ALASKA DIVISION OF GEOLOGICAL &
GEOPHYSICAL SURVEYS

PRELIMINARY INTERPRETIVE REPORT 2002-3
Stevens, 2013
SHEET 1 OF 1

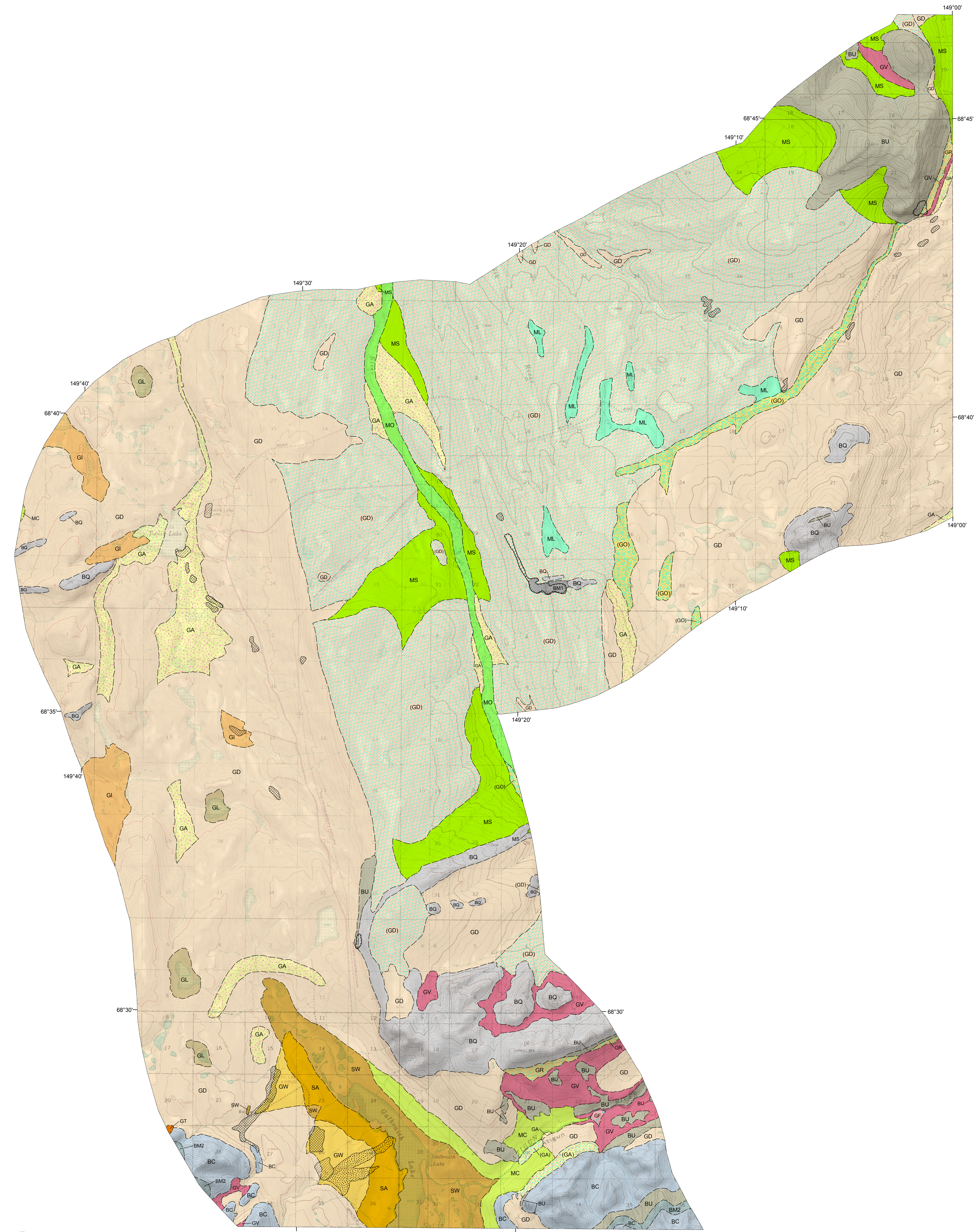


Table 1. *Generalized engineering properties of unconsolidated materials; parentheses indicate deposits covered by more than 0.3 m silty overburden.*

