Ovis Rd.
95 Pines Subdivision
City of Ponderay
Bonner County, Idaho
Parcel No. RPP0079000001FA

Stormwater Management Plan Report

Prepared by:

PROFESSIONAL ENGINEER
LICENSED
20126
8/16/23
STATE OF IDAHO
CHRISTINE M. BAKER

HMH engineering

3882 N. Schreiber Way, Suite 104
Coeur d'Alene, ID 83814

Project Summary

The 95 Pines subdivision is accessed from US-95 in the city of Ponderay. The proposed subdivision consists of three lots. A private, gravel 22 ft wide road will be constructed as part of this project to access these lots.

Existing Site Conditions

The majority of the 9.8-acre site is currently undeveloped with a single-family residence. The general topography slopes gradually southwest. The project site is flat, with slopes averaging 1% and below. The site is bounded by US-95 to the west, and residential parcels on all other boundaries.

Site Soils

The Natural Resources Conservation Service (NRCS) Soil Survey indicates that the site soils consist of mission silt loam. Per NRCS, the infiltration rate for this type of soil is measured to be very low to moderately low at 0.00 to 0.06 in./hr. An NRCS Soil Survey Map and Soil Description are included in Appendix C.

Stormwater Management

The proposed stormwater management system was developed to retain and treat runoff from the proposed road. Improvements to the lots were not included in this analysis.

The proposed swales have been designed to retain and treat runoff volume generated by the peak flow of the 25-year, 24-hour storm event. There will be no measurable increase in the peak rate of runoff from the site after development when compared with the runoff rate in the undeveloped state, in accordance with City of Ponderay Design Standards.

The Bowstring method was used to estimate peak discharge and runoff volume for a 25-year storm event. Time of concentration was estimated at 5 min, and the gravel roadway runoff coefficient was estimated at 0.95 with a grass shoulders runoff coefficient of 0.25.

With reference to the *Idaho Catalog of Stormwater Best Management Practices,* the proposed stormwater improvements consist of a vegetated swale (BMP 9) with check dams (BMP 60). The check dams will be used to detain and promote treatment of runoff from the proposed private roadway.

The swales were designed to accommodate the increase in post development runoff volume generated at peak-flow for the design storm. Calculations are included in Appendix A, which demonstrate these requirements have been satisfied. A summary of the calculations follows. Basins A was sized to accommodate the difference between the pre-development and post-development conditions.

Pre-Development				
Basin	Runoff Coefficient	Area (ACRE)	Time of Concentration (MIN)	Peak Runoff Rate (CFS)
A	0.10	0.69	5	0.20

Post-Development						
Basin	Runoff Coefficient	Area (ACRE)	Time of Concentration (MIN)	Peak Runoff Rate (CFS)	Swale Volume Required (CF)	Swale Volume Provided (CF)
A	0.61	0.69	5	1.15	619	634

Erosion Control Plan

A rock construction access will be constructed and maintained to mitigate any sediment and/or debris from leaving the site. Silt fence will be placed down slope of the disturbed area. A vegetated buffer will be maintained where possible to filter runoff and ensure sediment does not leave the project area.

Permanent erosion control will consist of the installation of onsite bioretention areas and check dams. In addition, any areas that were disturbed during construction will be mulched, fertilized, and seeded. Multiple seeding applications may be required to adequately cover the area with vegetation. Temporary erosion control measures, shall only be removed once all disturbed areas have been re-vegetated.

Construction Schedule

To ensure proper stormwater management during construction, the contractor shall adhere to the following sequence for construction activities:

1. Installation of temporary erosion controls
2. Construction of swales
3. Paving of approach
4. Mulching, Fertilizing, and Seeding
5. Full re-vegetation of project site
6. Removal of temporary erosion control devices

Operation and Maintenance Plan

The Owner shall be responsible for the operation and maintenance of the temporary erosion control and construction of permanent erosion control. Owner contact is as follows:

Mike Hammack
478121 US-95
Ponderay, ID 83852
(208) 255-6988

Upon completion and acceptance, maintenance responsibility will revert to the property owners. Operations and maintenance for the temporary and permanent erosion controls, collection channel, and swale include, but are not limited to:

- Removal of sediment and debris from swales
- Repair of any areas damaged by excessive erosion
- Repairing seeded areas damaged before full re-vegetation is complete.
- Removal of sediment from silt fences
- Repair/Replace damaged silt fences

Inspection Schedule

During construction, the temporary erosion control devices shall be inspected at a minimum of once per week and after any storm event of 0.25" or greater. After construction, the site shall be inspected at a minimum of once per month and after major rain events until full re-vegetation has occurred. Inspections may be suspended when runoff is unlikely due to winter conditions.

Appendix

Stormwater Calculations .... A
Site Development Plans .... B
NRCS Soil Survey Map & Soil Description C

Appendix A: Stormwater Calculations

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PEAK DISCHARGE AND RUNOFF VOLUME BOWSTRING METHOD			
Project Name:	***95 Pines - Hammack, Existing Conditions***		
Designer:	Christine Baker, PE	Date:	9-Aug-23
This calculation sheet estimates peak runoff and runoff volumes as described in the April 2008 *Spokane Regional Stormwater Manual*.			

