OPERATING PERMIT APPLICATION

MONTANA LIMESTONE RESOURCES

APPENDIX A-7

BASELINE SOILS REPORT

Revised March 2018

BASELINE SOILS INVENTORY

MONTANA LIMESTONE RESOURCES PROJECT

GRANITE COUNTY, MONTANA

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Report Text and Tables Revised in Entirety
August 2017
(Changes not highlighted)

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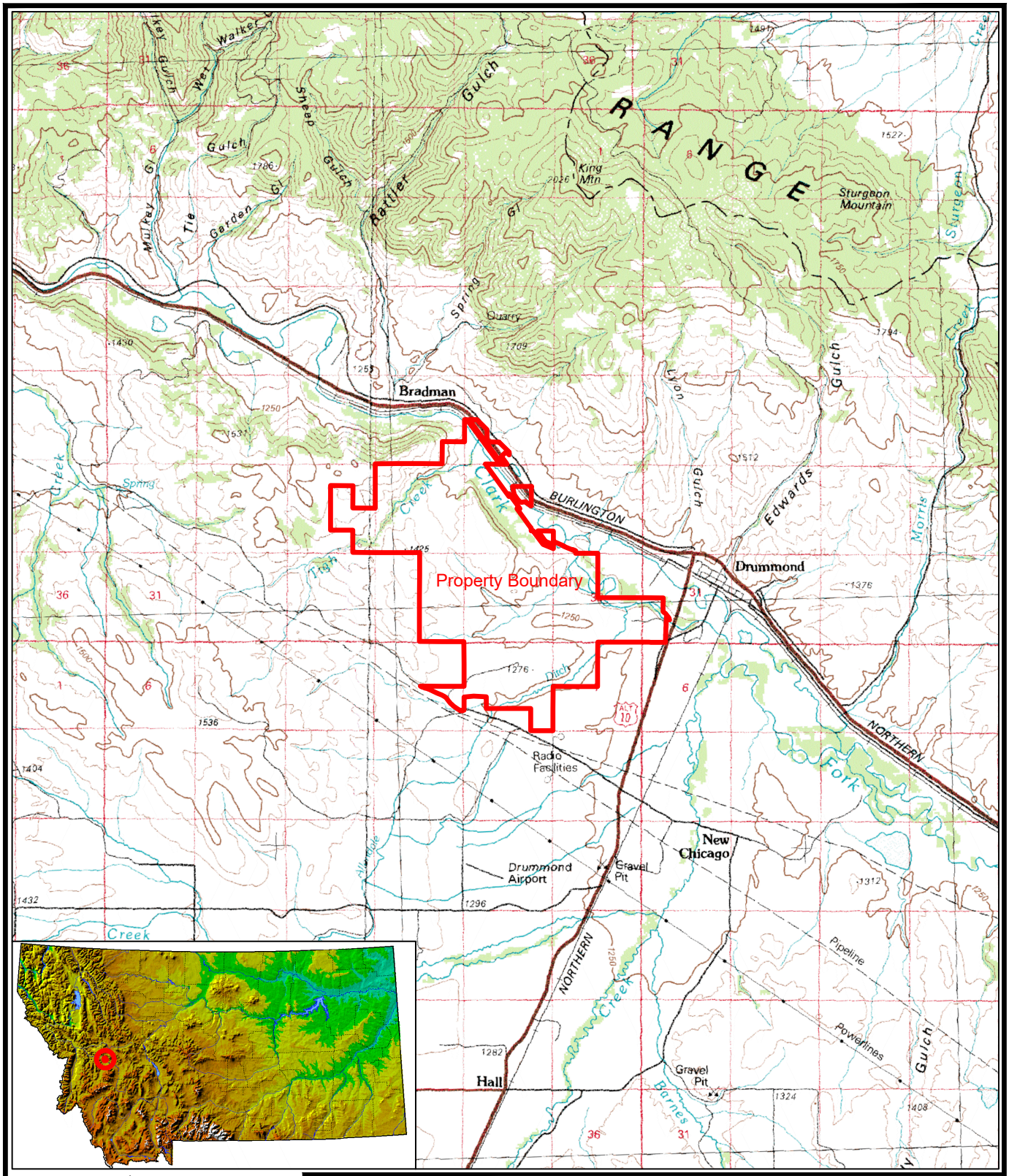
1.0 INTRODUCTION

Montana Limestone Resources, LLC (MLR) contracted WESTECH Environmental Services, Inc. (WESTECH) to conduct a baseline inventory of soil resources for the proposed Montana Limestone Resources project (Project). The Project is located in northeastern Granite County, approximately one mile west of Drummond, Montana (Figure 1). The Study Area for the soils inventory is located on land comprising the former Bar-Four-Bar Ranch property totaling 3521 acres (5.5 square miles). The Study Area is divided into two components, the intensive Study Area and the extensive Study Area. The intensive Study Area, consisting of approximately 1336 acres, includes the proposed mine and mine-facility sites. The extensive Study Area provides data for the lands surrounding the mine site, including any peripheral mine components. For the purposes of this report the term Study Area applies to the intensive Study Area, except where otherwise stated.

The soils baseline study provides an analysis of native soil characteristics, identifies considerations regarding soil salvage and describes potential reclamation limitations related to native soils. This report and the associated data will be applied mine permitting and reclamation planning, in accordance with the laws and regulations administered by the Montana Department of Environmental Quality Hard Rock Mining Program (DEQ).

Climate at the Study Area is continental, consisting of cold winters and warm summers with a growing season extending from April to September, in most years. Weather data collected at Drummond were examined for the 30-year period (NRCS 2013). The average annual temperature is 42.9 degrees Fahrenheit (F), ranging from an average minimum of 11.4 degrees F in January to an average maximum of 84.2 degrees F in July. Average temperatures range from 43 to 65 degrees F during the growing season. Precipitation averages 13.4 inches annually, ranging from 0.6 inches in February to 1.9 inches in June, with the greatest precipitation occurring in May and June.

Geology of the area consists of Tertiary sedimentary formations at lower elevations in the southern portion of the study area (Berg 2005). Higher elevations in the northern portion of the study area are comprised of a Mississippian carbonate formation (limestone), and Tertiary igneous formations comprised of andesite, basalt and rhyolite.



USGS 100k: Missoula East

Montana Limestone Resources
Project Area General Location

WESTECH ENVIRONMENTAL

SCALE: 1:100,000	
DATE: 08/17/17	
DRAWN BY: DC	
CHECKED BY: DC	
FILE: MLR17_Location_General.dwg	

Figure 1

2.0 METHODS

The plan of study for the baseline soils inventory was reviewed with DEQ in the spring of 2013 to solicit agency comments, in advance of field surveys. Prior to performing on-site soil surveys, a literature review was completed to summarize existing climate, geology and soil data for the Study Area. These data were evaluated to identify common geologic features and soils series within the Study Area and to categorize the diagnostic characteristics of dominant soils. Soils data for the extensive Study Area were provided from soils survey reports for Granite County, Montana published by the Natural Resources Conservation Service (NRCS 2013).

On-site field work included completing soil profile descriptions and soil sampling within the intensive Study Area (Figure 1 and Exhibit 1). Soil profile descriptions and the collection of soil samples were conducted during September and October of 2013. During the soil surveys, soils scientists traversed the Study Area on foot and placed soil excavation sites on representative landscape features. Soils were excavated to a depth of 5 feet or bedrock contact using shovels and hand-augers. Data parameters collected at each site include depth and thickness of soil horizons, physical soil characteristics and site descriptions (e.g. aspect, slope, land use) were recorded for each site. The extent of each soil type was marked on aerial photo base maps, and later used to establish the boundaries of each soil map unit.

A subset of the soil excavation sites were selected as sample sites based on the findings of the field-based soil classification. At each sample site 1-quart samples were collected from each of the identified soil horizons and labelled accordingly. These samples were sent to Energy Laboratories of Helena to provide laboratory analysis of physical and chemical characteristics. At the request of DEQ, separate chemical analyses were conducted to evaluate baseline concentrations of arsenic, cadmium, copper, lead and zinc in native soils within the Study Area. Additionally, selected samples of soils with high clay content were submitted for laboratory analysis of clay fraction mineralogy.

3.0 RESULTS

The study area is dominated by moderately deep to deep soils with isolated areas of shallow soils on convex ridges and steep slopes associated with rock outcrops (Plate 1 and Table 1). In general, the soils contain physical and chemical properties suitable for vegetation establishment and growth, such as neutral pH values and adequate organic matter (Table 2 and Table 3). Some isolated horizons were found to contain saline or sodic soils, although the proportion of this material within the Study Area is very small and would not inhibit soil salvage or reclamation potential. The presence of large coarse fragments in some areas and clay textures in others could restrict soil salvage, and soil handling in general. However, deep soils and suitable soil chemistries could also allow deeper or multiple-lift soil salvage in several areas.

No prime farmland soils were identified in the Study Area, although Danvers, Martinsdale, Quigley and Winspect soils are classified as farmland of statewide importance.

3.1 SOIL TYPES

Soils within the project exhibit noticeable differences in physical properties such as texture, coarse fragment content, and degree of soil development as a result of diverse parent materials and geologic processes in the area. Native soils were typically formed in colluvium or alluvium derived from various parent materials including Tertiary sedimentary clays along the southern boundary, with basalt and andesite along the western boundary (Berg 2005). In contrast, formations such as Mississippian Madison limestone deposits overlying the Pennsylvanian Amsden and Quadrant Formations occupy the central portion of the Study Area.

3.2 SOIL MAPPING UNITS

Ten soil map units were identified in the Study Area, with eight mapped as dominant series consociations and two mapped as soils complexes (Plate 1 and Table 1). Summary descriptions of the soil map units including dominant soil properties, soil location on the landscape, and potential soil salvage limitations are provided below.

BrTo : Braziel - Tolbert Loams (5-25% slopes)

Braziel and Tolbert soils are associated with igneous geologic deposits located in the southwestern portion of the Study Area. Braziel soils are deep to very deep soils with low to moderate densities of coarse fragments within the upper 30 inches of the soil profile. Tolbert soils are shallow to moderately deep soils that contain high coarse fragment content throughout the soil profile, including widespread boulders and stone-sized fragments. Within the mapping unit, Braziel soils are typically located on terraces, slopes and swales. Tolbert soils are commonly located on erosive topographies such as shoulders and ridges. Both soils consist of silt loam to loam textures and organic matter contents of four

percent or greater. However, the presence of dense and/or large diameter coarse fragment material could limit the effectiveness of salvage and reclamation potential of these soils.

Map Unit Composition: Braziel 50%, Tolbert 35%, Danvers 5%, Martinsdale 5%, Shawmut 5%

Co : Coben clay loam (5-15% slopes)

Coben soils are associated with clayey sedimentary geology on gentle to moderately sloping hills along the southern boundary of the study area. These soils have silty loam textures in near-surface horizons, with heavy clay textures at depths below 24 inches. Although the soil chemistry and organic content of these soils are adequate for plant growth, the fine-grained texture of these soils restricts plant density in native soils and could restrict salvage and handling operations.

Map Unit Composition: Coben 90%, Shawmut 5%, Whitecow 5%

Da : Danvers silty clay loam (5 – 25% slopes)

Danvers soils are deep, highly productive soils formed in colluvium and alluvium from loamy sedimentary parent materials. These soils are located on northern aspects of moderate to steep slopes, and have low densities of coarse fragments. The silty clay loam to clay textures of these soils could restrict soil handling and thus the reclamation potential of these soils, especially at depths below the topsoil horizon.

Map Unit Composition: Danvers 80%, Lap 5%, Martinsdale 5%, Shawmut 5%, Whitecow 5%

Lp : Lap gravelly loam (5 – 40 % slopes)

Lap soils are associated with convex topographies on ridges and terraces adjacent to limestone rock outcrops. These soils are shallow, with moderate to high coarse fragment density throughout the profile. The chemical properties of these soils are suitable for salvage and reclamation use; however, the proximity of these soils to rock outcrops and large coarse fragments will restrict the effectiveness of salvage .

Map Unit Composition: Lap 75%, Windham 10%, Quigley 10%, Whitecow 5%

Ma : Martinsdale gravelly loam (2 – 15% slopes)

Martinsdale soils are located in transitional areas near the periphery of igneous geologic deposits. These silty loam and clay textured soils formed in colluvium and alluvium on toeslopes and other depositional areas. Coarse fragment content within these soils varies with topographic position and parent material (i.e., colluvium versus alluvium). These soils would provide suitable reclamation material and effective salvage, especially in areas with moderate to low coarse fragment content.

Map Unit Composition: Martinsdale 80%, Shawmut 10%, Braziel 5%, Danvers 5%

Qu : Quigley silt loam (2 – 15% slopes)

Quigley soils formed in alluvium and colluvium on concave features associated with limestone ridges, shoulders and slopes. These moderately deep soils typically consist of silt loam to loam textures and low coarse fragment content at depths shallower than 24 inches. In general, these soils would provide adequate soil salvage and reclamation potential in topsoil and shallow sub-surface horizons. As with other soils in the area, salvage at some sites could be limited by the abundance of coarse fragments and/or shallow bedrock.

Map Unit Composition: Quigley 75%, Lap 10%, Windham 10%, Martinsdale 5%

Sh : Shawmut gravelly loam (2 – 15% slopes)

Shawmut soils formed in alluvium and colluvium on terraces and swales adjacent to drainage channels. These soils exhibit variable physical and chemical properties, reflecting the influence of soils and geology of adjacent uplands. In general, these soils are shallow and poorly developed with high densities of coarse fragments and/or exposed bedrock at depths below 15 inches. As a result, salvage and use of these soils for reclamation will be restricted by coarse fragment size and/or density.

Map Unit Composition: Shawmut 75%, Danvers 10%, Martinsdale 10%, Tolbert 5%

Wc-RO: Whitecow – Rock Outcrop (15 – 60% slopes)

Soils in this map unit include Whitecow silt loams formed in colluvium associated with outcroppings of limestone and other sedimentary rocks. These soils are located on steep to very steep slopes and contain a high percentage of coarse fragments, precluding safe and effective soil salvage.

Map Unit Composition: Whitecow 50%, Rock Outcrop 40%, Lap 10%

Wd : Windham skeletal loam (2 – 15% slopes)

Windham soils formed in alluvium and colluvium on shoulders and slopes of limestone formations. These soils are located in the transitional zones between limestone deposits and other geological parent materials. Windham soils are typically moderately deep to deep soils with moderate densities of coarse fragments distributed throughout the soil profile. The physical and chemical and properties of these soils are conducive to salvage and redistribution for reclamation; however, shallow bedrock or high coarse fragment content will be present in some locations.

Map Unit Composition: Windham 75%, Lap 10%, Quigley 10%, Martinsdale 5%

Ws : Winspect skeletal loam (2 – 50 % slopes)

Winspect soils formed in residuum and colluvium on ridges and slopes with sandstone and quartzite outcrops and float. These soils commonly exhibit coarser soil textures and lower organic material content than other soils in the Study Area, although they would still be suitable for most reclamation purposes. The limiting factor with these soils will be topography, since they are often located on steep slopes and narrow ridges.

Map Unit Composition: Winspect 80%, Lap 10%, Shawmut 5%, Whitecow 5%

3.3 INORGANIC ELEMENTS ANALYSES

Following a review of the soils baseline study plan, DEQ requested that MLR provide the results of laboratory analyses for total concentration by weight of selected inorganic elements in native soils. The elements requested for laboratory analysis were arsenic, cadmium, copper, lead and zinc. The results of this analysis are presented in Table 4 and summarized below.

Arsenic

Arsenic commonly occurs in concentrations higher than recommended Environmental Protection Agency monitoring levels in many Montana soils (DEQ 2005, DEQ 2013, EPA 2015). Due the elevated baseline concentrations of arsenic in Montana, DEQ completed a statewide study, based on soil samples gathered from each county in Montana, to identify background threshold values (BTV) for common inorganic elements in soils (DEQ 2013). The BTV threshold for arsenic in native Montana soils is 22.5 mg/kg, which incorporates two samples from Granite County (MSBI-46-01 and MSBI-46-02). The arsenic concentrations in the two MSBI samples were 19.1 mg/kg for sample MSBI-46-01 and 23.4 mg/kg for sample MSBI-46-02. One notable data clarification regarding the BTV threshold values is that these were developed based on samples of surface soils (0 – 6 inches deep). Therefore, comparing the BTV values to deeper soil horizons is inconsistent with the purpose of the BTV calculations. However, the results from the baseline inventory are provided in this report, for reference purposes.

Arsenic concentrations in the Study Area ranged from 3 to 121 mg/kg, with an average of 16 mg/kg (Table 4). A total of 14 samples from eight sample sites, representing seven soil series, contained arsenic concentrations in excess of the 22 mg/kg threshold. However, only four of the 14 samples exceeding the BTV for arsenic were from topsoil horizons and ranged from 24 to 31 mg/kg. The following sites contained arsenic values that exceeded the BTV thresholds:

Summary of Arsenic Concentrations Exceeding Montana BTV

Soils Series	Sample Site ID	Depth Range (inches)	Arsenic (mg/kg)
Braziel	PC-020	20-40	33
Danvers	PC-029	24-31 31-49	121 38
Lap	CB-11	0-7 7-14 14-24	28 24 35
Lap	CB-13	0-6	26
Martinsdale	PC-014	0-5	24
Shawmut	PC-009	11-23	26
Whitecow	CB-10	6-20	58
Windham	CB-05	0-3 3-10 10-18 18-38	31 26 25 30

Cadmium

The BTV for cadmium in Montana soils is 0.7 mg/kg. None of the soil samples from the Study Area exceeded 1 mg/kg, which was the detection limit for this element using standard laboratory protocols.

Copper

The BTV for copper in Montana soils is 165 mg/kg. None of the samples from the Study Area exceeded the BTV.

Lead

The BTV for lead in Montana soils is 29.8 mg/kg. None of the samples from the Study Area exceeded the BTV.

Zinc

The BTV for zinc in Montana soils is 118 mg/kg. Two samples from moderately deep to deep horizons in Danvers soils exceeded the BTV. The samples exceeding the BTV for zinc are presented below:

Summary of Zinc Concentrations Exceeding Montana BTV

Soils Series	Sample Site ID	Depth Range (inches)	Zinc (mg/kg)
Danvers	PC-017	52-60	151
Danvers	PC-029	24-31	119

3.4 CLAY MINERALOGY

Four soil map units representing about one-third of the intensive study area have horizons with high clay content. These soils are: Coben clay loam (Co on Exhibit 1; NRCS map unit 58C on Exhibit 2), Danvers clay loam (Da; NRCS map unit 49C); Martinsdale loam (Ma; NRCS map unit 52D); and Shawmut cobbly loam (Sh; NRCS map unit 151E).

Clayey soils can have engineering limitations due to shrink-swell behavior (an increase in volume when wetted), which is influenced by clay mineralogy. Soils dominated by the clay mineral smectite have greater shrink-swell potential than those dominated by relatively non-expanding clay minerals such as kaolinite and illite (Brady 2002). The Montana Guide for Soils (NRCS undated) provides criteria for assessing the degree of limitation for shrink-swell behavior based on clay mineralogy and linear extensibility percent (LEP). The NRCS Montana Guide criteria are summarized below:

Degrees of Limitation for Shrink-Swell Behavior

Soil Property	Low	Moderate[1]	High[1]	Very High
Percent clay and predominant clay mineral	0-18%; any clay mineral	18-35%; mixed or smectitic clays	35-60%; mixed or smectitic clays	>60%; mixed or smectitic clays
LEP[2]	<3.0	3.0-5.9	6.0-8.9	≥9.0

[1] Reduce one class for rock fragments greater than 35 percent.
[2] Linear extensibility percent.

Baseline soil sampling within the intensive study area indicates that Coben, Danvers, and Martinsdale soils have high clay content as a dominant characteristic, typically below a depth of 6 inches (Table 3). NRCS rates these soil units as very limited for some engineering applications due to shrink-swell potential (Section 5.0). To further assess these soil units for shrink-swell potential, samples from clay-dominated C-horizons of each unit were analyzed for mineralogy of the clay fraction. Results are shown in Table 5 and discussed below in relation to the NRCS Montana Guide criteria for shrink-swell limitation.

Some areas of Coben and Danvers soils have high to very high shrink-swell potential, based on clay content and predominance of smectite in the clay fraction (Table 5). NRCS rates Coben soils as having moderate to high shrink-swell potential based on LEPs of 3.0-8.9, and Danvers soils in general as having low to high shrink-swell potential based on LEPs of 0.0-8.9 (Table 6).

Martinsdale soils have moderate shrink-swell potential, based on clay content and predominance of non-smectitic clay minerals. NRCS rates Martinsdale soils in general as having low to moderate shrink-swell potential based on LEPs of 0.0-5.9 (Table 6).

Shawmut soils were also sampled to evaluate shrink-swell potential. The clay content and predominance of smectite in the clay fraction would place these soils in the high shrink-swell potential

category, but the classification is modified to the moderate potential category due to a coarse fraction content exceeding 35 percent (Table 5, Table 2). NRCS rates Shawmut soils as having low to moderate shrink-swell potential based on LEPs of 0.0-5.9 (Table 6).

Although clay soils are not uncommon in the study area, only some locations Coben and Danvers soils have high shrink-swell potential. Coben soils are located near the southern and eastern boundaries of the intensive study area; Danvers soils are located in the northwest part of the intensive study area. Both units comprise approximately 12 percent of the intensive study area. The presence of clay soils is not anticipated to adversely impact the reclamation potential of soils in the study area, based on the prevalence of coarser-textured soils and coarse fragments which will be mixed during soil handling and redistribution. Reclamation considerations are discussed in Section 4.0 of this report.

4.0 SOIL SALVAGE AND RECLAMATION CONSIDERATIONS

Soils in the study area consist of fine to fine-loamy textured topsoil and shallow sub-surface horizons with either weathered alluvium, colluvium or fractured bedrock in deeper horizons. In general, these soils contain organic matter, physical properties and chemistries suitable for use as reclamation materials based on DEQ criteria (DEQ 2013). Estimated soil salvage depths were developed with considerations for physical and chemical soil properties as well as environmental conditions, including slope and large coarse fragment content. Soil salvage depths were ultimately designed to minimize the handling of dense clay soils and shallow parent materials, both of which exhibit poor potential for use in reclamation. Recommended soil salvage depths and estimated salvaged soil volumes are provided in the Mine Application Permit.

4.1 Soil Texture

DEQ identifies the following soil textures as “unsuitable” for use as soil or soil substitutes: Clay, Silty Clay, Silt, Sand and Sandy Clay (DEQ 1998, DEQ 2016). Soil sampling conducted as part of the soil baseline study determined that soils containing these textures were found at eight sample sites (PC-009, PC-014, PC-017, PC-020, PC-029, CB-01, CB-05, and CB-06) representing six soil series . The overall weighted average soil textures within the study area is silty clay loam for both the salvaged portion of the soil profile and the overall (full depth) of the soil profiles.

The primary reclamation consideration regarding soils textures would be handling during wet conditions which could foul equipment and potentially result in hardened soils. Clay soil such as Coben (Co), Danvers (Da) and Martinsdale (Ma), constitute approximately 22 percent of the Study Area. The soils in these map units consist of clay to silty clay loam textured soils with an overall average coarse fragment content of 22.4 percent.

Potential reclamation or handling limitations associated with fine-textured soils will be mitigated by the following factors: 1) these soils are not dominant within the study area, 2) rock fragments will be salvaged along with the soil material, and 3) the majority of the remaining soils in the Study Area consist

of more coarsely textured soils that also contain rock fragments. Therefore, the mixing of these materials during salvage, storage and respreading operations will result in soil textures that are suitable for all reclamation uses.

4.2 Organic Matter

The soils within the study area generally contain at least 3 percent soil organic matter and up to 10 percent. The prevalence of organics in the soil coupled with the mix of soil textures provides for topsoil and subsoil materials that would support a variety of vegetative communities and could be applied on locations ranging from ridges to swales and slopes. The relatively high quality of the subsoil materials would enable the use of these soils for capping or padding and as a supplement to topsoil reserves.

4.3 Coarse Fragments / Shallow Bedrock

The potential for salvage limitations due to large, dense coarse fragments and or contact with shallow bedrock is a consideration for eight of the ten soil map units. However, this coarse fragment limitations are most likely to occur in Lap, Tolbert, Whitecow and Winspect soils which are commonly associated with ridges and rock outcrops. Soils including Martinsdale, Quigley, Shawmut and Windham soils contain widespread but discontinuous distribution of dense coarse fragments. As a result these soils will be more effectively salvaged at sites where coarse fragment are smaller and/or less dense.

5.0 NRCS SOILS ENGINEERING AND RECLAMATION PROPERTIES

NRCS ratings for relevant soils engineering and reclamation properties of soil map units within the Study Area are summarized on Table 6. Based on NRCS mapping of the Study Area, nine soil map units, comprising about 46 percent of the MLR property, are rated as having poor suitability for certain engineering applications. Four soil map units, representing about 32 percent of the MLR property, are rated as having poor suitability for reclamation. These soils and their potential limitations are discussed below.

5.1 LIMITATIONS FOR ENGINEERING PROPERTIES

<u>Roads</u>

Shawmut (NRCS map unit 151E), Roy-Shawmut-Danvers (351E), and Windham-Lap-rock outcrop (839E) soils and complexes on 15-35 percent slopes are rated as poorly suited for road construction on natural surfaces. The primary limitation for these soil units is slope, with low soil strength being rated a lesser limitation. The NRCS metric evaluates use of soils for road construction based on the presumption that an aggregate cap is not used on the road surface. The proposed Project would use crushed rock to cap all major roads, thus significantly improving stability and reducing erosion.