Map unit	Drainage	Permafrost	Frost susceptibility	Slope stability	Bearing strength	Potential primary products	Potential engineering considerations	Component geologic units*
GA (GA)	Good in recently deposited alluvium above stream level, fair to poor in older alluvium where permafrost has developed. Good in younger permafrost-free terrace deposits without significant cover of organic silt. Drainage may be inhibited on older, inactive surfaces mantled by appreciable thicknesses of silt and organic materials.	Generally absent in younger alluvial deposits; locally present in older deposits mantled by silt and peat. May be ice rich in overlying organic silt or where silt has infiltrated into gravels by percolating ground water, and where local accumulations of peat and organic silt promote development of segregated ice. Ice is typically limited to fine-grained overburden, but may coat particles and fill voids in coarse materials.	Minimal in well-drained modern alluvium; may be moderate to intense in active layer silt and peat. Terrace gravels generally not susceptible to heave; heave may occur in organic silt that caps older alluvium.	Generally stable, except for ice-rich permafrost-bearing deposits subject to thaw instability and areas adjacent to cutbanks or free faces, where sudden, rapid collapse may occur due to stream erosion or surface loading. Fill terraces may be subject to slumping and rapid erosion.	Variable, but generally good to fair, especially below peat and silt overburden.	Crushed aggregates and miscellaneous clean fill. Sand and gravel may be excellent for fill, base course, and surface course.	Cutbanks along active streams may fail, thus may not be suitable for structure sites. High flooding and icing potential along margins of streams. Shallow ground-water table along streams may restrict depth of excavation.	al, gr, al2, so2, io3, io2A, io2-E, io1-E, tg
GD (GD)	Variable, depending on proportion of silt- and clay-sized material and stage of permafrost development. Deposits on or at the base of steep slopes may be subject to snow avalanches and torrential flooding during periods of snowmelt or heavy precipitation.	Generally present within a meter of the surface, especially in older deposits. Segregated-ice content may be high where silt and organic materials are prevalent.	High in deposits that contain large proportions of silt, clay, or organic silt and in deposits with poor drainage.	Thaw unstable where deposit contains excess ice. Deposits of predominantly silty material are susceptible to creep, especially where saturated by near-surface ground water.	Variable, but generally fair to poor.	Unclassified fills, although some local pods or lenses may be a source of moderately sorted gravel.	Saturated or oversteepened deposits may be subject to slope failure, and local thaw subsidence may occur in areas of permafrost.	id, (id), id1, id1-E, id1?, id1A, id1B, id2, id2A, id2A?, id2B, id3, id3A, id3B, id?, sd2-E, sd2-E?, sd-E, sd?, (sd2), sd2?, sd2, sd
GF	Deposits on or at the base of steep slopes may be subject to snow avalanches and torrential flooding during periods of snowmelt or heavy precipitation.	Generally present within a meter of the surface, especially in older deposits. Ice commonly coats particles and fills voids.	Frost stable, except for silt and organic zones on older surfaces, especially where shallow permafrost inhibits drainage.	Generally stable, except where overburden is susceptible to frost heaving	Variable, but generally fair.	Locally good for fill, base course, and surface course.	May be subject to snow avalanches, debris flows, subsidence, and local liquefaction.	f
GI	Fair to poor where permafrost has developed.	Generally present within a meter of the surface and locally ice rich. Ice commonly coats particles and fills voids.	Frost stable, except for silt and organic zones on older surfaces, especially where shallow permafrost inhibits drainage.	Generally stable, except for ice-rich permafrost-bearing deposits subject to thaw instability.	Variable, but generally good to fair.	Locally good for fill, base course, and surface course.	Local finer-grained, permafrost-bearing zones may be subject to thaw subsidence.	f-i, i-c
GL	Very poor, may have standing water.	Generally present within a meter of the surface and generally extremely ice rich.	High.	Extremely unstable, actively thawing and flowing.	Poor.	Generally unsuited for most construction purposes.	Subject to slump, slough, subsidence, liquefaction, mudflows, and thaw subsidence.	fl, ika
(GO)	Drainage may be inhibited on older, inactive surfaces mantled by appreciable thicknesses of silt and organic materials.	Generally present within a meter of the surface, especially where mantled by appreciable thicknesses of silt and organic materials, and ice content may be high where silt and organic materials are prevalent. Ice commonly coats particles and fills voids.	Minimal in underlying gravels; heave may occur in organic silt that caps older alluvium.	Generally stable, except for ice-rich permafrost-bearing deposits subject to thaw instability.	Variable, but generally good to fair below peat and silt overburden.	Crushed aggregates and miscellaneous clean fill.	Overburden would need to be thawed and removed prior to excavation as borrow.	io1
GR	Good.	Generally present within a meter of the surface.	Low.	Generally unstable and may be subject to snow avalanches, debris flows, and rock falls.	Poor.	Rubble of competent rock good for riprap and coarse fill.	Potentially unstable, especially if disturbed by construction.	tr
GT	Generally good.	Generally present within a meter of the surface.	Low.	Generally unstable and commonly subject to debris flows, as well as potential snow avalanches and rock falls.	Variable, but generally poor.	Rubble of competent rock at fan apex good for riprap and coarse fill. Unclassified fills.	Highly unsuitable as sites of construction activities.	af