Zone C, 25-YR	
Area (ACRE):	0.69
Time of Conc. (MIN):	5
Weighted "C":	0.10
Outflow (CFS):	0
Detention (CU FT):	-

Time (MIN)	Time (SEC)	Intensity (IN/HR)	Q DEV. (CFS)	V In (CU FT)	V Out (CU FT)	Storage (CU FT)
5	300	2.90	0.20	80	0	-
5	300	2.90	0.20	80	0	-
10	600	2.05	0.14	99	0	-
15	900	1.70	0.12	118	0	-
20	1,200	1.50	0.10	135	0	-
25	1,500	1.35	0.09	149	0	-
30	1,800	1.20	0.08	157	0	-
35	2,100	1.05	0.07	160	0	-
40	2,400	0.96	0.07	166	0	-
45	2,700	0.93	0.06	180	0	-
50	3,000	0.87	0.06	186	0	-
55	3,300	0.82	0.06	192	0	-
60	3,600	0.77	0.05	197	0	-
70	4,200	0.70	0.05	208	0	-
80	4,800	0.65	0.04	220	0	-
90	5,400	0.61	0.04	232	0	-
100	6,000	0.57	0.04	240	0	-
120	7,200	0.51	0.04	257	0	-
180	10,800	0.4	0.03	301	0	-
240	14,400	0.34	0.02	340	0	-
300	18,000	0.29	0.02	362	0	-
360	21,600	0.27	0.02	404	0	-
480	28,800	0.23	0.02	459	0	-
600	36,000	0.19	0.01	473	0	-
720	43,200	0.17	0.01	508	0	-
1,080	64,800	0.13	0.01	582	0	-
1,440	86,400	0.11	0.01	657	0	-

Maximum Storage Required by Bowstring = -

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PEAK DISCHARGE AND RUNOFF VOLUME BOWSTRING METHOD			
Project Name:	***95 Pines - Hammack, Post-Development***		
Designer:	Christine Baker, PE	Date:	9-Aug-23

This calculation sheet estimates peak runoff and runoff volumes as described in the April 2008 *Spokane Regional Stormwater Manual*.

Zone C, 25-YR	
Area (ACRE):	0.69
Time of Conc. (MIN):	6
Weighted "C":	0.61
Outflow (CFS):	0.2
Detention (CU FT):	634

Time (MIN)	Time (SEC)	Intensity (IN/HR)	Q DEV. (CFS)	V In (CU FT)	V Out (CU FT)	Storage (CU FT)
6	360	2.73	1.15	552	72	480
5	300	2.90	1.22	489	60	429
10	600	2.05	0.86	621	120	501
15	900	1.70	0.71	729	180	549
20	1,200	1.50	0.63	832	240	592
25	1,500	1.35	0.57	919	300	619
30	1,800	1.20	0.50	968	360	608
35	2,100	1.05	0.44	979	420	559
40	2,400	0.96	0.40	1,016	480	536
45	2,700	0.93	0.39	1,101	540	561
50	3,000	0.87	0.36	1,139	600	539
55	3,300	0.82	0.34	1,177	660	517
60	3,600	0.77	0.32	1,202	720	482
70	4,200	0.70	0.29	1,269	840	429
80	4,800	0.65	0.27	1,342	960	382
90	5,400	0.61	0.26	1,413	1,080	333
100	6,000	0.57	0.24	1,464	1,200	264
120	7,200	0.51	0.21	1,566	1,440	126
180	10,800	0.4	0.17	1,833	2,160	-327
240	14,400	0.34	0.14	2,071	2,880	-809
300	18,000	0.29	0.12	2,204	3,600	-1,396
360	21,600	0.27	0.11	2,460	4,320	-1,860
480	28,800	0.23	0.10	2,790	5,760	-2,970
600	36,000	0.19	0.08	2,879	7,200	-4,321
720	43,200	0.17	0.07	3,089	8,640	-5,551
1,080	64,800	0.13	0.05	3,540	12,960	-9,420
1,440	86,400	0.11	0.05	3,992	17,280	-13,288

Maximum Storage Required by Bowstring = 619

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Appendix B: Development Plans

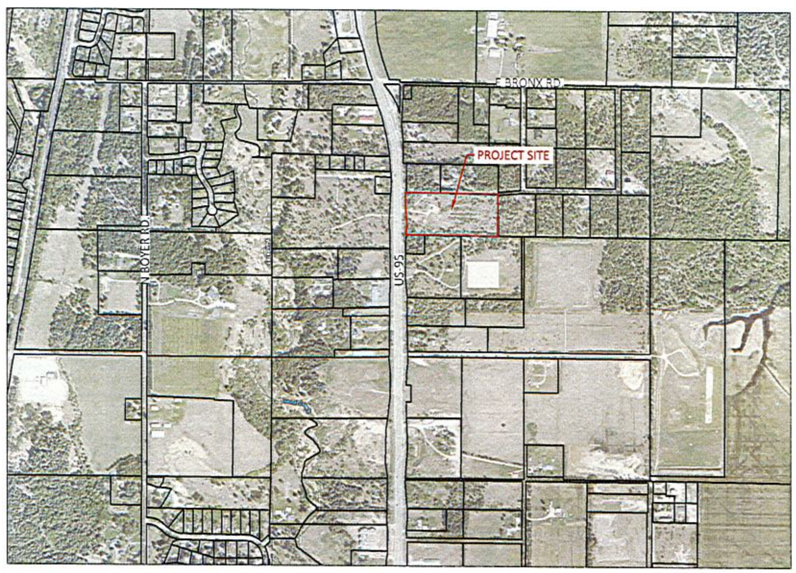
95 PINES
OVIS RD. IMPROVEMENT PLANS

PARCEL NO. RPP0079000001FA
BONNER COUNTY, IDAHO

CONTACT:
MIKE HAMMACK
478121 HWY 95
PONDERAY, ID 83852

SHEET LIST TABLE

SHEET NUMBER	DRAWING NUMBER	DRAWING DESCRIPTION
1	G-001	COVER
2	G-002	LEGEND
3	G-003	NOTES
4	C-101	PLAN & PROFILLE
5	C-102	EROSION CONTROL PLAN
6	C-103	CIVIL DETAILS



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VICINITY MAP
SCALE: NOT TO SCALE