<u>Small Commercial Buildings</u>

Winspect soils (NRCS map unit 39D), Roy-Shawmut-Danvers (351E), and Windham-Lap-rock outcrop (839E) soils and complexes on 15-35 percent slopes are rated as very limited for small commercial building stability on the basis of slope and rockiness (large stones or depth to bedrock). Varney-Conn

(36D), Boxwell (69D) and Shawmut (151E) soils are rated as very limited for small commercial building stability because of slope. Martinsdale (52D), Coben(58C), and Tanna (65D) soils are rated as very limited for small commercial building stability due to shrink-swell potential. Varney-Conn, Tanna, and Boxwell soils occur outside the intensive study area and are unlikely to be disturbed for building construction.

Engineering design for any proposed buildings will consider the limitations of native soils at that site.

5.2 LIMITATIONS FOR RECLAMATION POTENTIAL

Coben soils (NRCS map unit 58C) are rated as having poor reclamation potential due to clay content. These soils typically occur near the southern and eastern boundaries of the Study Area and comprise about 6 percent of the Study Area. On average, high clay content in Coben soils is found at depths below 20 inches.

Tanna soils (65D) are rated as having poor reclamation potential due to droughtiness and shallow bedrock. The NRCS map unit description states that the typical depth to bedrock is 20-40 inches. These soils would be salvaged within the safe operational parameters of equipment and consistent with DEQ suitability guidelines regarding coarse fragment content.

The Roy-Shawmut-Danvers complex on 15-35 percent slopes (351E) is rated as having fair-to-poor reclamation potential due to droughtiness, low organic matter content, and clay content. The potential limitations for reclamation use will be mitigated through mixing with other soils during salvage and redistribution.

The Windham-Lap-rock outcrop complex on 15-35 percent slopes (839E) is rated as having poor reclamation potential due to droughtiness and low organic matter content. This complex occurs on a substantial portion of the eastern half of the intensive study area. Several areas occupied by this map unit are not recommended for soil salvage due to steep slopes and excessive coarse fragment content. The remaining areas that would be salvaged were found to contain adequate organic matter content which in combination with the fine-loamy textures of these soils would mitigate against droughty characteristics.

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Table 1
Soil Map Unit Acreages in Intensive Study Area

Map Unit Symbol	Map Unit Name	Slopes (percent)	Acres in Study Area[1]	Percent of Study Area
BrTo	Braziel-Tolbert loams	5-25	274	20
Co	Coben clay loam	5-15	81	6
Da	Danvers silty clay loam	5-25	87	7
Lp	Lap gravelly loam	5-50	121	9
Ma	Martinsdale gravelly loam	2-15	125	9
Qg	Quigley silt loam	2-15	40	3
Sh	Shawmut gravelly loam	2-15	154	12
Wc-RO	Whitecow - Rock Outcrop	15-60	331	25
Wd	Windham skeletal loam	2-15	70	5
Ws	Winspect skeletal loam	2-50	53	4
		Total	**1336**	**100**

[1]Derived from the Baseline Soils Map (Plate 1).

Table 2
Soils Field Data

Site (SS)	Soil Series	Map Unit Symbol	Soil Horizon	Depth (inches)	Color[1] (moist)	Structure[2]	Coarse Fragment % Volumes				Aspect	Slope %	Roots[3]	Effervescence[4]
							Gravel	Cobbles	Stones	Boulders				
PC-001	Lap	Lp	A	0-9	5YR 3/2	mmsbk	0-5	0	0	0	N	15-20	MF, FM	NE
			C	9-15	5YR 5/3	massive	10-15	0-5	0	0			CF	SL/ST
			R	15-40+	-	-	-	-	-	-			-	ST
PC-002	Windham	Lp	A	0-8	5YR 3/1	wmpr/scabk	0-5	0	0	0	N	5-10	MF	NE
			Bt	8-20	5YR 5/4	wmpr/scabk	0-5	0	0	0			MF	NE
			Bw/C	20-32	5YR 6/3	massive	15-20	0	0	0			FF	SL/ST
			C	32-48	5YR 5/3	massive	10	0	0	0			FF	ST
PC-003	Lap	Lp	A	0-5	5YR 4/2	wfsbk	20	10	0	0	S	5-10	MF	SL/ST
			C	5-14+	5YR 5/3	loose	25	20	0	15			CF	ST
PC-004	Quigley	Qg	A	0-6	5YR 3/2	mmsbk	0	0	0	0	FLAT	0	CF	NE
			Bt	6-12	5YR 5/4	hmabk	5-10	0	0	0			CF	SL/ST
			C	12-24	5YR 6/3	massive	20	0	0	0			FF	VE
PC-005	Quigley	Qg	A	0-8	5YR 3/1	mmpr	0	0	0	0	SW	5-15	MF	NE
			Bw	8-14	5YR 4/3	wmabk	0-5	0	0	0			CF	NE
			C	14-22	5YR 4/2	massive	10-15	0	0	0			FF	NE
PC-006	Quigley	Qg	A	0-4	5YR 3/2	mmpr	0	0	0	0	W	5-10	MF, FM	NE
			Bt	4-10	5YR 4/3	hcabk	0	0	0	0			MF, FM	NE
			Bk1	10-16	5YR 5/3	mmabk	0	0	0	0			FF	SL/ST
			Bk2	16-26	5YR 6/4	wmabk	15	0	0	0			FF	VE
			C	26-34	5YR 6/4	massive	20	0	0	0			-	VE
PC-007	Quigley	Qg	A	0-5	5YR 3/2	mcsbk	0	0	0	0	SW	5	MF	NE
			Bt	5-12	5YR 5/4	hcabk	0	0	0	0			CF	NE
			Bk	12-26	5YR 5/3	wmabk	0-5	0	0	0			FF	VE
			C	26-42	5YR 5/3	massive	10-15	0	0	0			-	VE
PC-008	Windham	Wd	A	0-6	5YR 3/1	mcabk	5-10	0	0	0	FLAT (S)	0	MF, FM	NE
			B	6-12	5YR 4/2	wmsbk	15	0	0	0			MF, FM	SL
			C	12-24	5YR 6/4	massive	15-20	0	0	0			CF	VE
PC-009	Shawmut	Sh	A	0-3	5YR 3/2	mmgr	10	<1	0	0	NE	4	CF, FM	NE
			Bt	3-11	5YR 4/2	mcpr	15	<1	0	0			CF, FM	SL
			C	11-23	5YR 6/2	loose	50	10	0	0			FF	VE

Table 2
Soils Field Data

Site (SS)	Soil Series	Map Unit Symbol	Soil Horizon	Depth (inches)	Color[1] (moist)	Structure[2]	Coarse Fragment % Volumes				Aspect	Slope %	Roots[3]	Effervescence[4]
							Gravel	Cobbles	Stones	Boulders				
PC-010	Shawmut	Sh	A	0-7	5YR 3/2	wfgr	5	0	0	0	N	1	CF, FM, FC	NE
			Bt	7-17	5YR 3/2	wmpr/mmabk	10	0	0	0			CF, FM, FC	NE
			C	17-36	5YR 3/2	massive	40-50	10	0	0			FF, FM	SL
PC-011	Winspect	Ws	A	0-3	5YR 4/4	wfgr	5	0	0	0	S	20-50	CF, FM	ST
			Bk	3-11	-	wcsbk	5	0	0	0			FF, FM	VE
			C	11-27	-	massive	30	0	0	0			-	VE
PC-012	Coben	Co	See data for CB-01								NW	4	-	-
PC-013	Braziel	BrTo	A	0-6	5YR 3/2	wfgr	5	0	0	0	FLAT (SE)	0	CF	NE
			Btk	6-12	5YR 4/3	wmpr/hcabk	5	0	0	0			FF	SL
			Bk	12-26	7.5YR 5/3	wmpr/wmabk	5	0	0	0			-	VE
			C	26-40	7.5YR 5/3	massive	15	0	0	0			-	VE
PC-014	Martinsdale	Ma	A/B	0-5	7.5YR 4/3	wmabk	10	0	0	0	SE	10-15	CF, FM	VE
			C1	5-15	7.5YR 5/3	massive	20	0	0	0			FF, FM	VE
			C2	15-32	7.5YR 6/4	loose	40	0	0	0			FF	VE
PC-015	Shawmut	Sh	A	0-5	5YR 3/2	wmsbk	1	0	0	0	NW (varies)	0-2	CF, FM	NE
			Bt	5-20	5YR 4/3	mmpr/hcabk	3	0	0	0			CF, FM	ST
			Bk	20-38	5YR 4/3	mmpr/mmabk	3	0	0	0			FF, FM	VE
			C	38-52	5YR 4/4	massive	25	0	0	0			FF, FM	VE
PC-016	Coben	Co	A	0-5	5YR 3/2	wfgr	<5	0	0	0	N	2-4	CF	NE
			Bt	5-12	5YR 3/2	mcpr/hcabk	<5	0	0	0			CF	NE
			Bk	12-26	7.5YR 5/3	mcpr/mmabk	<5	0	0	0			FF	VE
			C	26-48	7.5YR 5/3	massive	5	0	0	0			FF	VE
PC-017	Danvers	Sh	A	0-6	5YR 2.5/1	mcabk	<5	0	0	0	E	3-10	MF, CM	NE
			Bt	6-15	5YR 3/2	mmpr/mmabk	<5	0	0	0			CF, FM	NE
			C1	15-38	10YR 6/2	massive	<5	0	0	0			FF, FM	ST
			C2	38-52	10YR 6/2	massive	<5	0	0	0			FF	VE
			C3	52-60	10YR 6/2	massive	5	0	0	0			-	VE
PC-018	Tolbert	BrTo	A	0-5	5YR 2.5/2	wfgr	<5	0	0	0	N	2-5	CF, FM	NE
			Bt	5-14	5YR 2.5/2	wmpr/mmabk	<5	0	0	0			CF, FM	NE
			Btk	14-22	5YR 3/2	wmpr/mmabk	5	0	0	0			FF	SL

Table 2
Soils Field Data

Site (SS)	Soil Series	Map Unit Symbol	Soil Horizon	Depth (inches)	Color[1] (moist)	Structure[2]	Coarse Fragment % Volumes				Aspect	Slope %	Roots[3]	Effervescence[4]
							Gravel	Cobbles	Stones	Boulders				
PC-019	Braziel	BrTo	A	0-7	5YR 2.5/2	wfgr	0	0	0	0	N	15-30	MF, FM	NE
			Bw	7-15	5YR 3/2	mcabk	0	0	0	0			CF, FM	NE
			Bt	15-25	7.5 YR 5/3	hfabk	<5	0	0	0			FF	NE
			C1	25-44	10YR 6/4	massive	10	0	0	0			-	VE
			C2	44-58	10YR 6/3	massive	20	0	0	0			-	VE
PC-020	Braziel	BrTo	A	0-6	5YR 4/2	mmabk	0-5	0	0	0	E/SE	5-10	MF, CM	NE
			Btk	6-20	7.5YR 5/2	mmabk	0-5	0	0	0			CF, FM	SL/ST
			C1	20-40	7.5YR 6/2	massive	5-10	0	0	0			FF	ST
			C2	40-52	7.5YR 6/3	massive	5-10	0	0	0			-	ST
PC-021	Braziel	BrTo	A	0-9	5YR 2.5/2	mmabk	0-5	0	0	0	E	10-20	MF, FM	NE
			A2	9-18	5YR 3/2	wfabk	0-5	0	0	0			CF, FM	NE
			C1	18-36	5YR 3/2	massive	0-5	0	0	0			FF	NE
			C2	36-38	5YR 3/2	massive	15-20	0	0	0			-	ST
PC-022	Tolbert	BrTo	A	0-5	5YR 3/1	mmgr	10-20	5-10	0-5	0	S/SE	5-15	MF, CM	NE
			C	5-11	5YR 3/2	massive	5-10	20-30	0-5	0			FF, FM	NE
PC-023	Danvers	Da	A	0-7	5YR 2.5/2	mmgr/wfabk	0-5	0	0	0	E	15-25	MF, CM	NE
			A2	7-11	5YR 2.5/2	wfabk	0	0	0	0			CF, FM	NE
			Btk	11-19	5YR 3/2	wmabk	0	0	0	0			FF	NE
			C1	19-30	5YR 4/3	massive	0	0	0	0			-	NE
			C2	30-53+	5YR 4/3	massive	0-5	0	0	0			-	SL/ST
PC-024	Tolbert	BrTo	A	0-6	5YR 2.5/2	mmgr	5-10	0-5	0	0	E	15-25	MF, CM	SL
			Bt/C	6-11	5YR 3/2	wfabk	10-20	0-5	0	0			CF	ST
			C	11-14	5YR 3/2	massive	20-40	10-20	0-5	0			FF	ST
PC-025	Tolbert	BrTo	A	0-5	5YR 2.5/2	mmgr/wmabk	0-5	0-5	0	0	SE	5-10	MF, CM	SL
			Bt	5-13	5YR 4/2	wfabk	0-5	5-15	0	0			CF	ST
			C	13-23	7.5YR 4/3	massive	15-25	0-5	0	0			FF	ST
PC-026	Shawmut	Sh	A	0-7	5YR 3/2	mmgr/wmabk	0-5	0	0	0	E	0-5	MF, FM	NE
			A/C	7-11	5YR 3/2	wfabk	5-15	0	0	0			CF, FM	NE
			C	11-17	5YR 3/2	massive	20-30	0-5	0-5	0			FF	SL

Table 2
Soils Field Data

Site (SS)	Soil Series	Map Unit Symbol	Soil Horizon	Depth (inches)	Color[1] (moist)	Structure[2]	Coarse Fragment % Volumes				Aspect	Slope %	Roots[3]	Effervescence[4]
							Gravel	Cobbles	Stones	Boulders				
PC-027	Danvers	Da	A	0-8	5YR 2.5/2	mmgr	0	0	0	0	E/NE	10-25	CF, FM	NE
			Bt	8-17	5YR 3/2	msbk	0	0	0	0			CF, FM	NE
			C1	17-29	7.5YR 4/3	massive	5	0	0	0			FF	NE
			C2	29-49	7.5YR 5/4	massive	10-15	0	0	0			-	ST
PC-028	Shawmut	Sh	A	0-4	5YR 2.5/2	mmgr	5	0	0	0	E	2-15	CF, FM	NE
			A2	4-16	5YR 3/2	mmgr/mmsbk	5	1	0	0			CF, FM	NE
			Cr	16+	5YR 3/2	massive	20-30	10	5	0			FF	NE
PC-029	Danvers	Da	A	0-7	5YR 2.5/1	mmgr	5	5	0	0	NE	5-8	CF	NE
			Bt	7-14	7.5YR 5/2	mmsbk	5	5	0	0			CF	SL
			C1	14-24	10YR 6/2	massive	5-10	0	0	0			FF	VE
			C2	24-31	2.5YR 6/6	massive	5	0	0	0			-	ST
			C3	31-49	2.5YR 6/4	massive	5	0	0	0			-	ST
PC-030	Martinsdale	Ma	A	0-8	5YR 2.5/1	mmgr	0	0	0	0	N/NE	2-8	MF, FM	NE
			A2	8-22	5YR 2.5/1	mmgr/mmsbk	0	0	0	0			CF, FM	NE
			C1	22-36	5YR 3/1	massive	0-5	0	0	0			FF	NE
			C2	36-44	7.5YR 6/2	massive	0-5	0	0	0			-	VE
PC-031	Shawmut	Sh	A	0-5	5YR 2.5/1	mmgr	5	5	5	5	N	5-15	CF	NE
			Bt	5-13	5YR 3/2	wfsbk	5-10	5	0	0			CF	NE
			C	13+	5YR 3/2	massive	20-40	20	0	0			FF	NE
PC-032	Martinsdale	Ma	A	0-7	5YR 2.5/2	mmgr/mmpl	0	0	0	0	E	1-5	FF, FM	SL
			Bk	7-14	10YR 6/3	wfabk	0	0	0	0			FF	ST
			C1	14-27	10YR 6/3	massive	0-5	0	0	0			FF	ST
			C2	27-50	10 YR 7/3	massive	0-5	0	0	0			-	VE
CB-01	Coben	Co	A	0-5	5YR 3/2	wfgr	15	5	0	0	W	10-20	MF, MM	NE
			Bt	5-12	5YR 4/4	wmpr/mcabk	0	5	0	0			MF, CM	ME
			Btk	12-24	5YR 5/3	mmabk	0	0	0	0			CF, FM	VE
			Ck	24-46	5YR 6/3	massive	0	0	0	0			FF	ST
			C	46-60+	5YR 6/4	massive	0	0	0	0			FF	NE
CB-02	Whitecow	WC-RO	AC	0-4	5YR 4/4	wfabk/massive	10	0	0	0	NW	5-15	CF, FM	NE
			C1	4-18	5YR 4/3	massive	10	0	0	0			CF, FM	SL
			C2	18-30	5YR 3/4	massive	10	10	10	0			FF	ST

Table 2
Soils Field Data

Site (SS)	Soil Series	Map Unit Symbol	Soil Horizon	Depth (inches)	Color[1] (moist)	Structure[2]	Coarse Fragment % Volumes				Aspect	Slope %	Roots[3]	Effervescence[4]
							Gravel	Cobbles	Stones	Boulders				
CB-03	Winspect	Ws	A	0-4	5YR 3/2	wfgr	10	10	0	0	E	10-20	CF, FM	NE
			B	4-11	5YR 4/3	hmabk	5	10	5	0			FF, FM	NE
			C	11-20	5YR 7/3	massive	40	10	0	0			-	VE
			R	20+	-	-	-	-	-	-			-	-
CB-04	Winspect	Ws	See data for CB-03								E	10-15	-	-
CB-05	Windham	Wd	A	0-3	5YR 3/2	wfgr	10	25	5	0	SE	5-15	CF	NE
			Bt	3-10	5YR 5/3	hmabk	10	20	5	0			FF	VE
			C1	10-18	5YR 5/4	massive	20	10	0	0			FF	VE
			C2	18-38	5 YR 4/6	massive	30	10	0	0			FF	VE
CB-06	Coben	Co	A	0-3	5YR 3/2	wfgr	2	2	0	0	SE	2-8	CF, FF	NE
			Bt	3-12	5YR 3/3	hmabk	0	0	0	0			CF, FF	SL
			Btk	12-28	5YR 4/4	mmabk	0	0	0	0			FF	VE
			C	28-46	5YR 5/4	massive	0	0	0	0			-	SL
			Cr	46-62	5YR 5/4	massive	0	0	0	0			-	NE
CB-07	Whitecow	WC-RO	A	0-4	5YR 3/3	gr	5	5	0	0	NE	20-60	CF, FM	NE
			Bt	4-12	5YR 4/3	wmsbk	5	10	0	0			CF, FM	NE
			C	12-20	5YR 4/4	massive	5	10	15	0			FF	NE
CB-08	Lap	Lp	A	0-5	5YR 2/2	wmsbk	5	5	0	0	N	15-40	CF, FM	NE
			Bt	5-11	5YR 3/2	mmsbk	10	10	0	0			CF, FM	NE
			C	11-17	5YR 4/4	massive	15	15	0	0			FF	NE
CB-09	Lap	Lp	A	0-5	5YR 3/2	wfsbk	10	0	0	0	N	5-20	MF, CM	NE
			B	5-10	5YR 3/3	wmsbk	10	0	0	0			MF, CM	NE
			C	10+	5YR 4/3	massive	15	10	5	5			CF	NE
CB-10	Whitecow	WC-RO	O	0-2	-	-	10	0	0	0	NW	40-60	-	-
			A	2-6	5YR 2/1	mmabk	15	10	0	0			FF, CM, CC	NE
			C	6-20	5YR 2/2	massive	15	15	15	0			FM,FC	NE
CB-11	Lap	Lp	A	0-7	5YR 3/2	wmsbk	10	0	0	0	NW	5-15	MF, CM	NE
			Bt	7-14	5YR 3/3	mmsbk	20	0	0	0			CF, FM	NE
			Ck	14-24	5YR 4/4	massive	30	10	0	0			CF, FM	VE

Table 2
Soils Field Data

Site (SS)	Soil Series	Map Unit Symbol	Soil Horizon	Depth (inches)	Color[1] (moist)	Structure[2]	Coarse Fragment % Volumes				Aspect	Slope %	Roots[3]	Effervescence[4]
							Gravel	Cobbles	Stones	Boulders				
CB-12	Winspect	Ws	A	0-5	7.5YR 4/3	wmsbk	0	0	0	0	S	2-8	MF, FM	NE
			B	5-18	7.5YR 4/4	mmabk	5	0	0	0			CF	NE
			Bk	18-36	7.5YR 4/4	mmabk	20	0	0	0			FF	ST
			C	36+	-	-	-	-	-	-			-	-
CB-13	Lap	Lp	A	0-6	7.5YR 4/3	wfgr	30	10	0	0	S	8-15	MF, CM	VE
			C	6-16	7.5YR 4/4	massive	10	40	0	0			MF, CM	VE
			Cr/R	16+	-	-	-	-	-	-			FF	VE
CB-14	Martinsdale	Ma	Ap	0-5	7.5YR 4/3	wfgr	0	0	0	0	SW	5-15	CF	NE
			Bt	5-16	7.5YR 4/4	wmpr/mcabk	10	0	0	0			CF	SL
			Bc	16-38	7.5YR 5/4	wmpr/wmabk	20	0	0	0			FF	VE
			C	38-46	7.5YR 5/3	massive	30	0	0	0			-	VE

[1]Color: Munsell color notations.

[2]Structure: Grade: m = massive, w = weak, m = moderate, s = strong.
Size: vf = very fine, f = fine, m = medium, c = coarse, vc = very coarse.
Type: gr = granular, pl = platy, pr = prismatic, cl = columnar, abk = angular blocky, sbk = subangular blocky.

[3]Roots: Abundance: F = few, C = common, M = many.
Size: VF = very fine, F = fine, M = medium, CO = coarse.