GV	Variable, depending on proportion of silt- and clay-sized material and stage of permafrost development. Deposits on or at the base of steep slopes may be subject to snow avalanches and torrential flooding during periods of snowmelt or heavy precipitation.	Generally present within a meter of the surface, especially in older deposits. Segregated-ice content may be high where silt and organic materials are prevalent.	High in deposits that contain large proportions of silt, clay, or organic silt and in deposits with poor drainage. Fans are frost stable, except for silt and organic zones on old fan surfaces, especially where shallow permafrost inhibits drainage. Heave may occur in organic silt caps.	Thaw unstable where deposit contains excess ice. Deposits of predominantly silty material are susceptible to creep, especially where saturated by near-surface ground water. Steep colluvial deposits, such as talus aprons at or near the angle of repose, are generally unstable and may be subject to snow avalanches, debris flows, and rock falls. Fans are generally stable, except where overburden is susceptible to frost heaving. Alluvial deposits generally stable, except for ice-rich permafrost-bearing deposits subject to thaw instability and areas adjacent to cutbanks or free faces, where sudden, rapid collapse may occur due to stream erosion or surface loading. Fill terraces may be subject to slumping and rapid erosion.	Variable, but generally fair to poor.	Unclassified fills, although some local pods or lenses may be a source of moderately sorted gravel and gravel-rich fluvial sand.	Fan surfaces may be subject to snow avalanches, debris flows, subsidence, and local liquefaction. Therefore, caution should be exercised during excavation and construction activities. Saturated or oversteepened deposits may be subject to slope failure, and local thaw subsidence may occur in areas of permafrost.	c, mv
GW	Good in recently deposited alluvium above stream level, fair to poor in older alluvium where permafrost has developed. Drainage may be inhibited on older, inactive surfaces mantled by appreciable thicknesses of silt and organic materials.	Generally absent in younger alluvial deposits; locally present in older deposits mantled by silt and peat. Present where local accumulations of peat and organic silt promote development of segregated ice. Ice is typically limited to fine-grained overburden, but may coat particles and fill voids in coarse materials.	Minimal in well-drained modern alluvium; may be moderate to intense in active layer silt and peat.	Generally stable, except for ice-rich, permafrost-bearing overburden deposits subject to thaw instability and areas adjacent to cutbanks or free faces, where sudden, rapid collapse may occur due to stream erosion or surface loading.	Variable, but generally good to fair, especially below peat and silt overburden.	Crushed aggregates and miscellaneous clean fill.	Subject to torrential floods, shifting channels, and local icings.	fd-gr
MC	Highly variable depending on stage of permafrost development. Very poor in frozen deposits.	Present within a meter of the surface. Interstitial ice, segregated ice, and massive ice may be present.	High in deposits with high proportion of silt or organic silt and in areas of poor drainage.	May be thaw unstable where perennially frozen or where containing excess ice.	Generally poor.	Generally unsuitable as materials sources.	Silt deposits may be subject to slump, slough, subsidence, liquefaction, mudflows, and thaw subsidence.	igl
ML	Generally poor.	Present within a meter of the surface. Abundant ice present as disseminated grains and as lenses and wedges.	High.	Thaw unstable where containing excess ice; subject to slumping and earthflows when thawed.	Generally poor.	Generally unsuitable as materials sources.	May be subject to slump, slough, subsidence, liquefaction, mudflows, and thaw subsidence. Thaw lakes common.	si
MO	Very poor.	Generally absent in younger alluvial deposits; extensive and ice rich in older deposits.	Very high.	Thaw unstable; subject to slumping and earthflows due to saturation when thawed.	Generally poor, especially where thawed.	Peat may be suitable for horticultural or energy applications.	Surface subject to inundation, extreme frost heaving, and thaw subsidence in saturated soils. Generally unsuitable as structure sites unless structures are pile supported.	al-sp
MS	Generally poor.	Present within a meter of the surface. Interstitial ice, segregated ice, and massive ice may be present, especially in deposits with appreciable organic content or in areas of limited drainage.	High.	Thaw unstable where containing excess ice; subject to slumping and earthflows. Susceptible to creep, especially where saturated by near-surface ground water.	Generally poor.	Generally unsuitable as materials sources.	Ice-rich deposits may be subject to slump, slough, subsidence, liquefaction, mudflows, and thaw subsidence. Pervasive downslope movement by surface creep and flow.	s
SA	Generally good. Drainage may be inhibited on older, inactive surfaces mantled by appreciable thicknesses of silt and organic materials.	Generally present within a meter of the surface in older deposits. Local surface accumulations of peat and organic silt promote development of segregated ice. Massive ice is typically limited to fine-grained overburden. Ice commonly coats particles and fills voids in sand.	Minimal in well drained sand; may be moderate to intense in interbedded silt layers or active layer silt and peat.	Sand-rich deposits may be unstable due to lack of cohesiveness.	Generally poor to fair.	Sand-rich deposits may be useful in some construction situations and as unclassified fine fills.	May be subject to distal effects of torrential floods, shifting channels, and local icings.	fd-sa
SW	Generally very good, except in areas of shallow permafrost.	Generally present within a meter of the surface. Ice commonly coats particles and fills voids in sand.	Minimal in well-drained sand.	Generally unstable due to lack of cohesiveness.	Generally poor.	May be useful in some construction situations and as unclassified fine fills.	Instability due to lack of cohesiveness of sand may require surface stabilization for construction activities.	al-sa, ds, sa, b