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

Plot Date: 8/16/2023 2:17 PM Plotted By: Christine Baker
Layout: G-001 COVER Path: Z:\DOCUMENTS\PROJECTS\2021\S21126 HAMMACK CONSTRUCTION\HWY 95\CIVIL\CAD\PLAN SHEETS\S21126 PINES COVER.DWG

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95 PINES
OVIS RD. IMPROVEMENT PLANS
CITY OF PONDERAY
BONNER COUNTY, IDAHO

PROFESSIONAL ENGINEER LICENSED 20126 8/16/23 STATE OF IDAHO CHRISTINE M. BAKER

CONSTRUCTION DRAWINGS

1"
SCALE: (11X17 ONLY)

DWG: S21126 Pines Cover.dwg
PROJECT NO: S21126
DRAWN BY: C. BAKER
CHECKED BY: J. SHAW
DATE: 2023.08.10

REVISIONS
NO. DATE BY DESCRIPTION

COVER

DRAWING: G-001
SHEET: 1 OF 6

SURVEY LEGEND

PROPOSED	EXISTING	DESCRIPTION
		FOUND ALUMINUM CAP MONUMENT
		FOUND BRASS CAP MONUMENT
		FOUND 1/2" MONUMENT
		FOUND 5/8" MONUMENT
		FOUND 1-1/4" COPPER DISC MONUMENT
		FOUND PIPE
		FOUND CONCRETE MONUMENT
	"X"	FOUND CHISELED "X"
		FOUND MAG NAIL
		FOUND STONE
		FOUND HIGHWAY MONUMENT
		SET 1/2" MONUMENT
		SET 5/8" MONUMENT
		SET ALUMINUM CAP MONUMENT
		SET TEMPORARY BENCH MARK
		SET COPPER DISK
	"X"	SET CHISELED "X"
		CALCULATED POINT, NOTHING FOUND OR SET

STORMWATER LEGEND

PROPOSED	EXISTING	DESCRIPTION
	GEO	GEOTHERMAL MANHOLE
D	D	STORM DRAIN MANHOLE
MW	MW	MONITORING WELL
		RECTANGULAR INLET
		ROUND INLET
		SQUARE INLET
AD	AD	AREA DRAIN
RD	RD	ROOF DRAIN
		SAND AND GREASE TRAP

DOMESTIC WATER LEGEND

PROPOSED	EXISTING	DESCRIPTION
W	W	WATER VALVE
WM	WM	WATER METER
		FIRE HYDRANT
FDC	FDC	FIRE DEPARTMENT CONNECTION (FDC)
		FROST FREE HYDRANT/SPIGOT
W	W	WATER MANHOLE
W	W	WELL
BFP	BFP	BACK FLOW PREVENTER (BFP)
PIND	PIND	POST INDICATOR VALVE
BO	BO	BLOW OFF
CV	CV	CURB VALVE

IRRIGATION LEGEND

PROPOSED	EXISTING	DESCRIPTION
IRR	IRR	PRESSURE IRRIGATION VALVE
HG	HG	IRRIGATION HEAD GATE
IRR	IRR	IRRIGATION BOX
IRR	IRR	IRRIGATION MANHOLE

SITE LEGEND

PROPOSED	EXISTING	DESCRIPTION
AC	AC	AIR CONDITIONING UNIT
		ADA SYMBOL
BOL	BOL	BOLLARD
MB	MB	MAILBOX
MAILBOX CLUSTER	MAILBOX CLUSTER	MAILBOX CLUSTER
PMTR	PMTR	PARKING METER
		SIGN
MH	MH	UNKNOWN MANHOLE

ELECTRICAL LEGEND

PROPOSED	EXISTING	DESCRIPTION
		POWER POLE
		GUY WIRE
P	P	POWER RISER
		AREA LIGHT
E	E	ELECTRIC MANHOLE
E	E	ELECTRIC RISER
EM	EM	ELECTRIC METER
VLT	VLT	ELECTRIC VAULT
J	J	ELECTRIC JUNCTION BOX
		ELECTRIC TRANSFORMER
		STREET LIGHT

SANITARY SEWER LEGEND

PROPOSED	EXISTING	DESCRIPTION
S	S	SANITARY SEWER MANHOLE
CO	CO	CLEAN OUT

NATURAL GAS LEGEND

PROPOSED	EXISTING	DESCRIPTION
GM	GM	GAS METER
G	G	GAS RISER
GV	GV	GAS VALVE
G	G	GAS MARKER
		GAS VENT

COMMUNICATION LEGEND

PROPOSED	EXISTING	DESCRIPTION
T	T	TELEPHONE MANHOLE
T	T	TELEPHONE PEDASTAL
		TELEPHONE POLE
C	C	CABLE RISER
F	F	FIBER OPTIC RISER
FO	FO	FIBER OPTIC MANHOLE
FO	FO	FIBER OPTIC MARKER

LANDSCAPE LEGEND

PROPOSED	EXISTING	DESCRIPTION
		SPRINKLER
		DECIDUOUS TREE
		CONIFEROUS TREE

LINE TYPES

PROPOSED	EXISTING	DESCRIPTION
		BOUNDARY LINE
		ADJACENT PROPERTY LINE
		PROPERTY LINE
		TIE LINE
		SECTION LINE
		ROADWAY CENTERLINE
		EASEMENT LINE
EG	EG	EDGE OF GRAVEL
EP	EP	EDGE OF PAVEMENT
X	X	FENCE LINE
R/W	R/W	RIGHT-OF-WAY LINE
SAN	SAN	SANITARY SEWER LINE
	SD	STORM DRAIN LINE
W	W	WATER LINE
GIRR	GIRR	GRAVITY IRRIGATION LINE
PIRR	PIRR	PRESSURE IRRIGATION LINE
OHP	OHP	OVERHEAD POWER LINE
P	P	UNDERGROUND POWER LINE
T	T	UNDERGROUND TELEPHONE LINE
G	G	GAS LINE
UGTV	UGTV	UNDERGROUND CABLE TV
FO	FO	FIBER OPTICS LINE
		FLOOD LINE
GEO	GEO	GEOTHERMAL LINE
		CONCRETE SURFACE
		CURB AND GUTTER
		BUILDING
		ASPHALT SURFACE
2400	2400	GROUND CONTOUR
		HYDROSEED/SWALE
		GRADING DIRECTION
		GRADING AREA
		SILT FENCE
		WATTLE
		CONSTRUCTION ENTRANCE
		CUT SLOPE EXTENT
		FILL SLOPE EXTENT