[4]Effervescence: NE = non effervescent, VS = very slightly effervescent, SL = slightly effervescent, ST = strongly effervescent, VE = violently effervescent

Table 3
Soils Lab Data

Sample Site (SS)	Soil Series	Map Unit Symbol	Horizon	Depth (inches)	Lab Soil Texture[1]	Sand %	Silt %	Clay %	Base Saturation %	Organic matter %	pH (std units)	Electrical Conductivity (EC) (mmhos/cm)	Sodium Adsorption Ratio (SAR) (unitless)
PC-005	Quigley	Qg	A	0-8	SiL	16	63	21	57.0	6.3	6.8	0.6	<0.1
			Bw	8-14	SiL	14	67	19	56.2	5.3	7.4	0.4	<0.1
			C	14-22	SiL	12	67	21	51.4	4.1	7.3	0.2	0.2
PC-008	Windham	Wd	A	0-6	SiL	16	69	15	34.0	3.8	6.5	0.5	6.1
			B	6-12	SiL	14	61	25	59.7	3.0	7.9	3.0	17.3
			C	12-24	SiCL	18	45	37	56.9	2.3	8.3	18.9	20.2
PC-009	Shawmut	Sh	A	0-3	SiL	20	56	24	56.3	6.9	6.3	0.4	0.4
			Bt	3-11	SiCL	16	50	34	57.0	4.5	6.4	0.3	0.5
			C	11-23	C	38	20	42	51.6	3.3	7.8	0.5	2.5
PC-011	Winspect	Ws	A	0-3	L	40	46	14	43.0	4.5	7.4	0.7	<0.1
			Bk	3-11	SiL	36	50	14	46.0	3.5	7.6	0.8	1.4
			C	11-27	SL	58	32	10	32.8	1.4	8.1	8.0	6.0
PC-013	Braziel	BrTo	A	0-6	SiL	24	64	12	47.9	5.2	6.4	0.7	1.6
			Btk	6-12	SiL	16	58	26	54.4	3.6	7.2	0.8	7.4
			Bk	12-26	SiL	16	58	26	54.3	2.8	8.0	5.5	10.8
			C	26-40	SiL	18	60	22	46.0	2.2	8.1	6.8	15.8
PC-014	Martinsdale	Ma	A/B	0-5	C	18	36	46	60.3	6.2	7.5	0.6	0.2
			C1	5-15	C	12	24	64	80.7	4.0	8.0	0.9	2.7
			C2	15-32	C	20	20	60	68.8	3.4	8.0	6.5	4.6
PC-017	Danvers	Da	A	0-6	SiCL	20	49	31	66.6	7.2	7.4	0.9	0.8
			Bt	6-15	C	14	37	49	96.3	4.8	8.2	1.3	4.9
			C1	15-38	C	16	13	71	82.7	2.7	8.1	6.8	5.0
			C2	38-52	C	22	33	45	82.6	2.9	7.6	3.0	1.1
			C3	52-60	C	32	25	43	78.7	4.6	7.4	3.2	0.8
PC-020	Braziel	BrTo	A	0-6	SiCL	10	53	37	60.9	6.0	7.1	0.4	<0.1
			Btk	6-20	SiCL	12	55	33	53.5	3.8	7.7	0.4	0.2
			C1	20-40	SiCL	6	57	37	51.4	3.7	7.8	4.2	1.8
			C2	40-52	C	10	37	53	59.0	4.4	7.9	4.8	3.1

Table 3
Soils Lab Data

Sample Site (SS)	Soil Series	Map Unit Symbol	Horizon	Depth (inches)	Lab Soil Texture[1]	Sand %	Silt %	Clay %	Base Saturation %	Organic matter %	pH (std units)	Electrical Conductivity (EC) (mmhos/cm)	Sodium Adsorption Ratio (SAR) (unitless)
PC-021	Braziel	BrTo	A	0-9	SiL	16	63	21	53.7	6.0	6.3	0.4	0.1
			A2	9-18	SiL	16	65	19	56.7	5.7	6.8	0.3	0.2
			C1	18-36	SiL	18	63	19	55.2	5.7	6.7	0.4	0.2
			C2	36-38	SiL	16	61	23	55.8	5.4	7.2	0.6	0.3
PC-025	Tolbert	BrTo	A	0-5	CL	22	45	33	52.1	5.8	6.1	0.2	0.2
			Bt	5-13	SiCL	18	51	31	51.2	4.5	6.3	0.2	0.3
			C	13-23	L	26	49	25	47.2	3.7	6.5	0.3	0.5
PC-027	Danvers	Da	A	0-8	SiCL	18	43	39	64.5	7.4	5.6	0.3	0.9
			Bt	8-17	SiCL	20	51	29	44.7	4.3	5.6	0.3	2.1
			C1	17-29	SiCL	18	48	34	51.8	3.5	7.2	0.6	3.0
			C2	29-49	SiCL	18	49	33	49.4	2.8	7.9	0.5	4.1
PC-028	Shawmut	Sh	A	0-4	SiCL	20	53	27	45.3	5.6	6.7	0.5	0.1
			A2	4-16	SiL	20	55	25	46.8	5.5	6.8	0.4	0.2
PC-029	Danvers	Da	A	0-7	SiCL	18	47	35	59.2	6.2	6.6	0.6	0.2
			Bt	7-14	C	6	25	69	94.5	5.0	7.6	0.3	0.7
			C1	14-24	C	10	31	59	80.6	3.4	7.8	0.6	1.7
			C2	24-31	C	<1	7	93	134	3.2	7.7	2.8	2.2
			C3	31-49	C	8	11	81	121	2.8	7.7	2.2	2.4
PC-030	Martinsdale	Ma	A	0-8	SiL	17	62	21	74.5	10.8	6.8	0.5	<0.1
			A2	8-22	SiL	14	63	23	67.1	9.5	6.9	0.5	0.1
			C1	22-36	SiCL	16	55	29	51.7	4.1	7.5	1.1	1.4
			C2	36-44	SiCL	14	55	31	53.7	2.5	7.8	0.4	1.6
CB-01	Coben	Co	A	0-5	SiL	28	54	18	48.8	5.2	6.4	0.5	0.8
			Bt	5-12	SiCL	16	56	28	49.8	3.6	6.4	0.2	1.9
			Btk	12-24	C	14	28	58	112	3.4	7.9	1.7	3.5
			Ck	24-46	C	20	14	66	114	3.5	7.6	3.4	2.7
			C	46-60+	C	30	14	56	113	3.1	7.6	2.4	3.2
CB-05	Windham	Wd	A	0-3	L	30	46	24	52.8	4.7	6.5	0.4	0.4
			Bt	3-10	CL	22	46	32	50.5	2.7	7.6	0.4	0.4
			C1	10-18	C	16	30	54	71.0	3.1	7.8	0.4	1.8
			C2	18-38	C	16	38	46	68.2	3.8	7.6	0.7	2.7

Table 3
Soils Lab Data

Sample Site (SS)	Soil Series	Map Unit Symbol	Horizon	Depth (inches)	Lab Soil Texture[1]	Sand %	Silt %	Clay %	Base Saturation %	Organic matter %	pH (std units)	Electrical Conductivity (EC) (mmhos/cm)	Sodium Adsorption Ratio (SAR) (unitless)
CB-06	Coben	Co	A	0-3	SiL	17	67	16	40.0	3.9	6.7	0.3	3.2
			Bt	3-12	SiC	6	54	40	69.2	4.8	7.6	0.5	4.6
			Btk	12-28	SiL	2	72	26	84.4	4.1	7.9	0.6	5.1
			C	28-46	C	<1	16	84	131	4.1	7.8	4.5	6.0
			Cr	46-62	C	<1	10	90	152	4.2	7.8	3.2	6.7
CB-07	Whitecow	Wc-RO	A	0-4	SiCL	20	52	28	38.7	5.1	6.3	0.3	0.4
			Bt	4-12	SiCL	18	54	28	40.2	4.5	6.5	0.1	0.4
			C	12-20	SiCL	20	52	28	41.5	3.9	6.8	0.3	0.4
CB-10	Whitecow	Wc-RO	O	0-2									
			A	2-6	SiCL	20	49	31	58.8	11.5	5.8	0.3	0.7
			C	6-20	SiCL	18	47	35	52.3	8.7	6.2	0.4	1.3
CB-11	Lap	Lp	A	0-7	SiL	20	61	19	83.2	12.6	6.4	0.7	0.1
			Bt	7-14	SiL	16	63	21	62.8	6.6	7.3	0.8	0.4
			Ck	14-24	SiCL	20	47	33	60.5	5.1	7.5	0.9	1.4
CB-12	Winspect	Ws	A	0-5	SiL	16	67	17	50.0	6.1	6.3	0.4	0.6
			B	5-18	SiL	18	67	15	50.6	3.8	7.5	2.3	13.5
			Bk	18-36	SiCL	16	53	31	70.1	2.6	8.4	4.2	16.2
			C	36+									
CB-13	Lap	Lp	A	0-6	SiL	32	50	18	58.6	6.4	7.4	0.8	<0.1
			C	6-16	L	28	46	26	54.3	4.5	7.4	0.7	<0.1
			Cr/R	16+									
CB-14	Martinsdale	Ma	Ap	0-5	SiL	15	67	18	45.5	3.9	6.3	0.5	0.6
			Bt	5-16	SiL	14	66	20	45.8	3.4	6.4	0.8	3.6
			Bc	16-38	SiL	12	66	22	48.2	2.4	8.0	4.3	13.1
			C	38-46	SiL	18	62	20	48.6	2.3	8.0	6.4	14.2

[1] Lab Soil Textures: C = clay, CL = clay loam, L = loam, LS = loamy sand, LFS = loamy fine sand, SiL =silty loam, SiCL = silty clay loam, SiC = silty clay, S = sand, SL = sandy loam, SCL = sandy clay loam, SC = sandy clay

Table 4
Inorganic Elements Analysis

Sample Site (SS)	Soil Series	Map Unit Symbol	Horizon	Depth (inches)	Inorganic Element Concentration				
					Arsenic (mg/kg)	Cadmium (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Zinc (mg/kg)
PC-005	Quigley	Qg	A	0-8	10	<1	21	20	60
			Bw	8-14	10	<1	17	19	56
			C	14-22	10	<1	16	19	54
PC-008	Windham	Wd	A	0-6	16	<1	17	21	46
			B	6-12	13	<1	14	21	59
			C	12-24	15	<1	7	9	19
PC-009	Shawmut	Sh	A	0-3	14	<1	22	20	64
			Bt	3-11	11	<1	18	18	69
			C	11-23	26	<1	18	10	90
PC-011	Winspect	Ws	A	0-3	19	<1	19	15	46
			Bk	3-11	10	<1	10	10	34
			C	11-27	3	<1	4	6	13
PC-013	Braziel	BrTo	A	0-6	12	<1	17	16	48
			Btk	6-12	8	<1	13	15	52
			Bk	12-26	11	<1	16	12	45
			C	26-40	14	<1	16	11	47
PC-014	Martinsdale	Ma	A/B	0-5	24	<1	23	14	70
			C1	5-15	11	<1	17	11	46
			C2	15-32	11	<1	14	9	38
PC-017	Danvers	Da	A	0-6	12	<1	23	18	68
			Bt	6-15	9	<1	21	17	71
			C1	15-38	7	<1	15	16	43
			C2	38-52	8	<1	23	20	56
			C3	52-60	20	<1	41	27	151
PC-020	Braziel	BrTo	A	0-6	16	<1	20	15	53
			Btk	6-20	15	<1	17	14	46
			C1	20-40	33	<1	28	11	50
			C2	40-52	16	<1	18	11	49
PC-021	Braziel	BrTo	A	0-9	20	<1	20	14	62
			A2	9-18	9	<1	12	15	55
			C1	18-36	8	<1	12	15	51
			C2	36-38	10	<1	14	14	53
PC-025	Tolbert	BrTo	A	0-5	13	<1	15	16	58
			Bt	5-13	11	<1	14	16	57
			C	13-23	13	<1	14	17	49
PC-027	Danvers	Da	A	0-8	9	<1	14	11	52
			Bt	8-17	9	<1	14	14	51
			C1	17-29	9	<1	19	12	56
			C2	29-49	6	<1	16	10	56
PC-028	Shawmut	Sh	A	0-4	13	<1	19	19	60
			A2	4-16	17	<1	18	18	55
			Cr	16+	Not Sampled				

Table 4
Inorganic Elements Analysis

Sample Site (SS)	Soil Series	Map Unit Symbol	Horizon	Depth (inches)	Inorganic Element Concentration				
					Arsenic (mg/kg)	Cadmium (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Zinc (mg/kg)
PC-029	Danvers	Da	A	0-7	16	<1	17	22	70
			Bt	7-14	10	<1	15	22	74
			C1	14-24	12	<1	12	8	66
			C2	24-31	121	<1	20	29	119
			C3	31-49	38	<1	13	15	78
PC-030	Martinsdale	Ma	A	0-8	9	<1	16	9	63
			A2	8-22	6	<1	17	10	62
			C1	22-36	7	<1	14	17	54
			C2	36-44	17	<1	15	17	42
CB-01	Coben	Co	A	0-5	18	<1	17	16	47
			Bt	5-12	12	<1	17	18	57
			Btk	12-24	18	<1	18	11	41
			Ck	24-46	11	<1	16	10	31
			C	46-60+	11	<1	15	10	31
CB-05	Windham	Wd	A	0-3	31	<1	21	19	54
			Bt	3-10	26	<1	18	14	40
			C1	10-18	25	<1	18	14	45
			C2	18-38	30	<1	19	19	54
CB-06	Coben	Co	A	0-3	7	<1	12	19	54
			Bt	3-12	7	<1	17	15	57
			Btk	12-28	8	<1	20	13	47
			C	28-46	9	<1	22	12	35
			Cr	46-62	4	<1	25	10	19
CB-07	Whitecow	Wc-RO	A	0-4	11	<1	15	20	65
			Bt	4-12	10	<1	15	14	68
			C	12-20	9	<1	15	15	63
CB-10	Whitecow	Wc-RO	O	0-2	Not Sampled				
			A	2-6	21	<1	19	15	66
			C	6-20	58	<1	19	13	58
CB-11	Lap	Lp	A	0-7	28	<1	22	14	61
			Bt	7-14	24	<1	16	14	52
			Ck	14-24	35	<1	41	13	41
CB-12	Winspect	Ws	A	0-5	15	<1	15	16	60
			B	5-18	8	<1	13	17	54
			Bk	18-36	14	<1	18	16	46
			Cr	36+	Not Sampled				
CB-13	Lap	Lp	A	0-6	26	<1	21	15	50
			C	6-16	20	<1	13	7	31
			Cr/R	16+	Not Sampled				
CB-14	Martinsdale	Ma	Ap	0-5	9	<1	15	15	54
			Bt	5-16	10	<1	15	16	57
			Bc	16-38	13	<1	15	12	49
			C	38-46	11	<1	14	11	47

Table 5. Clay Mineralogy of Selected Soil Samples

Sample Site	Soil Series	Map Unit Symbol	Depth (inches)	Horizon	Lab Soil Texture	Lab Percent Clay	Mineralogy of Clay Fraction (<2 µm)[1]		
							Smectite (Percent of Clay Fraction)	Illite (Percent of Clay Fraction)	Kaolin (Percent of Clay fraction)
PC-009	Shawmut	Sh	11-23	C	Clay	42	53	21	26
PC-017	Danvers	Da	15-38	C1	Clay	71	69	9	22
PC-017	Danvers	Da	38-52	C2	Clay	45	62	15	23
PC-029	Danvers	Da	31-49	C3	Clay	81	97	< 1	3
CB-01	Coben	Co	46-60	C	Clay	56	86	11	3
CB-14	Martinsdale	Ma	38-46	C	Silt Loam	20	28	43	29

[1] Laboratory-analyzed by x-ray diffraction (XRD) of air-dried (relative humidity about 25%), glycolated, oriented clay mounts.

Table 6. NRCS Soils Engineering and Reclamation Data Summary

Soil Map Unit Symbol	Soil Map Unit Name	Location (I/E)[1]	NRCS Soil Engineering Properties			NRCS Soil Reclamation Properties		
			Suitability for Roads (Rating/Limitations)	Buildings Stability (Rating/Limitations)[2]	Linear Extensibility (Percent)[3]	Off-Road Erosion Hazard (Rating/Limitations)	Reclamation Potential (Rating/Limitations)[4]	Erosion Factor (Kw; whole soil)[5]
24B	Conn loam, 0-4% slopes	E	Moderately suited/ Low strength	Not limited	0.0 - 2.9 (Low)	Slight/ None listed	Fair/Low o.m., water erosion	0.28 - 0.37
24C	Conn loam, 4-8% slopes	E	Moderately suited/ Low strength, slope	Somewhat limited/ Slope	0.0 - 2.9 (Low)	Slight/ None listed	Fair/Low o.m., water erosion	0.28 - 0.37
33B	Rothiemay loam, 2-4% slopes	E	Moderately suited/ Low strength	Somewhat limited/ Shrink-swell	0.0 - 5.9 (Low to Mod.)	Slight/ None listed	Fair/Low o.m., water erosion	0.24 - 0.37
36D	Varney-Conn loams, 8-15% slopes	E	Moderately suited/ Low strength, slope	Very limited/ Slope	0.0 - 5.9 (Low to Mod.)	Slight/ None listed	Fair/Low o.m., water erosion	0.24 - 0.49
39D	Winspect gravelly loam, 8-15% slopes	I	Moderately suited/ Slope	Very limited/ Slope, large stones	0.0 - 2.9 (Low)	Slight/ None listed	Fair/Low o.m., cobbles	0.10 - 0.15
49C	Danvers clay loam, 4-8% slopes	I/E	Moderately suited/ Low strength, slope	Somewhat limited/ Slope	0.0 - 8.9 (Low to High)	Slight/ None listed	Fair/Clay, low o.m.	0.20 - 0.32
52C	Martinsdale loam, 4-8% slopes	I	Moderately suited/ Low strength, slope	Somewhat limited/ Slope, shrink-swell	0.0 - 5.9 (Low to Mod.)	Slight/ None listed	Fair/Water erosion, low o.m., clay	0.24 - 0.37
52D	Martinsdale loam, 8-15% slopes	I	Moderately suited/ Low strength, slope	Very limited/ Slope, shrink-swell	0.0 - 5.9 (Low to Mod.)	Slight/ None listed	Fair/Water erosion, low o.m., clay	0.24 - 0.37
58C	Coben clay loam, 4-8% slopes	I/E	Moderately suited/ Low strength, slope	Very limited/ Shrink-swell, slope	3.0 - 8.9 (Mod. to High)	Slight/ None listed	Poor/Clay	0.24 - 0.32
60C	Quigley loam, 4-8% slopes	I	Moderately suited/ Low strength, slope	Somewhat limited/ Slope, shrink-swell	0.0 - 5.9 (Low to Mod.)	Slight/ None listed	Fair/Water erosion, low o.m.	0.20 - 0.43
65D	Tanna loam, 8-15% slopes	E	Moderately suited/ Low strength, slope	Very limited/ Slope, shrink-swell	0.0 - 5.9 (Low to Mod.)	Slight/ None listed	Poor/Droughty, shallow bedrock	0.28 - 0.49
69D	Boxwell loam, 8-15% slopes	E	Moderately suited/ Low strength, slope	Very limited/ Slope	0.0 - 5.9 (Low to Mod.)	Slight/ None listed	Not rated	0.32 - 0.43
151E	Shawmut cobbly loam, 15-35% slopes	I	Poorly suited/ Slope, low strength	Very limited/ Slope	0.0 - 5.9 (Low to Mod.)	Moderate/ Slope/erodibility	Fair/Droughty, low o.m.	0.10 - 0.15
351E	Roy-Shawmut-Danvers complex, 15-35% slopes	E	Poorly suited/ Slope, low strength	Very limited/ Slope, large stones	0.0 - 4.0 (Low to Mod.)	Moderate/ Slope/erodibility	Fair-Poor/Droughty, clay, low o.m.	0.10 - 0.28
839E	Windham-Lap-Rock outcrop complex, 15-35% slopes	I	Poorly suited/ Slope, low strength	Very limited/ Slope, depth to bedrock	0.0 - 5.9 (Low to Mod.)	Moderate/ Slope/erodibility	Poor/Droughty, low o.m.	0.10 - 0.32

[1] Location of soil map unit: I = within intensive study area; E = within extensive study area (see report text for explanation).

[2] Ratings for small commercial buildings.

[3] Linear extensibility-percent (LEP) is an expression of volume change in soil with change in water content; it is used to classify a soil's shrink-swell potential. NRCS classifies soil shrink-swell potential as low (LEP <3.0), moderate (LEP 3.0-5.9), high (LEP 6.0-8.9), or very high (LEP >9.0) (Sec. 618.41, NRCS National Soil Survey Handbook).

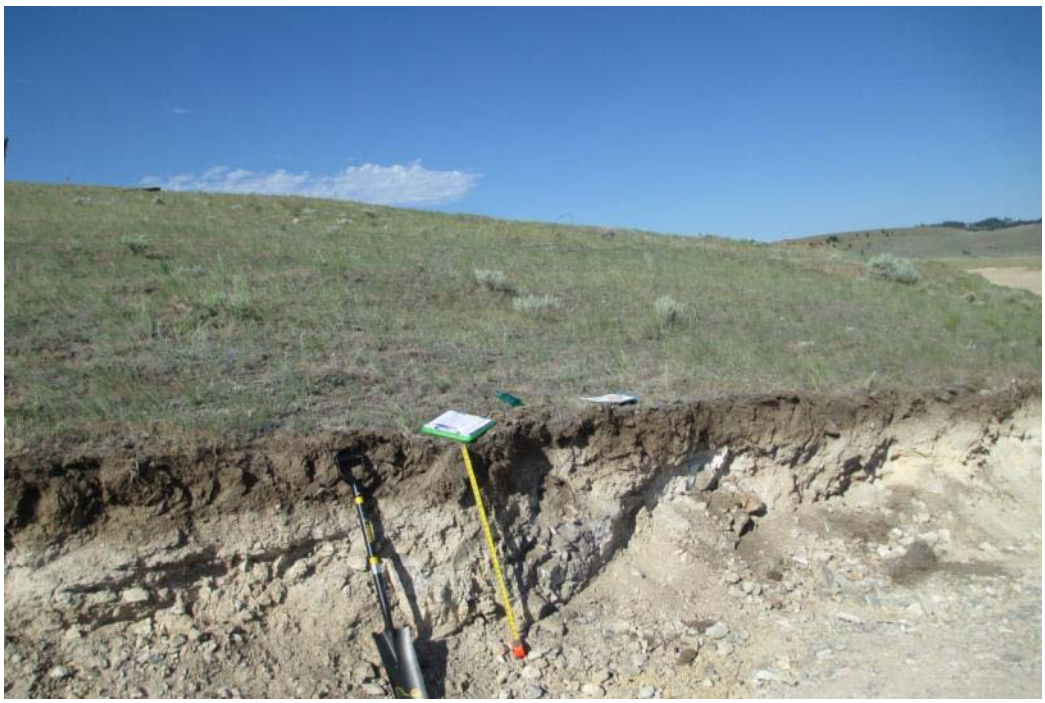
[4] O.m. = organic matter content.

[5] Soil erodibility factors quantify soil detachment by runoff and raindrop impact and are used to predict long-term soil loss from sheet and rill erosion. The soil erodibility factor Kw applies to the whole soil, taking into account coarse fragment (>2.0 mm particle diameter) content as well as the fine fraction. Classes are identified by a representative class value ranging from 0.02 (low) to 0.64 (high) (Sec. 618.58, NRCS National Soil Survey Handbook).