* Source of geologic units: Hamilton (2003)

Table 2. *Generalized engineering properties of bedrock units.*

Map unit	Principal rock characteristics	Potential primary products	Component geologic units**
BC	Sedimentary carbonate rocks	•Dimension stone •Ornamental stone •Crushed rock •Cement •Riprap •Coarse fill •Base course •Surface coarse	lPMlu, Mlm
BM1	Mixed quartzose sedimentary rocks and fine-grained, platy sedimentary rocks	Quartzose sandstone and conglomerate: •Riprap •Drain rock •Crushed rock •Coarse fill •Unclassified fills Shale: •Generally unsuitable for most construction purposes	Kfmc+Kpm
BM2	Sedimentary carbonate rocks overlain by fine-grained, platy sedimentary rocks	Limestone: •Dimension stone •Ornamental stone •Crushed rock •Cement •Riprap •Coarse fill •Base course •Surface coarse Mudstone: •Generally unsuitable for most construction purposes	Mll
BQ	Quartzose sedimentary rocks	•Riprap •Drain rock •Crushed rock •Coarse fill •Unclassified fills	Kfmc, Kfmc?, Kfmu
BU	Rocks of mixed lithology and character	Lithic sandstone: •Unclassified fills Limestone: •Dimension stone •Ornamental stone •Crushed rock •Cement •Riprap •Coarse fill •Base course •Surface coarse Mudstone, siltstone, coal: •Generally unsuitable for most construction purposes	JTRo, Kfml, Knl, Knu, Ko, Kpm, Kto, Mk, Ps

** Source of geologic units: Harris and others (2002)

ENGINEERING-GEOLOGIC MAP OF THE DALTON HIGHWAY FROM GALBRAITH LAKE TO SLOPE MOUNTAIN, SOUTHERN ARCTIC FOOTHILLS, ALASKA

by

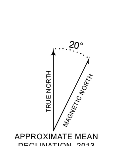
D.S.P. Stevens

2013

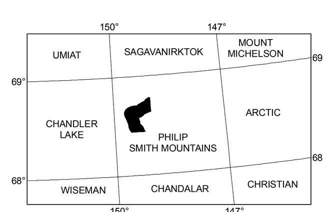
SCALE 1:63360

1 1/2 0 1 2 3 4 5 MILES
3000 0 3000 6000 9000 12000 15000 18000 21000 24000 27000 FEET
1 .5 0 1 2 3 4 5 6 7 KILOMETERS

PHILLIP SMITH MOUNTAINS B-4 AND B-5 -- CONTOUR INTERVAL 100 FEET
PHILLIP SMITH MOUNTAINS C-4, C-5, AND D-4 -- CONTOUR INTERVAL 50 FEET
PHILLIP SMITH MOUNTAINS B-4 AND B-5 -- DOTTED LINES REPRESENT 50 FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929