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95 PINES
OVIS RD. IMPROVEMENT PLANS
CITY OF PONDERAY
BONNER COUNTY, IDAHO

PROFESSIONAL ENGINEER
LICENSED
20126
8/16/23
STATE OF IDAHO
CHRISTINE M. BAKER

CONSTRUCTION DRAWINGS

1"
SCALE: (11X17 ONLY)

DWG:
PROJECT NO: 521126
DRAWN BY: C. BAKER
CHECKED BY: J. SHAW
DATE: 2023.08.10

REVISIONS

NO.	DATE	BY	DESCRIPTION

LEGEND

DRAWING: G-002
SHEET: 2 OF 6

Plot Date: 8/16/2023 2:51 PM Plotted By: Christine Baker
Layout: G-002 LEGEND Path: Z:\DOCUMENTS\PROJECTS\2021\S21126 HAMMACK CONSTRUCTION\HWY 95\CIVIL\CAD\PLAN SHEETS\S21126 PINES LEGEND.DWG

GENERAL NOTES:

1. All work shall conform to the "Idaho Standards For Public Works Construction", (ISPWC) current edition, and the requirements of the City of Ponderay. In the case of conflict, the most stringent standard shall apply.
2. No revisions shall be made to these plans without the approval of the City Engineer. All proposed revisions shall be submitted by the Engineer of Record for review and approval by the City.
3. All safety standards and requirements shall be the responsibility of the Contractor.
4. Existing utilities shall be located by contacting CALL BEFORE YOU DIG at 811, at least 48 hours prior to starting any excavations. The Contractor shall notify the appropriate utility companies prior to starting work near any facilities and shall coordinate their work with company representatives.
5. Work shall not begin until a permit is issued by the City of Ponderay.
6. An approved set of improvement plans shall be kept on the job site at all times.
7. The Contractor shall maintain the streets, and all other public rights-of-way in a clean, safe and useable condition. All soil, rock, or construction debris shall be promptly removed from the publicly owned property during construction, and upon completion of the project. All adjacent property; private or public, shall be maintained in a clean, safe and useable condition.
8. Existing property corners or survey monuments shall be protected during the course of construction. Any damaged or obliterated corners or monuments shall be re-established by professional surveyors, licensed to work in the State of Idaho, prior to final acceptance. At the contractors expense.
9. A qualified professional shall verify the adequacy of erosion and sedimentation control measures prior to the start of construction, and as necessary during the course of the project. Erosion and sedimentation control measures shall be installed in accordance with these plans, and the "Catalog of Storm Water Best Management Practices for Idaho Cities and Counties" as prepared by the Idaho Division of Environmental Quality.
10. All projects which disturb 1 acre or more of land; shall file a Notice of Intent (NOI), with the *IDEQ*. Copies of any required Storm Water Pollution Prevention Plans (SWPPP) or NOI shall be provided to the City prior to start of construction.
11. All construction operations conducted on the premises shall be restricted to the hours between 6:00 a.m. and 10:00 p.m., unless otherwise approved by the City. This includes the warming up, or running of trucks,or other construction equipment and any other noise generating activity.
12. Contractor shall be responsible for all project inspections, including materials testing and quality control. Project certification and as-built drawings shall be submitted to the City prior to final acceptance.
13. The Contractor shall be responsible for all proposed traffic control, in accordance with the M.U.T.C.D., current edition and Idaho Transportation Department requirements. No work shall commence until an access permit is issued and all approved traffic control is in place.

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STORMWATER NOTES:

1. Temporary erosion control and water pollution measures shall be installed, in accordance with the plans and accepted best management practices. Adjustments to accommodate differing field conditions shall be made, as necessary, throughout the construction process. At no time, will silt and/or debris be allowed to drain into an existing or newly installed facility.
2. All disturbed areas outside of right-of-way shall receive a minimum 1-inch dressing of top soil and be hydro seeded or sodded, as indicated on the plans. Seeded areas will not be accepted until the seed has germinated, and the grass is thoroughly established. Sodded areas will not be accepted until the roots have taken hold, and the grass has received two cuttings.
3. Topsoil shall be placed within swales and streetside planting strips at a depth of 4-inches (min). Do not compact subgrade or topsoil within swales.
4. Grass infiltration areas shall be hydro-seeded with 50 lb. / 1,000 square feet, consisting of a mixture with equal portions of Canada Bluegrass, Crested Wheatgrass, Hard Fescue and Sheep Fescue. Seeded areas shall be fertilized with a commercial fertilizer per the manufactures specifications and mulched with "Silva Fiber Plus", or approved equal wood fiber cellulose at a rate of 1 ton per acre.