APPENDIX A

SOILS SAMPLE SITE PHOTOS

MONTANA LIMESTONE RESOURCES BASELINE SOILS INVENTORY



Site PC-001: Lap soils

Site PC-002: Windham soils

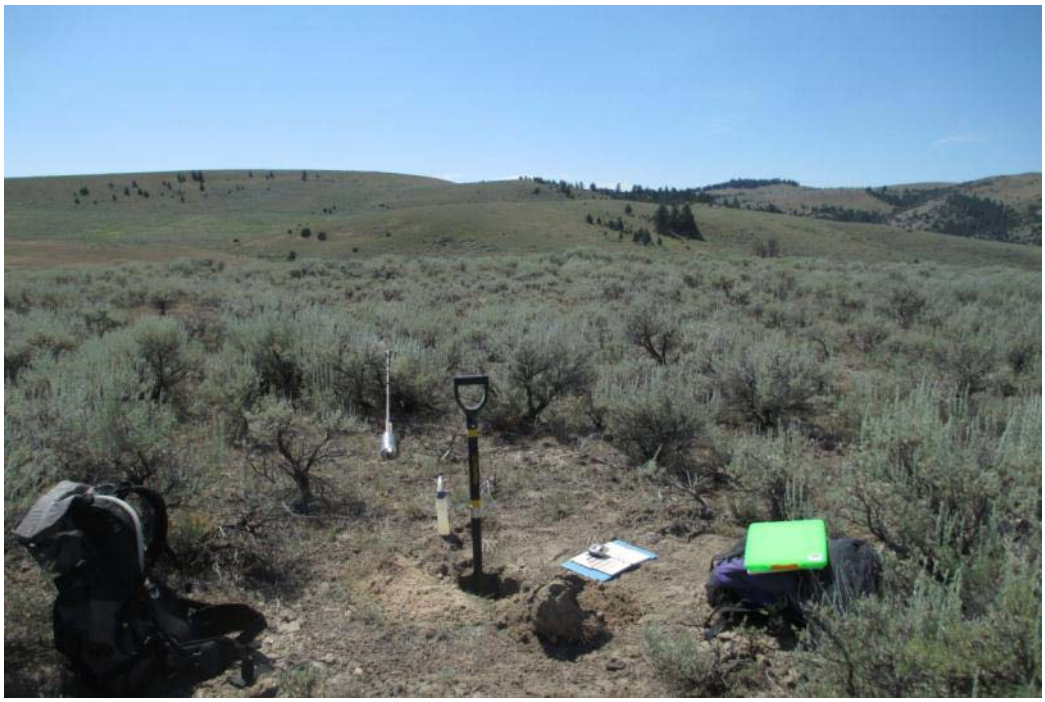
Site PC-003: Lap soils

Site PC-004: Quigley soils

Site PC-005: Quigley soils

Site PC-006: Quigley soils

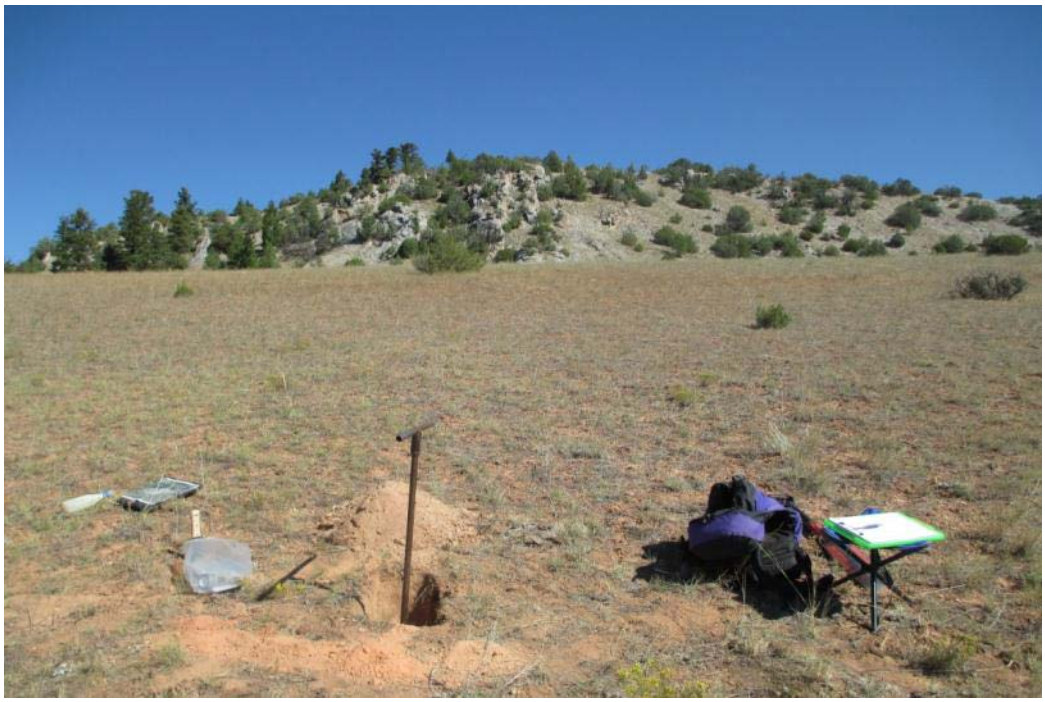
Site PC-007: Quigley soils



Site PC-008: Windham soils

Site PC-009: Shawmut soils

Site PC-010: Shawmut soils



Site PC-011: Winspect soils

Site PC-012: Coben soils

Site PC-013: Braziel soils

Site PC-014: Martinsdale soils

Site PC-015: Shawmut soils

Site PC-016: Coben soils

Site PC-017: Danvers soils

Site PC-018: Tolbert soils

Site PC-019: Braziel soils

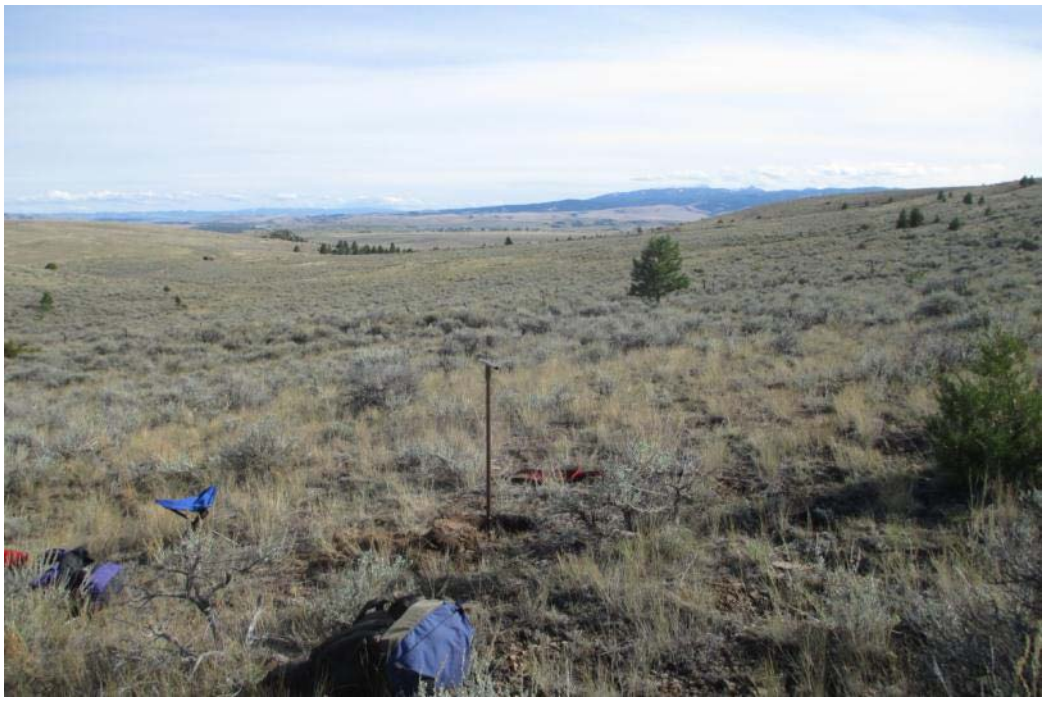
Site PC-020: Braziel soils

Site PC-021: Braziel soils

Site PC-022: Tolbert soils

Site PC-023: Danvers soils

Site PC-024: Tolbert soils



Site PC-025: Tolbert soils

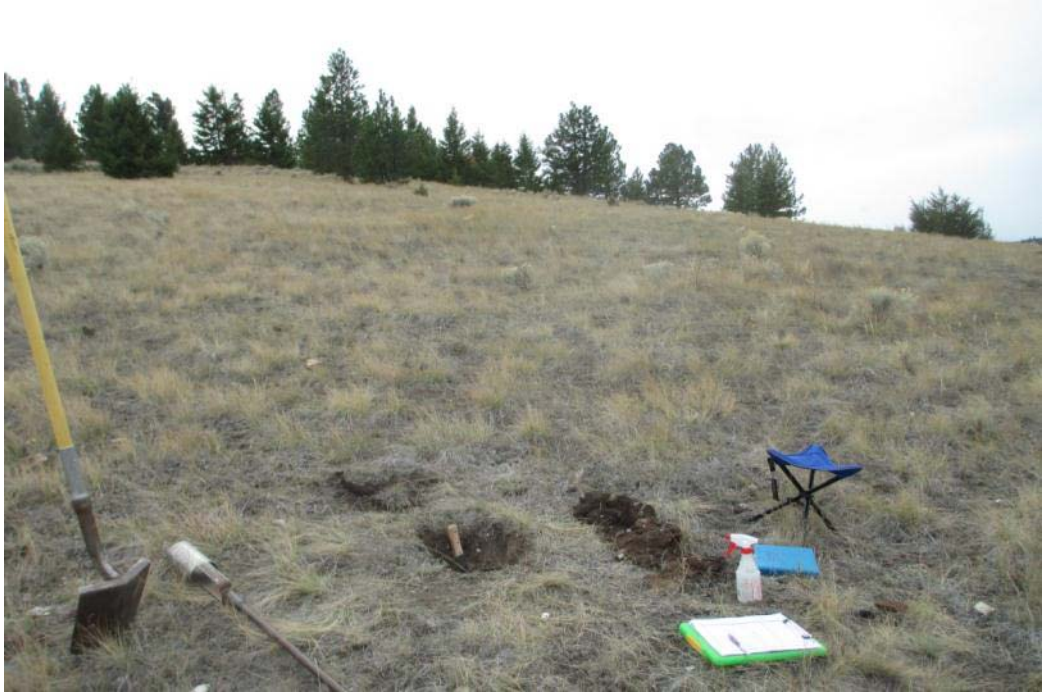
Site PC-026: Shawmut soils

Site PC-027: Danvers soils

Site PC-028: Shawmut soils

Site PC-029: Danvers soils

Site PC-030: Martinsdale soils



Site PC-031: Shawmut soils

Site PC-032: Martinsdale soils

Site CB-01: Coben soils

Site CB-02: Whitecow soils

Site CB-03: Winspect soils

Site CB-05: Windham soils

Site CB-06: Coben soils

Site CB-07: Whitecow soils

Site CB-08: Lap soils

Site CB-09: Lap soils

Site CB-010: Whitecow soils

Site CB-11: Lap soils

Site CB-12: Winspect soils

Site CB-13: Lap soils

Site CB-14: Martinsdale soils

APPENDIX B

NRCS SOILS ENGINEERING AND RECLAMATION DATA

MONTANA LIMESTONE RESOURCES BASELINE SOILS INVENTORY

Component Legend

Granite County Area, Montana

[This report shows only the major soils in each map unit]

Map unit symbol and name	Pct. of map unit	Component name	Component kind	Pct. Slope		
				Low	RV	High
10A:						
Mccabe-Canarway complex, impacted, 0 to 2 percent slopes, occasionally flooded						
	45	Mccabe	Series	0	1	2
	40	Canarway	Series	0	1	2
11A:						
Mccabe-Canarway complex, 0 to 2 percent slopes, occasionally flooded						
	45	Mccabe	Series	0	1	2
	40	Canarway	Series	0	1	2
24B:						
Conn loam, 0 to 4 percent slopes						
	85	Conn	Series	0	2	4
24C:						
Conn loam, 4 to 8 percent slopes						
	85	Conn	Series	4	6	8
25B:						
Straw silty clay loam, 0 to 4 percent slopes						
	85	Straw	Series	0	2	4
31B:						
Varney clay loam, 0 to 4 percent slopes						
	85	Varney	Series	0	2	4
33B:						
Rothiemay loam, 2 to 4 percent slopes						
	85	Rothiemay	Series	2	3	4
33C:						
Rothiemay loam, 4 to 8 percent slopes						
	85	Rothiemay	Series	4	6	8
33D:						
Rothiemay loam, 8 to 15 percent slopes						
	85	Rothiemay	Series	8	12	15
34B:						
Cetrack loam, 0 to 4 percent slopes						
	85	Cetrack	Series	0	2	4

Component Legend

Granite County Area, Montana

Map unit symbol and name	Pct. of map unit	Component name	Component kind	Pct. Slope		
				Low	RV	High
36B:						
Varney-Conn loams, 0 to 4 percent slopes						
	60	Varney	Series	0	2	4
	25	Conn	Series	0	2	4
36D:						
Varney-Conn loams, 8 to 15 percent slopes						
	60	Varney	Series	8	12	15
	25	Conn	Series	8	12	15
39C:						
Winspect gravelly loam, 4 to 8 percent slopes						
	85	Winspect	Series	4	6	8
39D:						
Winspect gravelly loam, 8 to 15 percent slopes						
	85	Winspect	Series	8	12	15
42E:						
Windham gravelly loam, 15 to 35 percent slopes						
	85	Windham	Series	15	25	35
49C:						
Danvers clay loam, 4 to 8 percent slopes						
	85	Danvers	Series	4	6	8
49D:						
Danvers clay loam, 8 to 15 percent slopes						
	85	Danvers	Series	8	12	15
51D:						
Shawmut gravelly loam, 8 to 15 percent slopes						
	85	Shawmut	Series	8	12	15
52B:						
Martinsdale loam, 0 to 4 percent slopes						
	85	Martinsdale	Series	0	2	4

Component Legend

Granite County Area, Montana

Map unit symbol and name	Pct. of map unit	Component name	Component kind	Pct. Slope		
				Low	RV	High
52C:						
Martinsdale loam, 4 to 8 percent slopes						
	85	Martinsdale	Series	4	6	8
52D:						
Martinsdale loam, 8 to 15 percent slopes						
	85	Martinsdale	Series	8	12	15
58C:						
Coben clay loam, 4 to 8 percent slopes						
	85	Coben	Series	4	6	8
60C:						
Quigley loam, 4 to 8 percent slopes						
	85	Quigley	Series	4	6	8
60D:						
Quigley loam, 8 to 15 percent slopes						
	85	Quigley	Series	8	12	15
65D:						
Tanna loam, 8 to 15 percent slopes						
	85	Tanna	Series	8	12	15
69C:						
Boxwell loam, 4 to 8 percent slopes						
	85	Boxwell	Series	4	6	8
69D:						
Boxwell loam, 8 to 15 percent slopes						
	85	Boxwell	Series	8	12	15
88E:						
Whitecow gravelly loam, 15 to 35 percent slopes						
	85	Whitecow	Series	15	25	35
88F:						
Whitecow gravelly loam, 35 to 60 percent slopes						
	85	Whitecow	Series	35	48	60
111A:						
Canarway-Mccabe complex, 0 to 2 percent slopes, occasionally flooded						
	45	Canarway	Series	0	1	2
	40	Mccabe	Series	0	1	2

Component Legend

Granite County Area, Montana

Map unit symbol and name	Pct. of map unit	Component name	Component kind	Pct. Slope		
				Low	RV	High
149D:						
Danvers cobbly loam, 8 to 15 percent slopes						
	85	Danvers	Series	8	12	15
151E:						
Shawmut cobbly loam, 15 to 35 percent slopes						
	85	Shawmut	Series	15	25	35
169F:						
Doney-Dolus complex, 15 to 45 percent slopes						
	55	Doney	Series	15	30	45
	35	Dolus	Series	15	30	45
351E:						
Roy-Shawmut-Danvers complex, 15 to 35 percent slopes						
	35	Roy	Series	15	25	35
	25	Danvers	Series	15	25	35
	25	Shawmut	Series	15	25	35
442D:						
Braziel-Tolbert gravelly loams, 8 to 15 percent slopes						
	50	Braziel	Series	8	12	15
	35	Tolbert	Series	8	12	15
442E:						
Braziel-Tolbert complex, 15 to 35 percent slopes						
	60	Braziel	Series	15	25	35
	25	Tolbert, very stony	Series	15	25	35
444B:						
Gregson silt loam, 0 to 4 percent slopes, rarely flooded						
	85	Gregson	Series	0	2	4
445B:						
Saypo silt loam, 0 to 4 percent slopes, rarely flooded						
	85	Saypo	Series	0	2	4

Component Legend

Granite County Area, Montana

Map unit symbol and name	Pct. of map unit	Component name	Component kind	Pct. Slope		
				Low	RV	High
447B:						
Kleinschmidt gravelly loam, cool, 0 to 4 percent slopes, rarely flooded						
	85	Kleinschmidt	Series	0	2	4
488F:						
Whitecow gravelly loam, cool, 35 to 60 percent slopes						
	85	Whitecow	Series	35	48	60
814B:						
Bandy loam, 0 to 4 percent slopes, rarely flooded						
	85	Bandy	Series	0	2	4
824E:						
Conn-Sixbeacon cobbly loams, 15 to 35 percent slopes						
	55	Conn	Series	15	25	35
	30	Sixbeacon	Series	15	25	35
839E:						
Windham-Lap-Rock outcrop complex, 15 to 35 percent slopes						
	45	Windham	Series	15	25	35
	30	Lap	Series	15	25	35
	10	Rock outcrop	Miscellaneous area	---	---	---
839F:						
Windham-Lap-Rock outcrop complex, 35 to 60 percent slopes						
	45	Windham	Series	35	48	60
	30	Lap	Series	35	48	60
	10	Rock outcrop	Miscellaneous area	---	---	---
855A:						
Mannixlee-Blossberg complex, o to 2 percent slopes, rarely flooded						
	45	Mannixlee	Series	0	2	4
	40	Blossberg	Series	0	2	4
915:						
Welded tuff						
	100	Rock outcrop, welded tuff	Miscellaneous area	---	---	---

Component Legend

Granite County Area, Montana

Map unit symbol and name	Pct. of map unit	Component name	Component kind	Pct. Slope		
				Low	RV	High
988F:						
Whitecow-Rock outcrop complex, 35 to 60 percent slopes						
	55	Whitecow	Series	35	48	60
	30	Rock outcrop	Miscellaneous area	---	---	---

Physical Soil Properties

Granite County Area, Montana

[Entries under "Erosion Factors--T" apply to the entire profile. Entries under "Wind Erodibility Group" and "Wind Erodibility Index" apply only to the surface layer. Absence of an entry indicates that data were not estimated. This report shows only the major soils in each map unit]

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
10A:														
Mccabe	0-2	---	---	5-15	1.25-1.45	14.00-42.00	0.11-0.13	0.0-2.9	2.0-4.0	.20	.20	3	3	86
	2-9	---	---	10-18	1.25-1.45	14.00-42.00	0.15-0.17	0.0-2.9	1.0-3.0	.17	.17			
	9-36	---	---	5-18	1.40-1.60	42.00-141.00	0.14-0.16	0.0-2.9	0.5-1.0	.28	.28			
	36-60	---	---	0-10	1.45-1.65	141.00	0.02-0.04	0.0-2.9	0.0-0.5	.05	.15			
Canarway	0-4	---	---	5-15	1.20-1.40	14.00-42.00	0.10-0.12	0.0-2.9	2.0-4.0	.10	.20	5	5	56
	4-10	---	---	0-15	1.30-1.50	14.00-42.00	0.09-0.12	0.0-2.9	1.0-3.0	.15	.24			
	10-60	---	---	0-10	1.40-1.60	141.00	0.03-0.04	0.0-2.9	0.5-1.0	.02	.02			
11A:														
Mccabe	0-2	---	---	5-15	1.25-1.45	14.00-42.00	0.11-0.13	0.0-2.9	2.0-4.0	.20	.20	3	3	86
	2-9	---	---	10-18	1.25-1.45	14.00-42.00	0.15-0.17	0.0-2.9	1.0-3.0	.17	.17			
	9-36	---	---	5-18	1.40-1.60	42.00-141.00	0.14-0.16	0.0-2.9	0.5-1.0	.28	.28			
	36-60	---	---	0-10	1.45-1.65	141.00	0.02-0.04	0.0-2.9	0.0-0.5	.05	.15			
Canarway	0-4	---	---	5-15	1.20-1.40	14.00-42.00	0.10-0.12	0.0-2.9	2.0-4.0	.10	.20	5	5	56
	4-10	---	---	0-15	1.30-1.50	14.00-42.00	0.09-0.12	0.0-2.9	1.0-3.0	.15	.24			
	10-60	---	---	0-10	1.40-1.60	141.00	0.03-0.04	0.0-2.9	0.5-1.0	.02	.02			
24B:														
Conn	0-8	---	---	18-27	1.10-1.30	4.00-14.00	0.11-0.17	0.0-2.9	2.0-4.0	.28	.28	5	6	48
	8-14	---	---	18-35	1.15-1.35	4.00-14.00	0.14-0.18	0.0-2.9	1.0-3.0	.28	.28			
	14-23	---	---	18-35	1.35-1.55	4.00-14.00	0.13-0.17	0.0-2.9	0.5-1.0	.32	.32			
	23-60	---	---	18-27	1.40-1.60	4.00-14.00	0.12-0.17	0.0-2.9	0.0-0.5	.37	.37			

Physical Soil Properties

Granite County Area, Montana

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
24C:														
Conn	0-8	---	---	18-27	1.10-1.30	4.00-14.00	0.11-0.17	0.0-2.9	2.0-4.0	.28	.28	5	6	48
	8-14	---	---	18-35	1.15-1.35	4.00-14.00	0.14-0.18	0.0-2.9	1.0-3.0	.28	.28			
	14-23	---	---	18-35	1.35-1.55	4.00-14.00	0.13-0.17	0.0-2.9	0.5-1.0	.32	.32			
	23-60	---	---	18-27	1.40-1.60	4.00-14.00	0.12-0.17	0.0-2.9	0.0-0.5	.37	.37			
25B:														
Straw	0-6	---	---	27-35	1.15-1.35	4.00-14.00	0.16-0.20	0.0-2.9	3.0-5.0	.28	.28	5	6	48
	6-60	---	---	22-35	1.20-1.40	4.00-14.00	0.16-0.19	3.0-5.9	1.0-3.0	.28	.28			
31B:														
Varney	0-7	---	---	27-30	1.15-1.35	4.00-14.00	0.14-0.18	3.0-5.9	2.0-4.0	.20	.20	5	6	48
	7-14	---	---	27-35	1.45-1.65	4.00-14.00	0.12-0.15	3.0-5.9	1.0-2.0	.28	.28			
	14-34	---	---	10-30	1.50-1.70	4.00-14.00	0.11-0.13	0.0-2.9	0.5-1.0	.37	.37			
	34-60	---	---	5-15	1.50-1.75	4.00-14.00	0.09-0.10	0.0-2.9	0.0-0.5	.49	.49			
33B:														
Rothiemay	0-4	---	---	15-27	1.15-1.35	4.00-14.00	0.15-0.19	0.0-2.9	2.0-4.0	.24	.24	5	6	48
	4-20	---	---	18-35	1.30-1.50	4.00-14.00	0.14-0.18	3.0-5.9	0.5-1.0	.32	.32			
	20-60	---	---	18-35	1.30-1.50	1.40-4.00	0.13-0.17	3.0-5.9	0.0-0.5	.37	.37			
33C:														
Rothiemay	0-4	---	---	15-27	1.15-1.35	4.00-14.00	0.15-0.19	0.0-2.9	2.0-4.0	.24	.24	5	6	48
	4-20	---	---	18-35	1.30-1.50	4.00-14.00	0.14-0.18	3.0-5.9	0.5-1.0	.32	.32			
	20-60	---	---	18-35	1.30-1.50	1.40-4.00	0.13-0.17	3.0-5.9	0.0-0.5	.37	.37			
33D:														
Rothiemay	0-4	---	---	15-27	1.15-1.35	4.00-14.00	0.15-0.19	0.0-2.9	2.0-4.0	.24	.24	5	6	48
	4-20	---	---	18-35	1.30-1.50	4.00-14.00	0.14-0.18	3.0-5.9	0.5-1.0	.32	.32			
	20-60	---	---	18-35	1.30-1.50	1.40-4.00	0.13-0.17	3.0-5.9	0.0-0.5	.37	.37			

Physical Soil Properties

Granite County Area, Montana

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
34B:														
Cetrack	0-6	---	---	15-25	1.10-1.30	4.00-14.00	0.16-0.20	0.0-2.9	2.0-4.0	.28	.28	3	6	48
	6-12	---	---	22-32	1.30-1.50	4.00-14.00	0.14-0.18	3.0-5.9	1.0-3.0	.32	.32			
	12-32	---	---	18-25	1.30-1.50	4.00-14.00	0.14-0.18	0.0-2.9	0.5-1.0	.37	.37			
	32-60	---	---	0-10	1.45-1.65	42.00-141.00	0.02-0.03	0.0-2.9	0.0-0.5	.05	.15			
36B:														
Varney	0-7	---	---	18-27	1.10-1.30	4.00-14.00	0.16-0.20	0.0-2.9	2.0-4.0	.24	.24	5	6	48
	7-14	---	---	27-35	1.45-1.65	4.00-14.00	0.12-0.15	3.0-5.9	1.0-2.0	.28	.28			
	14-34	---	---	10-30	1.50-1.70	4.00-14.00	0.11-0.13	0.0-2.9	0.5-1.0	.37	.37			
	34-60	---	---	5-15	1.50-1.75	4.00-14.00	0.09-0.10	0.0-2.9	0.0-0.5	.49	.49			
Conn	0-7	---	---	18-27	1.10-1.30	4.00-14.00	0.11-0.17	0.0-2.9	2.0-4.0	.28	.28	5	6	48
	7-11	---	---	18-35	1.15-1.35	4.00-14.00	0.14-0.18	0.0-2.9	1.0-3.0	.28	.28			
	11-34	---	---	18-35	1.35-1.55	4.00-14.00	0.13-0.17	0.0-2.9	0.5-1.0	.32	.32			
	34-60	---	---	18-27	1.40-1.60	4.00-14.00	0.12-0.17	0.0-2.9	0.0-0.5	.37	.37			
36D:														
Varney	0-7	---	---	18-27	1.10-1.30	4.00-14.00	0.16-0.20	0.0-2.9	2.0-4.0	.24	.24	5	6	48
	7-14	---	---	27-35	1.45-1.65	4.00-14.00	0.12-0.15	3.0-5.9	1.0-2.0	.28	.28			
	14-34	---	---	10-30	1.50-1.70	4.00-14.00	0.11-0.13	0.0-2.9	0.5-1.0	.37	.37			
	34-60	---	---	5-15	1.50-1.75	4.00-14.00	0.09-0.10	0.0-2.9	0.0-0.5	.49	.49			
Conn	0-8	---	---	18-27	1.10-1.30	4.00-14.00	0.11-0.17	0.0-2.9	2.0-4.0	.28	.28	5	6	48
	8-14	---	---	18-35	1.15-1.35	4.00-14.00	0.14-0.18	0.0-2.9	1.0-3.0	.28	.28			
	14-23	---	---	18-35	1.35-1.55	4.00-14.00	0.13-0.17	0.0-2.9	0.5-1.0	.32	.32			
	23-60	---	---	18-27	1.40-1.60	4.00-14.00	0.12-0.17	0.0-2.9	0.0-0.5	.37	.37			

Physical Soil Properties

Granite County Area, Montana

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
39C:														
Winspect	0-6	---	---	20-25	1.15-1.35	4.00-14.00	0.12-0.15	0.0-2.9	2.0-4.0	.10	.24	5	5	56
	6-11	---	---	20-30	1.20-1.45	4.00-14.00	0.11-0.14	0.0-2.9	2.0-3.0	.15	.32			
	11-20	---	---	20-35	1.30-1.55	4.00-14.00	0.09-0.10	0.0-2.9	1.0-2.0	.10	.32			
	20-60	---	---	20-35	1.35-1.60	1.40-4.00	0.09-0.10	0.0-2.9	0.0-1.0	.10	.37			
39D:														
Winspect	0-6	---	---	20-25	1.15-1.35	4.00-14.00	0.12-0.15	0.0-2.9	2.0-4.0	.10	.24	5	5	56
	6-11	---	---	20-30	1.20-1.45	4.00-14.00	0.11-0.14	0.0-2.9	2.0-3.0	.15	.32			
	11-20	---	---	20-35	1.30-1.55	4.00-14.00	0.09-0.10	0.0-2.9	1.0-2.0	.10	.32			
	20-60	---	---	20-35	1.35-1.60	1.40-4.00	0.09-0.10	0.0-2.9	0.0-1.0	.10	.37			
42E:														
Windham	0-7	---	---	18-27	1.20-1.40	4.00-14.00	0.12-0.14	0.0-2.9	2.0-4.0	.10	.28	2	5	56
	7-21	---	---	18-35	1.30-1.50	4.00-14.00	0.09-0.12	0.0-2.9	1.0-2.0	.10	.32			
	21-32	---	---	18-35	1.40-1.60	4.00-14.00	0.03-0.04	0.0-2.9	0.5-1.0	.10	.32			
	32-60	---	---	18-35	1.40-1.60	4.00-14.00	0.03-0.04	0.0-2.9	0.0-0.5	.10	.32			
49C:														
Danvers	0-5	---	---	20-35	1.15-1.35	4.00-14.00	0.14-0.18	3.0-5.9	2.0-4.0	.24	.24	5	6	48
	5-17	---	---	35-50	1.30-1.50	0.42-1.40	0.13-0.16	6.0-8.9	1.0-2.0	.32	.32			
	17-28	---	---	35-45	1.30-1.50	0.42-1.40	0.13-0.16	6.0-8.9	0.5-1.0	.28	.28			
	28-60	---	---	10-35	1.45-1.65	1.40-4.00	0.06-0.07	0.0-2.9	0.0-0.5	.20	.32			
49D:														
Danvers	0-5	---	---	20-35	1.15-1.35	4.00-14.00	0.14-0.18	3.0-5.9	2.0-4.0	.24	.24	5	6	48
	5-17	---	---	35-50	1.30-1.50	0.42-1.40	0.13-0.16	6.0-8.9	1.0-2.0	.32	.32			
	17-28	---	---	35-45	1.30-1.50	0.42-1.40	0.13-0.16	6.0-8.9	0.5-1.0	.28	.28			
	28-60	---	---	10-35	1.45-1.65	1.40-4.00	0.06-0.07	0.0-2.9	0.0-0.5	.20	.32			

