000 Gallon Dry Wells	0
Post-Developed Outflow (cfs)	1.26
Design Year Flow (yr)	25.00
Area (acres)	0.49
Developed "C" Factor	0.90
Area x "C"	0.44
Soil infiltration rate (in/hr)	0.57

Flow Calcs:

$Q_{INFILTRATE}$	0.02	CFS
$Q_{DRYWELL}$	0.00	CFS

#1 Time Inc. (min.)	#2 t Time Inc. (sec.) (#1*60)	#3 Intensity (in./hr.)	#4 Q_{dev} (cfs) (see below)	#5 $\forall_{in}$ (1) (ft^3) (see below)	#6 $\forall_{out}$ (ft^3)	Required Storage Volume (ft^3)
0	0.00	0	0	0	0	0
5	300.00	2.85	1.24	497	63	434
10	600.00	2.21	0.95	767	98	669
15	900.00	1.87	0.80	967	124	843
20	1,200.00	1.68	0.72	1098	148	950
25	1,500.00	1.49	0.63	1159	164	995
30	1,800.00	1.29	0.55	1169	172	997
35	2,100.00	1.22	0.51	1248	188	1060
40	2,400.00	1.14	0.48	1306	201	1106
45	2,700.00	1.06	0.44	1344	210	1134
50	3,000.00	0.98	0.41	1360	216	1145
55	3,300.00	0.90	0.37	1356	218	1138
60	3,600.00	0.82	0.34	1330	217	1113
65	3,900.00	0.79	0.33	1381	227	1154
70	4,200.00	0.77	0.31	1425	237	1189
75	4,500.00	0.74	0.30	1462	244	1217
80	4,800.00	0.71	0.29	1491	251	1240
85	5,100.00	0.68	0.28	1514	257	1257
90	5,400.00	0.66	0.27	1529	261	1268
95	5,700.00	0.63	0.25	1537	264	1273
100	6,000.00	0.60	0.24	1538	266	1271
105	6,300.00	0.58	0.23	1531	267	1264
110	6,600.00	0.55	0.22	1518	267	1251
115	6,900.00	0.52	0.21	1497	265	1232
120	7,200.00	0.49	0.20	1469	262	1207

(1) $\forall_{in} = 1.34 * Q_{Dev} * t$ for $t < T_c$

$\forall_{in} = (Q_{Dev} * t) + (.34 * Q_{Dev} * T_c)$ for $t > T_c$

$Q_{dev} = CIA - Q_{DRYWELL} - Q_{INFILTRATE}$

Pre-Development:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Trees/Brush	21,372.00	0.49	55	0.15
Gravel	0.00	0.00	76	0.55
Pavement	0.00	0.00	98	0.9
Grass	0.00	0.00	50	0.5
0	0.00	0.00	0	0
Totals:	21,372.00	0.49	55	0.15

Post-Development:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Sidewalk	0.00	0.00	98	0.9
Grass	0.00	0.00	50	0.6
Roof	0.00	0.00	98	0.9
Driveway	21,372.00	0.49	98	0.9
Parking Area	0.00	0.00	98	0.9
0	0.00	0.00	0	0
Totals:	21,372.00	0.49	98	0.90

Impervious Area:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)
Totals:	21,372.00	0.49
0.00	0.00	0.00
Totals:	21,372.00	0.49

Required treatment volume calculated for treatment of first 1/2" of a rain event

Required Treatment Area (ft^2)
1,781.00

GIA Treatment Capacity	
Bottom Area (ft^2)	1,782.00

→ GIA Capacity is Adequate

Storm Attenuation:

Stormwater Detention Basin Area (ft^2)	1,782.00
Detention Basin Depth (ft)	1.00
Detention Basin Storage Volume (ft^3)	1,782.00

Pre-Developed Flow (cfs)	0.21
Post-Developed Flow (cfs)	1.26
Required Storage Volume (ft^3)	1,307.17
Storage Volume (ft^3)	1,782.00

} Capacity is Adequate

Attachment "D"

(Operation and Maintenance)

MAINTENANCE STANDARDS FOR PRIVATELY MAINTAINED DRAINAGE FACILITIES

PIPES, TANKS

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
Storage Area	Plugged Air Vents	One-half of the cross section of a vent is blocked at any point with debris and sediment	Vents free of debris and sediment
	Debris and Sediment	Accumulated sediment depth exceeds 10% of the diameter of the storage area for ½ length of storage vault or any point depth exceeds 15% of diameter. Example: 72-inch storage tank would require cleaning when sediment reaches depth of 7 inches for more than ½ length of tank.	All sediment and debris removed from storage area.
	Joints Between Tank/Pipe Section	Any crack allowing material to be transported into facility	All joint between tank /pipe sections are sealed
	Tank Pipe Bent Out of Shape	Any part of tank/pipe is bent out of shape more than 10% of it's design shape	Tank/ pipe repaired or replaced to design.