MAP LOCATION



Location of Map Area

Topographic base map from:
U.S. Geological Survey topographic maps
Phillip Smith Mountains B-4 (1971 - minor revisions 1975)
Phillip Smith Mountains B-5 (1971 - minor revisions 1975)
Phillip Smith Mountains C-4 (1971 - minor revisions 1975)
Phillip Smith Mountains C-5 (1971 - minor revisions 1975)
Phillip Smith Mountains D-4 (1971 - minor revisions 1975)
Projection:
Universal Transverse Mercator Zone 6 North
Datum:
North American Datum of 1927
Geologic field investigations by:
D.S.P. Stevens (2001)
Geologic interpretation by:
D.S.P. Stevens (2001, 2002, 2013), based on Hamilton (2003)
Geologic GIS data layers created by:
D.S.P. Stevens (2001, 2002, 2013)
Cartography by:
P.E. Gallagher (2013)
Editorial review by:
P.K. Davis (2013)
Peer review by:
J.R. Schaefer (2002)

State of Alaska
Department of Natural Resources
DIVISION OF GEOLOGICAL & GEOPHYSICAL

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EXPLANATION

This map illustrates potential near-surface sources of various geologic materials that may be useful for construction. Field observations indicate that each geologic unit (for example, Terrace Gravel) has a definite composition or range of compositions. Therefore, the probable presence of construction materials is interpreted from the distribution of geologic units on the geologic map of this area. This map is generalized and is not intended to show exact locations of specific materials. The purpose is to indicate general areas that deserve consideration for certain materials and to eliminate other general areas from consideration for these materials. Local variations are common, especially near unit boundaries.

Potential uses of map units are qualitatively summarized in Tables 1 and 2, which show potential availability of various construction materials in each engineering-geologic unit. Precise economic evaluations of specific deposits as sources of construction materials will require detailed examination of each deposit, including areal extent, volume, grain size variation, thickness of overburden, thermal state of the ground (ground temperature), and depth to water table, as well as logistical factors, demand, and land ownership.

This map also addresses some of the principal hazards and engineering considerations that may be associated with mapped geologic units based on their general physical properties, conditions that are characteristic of their depositional environment, and topography. Potential geologic hazards directly relate to surficial-geologic units because (1) the processes that formed the deposits may be hazardous where still active, (2) postdepositional conditions (like ground ice) may present additional hazards, and (3) materials characteristically present in the deposits are known to be susceptible to certain hazards (like liquefaction). In general, natural hazards in lowlands are related to a lack of bearing strength (such as saturated, organic-rich swamp deposits and thawing of ice-rich permafrost) and to seasonal flooding. In highlands, mass movements may be a serious local concern. Local, unevaluated factors affecting mass movement (rock avalanches, landslides, and debris flows) include sediment textures, bedrock structures, and water content. This map is intended only as a general guide to some common hazards that may be present, depending on other factors like topography and water content, and does not preclude the presence of other unevaluated or site-specific hazards.

This map was derived electronically from geologic maps of the area (Hamilton, 2003; Harris and others, 2002) using Geographic Information System (GIS) software. It is only locally verified by ground observations during brief field visits. The results should be considered reconnaissance in nature. Location and extent of borrow pit on Galbraith Lake Camp fan courtesy of Northern Region DOT&PF, 2014. All other materials sites mapped on the basis of 1979 and 1982 aerial photographs and 2001 field observations.