Physical Soil Properties

Granite County Area, Montana

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
51D:														
Shawmut	0-4	---	---	15-27	1.20-1.40	4.00-14.00	0.12-0.15	0.0-2.9	2.0-4.0	.10	.24	3	7	38
	4-8	---	---	20-35	1.25-1.45	4.00-14.00	0.11-0.13	3.0-5.9	2.0-3.0	.15	.28			
	8-25	---	---	15-30	1.30-1.50	4.00-14.00	0.07-0.08	0.0-2.9	1.0-2.0	.10	.32			
	25-60	---	---	15-30	1.35-1.55	4.00-14.00	0.05-0.06	0.0-2.9	0.5-1.0	.05	.37			
52B:														
Martinsdale	0-7	---	---	18-27	1.20-1.40	4.00-14.00	0.18-0.20	0.0-2.9	2.0-4.0	.24	.24	5	6	48
	7-27	---	---	25-35	1.30-1.50	1.40-4.00	0.15-0.18	3.0-5.9	1.0-3.0	.28	.28			
	27-60	---	---	20-27	1.40-1.60	1.40-4.00	0.13-0.16	3.0-5.9	0.5-1.0	.37	.37			
52C:														
Martinsdale	0-7	---	---	18-27	1.20-1.40	4.00-14.00	0.18-0.20	0.0-2.9	2.0-4.0	.24	.24	5	6	48
	7-27	---	---	25-35	1.30-1.50	1.40-4.00	0.15-0.18	3.0-5.9	1.0-3.0	.28	.28			
	27-60	---	---	20-27	1.40-1.60	1.40-4.00	0.13-0.16	3.0-5.9	0.5-1.0	.37	.37			
52D:														
Martinsdale	0-7	---	---	18-27	1.20-1.40	4.00-14.00	0.18-0.20	0.0-2.9	2.0-4.0	.24	.24	5	6	48
	7-27	---	---	25-35	1.30-1.50	1.40-4.00	0.15-0.18	3.0-5.9	1.0-3.0	.28	.28			
	27-60	---	---	20-27	1.40-1.60	1.40-4.00	0.13-0.16	3.0-5.9	0.5-1.0	.37	.37			
58C:														
Coben	0-5	---	---	27-35	1.15-1.35	1.40-4.00	0.16-0.18	3.0-5.9	4.0-8.0	.28	.28	5	6	48
	5-12	---	---	35-60	1.30-1.50	0.01-0.42	0.12-0.14	6.0-8.9	2.0-4.0	.24	.24			
	12-40	---	---	35-50	1.30-1.50	0.42-1.40	0.12-0.14	6.0-8.9	1.0-2.0	.24	.24			
	40-46	---	---	30-45	1.30-1.50	0.42-1.40	0.12-0.14	3.0-5.9	0.5-1.0	.28	.28			
	46-60	---	---	20-35	1.30-1.50	1.40-4.00	0.13-0.16	3.0-5.9	0.0-0.5	.32	.32			

Physical Soil Properties

Granite County Area, Montana

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
60C:														
Quigley	0-7	---	---	20-27	1.10-1.25	4.00-14.00	0.16-0.20	0.0-2.9	4.0-8.0	.20	.20	5	6	48
	7-21	---	---	18-33	1.20-1.35	4.00-14.00	0.15-0.19	3.0-5.9	2.0-4.0	.28	.28			
	21-34	---	---	15-30	1.20-1.35	4.00-14.00	0.13-0.17	3.0-5.9	1.0-2.0	.43	.43			
	34-60	---	---	15-30	1.30-1.50	4.00-14.00	0.13-0.17	0.0-2.9	0.5-1.0	.43	.43			
60D:														
Quigley	0-7	---	---	20-27	1.10-1.25	4.00-14.00	0.16-0.20	0.0-2.9	4.0-8.0	.20	.20	5	6	48
	7-21	---	---	18-33	1.20-1.35	4.00-14.00	0.15-0.19	3.0-5.9	2.0-4.0	.28	.28			
	21-34	---	---	15-30	1.20-1.35	4.00-14.00	0.13-0.17	3.0-5.9	1.0-2.0	.43	.43			
	34-60	---	---	15-30	1.30-1.50	4.00-14.00	0.13-0.17	0.0-2.9	0.5-1.0	.43	.43			
65D:														
Tanna	0-5	---	---	20-27	1.10-1.30	1.40-4.00	0.16-0.20	0.0-2.9	2.0-4.0	.28	.28	3	6	48
	5-21	---	---	35-50	1.30-1.50	0.42-1.40	0.14-0.17	3.0-5.9	1.0-2.0	.32	.32			
	21-31	---	---	15-40	1.30-1.50	0.42-1.40	0.10-0.12	3.0-5.9	0.5-1.0	.49	.49			
	31-60	---	---	---	---	---	---	---	---	---	---			
69C:														
Boxwell	0-7	---	---	15-27	1.20-1.40	4.00-14.00	0.16-0.20	0.0-2.9	1.0-3.0	.32	.32	3	6	48
	7-12	---	---	18-35	1.30-1.50	4.00-14.00	0.16-0.18	3.0-5.9	0.5-1.0	.37	.37			
	12-25	---	---	15-27	1.30-1.50	4.00-14.00	0.16-0.20	0.0-2.9	0.0-0.5	.43	.43			
	25-60	---	---	---	---	---	---	---	---	---	---			
69D:														
Boxwell	0-7	---	---	15-27	1.20-1.40	4.00-14.00	0.16-0.20	0.0-2.9	1.0-3.0	.32	.32	3	6	48
	7-12	---	---	18-35	1.30-1.50	4.00-14.00	0.16-0.18	3.0-5.9	0.5-1.0	.37	.37			
	12-25	---	---	15-27	1.30-1.50	4.00-14.00	0.16-0.20	0.0-2.9	0.0-0.5	.43	.43			
	25-60	---	---	---	---	---	---	---	---	---	---			

Physical Soil Properties

Granite County Area, Montana

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
88E:														
Whitecow	0-4	---	---	18-27	1.25-1.45	4.00-14.00	0.12-0.16	0.0-2.9	0.5-2.0	.15	.28	2	7	38
	4-34	---	---	18-27	1.30-1.50	4.00-14.00	0.08-0.10	0.0-2.9	0.5-1.0	.10	.37			
	34-60	---	---	18-27	1.30-1.50	4.00-14.00	0.04-0.06	0.0-2.9	0.0-0.5	.05	.37			
88F:														
Whitecow	0-4	---	---	18-27	1.25-1.45	4.00-14.00	0.12-0.16	0.0-2.9	0.5-2.0	.15	.28	2	7	38
	4-34	---	---	18-27	1.30-1.50	4.00-14.00	0.08-0.10	0.0-2.9	0.5-1.0	.10	.37			
	34-60	---	---	18-27	1.30-1.50	4.00-14.00	0.04-0.06	0.0-2.9	0.0-0.5	.05	.37			
111A:														
Canarway	0-4	---	---	5-15	1.20-1.40	14.00-42.00	0.10-0.12	0.0-2.9	2.0-4.0	.10	.20	5	5	56
	4-10	---	---	0-15	1.30-1.50	14.00-42.00	0.09-0.12	0.0-2.9	1.0-3.0	.15	.24			
	10-60	---	---	0-10	1.40-1.60	141.00	0.03-0.04	0.0-2.9	0.5-1.0	.02	.02			
Mccabe	0-2	---	---	5-15	1.25-1.45	14.00-42.00	0.11-0.13	0.0-2.9	2.0-4.0	.20	.20	3	3	86
	2-9	---	---	10-18	1.25-1.45	14.00-42.00	0.15-0.17	0.0-2.9	1.0-3.0	.17	.17			
	9-36	---	---	5-18	1.40-1.60	42.00-141.00	0.14-0.16	0.0-2.9	0.5-1.0	.28	.28			
	36-60	---	---	0-10	1.45-1.65	141.00	0.02-0.04	0.0-2.9	0.0-0.5	.05	.15			
149D:														
Danvers	0-8	---	---	20-27	1.15-1.35	4.00-14.00	0.11-0.13	0.0-2.9	2.0-4.0	.15	.28	5	7	38
	8-16	---	---	35-50	1.30-1.50	0.42-1.40	0.14-0.17	6.0-8.9	1.0-3.0	.28	.28			
	16-38	---	---	30-45	1.30-1.50	0.42-1.40	0.14-0.17	6.0-8.9	0.5-1.0	.28	.28			
	38-60	---	---	10-35	1.30-1.55	1.40-4.00	0.08-0.09	0.0-2.9	0.0-0.5	.17	.32			
151E:														
Shawmut	0-4	---	---	15-27	1.15-1.35	4.00-14.00	0.12-0.15	0.0-2.9	2.0-4.0	.10	.24	3	7	38
	4-8	---	---	20-35	1.25-1.45	4.00-14.00	0.11-0.13	3.0-5.9	1.0-3.0	.15	.28			
	8-25	---	---	15-30	1.30-1.50	4.00-14.00	0.07-0.08	0.0-2.9	1.0-2.0	.10	.32			
	25-60	---	---	15-30	1.35-1.55	4.00-14.00	0.05-0.06	0.0-2.9	0.5-1.0	.10	.37			

Physical Soil Properties

Granite County Area, Montana

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
169F:														
Doney	0-11	---	---	18-27	1.20-1.40	4.00-14.00	0.12-0.14	0.0-2.9	0.5-2.0	.17	.32	3	7	38
	11-27	---	---	18-30	1.30-1.50	4.00-14.00	0.14-0.17	3.0-5.9	0.5-1.0	.24	.43			
	27-60	---	---	---	---	---	---	---	---	---	---			
Dolus	0-6	---	---	15-25	1.15-1.35	4.00-14.00	0.12-0.15	3.0-5.9	1.0-3.0	.15	.28	3	7	38
	6-14	---	---	15-27	1.30-1.50	4.00-14.00	0.07-0.09	3.0-5.9	0.0-0.5	.15	.37			
	14-28	---	---	15-27	1.30-1.50	4.00-14.00	0.07-0.09	3.0-5.9	0.0-0.5	.17	.43			
	28-38	---	---	---	---	---	---	---	---	---	---			
351E:														
Roy	0-7	---	---	15-27	1.15-1.35	4.00-14.00	0.11-0.15	0.0-2.9	2.0-4.0	.15	.24	5	7	38
	7-20	---	---	35-50	1.20-1.40	1.40-4.00	0.07-0.08	3.0-5.9	0.5-2.0	.05	.24			
	20-60	---	---	27-40	1.40-1.60	1.40-4.00	0.06-0.07	0.0-2.9	0.0-0.5	.10	.32			
Danvers	0-5	---	---	27-35	1.15-1.35	4.00-14.00	0.11-0.14	3.0-5.9	2.0-4.0	.10	.24	5	7	38
	5-9	---	---	35-50	1.30-1.50	0.42-1.40	0.14-0.17	6.0-8.9	1.0-3.0	.28	.28			
	9-17	---	---	30-45	1.30-1.50	0.42-1.40	0.14-0.17	6.0-8.9	0.5-1.0	.28	.28			
	17-60	---	---	10-35	1.30-1.55	1.40-4.00	0.08-0.09	0.0-2.9	0.0-0.5	.17	.32			
Shawmut	0-4	---	---	15-27	1.15-1.35	4.00-14.00	0.12-0.15	0.0-2.9	2.0-4.0	.10	.24	3	7	38
	4-16	---	---	20-35	1.25-1.45	4.00-14.00	0.11-0.13	3.0-5.9	1.0-3.0	.15	.28			
	16-25	---	---	15-30	1.30-1.50	4.00-14.00	0.07-0.08	0.0-2.9	1.0-2.0	.10	.32			
	25-60	---	---	15-30	1.35-1.55	4.00-14.00	0.05-0.06	0.0-2.9	0.5-1.0	.10	.37			
442D:														
Braziel	0-8	---	---	18-27	1.15-1.35	4.00-14.00	0.11-0.14	0.0-2.9	4.0-6.0	.15	.28	4	7	38
	8-17	---	---	25-35	1.20-1.40	1.40-4.00	0.07-0.10	3.0-5.9	2.0-4.0	.10	.32			
	17-43	---	---	25-35	1.25-1.45	1.40-4.00	0.06-0.10	3.0-5.9	1.0-3.0	.10	.32			
	43-60	---	---	15-30	1.30-1.50	1.40-4.00	0.06-0.10	0.0-2.9	0.5-1.0	.10	.37			

Physical Soil Properties

Granite County Area, Montana

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
442D:														
Tolbert	0-5	---	---	15-27	1.15-1.35	4.00-14.00	0.12-0.16	0.0-2.9	2.0-4.0	.17	.32	1	7	38
	5-12	---	---	23-35	1.20-1.40	4.00-14.00	0.05-0.09	3.0-5.9	1.0-2.0	.15	.37			
	12-60	---	---	---	---	---	---	---	---	---	---			
442E:														
Braziel	0-8	---	---	18-27	1.15-1.35	4.00-14.00	0.11-0.14	0.0-2.9	4.0-6.0	.15	.28	4	7	38
	8-17	---	---	25-35	1.20-1.40	1.40-4.00	0.07-0.10	3.0-5.9	2.0-4.0	.10	.28			
	17-43	---	---	25-35	1.25-1.45	1.40-4.00	0.06-0.10	3.0-5.9	1.0-3.0	.10	.32			
	43-60	---	---	15-30	1.30-1.50	1.40-4.00	0.06-0.10	0.0-2.9	1.0-2.0	.10	.37			
Tolbert, very stony	0-5	---	---	15-25	1.15-1.25	4.00-14.00	0.14-0.18	0.0-2.9	2.0-4.0	.10	.32	1	8	0
	5-12	---	---	23-27	1.25-1.35	4.00-14.00	0.12-0.14	0.0-2.9	1.0-2.0	.10	.37			
	12-60	---	---	---	---	---	---	---	---	---	---			
444B:														
Gregson	0-7	---	---	18-27	1.20-1.30	4.00-14.00	0.19-0.22	0.0-2.9	3.0-7.0	.32	.32	3	6	48
	7-26	---	---	18-35	1.40-1.50	4.00-14.00	0.18-0.21	0.0-2.9	2.0-4.0	.28	.28			
	26-60	---	---	0-5	1.50-1.60	42.00-141.00	0.03-0.05	0.0-2.9	0.5-1.0	.05	.15			
445B:														
Saypo	0-2	---	---	0	---	42.00-705.00	---	---	28-70	---	---	4	4L	86
	2-14	---	---	22-27	1.15-1.35	4.00-14.00	0.15-0.19	0.0-2.9	3.0-5.0	.28	.28			
	14-20	---	---	22-35	1.30-1.50	4.00-14.00	0.13-0.17	3.0-5.9	1.0-2.0	.32	.32			
	20-43	---	---	22-35	1.30-1.50	1.40-4.00	0.11-0.14	3.0-5.9	0.5-1.0	.37	.37			
	43-60	---	---	18-27	1.30-1.50	1.40-4.00	0.10-0.13	3.0-5.9	0.5-1.0	.10	.24			
447B:														
Kleinschmidt	0-8	---	---	15-25	1.10-1.30	4.00-14.00	0.15-0.18	0.0-2.9	3.0-5.0	.15	.24	3	7	38
	8-19	---	---	18-35	1.20-1.40	4.00-14.00	0.12-0.15	0.0-2.9	2.0-3.0	.10	.28			
	19-26	---	---	18-27	1.20-1.40	4.00-14.00	0.08-0.11	0.0-2.9	1.0-2.0	.10	.32			
	26-60	---	---	5-10	1.30-1.40	42.00-141.00	0.03-0.05	0.0-2.9	0.5-1.0	.02	.17			

Physical Soil Properties

Granite County Area, Montana

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
488F:														
Whitecow	0-4	---	---	18-27	1.25-1.45	4.00-14.00	0.12-0.16	0.0-2.9	0.5-2.0	.15	.28	2	7	38
	4-34	---	---	18-27	1.30-1.50	4.00-14.00	0.08-0.10	0.0-2.9	0.5-1.0	.10	.37			
	34-60	---	---	18-27	1.30-1.50	4.00-14.00	0.04-0.06	0.0-2.9	0.0-0.5	.05	.37			
814B:														
Bandy	0-7	---	---	15-25	1.15-1.25	4.00-14.00	0.15-0.18	0.0-2.9	4.0-6.0	.20	.20	2	6	48
	7-10	---	---	15-30	1.20-1.40	1.40-42.00	0.10-0.13	0.0-2.9	2.0-4.0	.17	.17			
	10-14	---	---	5-18	1.25-1.55	4.00-42.00	0.09-0.11	0.0-2.9	1.0-3.0	.24	.24			
	14-60	---	---	2-10	1.45-1.65	42.00-141.00	0.01-0.03	0.0-2.9	0.5-1.0	.02	.02			
824E:														
Conn	0-8	---	---	18-27	1.10-1.30	4.00-14.00	0.11-0.14	0.0-2.9	2.0-4.0	.15	.28	5	7	38
	8-13	---	---	18-35	1.15-1.35	4.00-14.00	0.14-0.18	0.0-2.9	1.0-3.0	.28	.28			
	13-18	---	---	18-35	1.35-1.55	4.00-14.00	0.13-0.17	0.0-2.9	0.5-1.0	.32	.32			
	18-60	---	---	18-27	1.40-1.60	4.00-14.00	0.12-0.16	0.0-2.9	0.0-0.5	.24	.37			
Sixbeacon	0-5	---	---	20-27	1.15-1.35	4.00-14.00	0.12-0.15	0.0-2.9	2.0-4.0	.15	.24	5	7	38
	5-9	---	---	20-27	1.20-1.40	4.00-14.00	0.14-0.18	0.0-2.9	1.0-2.0	.15	.28			
	9-23	---	---	10-20	1.30-1.50	4.00-14.00	0.10-0.13	0.0-2.9	0.5-1.0	.15	.43			
	23-60	---	---	0-5	1.50-1.70	42.00-141.00	0.02-0.03	0.0-2.9	0.0-0.5	.10	.32			
839E:														
Windham	0-7	---	---	18-27	1.20-1.40	4.00-14.00	0.12-0.14	0.0-2.9	2.0-4.0	.10	.28	2	5	56
	7-21	---	---	18-35	1.30-1.50	4.00-14.00	0.09-0.12	0.0-2.9	1.0-2.0	.10	.32			
	21-32	---	---	18-35	1.40-1.60	4.00-14.00	0.03-0.04	0.0-2.9	0.5-1.0	.10	.32			
	32-60	---	---	18-35	1.40-1.60	4.00-14.00	0.03-0.04	0.0-2.9	0.0-0.5	.10	.32			
Lap	0-8	---	---	15-25	1.20-1.40	4.00-14.00	0.16-0.18	0.0-2.9	2.0-4.0	.32	.32	1	4L	86
	8-16	---	---	20-27	1.30-1.50	4.00-14.00	0.07-0.08	3.0-5.9	1.0-2.0	.15	.43			
	16-26	---	---	---	---	---	---	---	---	---	---			

Physical Soil Properties

Granite County Area, Montana

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
839E:														
Rock outcrop	---	---	---	---	---	---	---	---	---	---	---	---	---	---
839F:														
Windham	0-7	---	---	18-27	1.20-1.40	4.00-14.00	0.12-0.14	0.0-2.9	2.0-4.0	.10	.28	2	5	56
	7-21	---	---	18-35	1.30-1.50	4.00-14.00	0.09-0.12	0.0-2.9	1.0-2.0	.10	.32			
	21-32	---	---	18-35	1.40-1.60	4.00-14.00	0.03-0.04	0.0-2.9	0.5-1.0	.10	.32			
	32-60	---	---	18-35	1.40-1.60	4.00-14.00	0.03-0.04	0.0-2.9	0.0-0.5	.10	.32			
Lap	0-8	---	---	15-25	1.20-1.40	4.00-14.00	0.16-0.18	0.0-2.9	2.0-4.0	.32	.32	1	4L	86
	8-16	---	---	20-27	1.30-1.50	4.00-14.00	0.07-0.08	3.0-5.9	1.0-2.0	.15	.43			
	16-26	---	---	---	---	---	---	---	---	---	---			
Rock outcrop	---	---	---	---	---	---	---	---	---	---	---	---	---	---
855A:														
Mannixlee	0-2	---	---	0	---	42.00-705.00	---	---	28-70	---	---	4	6	48
	2-9	---	---	18-35	1.10-1.30	4.00-14.00	0.16-0.20	0.0-2.9	4.0-6.0	.24	.24			
	9-25	---	---	18-35	1.15-1.35	1.40-4.00	0.14-0.18	3.0-5.9	2.0-4.0	.28	.28			
	25-45	---	---	18-35	1.20-1.40	1.40-4.00	0.14-0.18	3.0-5.9	1.0-2.0	.43	.43			
	45-52	---	---	5-25	1.35-1.55	4.00-14.00	0.08-0.11	0.0-2.9	0.5-1.0	.28	.28			
	52-60	---	---	5-20	1.45-1.65	4.00-42.00	0.04-0.06	0.0-2.9	0.0-0.5	.02	.05			
Blossberg	0-1	---	---	0	---	42.00-705.00	---	---	28-70	---	---	3	6	48
	1-15	---	---	18-27	1.17-1.27	4.00-14.00	0.14-0.18	0.0-2.9	4.0-6.0	.20	.20			
	15-24	---	---	18-35	1.11-1.31	1.40-14.00	0.15-0.18	3.0-5.9	2.0-4.0	.28	.28			
	24-29	---	---	10-20	1.26-1.56	4.00-42.00	0.09-0.11	0.0-2.9	1.0-2.0	.17	.37			
	29-60	---	---	0-10	1.50-1.70	42.00-141.00	0.02-0.03	0.0-2.9	0.0-0.5	.02	.05			
915:														
Rock outcrop, welded tuff	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Physical Soil Properties

Granite County Area, Montana

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
988F:														
Whitecow	0-4	---	---	18-27	1.25-1.45	4.00-14.00	0.12-0.16	0.0-2.9	0.5-2.0	.15	.28	2	7	38
	4-34	---	---	18-27	1.30-1.50	4.00-14.00	0.08-0.10	0.0-2.9	0.5-1.0	.10	.37			
	34-60	---	---	18-27	1.30-1.50	4.00-14.00	0.04-0.06	0.0-2.9	0.0-0.5	.05	.37			
Rock outcrop	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Engineering Properties

Granite County Area, Montana

[Absence of an entry indicates that the data were not estimated. This report shows only the major soils in each map unit]

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
10A:												
Mccabe	0-2	Sandy loam	SM	A-2, A-4	0	0	100	100	60-70	30-40	20-25	NP-5
	2-9	Fine sandy loam, loam, sandy loam	CL-ML, SC-SM	A-4	0	0	100	100	60-90	35-65	25-30	5-10
	9-36	Fine sandy loam, loam, sandy loam, very fine sandy loam	CL-ML, SC-SM, SM	A-2-4, A-4	0	0	100	100	60-90	30-65	20-30	NP-10
	36-60	Very cobbly loamy sand, very gravelly loamy sand, very gravelly sand	SM, SP-SM	A-1	0	15-40	50-60	40-55	20-40	5-15	20-25	NP-5
Canarway	0-4	Gravelly sandy loam	SM	A-2	0	0-10	60-80	55-75	35-55	15-30	20-25	NP-5
	4-10	Gravelly coarse sandy loam, gravelly sandy loam	SM	A-2	0	0-10	60-80	55-75	25-55	10-30	20-25	NP-5
	10-60	Very cobbly loamy sand, very gravelly sand	GM, SM, SP-SM	A-1	0	15-40	50-70	40-55	20-40	5-15	20-25	NP-5
11A:												
Mccabe	0-2	Sandy loam	SM	A-2, A-4	0	0	100	100	60-70	30-40	20-25	NP-5
	2-9	Fine sandy loam, loam, sandy loam	CL-ML, SC-SM	A-4	0	0	100	100	60-90	35-65	25-30	5-10
	9-36	Fine sandy loam, loam, sandy loam, very fine sandy loam	CL-ML, SC-SM, SM	A-2-4, A-4	0	0	100	100	60-90	30-65	20-30	NP-10
	36-60	Very cobbly loamy sand, very gravelly loamy sand, very gravelly sand	SM, SP-SM	A-1	0	15-40	50-60	40-55	20-40	5-15	20-25	NP-5

Engineering Properties

Granite County Area, Montana

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
11A:												
Canarway	0-4	Gravelly sandy loam	SM	A-2	0	0-10	60-80	55-75	35-55	15-30	20-25	NP-5
	4-10	Gravelly coarse sandy loam, gravelly sandy loam	SM	A-2	0	0-10	60-80	55-75	25-55	10-30	20-25	NP-5
	10-60	Very cobbly loamy sand, very gravelly sand	GM, SM, SP-SM	A-1	0	15-40	50-70	40-55	20-40	5-15	20-25	NP-5
24B:												
Conn	0-8	Loam	CL-ML	A-4	0	0	100	80-100	70-95	50-75	25-30	5-10
	8-14	Clay loam, loam	CL, CL-ML	A-4, A-6	0	0	80-100	75-100	65-100	50-80	25-35	5-15
	14-23	Clay loam, gravelly sandy loam, loam	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0-10	70-100	65-100	50-100	35-80	25-35	5-15
	23-60	Gravelly loam, loam, sandy loam	CL-ML, SC-SM	A-4	0	0-10	75-100	70-100	55-95	35-75	25-30	5-10
24C:												
Conn	0-8	Loam	CL-ML	A-4	0	0	100	80-100	70-95	50-75	25-30	5-10
	8-14	Clay loam, loam	CL, CL-ML	A-4, A-6	0	0	80-100	75-100	65-100	50-80	25-35	5-15
	14-23	Clay loam, gravelly sandy loam, loam	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0-10	70-100	65-100	50-100	35-80	25-35	5-15
	23-60	Gravelly loam, loam, sandy loam	CL-ML, SC-SM	A-4	0	0-10	75-100	70-100	55-95	35-75	25-30	5-10
25B:												
Straw	0-6	Silty clay loam	CL	A-6	0	0	100	100	90-100	70-85	30-35	10-15
	6-60	Clay loam, loam, silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	80-100	60-85	25-35	5-15