EARTHWORK AND GRADING NOTES:

1. All cuts and fills shall be confined to the limits indicated within the approved grading plans.
2. The Contractor shall insure that all temporary slopes are stable and that appropriate erosion measures are in place and maintained.
3. Groundwater or unanticipated geologic conditions shall be reported to the Engineer of Record for assessment and recommendations.
4. Compaction shall be performed in accordance with ISPWC requirements. All compaction efforts shall be monitored and tested by an experienced Soil Technician representing the Contractor.
5. Earthwork and grading shall be performed in accordance with ISPWC requirements. All earthwork and grading shall be monitored and tested by a qualified Soil Technician representing the Contractor.
6. Clear and grub to the limits shown on the plans. Remove all debris, trees, stumps, brush, roots, organic soil, existing fill or any other delirious material as indicated. Onsite disposal of organic materials is not allowed without written consent of the Owner. A Licensed Engineer shall review and approve all stripped and cleared areas prior to placement of fill. The Engineer of Record shall review and approve all cleared and grubbed areas prior to placement of geotextile and fill. Proofroll subgrade prior to placement of fill at the discretion of the Engineer of Record.
7. Engineered fills shall conform to the requirements of the ISPWC and approved plans. The Engineer of Record shall pre-approve all import aggregate sources.
8. Boulders and cobbles greater than 6 inches appearing in the excavation to a depth of at least 4 inches below subgrade shall be removed.
9. All fill material shall be dried or moistened to within 2% of the optimum moisture, prior to placement. Lifts shall not exceed eight inches. All fill shall be compacted to at least 90% of Modified Proctor (ASTM D-1557, AASHTO T-180), with the top 12 inches within the roadway prism compacted to 95% of the modified proctor. Material too coarse to test per the specified standards shall be placed in controlled lifts under a performance based method, as outlined within ISPWC.
10. Embankments shall not be constructed on frozen or snow-covered ground, or with frozen materials.
11. Embankments constructed on slopes greater than 5 horizontal to 1 vertical shall be keyed into the undisturbed ground with horizontal benches of sufficient width to allow for the proper operation of compaction equipment.

STREET NOTES:

1. All fill placed within the roadway prism shall be compacted per ISPWC Section 202.
2. Prior to placing fill material, the following shall be completed:
   - A. The contractor shall provide copies of compaction test results to the Engineer of Record, for all trenches and subgrade as applicable Engineer of Record shall review and furnish to the City Engineer for approval.
   - B. Subgrade shall be inspected and approved by the Engineer of Record.
   - C. Proof-roll subgrade shall be at the discretion of the Engineer of Record.
   - D. Obtain authorization from the Engineer of Record, to proceed with placement of base material. The City shall be notified at least 24 hours prior to placement of base material.
3. Imported fill material shall conform to the following:
   - A. Rock Cap shall meet the requirements of the Idaho Transportation Department, 2018 Standard Specifications for Highway Construction, Section 703.08, Class I (Rock Cap).
   - B. 3/4"-inch minus base course shall meet the requirements of ISPWC Section 802, 3/4"(Type II).
4. After placing fill material, the following shall be completed:
   - A. The Contractor shall provide copies of compaction test results for base material to the Engineer of Record. Engineer of Record shall review and furnish to City Engineer for approval.

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95 PINES
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CITY OF PONDERAY
BONNER CO , IDAHO