DESCRIPTION OF MATERIALS UNITS

UNCONSOLIDATED MATERIALS

GA
(GA)
WELL TO LOCALLY POORLY GRADED GRAVEL WITH SAND AND SILT—Chiefly (estimated >80 percent) clean sand and gravel with some (estimated 10-30 percent) silt. Grain size and degree of stratification are variable. Permafrost may be present, especially in older deposits. Older deposits may contain highly weathered clasts and thus may not be suitable as construction materials. Rare oversized materials may include boulders. Subunit (GA) covered by 0.5-1.0m silt-rich overburden. Includes primarily GW and GW-GM of the ASTM standards soil classification (American Society for Testing and Materials, 1988), with possible subordinate proportions of GP and GP-GM. Subunit (GA) overburden includes primarily ML, OL/OH, and SM.

GD
(GD)
POORLY TO MODERATELY GRADED GRAVEL WITH SILT, SAND, AND CLAY—Estimated 20-60 percent coarse, granular deposits with considerable oversized material. Extremely variable in composition and areal extent of individual component deposits. Engineering applications vary widely due to large range of grain size and sorting properties. Older deposits may contain highly weathered clasts and thus may not be suitable as construction materials. Subunit (GD) covered by silt-rich overburden of variable thickness. Includes primarily GP, GP-GM, GP-GC, GM, and GC of the ASTM standards soil classification (American Society for Testing and Materials, 1988). Subunit (GD) overburden includes primarily ML, OL/OH, and SM.

GF
MODERATELY TO POORLY GRADED GRAVEL WITH SAND AND SILT—Estimated 30-80 percent coarse, granular deposits with considerable oversized material. Engineering applications vary somewhat due to range of grain size and sorting properties. Ice rich permafrost may be present, especially in older deposits. Includes primarily GW-GM, GP-GM, and GM of the ASTM standards soil classification (American Society for Testing and Materials, 1988).

GI
WELL TO MODERATELY GRADED GRAVEL WITH SAND AND SILT—Chiefly (estimated >80 percent) clean sand and gravel, with some (estimated 10-30 percent) silt. Grain size and degree of stratification are variable. Ice rich permafrost may be present, especially in older deposits. Older deposits may contain highly weathered clasts and thus may not be suitable as construction materials. Rare oversized materials may include boulders. May locally include some poorly graded gravel with higher silt and/or clay content. Includes primarily GW, GW-GM and GM of the ASTM standards soil classification (American Society for Testing and Materials, 1988). Locally includes GP-GM.

GL
VERY POORLY GRADED SILTY AND CLAYEY GRAVEL WITH ORGANIC DEBRIS—Estimated 20-80 percent coarse, granular deposits with considerable oversized material. Engineering applications limited, and vary widely due to large range of grain size and sorting properties. Includes primarily GP-GM, GP-GC and GP of the ASTM standards soil classification (American Society for Testing and Materials, 1988), with subordinate proportions of OL/OH, SM, and ML.

(GO)
WELL GRADED, WEATHERED GRAVEL WITH SAND AND SILT—Chiefly (estimated >80 percent) clean sand and gravel, overlain by 0.3–2.5m organic-rich silt. Grain size and degree of stratification are variable. Ice rich permafrost may be present, especially in overburden. Rare oversized materials may include boulders. Includes primarily GW and GW-GM of the ASTM standards soil classification (American Society for Testing and Materials, 1988). Overburden includes primarily ML, OL/OH, and SM.

GR
POORLY GRADED ROCK DEBRIS AND RUBBLE, WITH MINOR VARIABLE AMOUNTS OF INTERSTITIAL SAND, SILT, AND CLAY—Estimated 90 percent coarse, angular deposits with considerable oversized material. Engineering applications vary widely due to large range of grain size and sorting properties. Includes primarily GP of the ASTM standards soil classification (American Society for Testing and Materials, 1988).

GT
POORLY TO MODERATELY GRADED GRAVEL WITH SILT AND SAND—Estimated 20-80 percent coarse, granular deposits with local oversized material that may include boulders. Engineering applications vary widely due to large range of grain size and sorting properties. Ice rich permafrost may be present, especially in older deposits. Includes primarily GP-GM and GP of the ASTM standards soil classification (American Society for Testing and Materials, 1988).

GV
MIXED COARSE AND FINE MATERIALS—Mixed deposits of rubble, gravel, sand, silt, clay, and organic material in variable proportions and areal extent. Engineering applications vary widely due to large range of grain size and sorting properties. Permafrost may be present, especially in older deposits. Includes primarily GP, GP-GM, GP-GC, GM, GC, SM, ML and OL/OH of the ASTM standards soil classification (American Society for Testing and Materials, 1988). Locally includes GW, GW-GM, SW, and SW-SM.