Engineering Properties

Granite County Area, Montana

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
31B:												
Varney	0-7	Clay loam	CL, CL-ML	A-4, A-6	0	0-5	90-100	80-100	60-95	55-85	25-35	5-15
	7-14	Clay loam, gravelly clay loam, gravelly sandy clay loam	CL, GC, SC	A-2, A-6	0	0-10	65-100	55-95	45-85	30-70	30-40	10-20
	14-34	Gravelly sandy clay loam, gravelly sandy loam, loam	CL-ML, GC-GM, SC-SM	A-2, A-4, A-6	0	0-10	65-100	55-95	40-80	30-65	20-35	5-15
	34-60	Stratified gravelly loamy sand to loam	SM	A-1, A-2, A-4	0	0-10	70-100	55-95	35-75	20-50	15-25	NP-5
33B:												
Rothiemay	0-4	Loam	CL-ML	A-4	0	0-5	90-100	80-100	75-95	50-75	25-30	5-10
	4-20	Clay loam, loam	CL, CL-ML	A-4, A-6	0	0-5	90-100	80-100	75-95	55-80	25-35	5-15
	20-60	Clay loam, gravelly clay loam, loam	CL, CL-ML, GC, GC-GM	A-4, A-6	0	0-5	65-95	60-95	55-95	40-80	25-35	5-15
33C:												
Rothiemay	0-4	Loam	CL-ML	A-4	0	0-5	90-100	80-100	75-95	50-75	25-30	5-10
	4-20	Clay loam, loam	CL, CL-ML	A-4, A-6	0	0-5	90-100	80-100	75-95	55-80	25-35	5-15
	20-60	Clay loam, gravelly clay loam, loam	CL, CL-ML, GC, GC-GM	A-4, A-6	0	0-5	65-95	60-95	55-95	40-80	25-35	5-15

Engineering Properties

Granite County Area, Montana

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
33D:												
Rothiemay	0-4	Loam	CL-ML	A-4	0	0-5	90-100	80-100	75-95	50-75	25-30	5-10
	4-20	Clay loam, loam	CL, CL-ML	A-4, A-6	0	0-5	90-100	80-100	75-95	55-80	25-35	5-15
	20-60	Clay loam, gravelly clay loam, loam	CL, CL-ML, GC, GC-GM	A-4, A-6	0	0-5	65-95	60-95	55-95	40-80	25-35	5-15
34B:												
Cetrack	0-6	Loam	CL-ML	A-4	0	0-10	90-100	85-100	70-95	50-75	25-30	5-10
	6-12	Clay loam, gravelly clay loam, loam	CL	A-6	0	0-10	80-100	75-95	65-95	50-70	30-35	10-15
	12-32	Gravelly loam, loam	SC-SM	A-4	0	0-10	75-90	70-85	55-75	40-50	25-30	5-10
	32-60	Very gravelly loamy sand, very gravelly sand, extremely gravelly loamy sand	GM, GP, GP-GM, SP-SM	A-1	0	10-30	35-60	30-50	10-35	0-15	0-14	NP
36B:												
Varney	0-7	Loam	CL-ML	A-4	0	0-5	90-100	80-100	70-90	50-65	25-30	5-10
	7-14	Clay loam, gravelly clay loam, gravelly sandy clay loam	CL, GC, SC	A-2, A-6	0	0-10	65-100	55-95	45-85	30-70	30-40	10-20
	14-34	Gravelly sandy clay loam, gravelly sandy loam, loam	CL-ML, GC-GM, SC-SM	A-2, A-4, A-6	0	0-10	65-100	55-95	40-80	30-65	20-35	5-15
	34-60	Stratified gravelly loamy sand to loam	SM	A-1, A-2, A-4	0	0-10	70-100	55-95	35-75	20-50	15-25	NP-5

Engineering Properties

Granite County Area, Montana

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
36B:												
Conn	0-7	Loam	CL-ML	A-4	0	0	100	80-100	70-95	50-75	25-30	5-10
	7-11	Clay loam, loam	CL, CL-ML	A-4, A-6	0	0	80-100	75-100	65-100	50-80	25-35	5-15
	11-34	Clay loam, gravelly sandy loam, loam	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0-10	70-100	65-100	50-100	35-80	25-35	5-15
	34-60	Gravelly loam, loam, sandy loam	CL-ML, SC-SM	A-4	0	0-10	75-100	70-100	55-95	35-75	25-30	5-10
36D:												
Varney	0-7	Loam	CL-ML	A-4	0	0-5	90-100	80-100	70-90	50-65	25-30	5-10
	7-14	Clay loam, gravelly clay loam, gravelly sandy clay loam	CL, GC, SC	A-2, A-6	0	0-10	65-100	55-95	45-85	30-70	30-40	10-20
	14-34	Gravelly sandy clay loam, gravelly sandy loam, loam	CL-ML, GC-GM, SC-SM	A-2, A-4, A-6	0	0-10	65-100	55-95	40-80	30-65	20-35	5-15
	34-60	Stratified gravelly loamy sand to loam	SM	A-1, A-2, A-4	0	0-10	70-100	55-95	35-75	20-50	15-25	NP-5
Conn	0-8	Loam	CL-ML	A-4	0	0	100	80-100	70-95	50-75	25-30	5-10
	8-14	Clay loam, loam	CL, CL-ML	A-4, A-6	0	0	80-100	75-100	65-100	50-80	25-35	5-15
	14-23	Clay loam, gravelly sandy loam, loam	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0-10	70-100	65-100	50-100	35-80	25-35	5-15
	23-60	Gravelly loam, loam, sandy loam	CL-ML, SC-SM	A-4	0	0-10	75-100	70-100	55-95	35-75	25-30	5-10

Engineering Properties

Granite County Area, Montana

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
39C:												
Winspect	0-6	Gravelly loam	CL-ML, GC-GM, SC-SM	A-4	0	5-15	65-85	60-80	50-75	35-60	25-30	5-10
	6-11	Cobbly loam, very cobbly loam, gravelly loam, stony clay loam	CL, CL-ML, GC, GC-GM	A-4, A-6	5-10	15-20	65-90	60-80	55-75	45-65	25-35	5-15
	11-20	Cobbly clay loam, very cobbly loam, very cobbly sandy clay loam, very gravelly loam	GC, GC-GM, SC	A-2, A-4, A-6	0	30-45	60-75	50-65	35-55	25-45	25-35	5-15
	20-60	Very cobbly clay loam, very cobbly loam, very gravelly loam	GC, GC-GM, SC, SC-SM	A-2, A-4, A-6	0-5	30-40	55-70	45-60	35-50	25-40	25-35	5-15
39D:												
Winspect	0-6	Gravelly loam	CL-ML, GC-GM, SC-SM	A-4	0	5-15	65-85	60-80	50-75	35-60	25-30	5-10
	6-11	Cobbly loam, very cobbly loam, gravelly loam, stony clay loam	CL, CL-ML, GC, GC-GM	A-4, A-6	5-10	15-20	65-90	60-80	55-75	45-65	25-35	5-15
	11-20	Cobbly clay loam, very cobbly loam, very cobbly sandy clay loam, very gravelly loam	GC, GC-GM, SC	A-2, A-4, A-6	0	30-45	60-75	50-65	35-55	25-45	25-35	5-15
	20-60	Very cobbly clay loam, very cobbly loam, very gravelly loam	GC, GC-GM, SC, SC-SM	A-2, A-4, A-6	0-5	30-40	55-70	45-60	35-50	25-40	25-35	5-15

Engineering Properties

Granite County Area, Montana

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
42E:												
Windham	0-7	Gravelly loam	GC-GM, GM, ML, SM	A-1, A-2, A-4	0	0-20	30-80	25-75	20-60	15-55	20-30	NP-10
	7-21	Clay loam, gravelly clay loam, very gravelly loam	CL-ML, GC, GC-GM, SC-SM	A-2, A-4, A-6	0	0-25	40-90	35-85	30-65	25-60	20-35	5-15
	21-32	Very gravelly loam, extremely gravelly clay loam, extremely gravelly loam, extremely gravelly sandy loam	GC-GM, GM	A-1, A-2	0	10-30	25-50	15-30	10-25	10-20	20-30	NP-10
	32-60	Very gravelly loam, extremely gravelly clay loam, extremely gravelly loam, extremely gravelly sandy loam	GC-GM, GM, GP-GM	A-1, A-2	0	10-30	25-50	15-30	10-25	5-20	15-30	NP-10
49C:												
Danvers	0-5	Clay loam	CL	A-6	0	0-5	95-100	90-100	75-95	60-80	30-40	10-15
	5-17	Clay loam, silty clay, silty clay loam	CH, CL	A-6, A-7	0	0-5	95-100	90-100	75-100	65-90	35-55	15-30
	17-28	Clay, clay loam	CL	A-6, A-7	0	0-5	95-100	90-100	75-100	60-85	35-50	15-25
	28-60	Gravelly clay loam, very gravelly sandy loam, extremely gravelly loam	GC, GC-GM, SC, SC-SM	A-2, A-4, A-6	0	0-15	35-80	25-75	20-65	15-50	25-40	5-15

Engineering Properties

Granite County Area, Montana

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
49D:												
Danvers	0-5	Clay loam	CL	A-6	0	0-5	95-100	90-100	75-95	60-80	30-40	10-15
	5-17	Clay loam, silty clay, silty clay loam	CH, CL	A-6, A-7	0	0-5	95-100	90-100	75-100	65-90	35-55	15-30
	17-28	Clay, clay loam	CL	A-6, A-7	0	0-5	95-100	90-100	75-100	60-85	35-50	15-25
	28-60	Gravelly clay loam, very gravelly sandy loam, extremely gravelly loam	GC, GC-GM, SC, SC-SM	A-2, A-4, A-6	0	0-15	35-80	25-75	20-65	15-50	25-40	5-15
51D:												
Shawmut	0-4	Gravelly loam	GC-GM, SC-SM	A-2, A-4	0	0-15	65-90	60-80	45-70	30-50	25-30	5-10
	4-8	Gravelly clay loam, gravelly sandy clay loam	GC, GC-GM, SC, SC-SM	A-2, A-4, A-6	0	0-15	65-85	60-80	55-75	30-50	25-35	5-15
	8-25	Very gravelly clay loam, very gravelly loam, very gravelly sandy loam	GC-GM	A-2, A-4	0	10-25	40-60	35-55	30-50	20-40	25-30	5-10
	25-60	Very gravelly clay loam, extremely gravelly loam, extremely gravelly sandy loam	GC, GP-GC	A-1, A-2	0	10-25	30-35	25-30	20-25	10-20	20-30	5-10
52B:												
Martinsdale	0-7	Loam	CL-ML	A-4	0	0-5	85-100	80-100	70-85	50-75	25-30	5-10
	7-27	Clay loam, loam, sandy clay loam	CL, SC	A-6	0	0-5	85-100	80-100	65-90	40-70	30-35	10-15
	27-60	Loam, sandy clay loam	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0-5	85-100	80-100	60-90	35-70	25-35	5-15

Engineering Properties

Granite County Area, Montana

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
52C:												
Martinsdale	0-7	Loam	CL-ML	A-4	0	0-5	85-100	80-100	70-85	50-75	25-30	5-10
	7-27	Clay loam, loam, sandy clay loam	CL, SC	A-6	0	0-5	85-100	80-100	65-90	40-70	30-35	10-15
	27-60	Loam, sandy clay loam	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0-5	85-100	80-100	60-90	35-70	25-35	5-15
52D:												
Martinsdale	0-7	Loam	CL-ML	A-4	0	0-5	85-100	80-100	70-85	50-75	25-30	5-10
	7-27	Clay loam, loam, sandy clay loam	CL, SC	A-6	0	0-5	85-100	80-100	65-90	40-70	30-35	10-15
	27-60	Loam, sandy clay loam	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0-5	85-100	80-100	60-90	35-70	25-35	5-15
58C:												
Coben	0-5	Clay loam	CL	A-6	0	0	100	95-100	85-100	65-80	30-35	10-15
	5-12	Clay, silty clay, silty clay loam	CH	A-7	0	0	100	95-100	90-100	75-95	50-60	30-40
	12-40	Clay, clay loam, silty clay loam	CL	A-7	0	0	100	95-100	85-100	70-95	40-50	20-30
	40-46	Clay, clay loam	CL	A-6	0	0	80-100	70-95	65-90	55-85	30-40	10-20
	46-60	Clay loam, gravelly loam, loam	CL, CL-ML	A-4, A-6	0	0	80-100	70-95	65-90	55-85	25-35	5-15

Engineering Properties

Granite County Area, Montana

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
60C:												
Quigley	0-7	Loam	CL, CL-ML	A-4	0	0-5	90-100	85-100	70-95	50-75	25-30	5-10
	7-21	Clay loam, loam, silt loam	CL, CL-ML, SC-SM	A-4, A-6	0	0-8	90-100	80-100	66-98	49-76	25-35	5-15
	21-34	Clay loam, loam, silt loam	CL, CL-ML	A-4, A-6	0	0-8	81-90	72-90	63-90	54-81	25-35	5-15
	34-60	Clay loam, loam, silt loam	CL, CL-ML, ML	A-4	0	0-8	83-91	74-91	65-91	55-82	20-30	NP-10
60D:												
Quigley	0-7	Loam	CL, CL-ML	A-4	0	0-5	90-100	85-100	70-95	50-75	25-30	5-10
	7-21	Clay loam, loam, silt loam	CL, CL-ML, SC-SM	A-4, A-6	0	0-8	90-100	80-100	66-98	49-76	25-35	5-15
	21-34	Clay loam, loam, silt loam	CL, CL-ML	A-4, A-6	0	0-8	81-90	72-90	63-90	54-81	25-35	5-15
	34-60	Clay loam, loam, silt loam	CL, CL-ML, ML	A-4	0	0-8	83-91	74-91	65-91	55-82	20-30	NP-10
65D:												
Tanna	0-5	Loam	CL-ML	A-4	0	0-5	95-100	90-100	80-95	60-85	20-30	5-10
	5-21	Clay, clay loam, silty clay loam	CL	A-6, A-7	0	0-5	90-100	90-100	80-95	75-90	35-45	15-25
	21-31	Channery clay loam, very channery loam, silty clay loam	CL, CL-ML, GC-GM	A-2, A-4, A-6	0	0-10	40-100	30-95	25-80	20-70	25-40	5-15
	31-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---

Engineering Properties

Granite County Area, Montana

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
69C:												
Boxwell	0-7	Loam	CL-ML	A-4	0	0	100	100	90-100	70-90	20-30	5-10
	7-12	Clay loam, loam, silty clay loam	CL	A-6	0	0	100	100	90-95	70-85	25-35	10-15
	12-25	Loam, silt loam, very fine sandy loam	CL-ML	A-4	0	0	100	100	85-95	70-80	20-30	5-10
	25-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
69D:												
Boxwell	0-7	Loam	CL-ML	A-4	0	0	100	100	90-100	70-90	20-30	5-10
	7-12	Clay loam, loam, silty clay loam	CL	A-6	0	0	100	100	90-95	70-85	25-35	10-15
	12-25	Loam, silt loam, very fine sandy loam	CL-ML	A-4	0	0	100	100	85-95	70-80	20-30	5-10
	25-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
88E:												
Whitecow	0-4	Gravelly loam	CL-ML, GM, SM	A-4	0	0-15	70-85	60-75	50-70	40-60	20-30	NP-10
	4-34	Very cobbly loam, extremely channery loam, very gravelly loam	GC, GC-GM	A-2, A-4, A-6	0	20-25	35-70	25-60	20-55	15-50	20-35	5-15
	34-60	Extremely cobbly loam, extremely channery loam, extremely gravelly loam	GC, GC-GM	A-1, A-2	0	15-40	25-45	20-30	15-30	10-30	20-35	5-15

Engineering Properties

Granite County Area, Montana

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
88F:												
Whitecow	0-4	Gravelly loam	CL-ML, GM, SM	A-4	0	0-15	70-85	60-75	50-70	40-60	20-30	NP-10
	4-34	Very cobbly loam, extremely channery loam, very gravelly loam	GC, GC-GM	A-2, A-4, A-6	0	20-25	35-70	25-60	20-55	15-50	20-35	5-15
	34-60	Extremely cobbly loam, extremely channery loam, extremely gravelly loam	GC, GC-GM	A-1, A-2	0	15-40	25-45	20-30	15-30	10-30	20-35	5-15
111A:												
Canarway	0-4	Gravelly sandy loam	SM	A-2	0	0-10	60-80	55-75	35-55	15-30	20-25	NP-5
	4-10	Gravelly coarse sandy loam, gravelly sandy loam	SM	A-2	0	0-10	60-80	55-75	25-55	10-30	20-25	NP-5
	10-60	Very cobbly loamy sand, very gravelly sand	GM, SM, SP-SM	A-1	0	15-40	50-70	40-55	20-40	5-15	20-25	NP-5
Mccabe	0-2	Sandy loam	SM	A-2, A-4	0	0	100	100	60-70	30-40	20-25	NP-5
	2-9	Fine sandy loam, loam, sandy loam	CL-ML, SC-SM	A-4	0	0	100	100	60-90	35-65	25-30	5-10
	9-36	Fine sandy loam, loam, sandy loam, very fine sandy loam	CL-ML, SC-SM, SM	A-2-4, A-4	0	0	100	100	60-90	30-65	20-30	NP-10
	36-60	Very cobbly loamy sand, very gravelly loamy sand, very gravelly sand	SM, SP-SM	A-1	0	15-40	50-60	40-55	20-40	5-15	20-25	NP-5

Engineering Properties

Granite County Area, Montana

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
149D:												
Danvers	0-8	Cobbly loam	CL-ML, SC-SM	A-4	0	15-30	75-95	70-90	65-85	45-65	25-30	5-10
	8-16	Clay loam, silty clay, silty clay loam	CH, CL	A-6, A-7	0	0-5	95-100	90-100	75-100	65-90	35-55	15-30
	16-38	Clay, clay loam, silty clay loam	CL	A-6, A-7	0	0-5	95-100	90-100	75-100	60-85	35-50	15-25
	38-60	Cobbly clay loam, very gravelly sandy loam, extremely gravelly loam	GC, GC-GM, SC, SC-SM	A-2, A-4, A-6	0	15-20	35-80	30-75	20-65	15-50	25-40	5-15
151E:												
Shawmut	0-4	Cobbly loam	CL-ML, SC-SM	A-4	0	15-30	75-95	70-90	65-85	45-65	25-30	5-10
	4-8	Gravelly clay loam, gravelly sandy clay loam	GC, GC-GM, SC, SC-SM	A-2, A-4, A-6	0	0-10	65-85	60-80	55-75	30-50	25-35	5-15
	8-25	Very gravelly clay loam, very gravelly loam, very gravelly sandy loam	GC-GM	A-2, A-4	0	10-25	40-60	35-55	30-50	20-40	25-30	5-10
	25-60	Very gravelly clay loam, extremely gravelly loam, extremely gravelly sandy loam	GC, GP-GC	A-1, A-2	0	0-25	30-35	25-30	20-25	10-20	20-30	5-10
169F:												
Doney	0-11	Cobbly loam	CL-ML, SC-SM	A-4	0	10-20	70-90	65-85	55-80	40-65	25-30	5-10
	11-27	Clay loam, gravelly loam, loam	CL, CL-ML	A-4, A-6	0	0	80-100	75-100	65-95	55-80	25-35	5-15
	27-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---

Engineering Properties

Granite County Area, Montana

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
169F:												
Dolus	0-6	Channery loam	SC, SC-SM	A-4, A-6	0	0-10	70-80	65-75	55-65	35-45	25-35	5-15
	6-14	Very channery loam	GC, GC-GM	A-2	0	0-25	40-50	35-45	25-35	20-30	25-35	5-15
	14-28	Very channery loam	GC, GC-GM	A-2	0	0-25	40-50	35-45	25-35	20-30	25-35	5-15
	28-38	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
351E:												
Roy	0-7	Cobbly loam	CL-ML, ML	A-4	0	15-30	80-100	70-90	60-80	50-70	20-30	NP-10
	7-20	Very cobbly clay loam, very stony clay loam, extremely stony clay	CL, GC, SC	A-2, A-6, A-7	20-40	10-25	40-80	30-70	20-65	20-55	30-50	15-30
	20-60	Very cobbly clay loam, very stony sandy clay loam, extremely stony clay loam	CL-ML, GC, GC-GM, SC-SM	A-2, A-4, A-6	20-40	10-25	40-80	30-70	20-65	20-55	25-40	5-15
Danvers	0-5	Cobbly clay loam	CL, SC	A-6	0	15-30	75-95	70-90	55-85	45-80	30-40	10-15
	5-9	Clay loam, silty clay, silty clay loam	CH, CL	A-6, A-7	0	0-5	95-100	90-100	75-100	65-90	35-55	15-30
	9-17	Clay, clay loam, silty clay loam	CL	A-6, A-7	0	0-5	95-100	90-100	75-100	60-85	35-50	15-25
	17-60	Cobbly clay loam, very gravelly sandy loam, extremely gravelly loam	GC, GC-GM, SC, SC-SM	A-2, A-4, A-6	0	15-20	35-80	30-75	20-65	15-50	25-40	5-15

Engineering Properties

Granite County Area, Montana

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
351E:												
Shawmut	0-4	Cobbly loam	CL-ML, SC-SM	A-4	0	15-30	75-95	70-90	65-85	45-65	25-30	5-10
	4-16	Gravelly clay loam, gravelly sandy clay loam	GC, GC-GM, SC, SC-SM	A-2, A-4, A-6	0	0-10	65-85	60-80	55-75	30-50	25-35	5-15
	16-25	Very gravelly clay loam, very gravelly loam, very gravelly sandy loam	GC-GM	A-2, A-4	0	10-25	40-60	35-55	30-50	20-40	25-30	5-10
	25-60	Very gravelly clay loam, extremely gravelly loam, extremely gravelly sandy loam	GC, GP-GC	A-1, A-2	0	0-25	30-35	25-30	20-25	10-20	20-30	5-10
442D:												
Braziel	0-8	Gravelly loam	CL-ML, SC-SM	A-4	0-5	0-10	65-80	60-75	50-70	35-55	25-30	5-10
	8-17	Very gravelly clay loam, very gravelly loam	GC	A-2, A-6	0-10	10-20	40-60	35-55	30-55	20-45	30-35	10-15
	17-43	Very cobbly clay loam, very gravelly clay loam, extremely gravelly loam	GC	A-2, A-6	0-15	10-30	35-60	30-55	25-55	20-45	30-35	10-15
	43-60	Very cobbly clay loam, very gravelly clay loam, extremely gravelly loam	GC-GM	A-2, A-4	0-20	10-25	40-65	30-55	25-50	20-40	25-30	5-10
Tolbert	0-5	Gravelly loam	CL-ML, SC-SM	A-4	0	0-10	60-80	55-75	45-65	35-60	25-30	5-10
	5-12	Very cobbly clay loam, extremely cobbly loam, very gravelly clay loam	GC, GC-GM	A-2, A-4, A-6	0-15	30-50	40-75	30-65	25-60	20-50	25-35	5-15
	12-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---

Engineering Properties

Granite County Area, Montana

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
442E:												
Braziel	0-8	Stony loam	CL-ML	A-4	10-20	10-15	85-95	75-90	70-85	50-65	25-30	5-10
	8-17	Very gravelly clay loam, very gravelly loam, very stony loam	GC	A-2, A-6	15-25	0-15	50-65	40-55	35-50	25-45	30-35	10-15
	17-43	Very cobbly clay loam, very gravelly clay loam, extremely gravelly loam	GC	A-2, A-6	0-15	10-30	35-60	30-55	25-55	20-45	30-35	10-15
	43-60	Very cobbly clay loam, very gravelly clay loam, extremely gravelly loam	GC-GM	A-2, A-4	0-20	10-25	40-65	30-55	25-50	20-40	25-30	5-10
Tolbert, very stony	0-5	Very stony loam	CL, ML, SC-SM	A-4	31-38	18-25	81-94	70-91	59-85	42-63	25-35	5-10
	5-12	Gravelly loam, very gravelly loam	GC, GC-GM	A-4	0	21-27	45-61	32-61	28-57	21-43	20-30	5-10
	12-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
444B:												
Gregson	0-7	Silt loam	CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	7-26	Clay loam, loam	CL, CL-ML	A-4, A-6	0	0	100	100	85-100	60-80	20-35	5-15
	26-60	Very gravelly loamy sand, very gravelly sand	GM, GP-GM, SP-SM	A-1	0	10-25	50-65	40-55	20-40	5-15	15-20	NP-5