PROFESSIONAL ENGINEER LICENSED 20126 8/16/23 STATE OF IDAHO CHRISTINE M. BAKER

CONSTRUCTION DRAWINGS

1" SCALE: (11X17 OF

DWG: S21126 Pines PLAN L
PROJECT NO: S21126
DRAWN BY: C. BAKER
CHECKED BY: J. SHAW
DATE: 2023.08.10

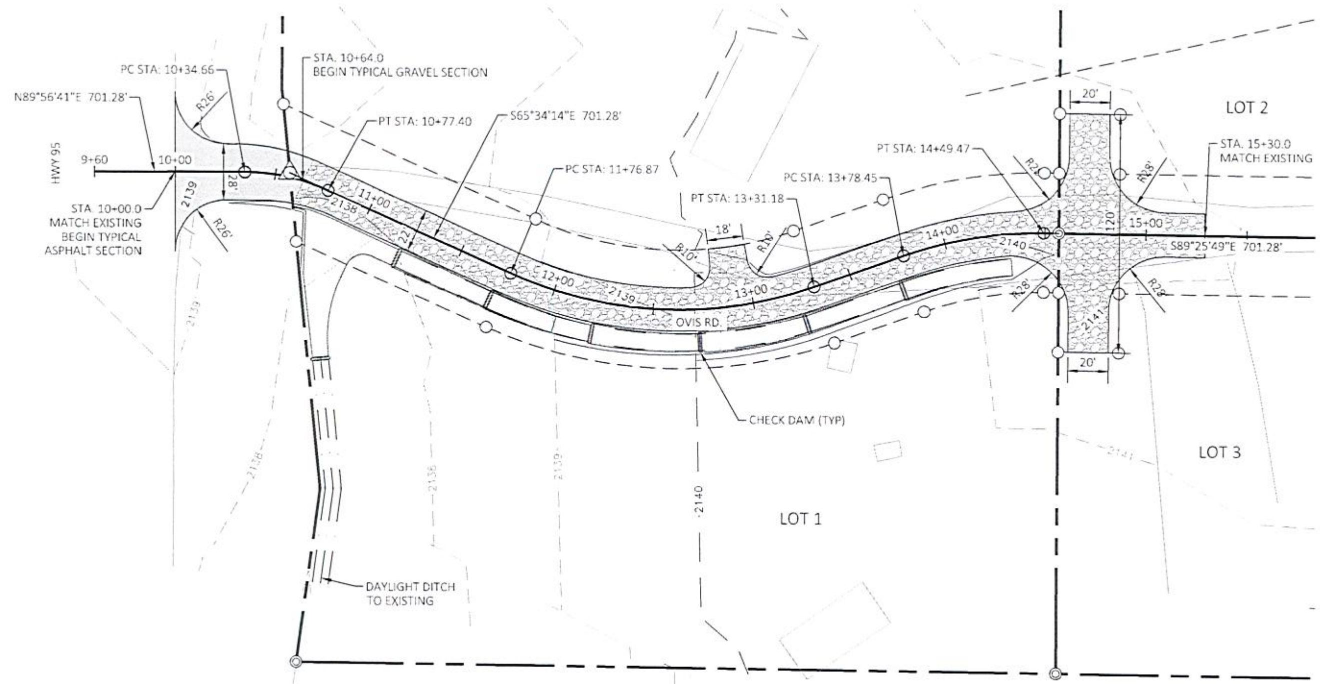
REVISIONS

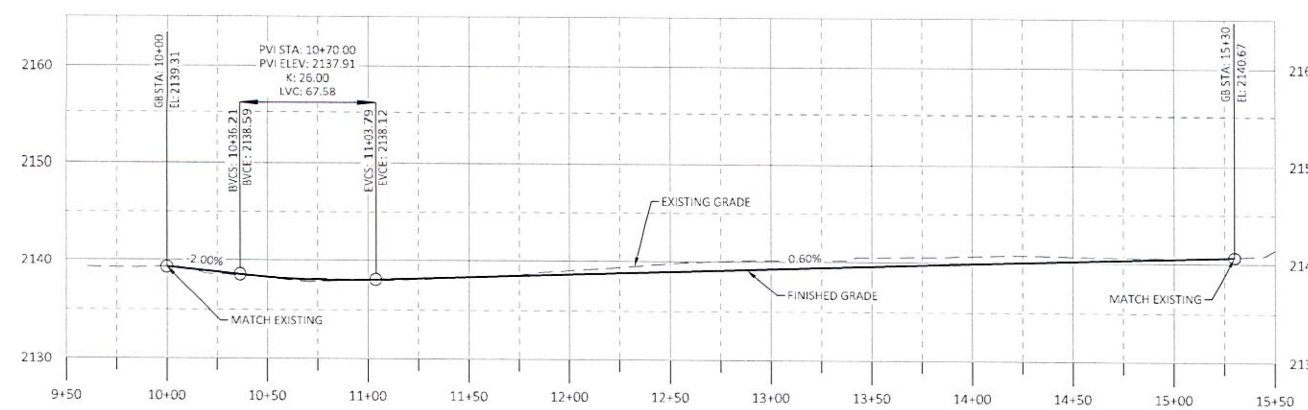
NO	DATE	BY	DESCRIPTION

NOTES

DRAWING: G-003
SHEET: 3 OF 6

Plot Date: 8/16/2023 2:18 PM Plotted By: Christine Baker
Layout: NOTES Path: Z:\DOCUMENTS\PROJECTS\2021\S21126 HAMMACK CONSTRUCTION\HWY 95\CIVIL\CAD\PLAN SHEETS\S21126 PINES PLAN.DWG





Know what's below. Call before you dig.

Plot Date: 8/16/2023 2:18 PM Plotted By: Christine Baker
Layout: C-101 PLAN & PROFILE Path: Z:\DOCUMENTS\PROJECTS\2021\S21126 HAMMACK CONSTRUCTION\HWY 95\CIVIL\CAD\PLAN SHEETS\S21126 PINES PLAN DWG

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CITY OF PONDERAY
BONNER COUNTY, IDAHO

PROFESSIONAL ENGINEER LICENSED 20126 8/16/23 STATE OF IDAHO CHRISTINE M. BAKER

CONSTRUCTION DRAWINGS

1"
SCALE: (11X17 ONLY)