ENERGY DISSIPATERS

Maintenance Components	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed.
External: Rock Pad	Missing or Moved Rock	Only one layer of rock exists above native soil in area five square feet or larger, or any exposure of native soil.	Replace rocks to design standards.

CONVEYANCE SYSTEMS (PIPES & DITCHES)

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
Pipes	Sediment & Debris	Accumulated sediment that exceeds 20% of the diameter of the pipe.	Pipe cleaned of all sediment and debris.
	Vegetation	Vegetation that reduces free movement of water through pipes.	All vegetation removed so water flows freely through pipes.
	Damaged	Protective coating is damaged; rust is causing more than 50% deterioration to any part of pipe.	Pipe repaired or replaced.
		Any dent that decreases the cross section area of pipe by more than 20%.	Pipe repaired or replaced.
Open Ditches	Trash & Debris	Trash and debris exceeds 1 cubic foot per 1,000 square feet of ditch and slopes.	Trash and debris cleared from ditches.
	Sediment	Accumulated sediment that exceeds 20 % of the design depth.	Ditch cleaned/ flushed of all sediment and debris so that it matches design.
	Vegetation	Vegetation that reduces free movement of water through ditches.	Water flows freely through ditches.
Side Slopes of Pond	Erosion	Eroded damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion.	Slopes should be stabilized by using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction.
	Rock Lining Out of Place or Missing (If Applicable).	Maintenance person can see native soil beneath the rock lining.	Replace rocks to design standards.

GROUNDS (LANDSCAPING)

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Weeds (Nonpoisonous)	Weeds growing in more than 20% of the landscaped area (trees and shrubs only).	Weeds present in less than 5% of the landscaped area.
	Safety Hazard	Any presence of poison ivy or other poisonous vegetation.	No poisonous vegetation present in landscaped area.
	Trash or Litter	Paper, cans, bottles, totaling more than 1 cubic foot within a landscaped area (trees and shrubs only) of 1,000 square feet.	Area clear of litter.
Trees and Shrubs	Damaged	Limbs or parts of trees or shrubs that are split or broken which affect more than 25% of the total foliage of the tree or shrub.	Trees and shrubs with less than 5% of total foliage with split or broken limbs.
		Trees or shrubs that have been blown down or knocked over.	Tree or shrub in place free of injury.
		Trees or shrubs which are not adequately supported or are leaning over, causing exposure of the roots.	Tree or shrub in place and adequately supported; remove any dead or diseased trees.

Typical Biofiltration Swale

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Biofiltration swale	Sediment Accumulation on Grass	Sediment depth exceeds 2-inches	Remove sediment deposits on grass treatment area of the bio-swale. When finished, swale should be level from side to side and drain freely toward outlet. There should be no areas of standing water once inflow has ceased.
	Standing water	When water stands in the swale between storms and does not drain freely.	Any of the following may apply: remove sediment or trash blockages, improve grade from head to foot of swale, remove clogged check dams, add underdrains or convert to a wet biofiltration swale.
	Flow spreader	Flow spreader uneven or clogged so that flows are not uniformly distributed through entire swale width.	Level the spreader and clean so that flows are spread evenly over entire wale width.
	Constant baseflow	When small quantities of water continually flow through the swale, even when it has been dry for weeks, and an eroded, muddy channel has formed in the swale bottom.	Add a low-flow pea-gravel drain the length of the swale or by-pass the baseflow around the swale.
	Poor vegetation coverage	When grass is sparse or bare or eroded patches occur in more than 10% of the swale bottom.	Determine why grass growth is poor and correct that condition. Re-plant with plugs of grass from the upper slope: plant in the swale bottom at 8-inch intervals. Or reseed into loosened, fertile soil.
	Vegetation	When the grass becomes excessively tall (greater than 10-inches); when nuisance weeds and other vegetation starts to take over.	Mow vegetation or remove nuisance vegetation so that flow not impeded. Grass should be mowed to a height of 3 to 4 inches. Remove grass clippings.
	Excessive shading	Grass growth is poor because sunlight does not reach swale.	If possible, trim back over-hanging limbs, remove brushy vegetation on adjacent slopes.
	Inlet Outlet	Inlet/ outlet areas clogged with sediment and/ or debris.	Remove material so that there is no clogging or blockage in the inlet and outlet area.
	Trash and Debris Accumulation	Trash and debris accumulated in the bio-swale.	Remove trash and debris from bioswale.
	Erosion/ Scouring	Eroded or scoured swale bottom due to flow channelization, or higher flows.	For ruts or bare areas less than 12 inches wide, repair the damaged area by filling with crushed gravel. The grass will creep in over the rock in time. If bare areas are large, generally greater than 12 inches wide, the swale should be re-graded and re-seeded. For smaller bare areas, overseed when bare spots are evident, or take plugs of grass from the upper slope and plant in the swale bottom at 8-inch intervals.