Engineering Properties

Granite County Area, Montana

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
445B:												
Saypo	0-2	Slightly decomposed plant material	PT	A-8	0	0	100	100	100	100	---	---
	2-14	Silt loam	CL-ML	A-4	0	0	100	90-100	80-100	70-90	20-30	5-10
	14-20	Clay loam, loam, silt loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	75-90	65-80	25-35	5-15
	20-43	Clay loam, gravelly loam, loam	CL, CL-ML, GC-GM, SC-SM	A-4, A-6	0	0-10	65-95	55-90	45-75	35-65	25-35	5-15
	43-60	Gravelly loam, very gravelly loam, very gravelly sandy loam, loam	SC, SP-SC	A-1-a, A-2-6, A-7-6	0	0-10	63-96	22-96	17-82	9-46	25-45	5-20
447B:												
Kleinschmidt	0-8	Gravelly loam	CL-ML, GC-GM, SC-SM	A-4	0	0-5	65-90	55-80	45-75	35-60	25-30	5-10
	8-19	Gravelly loam, very gravelly clay loam	GC-GM, SC-SM	A-2, A-4	0	0-10	50-80	40-70	35-65	25-50	25-30	5-10
	19-26	Very gravelly loam, very gravelly sandy loam	GC-GM	A-2	0	10-30	40-60	35-55	20-50	10-35	25-30	5-10
	26-60	Extremely cobbly loamy sand, extremely cobbly sandy loam, extremely gravelly sand	GP-GM	A-1	0	25-40	25-45	15-35	10-25	5-10	20-30	NP-5

Engineering Properties

Granite County Area, Montana

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
488F:												
Whitecow	0-4	Gravelly loam	CL-ML, GM, SM	A-4	0	0-15	70-85	60-75	50-70	40-60	20-30	NP-10
	4-34	Very cobbly loam, extremely channery loam, very gravelly loam	GC, GC-GM	A-2, A-4, A-6	0	20-25	35-70	25-60	20-55	15-50	20-35	5-15
	34-60	Extremely cobbly loam, extremely channery loam, extremely gravelly loam	GC, GC-GM	A-1, A-2	0	15-40	25-45	20-30	15-30	10-30	20-35	5-15
814B:												
Bandy	0-7	Loam	CL-ML	A-4	0	0-10	95-100	95-100	80-95	55-75	25-30	5-10
	7-10	Clay loam, gravelly loam, sandy loam	CL-ML, SC-SM	A-2, A-4	0	0-10	60-100	55-95	35-90	20-70	25-30	5-10
	10-14	Gravelly loam, gravelly sandy loam, sandy loam	CL-ML, SC-SM	A-2, A-4	0	0-10	60-100	55-95	35-85	15-65	20-25	5-10
	14-60	Very cobbly loamy sand, very gravelly sand, extremely gravelly sand	GM, GP-GM, SP-SM	A-1	0	10-30	35-65	25-55	15-40	5-15	20-25	NP-5
824E:												
Conn	0-8	Cobbly loam	CL-ML, SC-SM	A-4	0	10-30	75-95	70-85	60-80	40-65	25-30	5-10
	8-13	Clay loam, loam	CL, CL-ML	A-4, A-6	0	0	80-100	75-100	65-100	50-80	25-35	5-15
	13-18	Clay loam, gravelly sandy loam, loam	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0-10	70-100	65-100	50-100	35-80	25-35	5-15
	18-60	Gravelly loam, loam, sandy loam	CL-ML, SC-SM	A-4	0	0-10	75-100	70-100	55-95	35-75	25-30	5-10

Engineering Properties

Granite County Area, Montana

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
824E:												
Sixbeacon	0-5	Cobbly loam	CL-ML	A-4	0-5	15-20	90-95	85-90	70-85	50-70	25-30	5-10
	5-9	Gravelly loam, loam	CL-ML, GC-GM, SC-SM	A-4	0	0-10	65-100	60-95	55-90	40-75	25-30	5-10
	9-23	Very gravelly loam, very gravelly sandy loam	GC-GM	A-2	0	0-15	35-55	30-50	20-50	10-35	20-25	5-10
	23-60	Very gravelly sandy loam, extremely gravelly loamy sand, extremely gravelly sandy loam	GM, GP-GM	A-1	0-5	15-25	25-45	20-35	10-30	5-15	20-25	NP-5
839E:												
Windham	0-7	Gravelly loam	GC-GM, GM, ML, SM	A-1, A-2, A-4	0	0-20	30-80	25-75	20-60	15-55	20-30	NP-10
	7-21	Clay loam, gravelly clay loam, very gravelly loam	CL-ML, GC, GC-GM, SC-SM	A-2, A-4, A-6	0	0-25	40-90	35-85	30-65	25-60	20-35	5-15
	21-32	Very gravelly loam, extremely gravelly clay loam, extremely gravelly loam, extremely gravelly sandy loam	GC-GM, GM	A-1, A-2	0	10-30	25-50	15-30	10-25	10-20	20-30	NP-10
	32-60	Very gravelly loam, extremely gravelly clay loam, extremely gravelly loam, extremely gravelly sandy loam	GC-GM, GM, GP-GM	A-1, A-2	0	10-30	25-50	15-30	10-25	5-20	15-30	NP-10

Engineering Properties

Granite County Area, Montana

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
839E:												
Lap	0-8	Loam	CL-ML	A-4	0	0-5	90-100	80-95	70-90	50-70	25-30	5-10
	8-16	Very channery loam	GC, GC-GM	A-2, A-4, A-6	0	0-10	40-60	30-55	25-50	20-40	25-35	5-15
	16-26	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop	---	---	---	---	---	---	---	---	---	---	---	---
839F:												
Windham	0-7	Gravelly loam	GC-GM, GM, ML, SM	A-1, A-2, A-4	0	0-20	30-80	25-75	20-60	15-55	20-30	NP-10
	7-21	Clay loam, gravelly clay loam, very gravelly loam	CL-ML, GC, GC-GM, SC-SM	A-2, A-4, A-6	0	0-25	40-90	35-85	30-65	25-60	20-35	5-15
	21-32	Very gravelly loam, extremely gravelly clay loam, extremely gravelly loam, extremely gravelly sandy loam	GC-GM, GM	A-1, A-2	0	10-30	25-50	15-30	10-25	10-20	20-30	NP-10
	32-60	Very gravelly loam, extremely gravelly clay loam, extremely gravelly loam, extremely gravelly sandy loam	GC-GM, GM, GP-GM	A-1, A-2	0	10-30	25-50	15-30	10-25	5-20	15-30	NP-10
Lap	0-8	Loam	CL-ML	A-4	0	0-5	90-100	80-95	70-90	50-70	25-30	5-10
	8-16	Very channery loam	GC, GC-GM	A-2, A-4, A-6	0	0-10	40-60	30-55	25-50	20-40	25-35	5-15
	16-26	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---

Engineering Properties

Granite County Area, Montana

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
839F:												
Rock outcrop	---	---	---	---	---	---	---	---	---	---	---	---
855A:												
Mannixlee	0-2	Slightly decomposed plant material	PT	A-8	0	0	100	100	100	100	---	---
	2-9	Clay loam	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-80	25-35	5-15
	9-25	Clay loam, loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	100	100	85-100	60-95	25-35	5-15
	25-45	Clay loam, gravelly loam, silt loam	CL-ML	A-4, A-6	0	0-15	75-100	70-100	60-100	50-90	25-35	5-15
	45-52	Gravelly loam, loamy coarse sand, sandy loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0	0-10	60-90	55-85	35-80	15-65	20-30	NP-10
	52-60	Very cobbly sandy loam, very gravelly sandy loam, extremely gravelly loamy coarse sand	GM, GP-GM	A-1	0	20-30	30-65	25-60	15-40	5-25	20-25	NP-5
Blossberg	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	100	100	---	---
	1-15	Loam	CL-ML	A-4	0	0-10	90-100	85-100	70-95	50-75	25-30	5-10
	15-24	Clay loam, loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0-10	90-100	85-100	70-95	50-95	25-35	5-15
	24-29	Gravelly loam, gravelly sandy loam, very gravelly sandy loam	GC-GM, SC-SM	A-2, A-4	0	10-25	60-80	55-75	40-70	20-50	20-25	5-10
	29-60	Very cobbly sand, very gravelly loamy coarse sand	SM, SP-SM	A-1	0	21-29	51-65	35-65	17-39	5-16	20-25	NP-5
915:												
Rock outcrop, welded tuff	---	---	---	---	---	---	---	---	---	---	---	---

Engineering Properties

Granite County Area, Montana

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
988F:												
Whitecow	0-4	Gravelly loam	CL-ML, GM, SM	A-4	0	0-15	70-85	60-75	50-70	40-60	20-30	NP-10
	4-34	Very cobbly loam, extremely channery loam, very gravelly loam	GC, GC-GM	A-2, A-4, A-6	0	20-25	35-70	25-60	20-55	15-50	20-35	5-15
	34-60	Extremely cobbly loam, extremely channery loam, extremely gravelly loam	GC, GC-GM	A-1, A-2	0	15-40	25-45	20-30	15-30	10-30	20-35	5-15
Rock outcrop	---	---	---	---	---	---	---	---	---	---	---	---

Dwellings and Small Commercial Buildings

Granite County Area, Montana

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The columns that identify the rating class and limiting features show no more than five limitations for any given soil. The soil may have additional limitations. This report shows only the major soils in each map unit]

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
10A:							
Mccabe	45	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.98	Depth to saturated zone	1.00	Depth to saturated zone	0.98
Canarway	40	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.98	Depth to saturated zone	1.00	Depth to saturated zone	0.98
11A:							
Mccabe	45	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.98	Depth to saturated zone	1.00	Depth to saturated zone	0.98
Canarway	40	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.98	Depth to saturated zone	1.00	Depth to saturated zone	0.98
24B:							
Conn	85	Not limited		Not limited		Not limited	
24C:							
Conn	85	Not limited		Not limited		Somewhat limited	
						Slope	0.50
25B:							
Straw	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
31B:							
Varney	85	Not limited		Not limited		Not limited	
33B:							
Rothiemay	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50

Dwellings and Small Commercial Buildings

Granite County Area, Montana

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
33C:							
Rothiemay	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	0.50
						Shrink-swell	0.50
33D:							
Rothiemay	85	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
34B:							
Cetrack	85	Not limited		Not limited		Not limited	
36B:							
Varney	60	Not limited		Not limited		Not limited	
Conn	25	Not limited		Not limited		Not limited	
36D:							
Varney	60	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
Conn	25	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
39C:							
Winspect	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Large stones	0.17	Large stones	0.17	Slope	0.50
						Large stones	0.17
39D:							
Winspect	85	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Large stones	0.17	Large stones	0.17	Large stones	0.17
42E:							
Windham	85	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
49C:							
Danvers	85	Not limited		Not limited		Somewhat limited	
						Slope	0.50

Dwellings and Small Commercial Buildings

Granite County Area, Montana

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
49D:							
Danvers	85	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
51D:							
Shawmut	85	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
52B:							
Martinsdale	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
52C:							
Martinsdale	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	0.50
						Shrink-swell	0.50
52D:							
Martinsdale	85	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
58C:							
Coben	85	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
						Slope	0.50
60C:							
Quigley	85	Somewhat limited		Not limited		Somewhat limited	
		Shrink-swell	0.50			Slope	0.50
						Shrink-swell	0.50
60D:							
Quigley	85	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Shrink-swell	0.50			Shrink-swell	0.50
65D:							
Tanna	85	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Shrink-swell	0.50	Depth to soft bedrock	0.35	Shrink-swell	0.50
69C:							
Boxwell	85	Not limited		Somewhat limited		Somewhat limited	
				Depth to soft bedrock	0.84	Slope	0.50

Dwellings and Small Commercial Buildings

Granite County Area, Montana

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
69D:							
Boxwell	85	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
				Depth to soft bedrock	0.84		
88E:							
Whitecow	85	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
88F:							
Whitecow	85	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
111A:							
Canarway	45	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.98	Depth to saturated zone	1.00	Depth to saturated zone	0.98
Mccabe	40	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.98	Depth to saturated zone	1.00	Depth to saturated zone	0.98
149D:							
Danvers	85	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Slope	1.00
		Slope	0.63	Slope	0.63	Shrink-swell	1.00
151E:							
Shawmut	85	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
169F:							
Doney	55	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Shrink-swell	0.50	Depth to soft bedrock	0.71	Shrink-swell	0.50
Dolus	35	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
				Depth to soft bedrock	0.64		

Dwellings and Small Commercial Buildings

Granite County Area, Montana

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
351E:							
Roy	35	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Large stones	0.86	Large stones	0.86	Large stones	0.86
Danvers	25	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
Shawmut	25	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
442D:							
Braziel	50	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Tolbert	35	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Slope	0.63	Slope	0.63	Depth to hard bedrock	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
		Large stones	0.06	Large stones	0.06	Large stones	0.06
442E:							
Braziel	60	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
		Large stones	0.03	Large stones	0.03	Large stones	0.03
Tolbert, very stony	25	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
		Large stones	0.40	Large stones	0.40	Large stones	0.40
444B:							
Gregson	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.99		
445B:							
Saypo	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
				Depth to saturated zone	0.99		

Dwellings and Small Commercial Buildings

Granite County Area, Montana

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
447B:							
Kleinschmidt	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.99		
488F:							
Whitecow	85	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
814B:							
Bandy	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.98	Depth to saturated zone	1.00	Depth to saturated zone	0.98
824E:							
Conn	55	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
Sixbeacon	30	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
839E:							
Windham	45	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
Lap	30	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
Rock outcrop	10	Not rated		Not rated		Not rated	
839F:							
Windham	45	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
Lap	30	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
Rock outcrop	10	Not rated		Not rated		Not rated	

Dwellings and Small Commercial Buildings

Granite County Area, Montana

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
855A:							
Mannixlee	45	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.50	Depth to saturated zone	1.00	Shrink-swell	0.50
		Depth to saturated zone	0.98	Shrink-swell	0.50	Depth to saturated zone	0.98
Blossberg	40	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.98	Depth to saturated zone	1.00	Depth to saturated zone	0.98
915:							
Rock outcrop, welded tuff	100	Not rated		Not rated		Not rated	
988F:							
Whitecow	55	Very limited		Very limited		Very limited	
		Too steep	1.00	Too steep	1.00	Slope	1.00
Rock outcrop	30	Not rated		Not rated		Not rated	

Hazard of Erosion and Suitability for Roads on Forestland

Granite County Area, Montana

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The columns that identify the rating class and limiting features show no more than five limitations for any given soil. The soil may have additional limitations. This report shows only the major soils in each map unit]

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
10A:							
Mccabe	45	Slight		Slight		Moderately suited	
						Low strength	0.50
						Flooding	0.50
						Wetness	0.50
Canarway	40	Slight		Slight		Moderately suited	
						Flooding	0.50
						Wetness	0.50
11A:							
Mccabe	45	Slight		Slight		Moderately suited	
						Low strength	0.50
						Flooding	0.50
						Wetness	0.50
Canarway	40	Slight		Slight		Moderately suited	
						Flooding	0.50
						Wetness	0.50
24B:							
Conn	85	Slight		Slight		Moderately suited	
						Low strength	0.50
24C:							
Conn	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
25B:							
Straw	85	Slight		Slight		Moderately suited	
						Low strength	0.50
31B:							
Varney	85	Slight		Slight		Moderately suited	
						Low strength	0.50
33B:							
Rothiemay	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50

Hazard of Erosion and Suitability for Roads on Forestland

Granite County Area, Montana

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
33C:							
Rothiemay	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
33D:							
Rothiemay	85	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
34B:							
Cetrack	85	Slight		Slight		Moderately suited	
						Low strength	0.50
36B:							
Varney	60	Slight		Slight		Moderately suited	
						Low strength	0.50
Conn	25	Slight		Slight		Moderately suited	
						Low strength	0.50
36D:							
Varney	60	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
Conn	25	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
39C:							
Winspect	85	Slight		Slight		Moderately suited	
						Low strength	0.50
						Slope	0.50
39D:							
Winspect	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Slope	0.50
42E:							
Windham	85	Moderate		Moderate		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.50	Slope	1.00

Hazard of Erosion and Suitability for Roads on Forestland

Granite County Area, Montana

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
49C:							
Danvers	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
49D:							
Danvers	85	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
51D:							
Shawmut	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Slope	0.50
52B:							
Martinsdale	85	Slight		Slight		Moderately suited	
						Low strength	0.50
52C:							
Martinsdale	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
52D:							
Martinsdale	85	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
58C:							
Coben	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
60C:							
Quigley	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
60D:							
Quigley	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Slope	0.50
						Low strength	0.50

Hazard of Erosion and Suitability for Roads on Forestland

Granite County Area, Montana

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
65D:							
Tanna	85	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
69C:							
Boxwell	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
69D:							
Boxwell	85	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
88E:							
Whitecow	85	Moderate		Moderate		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.50	Slope	1.00
						Low strength	0.50
88F:							
Whitecow	85	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
111A:							
Canarway	45	Slight		Slight		Moderately suited	
						Flooding	0.50
						Wetness	0.50
Mccabe	40	Slight		Slight		Moderately suited	
						Low strength	0.50
						Flooding	0.50
						Wetness	0.50
149D:							
Danvers	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Slope	0.50
						Low strength	0.50
151E:							
Shawmut	85	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50

Hazard of Erosion and Suitability for Roads on Forestland

Granite County Area, Montana

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
169F:							
Doney	55	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
Dolus	35	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
351E:							
Roy	35	Moderate		Moderate		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.50	Slope	1.00
						Low strength	0.50
Danvers	25	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
Shawmut	25	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
442D:							
Braziel	50	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Slope	0.50
						Low strength	0.50
Tolbert	35	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Slope	0.50
						Low strength	0.50
442E:							
Braziel	60	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
Tolbert, very stony	25	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
444B:							
Gregson	85	Slight		Slight		Moderately suited	
						Low strength	0.50
445B:							
Saypo	85	Slight		Slight		Moderately suited	
						Low strength	0.50

Hazard of Erosion and Suitability for Roads on Forestland

Granite County Area, Montana

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
447B:							
Kleinschmidt	85	Slight		Slight		Moderately suited	
						Low strength	0.50
488F:							
Whitecow	85	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
814B:							
Bandy	85	Slight		Slight		Moderately suited	
						Low strength	0.50
						Wetness	0.50
824E:							
Conn	55	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
Sixbeacon	30	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
839E:							
Windham	45	Moderate		Moderate		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.50	Slope	1.00
Lap	30	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
Rock outcrop	10	Not rated		Not rated		Not rated	
839F:							
Windham	45	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
Lap	30	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
Rock outcrop	10	Not rated		Not rated		Not rated	

Hazard of Erosion and Suitability for Roads on Forestland

Granite County Area, Montana

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
855A:							
Mannixlee	45	Slight		Slight		Moderately suited	
						Wetness	0.50
						Low strength	0.50
Blossberg	40	Slight		Slight		Moderately suited	
						Wetness	0.50
						Low strength	0.50
915:							
Rock outcrop, welded tuff	100	Not rated		Not rated		Not rated	
988F:							
Whitecow	55	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
Rock outcrop	30	Not rated		Not rated		Not rated	

Source of Reclamation Material, Roadfill, and Topsoil

Granite County Area, Montana

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the limitation. This report shows only the major soils in each map unit]

Map symbol and soil name	Pct. of map unit	Potential as a source of reclamation material		Potential as a source of roadfill		Potential as a source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
10A:							
Mccabe	45	Fair		Fair		Poor	
		Too acid	0.84	Wetness depth	0.14	Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.88			Wetness depth	0.14
Canarway	40	Poor		Fair		Poor	
		Too sandy	0.00	Wetness depth	0.14	Rock fragments	0.00
		Droughty	0.00	Cobble content	0.74	Too sandy	0.00
		Organic matter content low	0.88			Hard to reclaim (rock fragments)	0.00
						Wetness depth	0.14
11A:							
Mccabe	45	Fair		Fair		Poor	
		Too acid	0.84	Wetness depth	0.14	Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.88			Wetness depth	0.14
Canarway	40	Poor		Fair		Poor	
		Too sandy	0.00	Wetness depth	0.14	Rock fragments	0.00
		Droughty	0.00	Cobble content	0.74	Too sandy	0.00
		Organic matter content low	0.88			Hard to reclaim (rock fragments)	0.00
						Wetness depth	0.14
24B:							
Conn	85	Fair		Good		Fair	
		Organic matter content low	0.12			Rock fragments	0.88
		Water erosion	0.99				
		Carbonate content	0.46				
24C:							
Conn	85	Fair		Good		Fair	
		Organic matter content low	0.12			Rock fragments	0.88
		Water erosion	0.99				
		Carbonate content	0.46				
25B:							
Straw	85	Good		Fair		Good	
				Shrink-swell	0.87		

Source of Reclamation Material, Roadfill, and Topsoil

Granite County Area, Montana

Map symbol and soil name	Pct. of map unit	Potential as a source of reclamation material		Potential as a source of roadfill		Potential as a source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
31B:							
Varney	85	Fair		Good		Fair	
		Organic matter content low	0.12			Rock fragments	0.12
		Water erosion	0.68				
		Carbonate content	0.80				
33B:							
Rothiemay	85	Fair		Fair		Fair	
		Organic matter content low	0.12	Shrink-swell	0.87	Rock fragments	0.28
		Water erosion	0.99			Carbonate content	0.73
		Carbonate content	0.01				
33C:							
Rothiemay	85	Fair		Fair		Fair	
		Organic matter content low	0.12	Shrink-swell	0.87	Rock fragments	0.28
		Water erosion	0.99			Carbonate content	0.73
		Carbonate content	0.01				
33D:							
Rothiemay	85	Fair		Fair		Fair	
		Organic matter content low	0.12	Shrink-swell	0.87	Rock fragments	0.28
		Water erosion	0.99			Slope	0.37
		Carbonate content	0.01			Carbonate content	0.73
34B:							
Cetrack	85	Fair		Good		Poor	
		Organic matter content low	0.12			Hard to reclaim (rock fragments)	0.00
		Water erosion	0.99			Rock fragments	0.28
		Carbonate content	0.80				
36B:							
Varney	60	Fair		Good		Fair	
		Organic matter content low	0.12			Rock fragments	0.12
		Water erosion	0.68				
		Carbonate content	0.80				
Conn	25	Fair		Good		Fair	
		Organic matter content low	0.12			Rock fragments	0.72
		Water erosion	0.99			Carbonate content	0.95
		Carbonate content	0.46				

Source of Reclamation Material, Roadfill, and Topsoil

Granite County Area, Montana

Map symbol and soil name	Pct. of map unit	Potential as a source of reclamation material		Potential as a source of roadfill		Potential as a source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
36D:							
Varney	60	Fair		Good		Fair	
		Organic matter content low	0.12			Rock fragments	0.12
		Water erosion	0.68			Slope	0.37
		Carbonate content	0.80				
Conn	25	Fair		Good		Fair	
		Organic matter content low	0.12			Slope	0.37
		Water erosion	0.99			Rock fragments	0.88
		Carbonate content	0.46				
39C:							
Winspect	85	Fair		Fair		Poor	
		Carbonate content	0.46	Cobble content	0.14	Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.50			Rock fragments	0.00
		Cobble content	0.86			Carbonate content	0.70
39D:							
Winspect	85	Fair		Fair		Poor	
		Carbonate content	0.46	Cobble content	0.14	Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.50			Rock fragments	0.00
		Cobble content	0.86			Slope	0.37
						Carbonate content	0.70
42E:							
Windham	85	Poor		Poor		Poor	
		Carbonate content	0.00	Slope	0.00	Hard to reclaim (rock fragments)	0.00
		Droughty	0.25			Slope	0.00
		Organic matter content low	0.12			Carbonate content	0.00
						Rock fragments	0.00
49C:							
Danvers	85	Fair		Fair		Poor	
		Too clayey	0.02	Shrink-swell	0.97	Too clayey	0.02
		Organic matter content low	0.12			Hard to reclaim (rock fragments)	0.00
		Carbonate content	0.68				

Source of Reclamation Material, Roadfill, and Topsoil

Granite County Area, Montana

Map symbol and soil name	Pct. of map unit	Potential as a source of reclamation material		Potential as a source of roadfill		Potential as a source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
49D:							
Danvers	85	Fair		Fair		Poor	
		Too clayey	0.02	Shrink-swell	0.97	Too clayey	0.02
		Organic matter content low	0.12			Hard to reclaim (rock fragments)	0.00
		Carbonate content	0.68			Slope	0.37
51D:							
Shawmut	85	Fair		Good		Poor	
		Droughty	0.54			Hard to reclaim (rock fragments)	0.00
		Carbonate content	0.80			Rock fragments	0.00
		Organic matter content low	0.88			Slope	0.37
						Carbonate content	0.99
52B:							
Martinsdale	85	Fair		Fair		Fair	
		Water erosion	0.99	Shrink-swell	0.87	Too clayey	0.93
		Carbonate content	0.68				
		Organic matter content low	0.88				
		Too clayey	0.98				
52C:							
Martinsdale	85	Fair		Fair		Fair	
		Water erosion	0.99	Shrink-swell	0.87	Too clayey	0.93
		Carbonate content	0.68				
		Organic matter content low	0.88				
		Too clayey	0.98				
52D:							
Martinsdale	85	Fair		Fair		Fair	
		Water erosion	0.99	Shrink-swell	0.87	Slope	0.37
		Carbonate content	0.68			Too clayey	0.93
		Organic matter content low	0.88				
		Too clayey	0.98				
58C:							
Coben	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
				Shrink-swell	0.39		