DWG: S21126 Pines PLAN.dwg
PROJECT NO: S21126
DRAWN BY: C. BAKER
CHECKED BY: J. SHAW
DATE: 2023.08.10

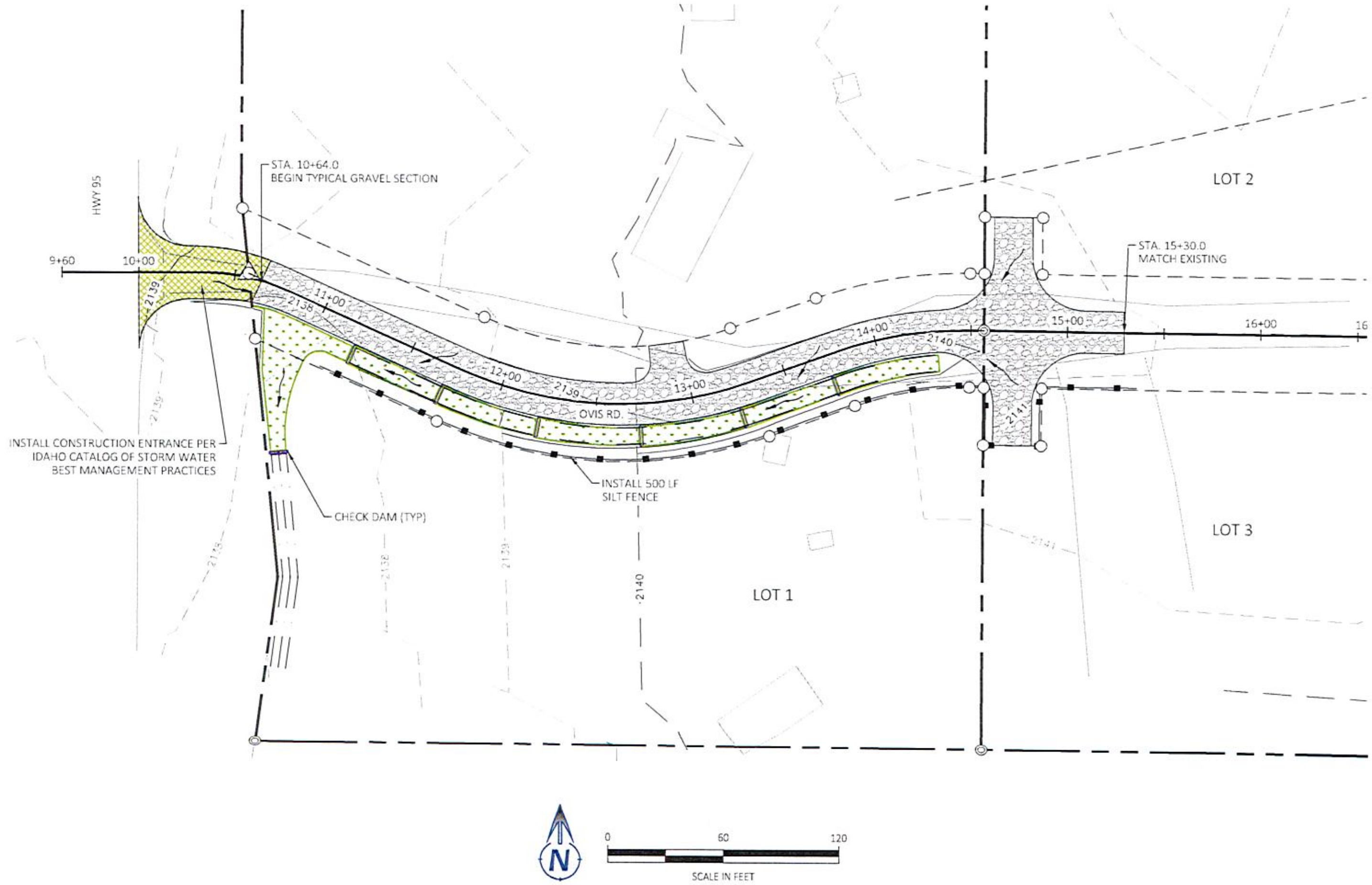
REVISIONS

NO.	DATE	BY	DESCRIPTION

PLAN & PROFILLE

DRAWING: C-101

SHEET: 4 OF 6



Plot Date: 8/16/2023 2:18 PM Plotted By: Christine Baker
Layout: C-102 EROSION CONTROL PLAN Path: Z:\DOCUMENTS\PROJECTS\2021\S21126 HAMMACK CONSTRUCTION\HWY 95\CIVIL\CAD\PLAN SHEETS\S21126 PINES PLAN.DWG

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

HMH engineering
3882 N. Schreiber Way, Suite 104
Coeur d'Alene, ID 83815
(208) 635-5825

95 PINES
OVIS RD. IMPROVEMENT PLANS

CITY OF PONDERAY
BONNER COUNTY, IDAHO

PROFESSIONAL ENGINEER
LICENSED
20126
8/16/23
STATE OF IDAHO
CHRISTINE M. BAKER

CONSTRUCTION DRAWINGS

1"
SCALE: (11X17 ONLY)

DWG: S21126 Pines PLAN.dwg
PROJECT NO: S21126
DRAWN BY: C. BAKER
CHECKED BY: J. SHAW
DATE: 2023.08.10

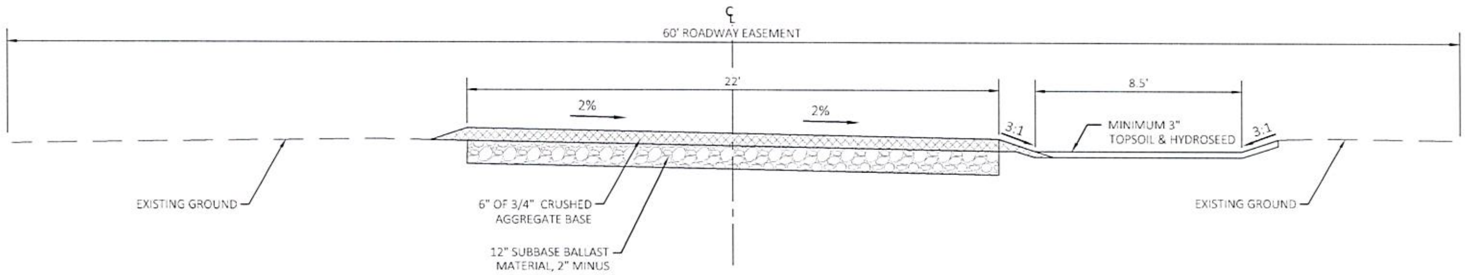
REVISIONS

NO.	DATE	BY	DESCRIPTION

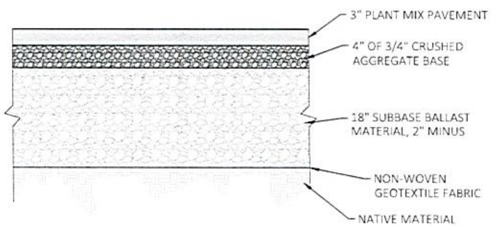
EROSION CONTROL PLAN

DRAWING: C-102

SHEET: 5 OF 6



OVIS RD. TYPICAL SECTION
NOT TO SCALE



TYPICAL ASPHALT SECTION
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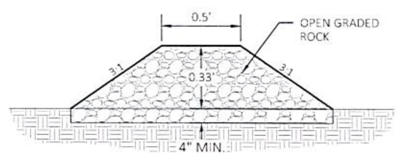

CHECK DAM DETAIL
NOT TO SCALE

Know what's below. Call before you dig.