GW
WELL GRADED GRAVEL, WITH SAND—Chiefly (estimated >90 percent) clean gravel and sand. Grain size and degree of stratification are variable. Ice-rich permafrost may be present, especially in overburden and older deposits. Rare oversized materials may include boulders. Includes primarily GW of the ASTM standards soil classification (American Society for Testing and Materials, 1988).

MC
WELL GRADED SILT, SILT WITH SAND, SANDY SILT, AND CLAY—Estimated >80 percent silt and sand, with some (estimated 10-30 percent) clay. Commonly frozen and ice-rich, especially on north-facing slopes. Includes primarily ML of the ASTM standards soil classification (American Society for Testing and Materials, 1988), with subordinate proportions of CL, CH, or MH.

ML
SILT WITH MINOR SAND AND SMALL PEBBLES—Estimated >90 percent silt. May be locally organic rich. Commonly frozen and ice rich, especially on north-facing slopes. Includes primarily ML of the ASTM standards soil classification (American Society for Testing and Materials, 1988).

MO
WELL GRADED ORGANIC RICH SILT AND SAND—Estimated >80 percent organic silt and peat. Commonly frozen and ice-rich due to the excellent insulating properties of peat, especially on north-facing slopes. Includes primarily ML and OL/OH of the ASTM standards soil classification (American Society for Testing and Materials, 1988).

MS
SANDY SILT WITH GRAVEL, ORGANIC SILT, AND SILTY SAND WITH GRAVEL—Chiefly fine materials. Estimated >70 percent silt. May be organic rich. Commonly frozen and ice-rich, especially on north-facing slopes. Includes primarily ML, OL/OH, and SM of the ASTM standards soil classification (American Society for Testing and Materials, 1988).

SA
WELL TO MODERATELY GRADED SAND, WITH SILT AND GRAVEL—Chiefly fine materials. Estimated >80 percent sand. May be locally organic rich. Ice-rich permafrost may be present, especially in older deposits. Includes primarily SW, SW-SM, and SM of the ASTM standards soil classification (American Society for Testing and Materials, 1988).

SW
WELL GRADED FINE- TO COARSE-GRAINED SAND—Estimated >90 percent sand. Includes primarily SW of the ASTM standards soil classification (American Society for Testing and Materials, 1988).

BEDROCK MATERIALS

BC
MEDIUM-JOINTED TO MASSIVE, FINE- TO COARSE-GRAINED SEDIMENTARY CARBONATE ROCKS—Chiefly limestone. May include chert nodules and zones of platy bedding.

BM1
MIXED MEDIUM-JOINTED, FINE- TO COARSE-GRAINED, QUARTZOSE SEDIMENTARY ROCKS AND VERY FINE-GRAINED, PLATY SEDIMENTARY ROCKS—Chiefly conglomerate, sandstone, and shale.

BM2
MIXED MEDIUM-JOINTED TO MASSIVE, MEDIUM-GRAINED SEDIMENTARY CARBONATE ROCKS AND VERY FINE-GRAINED, PLATY SEDIMENTARY ROCKS—Chiefly limestone overlain by shale.

BQ
MEDIUM-JOINTED, FINE- TO COARSE-GRAINED QUARTZOSE SEDIMENTARY ROCKS—Chiefly chert-rich conglomerate and sandstone.

BU
UNDIFFERENTIATED MIXED ROCKS—Rocks of mixed lithology and/or very fine-grained sedimentary lithologies that are generally poorly suited for use as construction materials. Includes non-quartzose sandstone, shale, mudstone, siltstone, limestone, and coal.

EXPLANATION OF MAP SYMBOLS

CONTACT—Identity and existence certain, location approximate

BORROW PIT—Site mined for construction materials, principally sand and gravel

GRADED AREA—Includes Toolik Research Site and pipeline construction camps

NALED—Zone of persistent icing, approximately located

ROCK QUARRY—Area mined for rock materials for construction

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Harris, E.E., Mull, C.G., Reifenstuhl, R.R., and Montayne, Simone, 2002, Geologic map of the Dalton Highway (Atigun Gorge to Slope Mountain) area, southern Arctic Foothills, Alaska: Alaska Division of Geological & Geophysical Surveys Preliminary Interpretive Report 2002-2, 1 sheet, scale 1:63,360.

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