Source of Reclamation Material, Roadfill, and Topsoil

Granite County Area, Montana

Map symbol and soil name	Pct. of map unit	Potential as a source of reclamation material		Potential as a source of roadfill		Potential as a source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
60C:							
Quigley	85	Fair		Good		Good	
		Water erosion	0.90				
		Carbonate content	0.46				
		Organic matter content low	0.88				
60D:							
Quigley	85	Fair		Good		Fair	
		Water erosion	0.90			Slope	0.37
		Carbonate content	0.46				
		Organic matter content low	0.88				
65D:							
Tanna	85	Poor		Poor		Fair	
		Organic matter content low	0.00	Depth to bedrock	0.00	Too clayey	0.07
		Too clayey	0.08	Shrink-swell	0.87	Slope	0.37
		Droughty	0.59			Depth to bedrock	0.65
		Depth to bedrock	0.65				
69C:							
Boxwell	85	Not rated		Poor		Not rated	
				Depth to bedrock	0.00		
69D:							
Boxwell	85	Not rated		Poor		Not rated	
				Depth to bedrock	0.00		
88E:							
Whitecow	85	Poor		Poor		Poor	
		Carbonate content	0.00	Cobble content	0.74	Hard to reclaim (rock fragments)	0.00
		Droughty	0.57	Slope	0.00	Rock fragments	0.00
		Organic matter content low	0.88			Slope	0.00
						Carbonate content	0.00
88F:							
Whitecow	85	Poor		Poor		Poor	
		Carbonate content	0.00	Slope	0.00	Hard to reclaim (rock fragments)	0.00
		Droughty	0.57	Cobble content	0.74	Rock fragments	0.00
		Organic matter content low	0.88			Slope	0.00
						Carbonate content	0.00

Source of Reclamation Material, Roadfill, and Topsoil

Granite County Area, Montana

Map symbol and soil name	Pct. of map unit	Potential as a source of reclamation material		Potential as a source of roadfill		Potential as a source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
111A:							
Canarway	45	Poor		Fair		Poor	
		Too sandy	0.00	Wetness depth	0.14	Rock fragments	0.00
		Droughty	0.00	Cobble content	0.74	Too sandy	0.00
		Organic matter content low	0.88			Hard to reclaim (rock fragments)	0.00
						Wetness depth	0.14
Mccabe	40	Fair		Fair		Poor	
		Too acid	0.84	Wetness depth	0.14	Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.88			Wetness depth	0.14
149D:							
Danvers	85	Fair		Poor		Fair	
		Carbonate content	0.32	Low strength	0.00	Hard to reclaim (rock fragments)	0.02
		Too clayey	0.12	Shrink-swell	0.79	Too clayey	0.09
		Organic matter content low	0.88			Slope	0.37
						Rock fragments	0.97
						Carbonate content	0.98
151E:							
Shawmut	85	Fair		Poor		Poor	
		Droughty	0.54	Slope	0.00	Hard to reclaim (rock fragments)	0.00
		Carbonate content	0.80			Rock fragments	0.00
		Organic matter content low	0.88			Slope	0.00
						Carbonate content	0.99
169F:							
Doney	55	Poor		Poor		Poor	
		Organic matter content low	0.00	Depth to bedrock	0.00	Slope	0.00
				Slope	0.00	Depth to bedrock	0.29
		Droughty	0.26	Shrink-swell	0.91	Rock fragments	0.97
		Depth to bedrock	0.29				
Dolus	35	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Rock fragments	0.00
		Organic matter content low	0.12	Slope	0.00	Slope	0.00
				Shrink-swell	0.87	Depth to bedrock	0.35
		Depth to bedrock	0.35				

Source of Reclamation Material, Roadfill, and Topsoil

Granite County Area, Montana

Map symbol and soil name	Pct. of map unit	Potential as a source of reclamation material		Potential as a source of roadfill		Potential as a source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
351E:							
Roy	35	Poor		Poor		Poor	
		Stone content	0.00	Stones	0.00	Rock fragments	0.00
		Organic matter content low	0.12	Slope	0.00	Slope	0.00
				Cobble content	0.92	Hard to reclaim (rock fragments)	0.00
		Droughty	0.69				
		Too clayey	0.76			Too clayey	0.44
Danvers	25	Fair		Poor		Poor	
		Organic matter content low	0.12	Slope	0.00	Slope	0.00
						Rock fragments	0.00
		Carbonate content	0.32			Hard to reclaim (rock fragments)	0.02
		Too clayey	0.92				
						Too clayey	0.53
						Carbonate content	0.91
Shawmut	25	Fair		Poor		Poor	
		Droughty	0.73	Slope	0.00	Hard to reclaim (rock fragments)	0.00
		Carbonate content	0.80				
		Organic matter content low	0.88			Rock fragments	0.00
						Slope	0.00
442D:							
Braziel	50	Fair		Fair		Poor	
		Stone content	0.88	Stones	0.97	Rock fragments	0.00
		Droughty	0.91	Shrink-swell	0.98	Hard to reclaim (rock fragments)	0.00
						Slope	0.37
Tolbert	35	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Rock fragments	0.00
		Depth to bedrock	0.00	Cobble content	0.52	Depth to bedrock	0.00
				Shrink-swell	0.87	Slope	0.37
442E:							
Braziel	60	Fair		Poor		Poor	
		Stone content	0.27	Slope	0.00	Rock fragments	0.00
		Droughty	0.91	Stones	0.16	Slope	0.00
				Shrink-swell	0.98	Hard to reclaim (rock fragments)	0.00
Tolbert, very stony	25	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Rock fragments	0.00
		Depth to bedrock	0.00	Stones	0.00	Depth to bedrock	0.00
		Stone content	0.00	Cobble content	0.82	Slope	0.00
				Slope	0.00		

Source of Reclamation Material, Roadfill, and Topsoil

Granite County Area, Montana

Map symbol and soil name	Pct. of map unit	Potential as a source of reclamation material		Potential as a source of roadfill		Potential as a source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
444B:							
Gregson	85	Fair		Fair		Poor	
		Organic matter content low	0.88	Wetness depth	0.98	Hard to reclaim (rock fragments)	0.00
						Wetness depth	0.98
						Rock fragments	0.99
445B:							
Saypo	85	Fair		Fair		Fair	
		Carbonate content	0.16	Wetness depth	0.98	Carbonate content	0.75
		Organic matter content low	0.88	Shrink-swell	0.91	Wetness depth	0.98
						Hard to reclaim (rock fragments)	0.01
						Rock fragments	0.03
447B:							
Kleinschmidt	85	Fair		Fair		Poor	
		Droughty	0.79	Wetness depth	0.98	Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.88	Cobble content	0.98	Rock fragments	0.00
						Wetness depth	0.98
488F:							
Whitecow	85	Poor		Poor		Poor	
		Carbonate content	0.00	Slope	0.00	Hard to reclaim (rock fragments)	0.00
		Droughty	0.57	Cobble content	0.74	Rock fragments	0.00
		Organic matter content low	0.88			Slope	0.00
						Carbonate content	0.00
814B:							
Bandy	85	Poor		Fair		Poor	
		Too sandy	0.00	Wetness depth	0.14	Rock fragments	0.00
		Droughty	0.00			Too sandy	0.00
		Organic matter content low	0.88			Hard to reclaim (rock fragments)	0.00
						Wetness depth	0.14
824E:							
Conn	55	Fair		Poor		Poor	
		Organic matter content low	0.12	Slope	0.00	Slope	0.00
		Carbonate content	0.46			Rock fragments	0.88

Source of Reclamation Material, Roadfill, and Topsoil

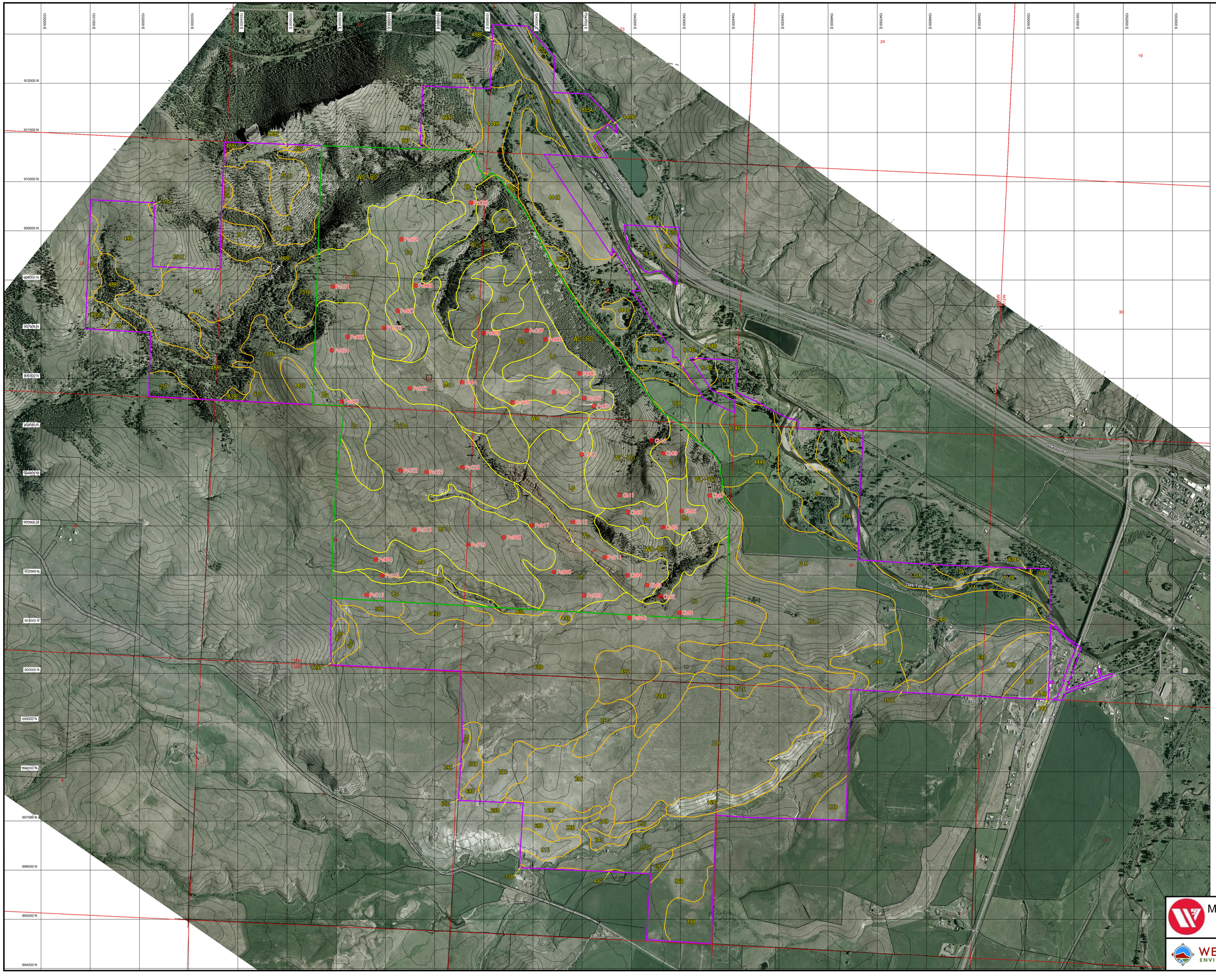
Granite County Area, Montana

Map symbol and soil name	Pct. of map unit	Potential as a source of reclamation material		Potential as a source of roadfill		Potential as a source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
824E:							
Sixbeacon	30	Fair		Poor		Poor	
		Droughty	0.31	Slope	0.00	Hard to reclaim (rock fragments)	0.00
		Organic matter content low	0.12			Rock fragments	0.00
		Carbonate content	0.32			Slope	0.00
						Carbonate content	0.91
839E:							
Windham	45	Poor		Poor		Poor	
		Carbonate content	0.00	Slope	0.00	Hard to reclaim (rock fragments)	0.00
		Droughty	0.25			Slope	0.00
		Organic matter content low	0.12			Carbonate content	0.00
						Rock fragments	0.00
Lap	30	Not rated		Poor		Not rated	
				Depth to bedrock	0.00		
				Slope	0.00		
				Shrink-swell	0.87		
Rock outcrop	10	Not rated		Not rated		Not rated	
839F:							
Windham	45	Poor		Poor		Poor	
		Carbonate content	0.00	Slope	0.00	Hard to reclaim (rock fragments)	0.00
		Droughty	0.25			Slope	0.00
		Organic matter content low	0.12			Carbonate content	0.00
						Rock fragments	0.00
Lap	30	Not rated		Poor		Not rated	
				Depth to bedrock	0.00		
				Slope	0.00		
				Shrink-swell	0.87		
Rock outcrop	10	Not rated		Not rated		Not rated	
855A:							
Mannixlee	45	Good		Fair		Poor	
				Wetness depth	0.14	Hard to reclaim (rock fragments)	0.00
				Shrink-swell	0.98	Wetness depth	0.14

Source of Reclamation Material, Roadfill, and Topsoil

Granite County Area, Montana

Map symbol and soil name	Pct. of map unit	Potential as a source of reclamation material		Potential as a source of roadfill		Potential as a source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
855A:							
Blossberg	40	Fair		Fair		Poor	
		Organic matter content low	0.12	Wetness depth	0.14	Hard to reclaim (rock fragments)	0.00
		Droughty	0.88			Wetness depth	0.14
						Rock fragments	0.80
915:							
Rock outcrop, welded tuff	100	Not rated		Not rated		Not rated	
988F:							
Whitecow	55	Poor		Poor		Poor	
		Carbonate content	0.00	Slope	0.00	Hard to reclaim (rock fragments)	0.00
		Droughty	0.57	Cobble content	0.74	Rock fragments	0.00
		Organic matter content low	0.88			Slope	0.00
						Carbonate content	0.00
Rock outcrop	30	Not rated		Not rated		Not rated	



LEGEND

- Intensive Study Area
- Extensive Study Area
- Soil Type Boundary
- Cb01 Soil Sample Site
- NRCS Soil Type Boundary

Intensive Study Area Soils

Symbol	Name	Acres	Percent of Area
BrTo	Braziel-Tolbert loams, 5-25%	274	20.5
Co	Coben clay loam, 5-15%	81	6.0
Da	Danvers silty clay loam, 5-25%	87	6.5
Lp	Lap gravelly loam, 5-50%	121	9.0
Ma	Martinsdale gravelly loam, 2-15%	125	9.4
Qg	Quigley silt loam, 2-15%	40	3.0
Sh	Shawmut gravelly loam, 2-15%	154	11.5
WC-RO	Whitecow - Rock Outcrop, 15-60%	331	24.8
Wd	Windham skeletal loam, 2-15%	70	5.2
Ws	Winspect skeletal loam, 2-50%	53	4.0
	Totals	1336	100

Extensive Study Area NRCS Soils

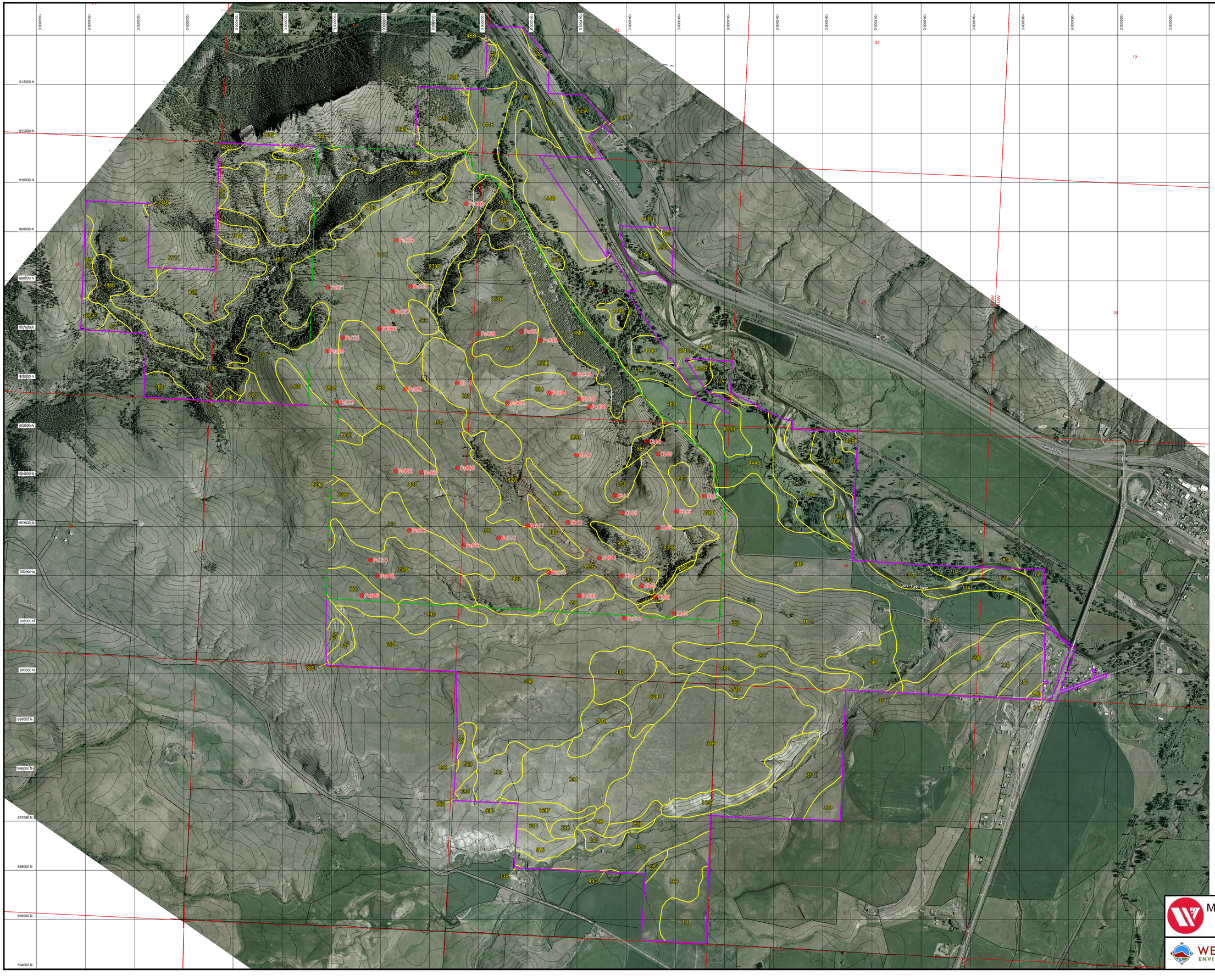
Symbol	Name	Acres	Percent of Area
10A	Mccabe-Canarway complex, impacted, 0-2%, occasionally flooded	26	1.2
11A	Mccabe-Canarway complex, 0-2%, occasionally flooded	146	6.7
24B	Con loam, 0-4%	172	7.9
24C	Con loam, 4-8%	30	1.4
25B	Straw silty clay loam, 0-4%	27	1.2
31B	Varney clay loam, 0-4%	154	7.1
33B	Rothiemay loam, 2-4%	61	2.8
33C	Rothiemay loam, 4-8%	18	0.8
33D	Rothiemay loam, 8-15%	7	0.3
34B	Cetrack loam, 0-4%	2	0.1
36B	Varney-Con loams, 0-4%	34	1.6
36D	Varney-Con loams, 8-15%	11	0.5
39C	Winspect gravelly loam, 4-8%	63	2.9
42E	Windham gravelly loam, 15-35%	69	3.1
49C	Danvers clay loam, 4-8%	53	2.4
49D	Danvers clay loam, 8-15%	52	2.4
52B	Martinsdale loam, 0-4%	9	0.4
52C	Martinsdale loam, 4-8%	14	0.6
58C	Coben clay loam, 4-8%	7	0.3
65D	Tanna loam, 8-15%	271	12.4
69C	Boxwell loam, 4-8%	4	0.2
69D	Boxwell loam, 8-15%	41	1.9
88E	Whitecow gravelly loam, 15-35%	1	0.1
88F	Whitecow gravelly loam, 35-60%	48	2.2
111A	Canarway-Mccabe complex, 0-2%, occasionally flooded	84	3.8
149D	Danvers cobbly loam, 8-15%	17	0.8
151E	Shawmut cobbly loam, 15-35%	44	2.0
169F	Doney-Dolus complex, 15-45%	37	1.7
351E	Roy-Shawmut-Danvers complex, 15-35%	287	13.1
442D	Braziel-Tolbert gravelly loams, 8-15%	9	0.4
442E	Braziel-Tolbert complex, 15-35%	2	0.1
444B	Gregson silt loam, 0-4%, rarely flooded	137	6.3
445B	Saypo silt loam, 0-4%, rarely flooded	3	0.2
447B	Kleinschmidt gravelly loam, cool, 0-4%, rarely flooded	3	0.1
488F	Whitecow gravelly loam, cool, 35-60%	131	6.0
814B	Bandy loam, 0-4%, rarely flooded	16	0.7
824E	Con-Subbeacon cobbly loams, 15-35%	23	1.1
839E	Windham-Lap-Rock outcrop complex, 15-35%	17	0.8
839F	Windham-Lap-Rock outcrop complex, 35-60%	32	1.5
855A	Mannixlee-Blossberg complex, 0-2%, rarely flooded	13	0.6
915	Welded tuff	10	0.5
	Totals	2185	100

0 400 800 1600
Feet

Montana Limestone Resources
Soils Baseline Map

WESTECH ENVIRONMENTAL

SCALE: 1"=800'	EXHIBIT
DATE: 4/1/14 | Rev. 2/19/18	1
DRAWN BY: DC	
CHECKED BY: CB	
FILE: MLR18_Soils_R2.dwg	SHEET: 1 of 1



LEGEND

- Intensive Study Area
- Extensive Study Area
- Cb01 Soil Sample Site
- NRCS Soil Type Boundary

Intensive Study Area NRCS Soils

Symbol	Name	Acres	Percent of Area
25B	Straw silty clay loam, 0-4%	1	0.1
39D	Winspect gravelly loam, 8-15%	23	1.7
49C	Danvers clay loam, 4-8%	90	6.7
49D	Danvers clay loam, 8-15%	11	0.8
51D	Shawmat gravelly loam, 8-15%	11	0.8
52C	Martinsdale loam, 4-8%	48	3.6
52D	Martinsdale loam, 8-15%	101	7.6
58C	Coben clay loam, 4-8%	14	1.0
60C	Quigley loam, 4-8%	36	2.7
65D	Tanna loam, 8-15%	16	1.2
88F	Whitecow gravelly loam, 35-60%	32	2.4
149D	Danvers cobbly loam, 8-15%	2	0.1
151E	Shawmut cobbly loam, 15-35%	178	13.3
351E	Roy-Shawmut-Danvers complex, 15-35%	131	9.8
442D	Braziel-Tolbert gravelly loams, 8-15%	2	0.1
442E	Braziel-Tolbert complex, 15-35%	110	8.2
444B	Gregson silt loam, 0-4%, rarely flooded	2	0.1
488F	Whitecow gravelly loam, cool, 35-60%	128	9.6
839E	Windham-Lap-Rock outcrop complex, 15-35%	388	29.0
839F	Windham-Lap-Rock outcrop complex, 35-60%	1	0.1
988F	Whitecow-Rock outcrop complex, 35-60%	11	0.8
	Total	1336	100

Extensive Study Area NRCS Soils

Symbol	Name	Acres	Percent of Area
10A	Mccabe-Canarway complex, impacted, 0-2%, occasionally flooded	26	1.2
11A	Mccabe-Canarway complex, 0-2%, occasionally flooded	146	6.7
24B	Con loam, 0-4%	172	7.9
24C	Con loam, 4-8%	30	1.4
25B	Straw silty clay loam, 0-4%	27	1.2
31B	Varney clay loam, 0-4%	154	7.1
33B	Rothiemay loam, 2-4%	61	2.8
33C	Rothiemay loam, 4-8%	18	0.8
33D	Rothiemay loam, 8-15%	7	0.3
34B	Cetrack loam, 0-4%	2	0.1
36B	Varney-Con loams, 0-4%	34	1.6
36D	Varney-Con loams, 8-15%	11	0.5
39C	Winspect gravelly loam, 4-8%	63	2.9
42E	Windham gravelly loam, 15-35%	69	3.1
49C	Danvers clay loam, 4-8%	53	2.4
49D	Danvers clay loam, 8-15%	52	2.4
52B	Martinsdale loam, 0-4%	9	0.4
52C	Martinsdale loam, 4-8%	14	0.6
58C	Coben clay loam, 4-8%	7	0.3
65D	Tanna loam, 8-15%	271	12.4
69C	Boxwell loam, 4-8%	4	0.2
69D	Boxwell loam, 8-15%	41	1.9
88E	Whitecow gravelly loam, 15-35%	1	0.1
88F	Whitecow gravelly loam, 35-60%	48	2.2
111A	Canarway-Mccabe complex, 0-2%, occasionally flooded	84	3.8
149D	Danvers cobbly loam, 8-15%	17	0.8
151E	Shawmut cobbly loam, 15-35%	44	2.0
169F	Doney-Dolus complex, 15-45%	37	1.7
351E	Roy-Shawmut-Danvers complex, 15-35%	287	13.1
442D	Braziel-Tolbert gravelly loams, 8-15%	9	0.4
442E	Braziel-Tolbert complex, 15-35%	2	0.1
444B	Gregson silt loam, 0-4%, rarely flooded	137	6.3
445B	Saypo silt loam, 0-4%, rarely flooded	3	0.2
447B	Kleinschmidt gravelly loam, cool, 0-4%, rarely flooded	3	0.1
488F	Whitecow gravelly loam, cool, 35-60%	131	6.0
814B	Bandy loam, 0-4%, rarely flooded	16	0.7
824E	Con-Sixbeacon cobbly loams, 15-35%	23	1.1
839E	Windham-Lap-Rock outcrop complex, 15-35%	17	0.8
839F	Windham-Lap-Rock outcrop complex, 35-60%	32	1.5
855A	Mannixlee-Blossberg complex, 0-2%, rarely flooded	13	0.6
915	Welded tuff	10	0.5
	Totals	2185	100

N

0 400 800 1600
Feet

Montana Limestone Resources
NRCS Soils Map

WESTECH ENVIRONMENTAL

SCALE: 1"=800'
DATE: 08/31/17 | Rev. 2/19/18
DRAWN BY: DC
CHECKED BY: CB
FILE: MLR18 Soils NRCS R1.dwg

EXHIBIT
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