Plot Date: 8/16/2023 2:18 PM Plotted By: Christine Baker
Layout: C-103 CIVIL DETAILS Path: Z:\DOCUMENTS\PROJECTS\2021\S21126 HAMMACK CONSTRUCTION\HWY 95\CIVIL\CAD\PLAN SHEETS\S21126 PINES PLAN DWG

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20126
8/16/23
STATE OF IDAHO
CHRISTINE M. BAKER

CONSTRUCTION DRAWINGS

1"
SCALE: (11X17 ONLY)

DWG: S21126 Pines PLAN dwg
PROJECT NO: S21126
DRAWN BY: C. BAKER
CHECKED BY: J. SHAW
DATE: 2023.08.10

REVISIONS

NO.	DATE	BY	DESCRIPTION

CIVIL DETAILS

DRAWING: C-103
SHEET: 6 OF 6

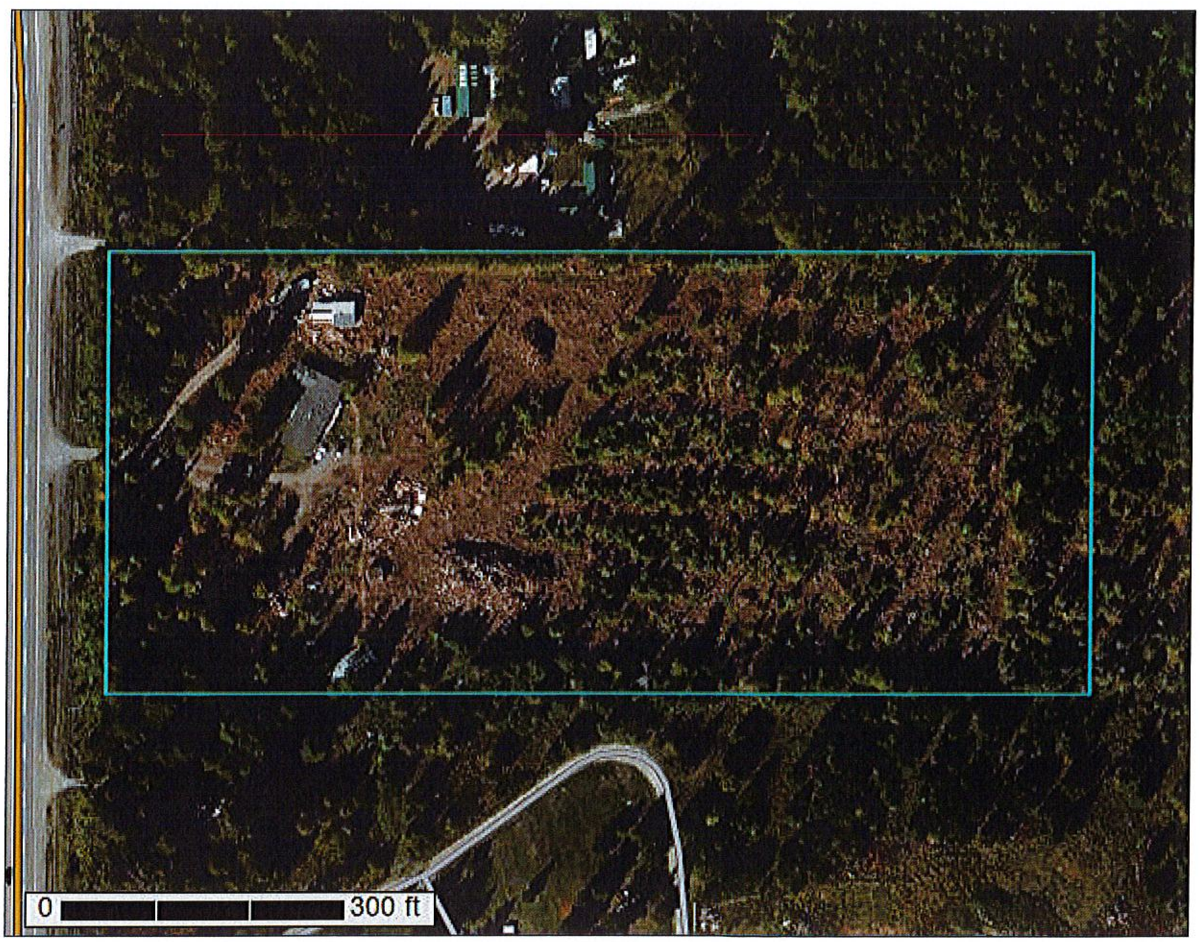
Appendix C: NRCS Soil Survey Map & Soil Description

USDA 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 Bonner County Area, Idaho, Parts of Bonner and Boundary Counties



July 20, 2023

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.

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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.

Soil Map


116° 32' 46" W
116° 32' 27" W
48° 19' 31" N
48° 19' 23" N
533650
533690
533730
533770
533810
533850
533890
533930
533970
534010
5352580
5352540
5352500
5352460
5352420
5352380
5352340
31
Soil Map may not be valid at this scale.
Map Scale: 1:1,760 if printed on A landscape (11" x 8.5") sheet.
Meters
0
25
50
100
150
Feet
0
50
100
200
300
N
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 18, Sep 2, 2022

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

Date(s) aerial images were photographed: Jul 16, 2021—Oct 18, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

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
31	Mission silt loam, 0 to 2 percent slopes	11.2	100.0%
Totals for Area of Interest		**11.2**	**100.0%**

Map Unit Descriptions

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.

Bonner County Area, Idaho, Parts of Bonner and Boundary Counties

31—Mission silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 5462
Elevation: 2,000 to 2,800 feet
Mean annual precipitation: 25 to 38 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Mission and similar soils: 75 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mission

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Volcanic ash and loess over silty glaciolacustrine deposits

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 3 inches: silt loam
Bw - 3 to 12 inches: silt loam
2Btx - 12 to 21 inches: silt loam
2E - 21 to 33 inches: silt
2Bt - 33 to 48 inches: silt loam
3C - 48 to 67 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 10 to 20 inches to fragipan
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: F043AY527WA - Warm-Frigid, Udic, Loamy Foothills/Valleys, high water table (western redcedar, moist herb) Thuja plicata / Clintonia uniflora
Other vegetative classification: western redcedar/queencup beadlily (CN530)
Hydric soil rating: No

Minor Components

Hoodoo

Percent of map unit: 3 percent
Landform: Drainageways, flood plains
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: Yes

Odenson

Percent of map unit: 2 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

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