State of Alaska
DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS
Manuscript Review Form

Report Title	Surficial geology and geohazards in the Alaska Highway Corridor, Alaska
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Editor	Paula Davis paula.davis@alaska.gov 907-451-5053

Recommendation

☐ Accept as submitted

☒ Accept with minor revisions

☐ Accept with major revisions

Revisions needed for:
☒ manuscript
☒ tables
☒ figures
☒ map(s)

☐ Do not accept. Major revisions required. Return to author.

☐ Do not accept. Material not suitable for a (RI, series). Return to author.

Reviewer's General Comments:

This report and associated maps are a significant contribution to the surficial and engineering geology of the Alaska Highway corridor between Delta Junction and the Canada border. It will be a crucial reference for future developments along this important transportation corridor and for future geologic work in the region. A similar and needed compilation of bedrock geology has yet to be undertaken.

See attached printouts for my general comments on the text and maps; detailed comments and edits on the text and captions (tables and figures) are in separate Word files using Track Changes. Comments on the figures are handwritten on the printed figures, and comments on the maps are handwritten on the sheets.

My comments on the surficial-geologic unit descriptions are in a separate Word file.

☒ I wish to be acknowledged in the final product.
☐ I wish to remain anonymous in the final product

Name of Reviewer, Organization, Address

Reviewer	**email/phone**
Rod Combellick	rcombellick@gmail.com

Reviewer Signature Rod Combellick **Date** 8-11-2016

Table 2

Cordilleran Ice Sheet western Yukon Territory	Eastern Alaska Range Delta River valley eastward	Yukon–Tanana Upland
Smith and others (1986) Hughes (1989) Tarnocai (1989) Tarnocai and others (1985) Tarnocai and Schweger (1991)	Péwé and Holmes (1964) Holmes (1965) Holmes and Péwé (1965) Holmes and Foster (1968) Péwé and Reger (1983a) Duk-Rodkin and others (2004) Hamilton (unpublished)	Weber (1986) Duk-Rodkin and others (2004) Briner and others (2005)
Holocene glaciation [a]	Holocene glaciation [a,b]	Unknown [c]
Stewart soil	Post-Donnelly soil	Immature soil formation
McConnell glaciation	Donnelly glaciation	Ramshorn advances Salcha glaciation
Diversion Creek paleosol	Post-Delta paleosol	Variable soil formation
Reid glaciation [d,e]	Delta glaciation [d,e]	Eagle glaciation Mt. Harper glaciation
Wounded Moose paleosols	Pre-Delta paleosol(s) [f]	Deep soil formation
Pre-Reid glaciations	Darling Creek glaciation(s)	Charley River glaciation

[a] *Northern lobe of White River Ash was deposited ~1.9 RC ka (Lerbekmo and others, 1975).*

[b] *Bed G of Hayes tephra set H was deposited ~3.7 RC ka (Begét and others, 1991; Riehle, 1994; Reger and Péwé, 2002).*

[c] *Previously named Ramshorn I and II advances (Weber, 1986), but later dated as late Wisconsin by Briner and others (2005).*

[d] *Sheep Creek tephras (SCt-) CC, C, K, and A, which were previously thought to date ~190 ka (Berger and others, 1996; Schaefer, 2002), are now thought to date ~80 ka, based on optically-stimulated luminescence (OSL) ages, and postdate the Reid and Delta glaciations (Westgate and others, 2008). SCt-F, which is stratigraphically beneath the Old Crow tephra (OCt) in the Fairbanks area, is still thought to date ~200 ka (Westgate and others, 2008).*

RC

[e] *For many years, OCt was dated at ~140 ka (Preece and others, 1999; Schaefer, 2002) but was initially recalculated to be 131 ± 11 ka by Péwé and others (2009). More recently, comparison of OCt and a newly redated glass fission-track standard indicates that the OCt could have a mean age of 124 ± 10 ka (Preece and others, 2011). Analysis of plant and insect remains on the surface beneath the OCt at The Palisades along the Yukon River and fossil remains in associated sediments indicate that OCt was deposited late in MIS 6 time, as interpreted by Péwé and others (1997). OCt is thought to postdate the Reid and Delta glaciations (Hughes, 1989; Begét and Keskinen, 2003).*

[f] *Includes the Gerstle River paleosol of Duk-Rodkin and others (2004).*

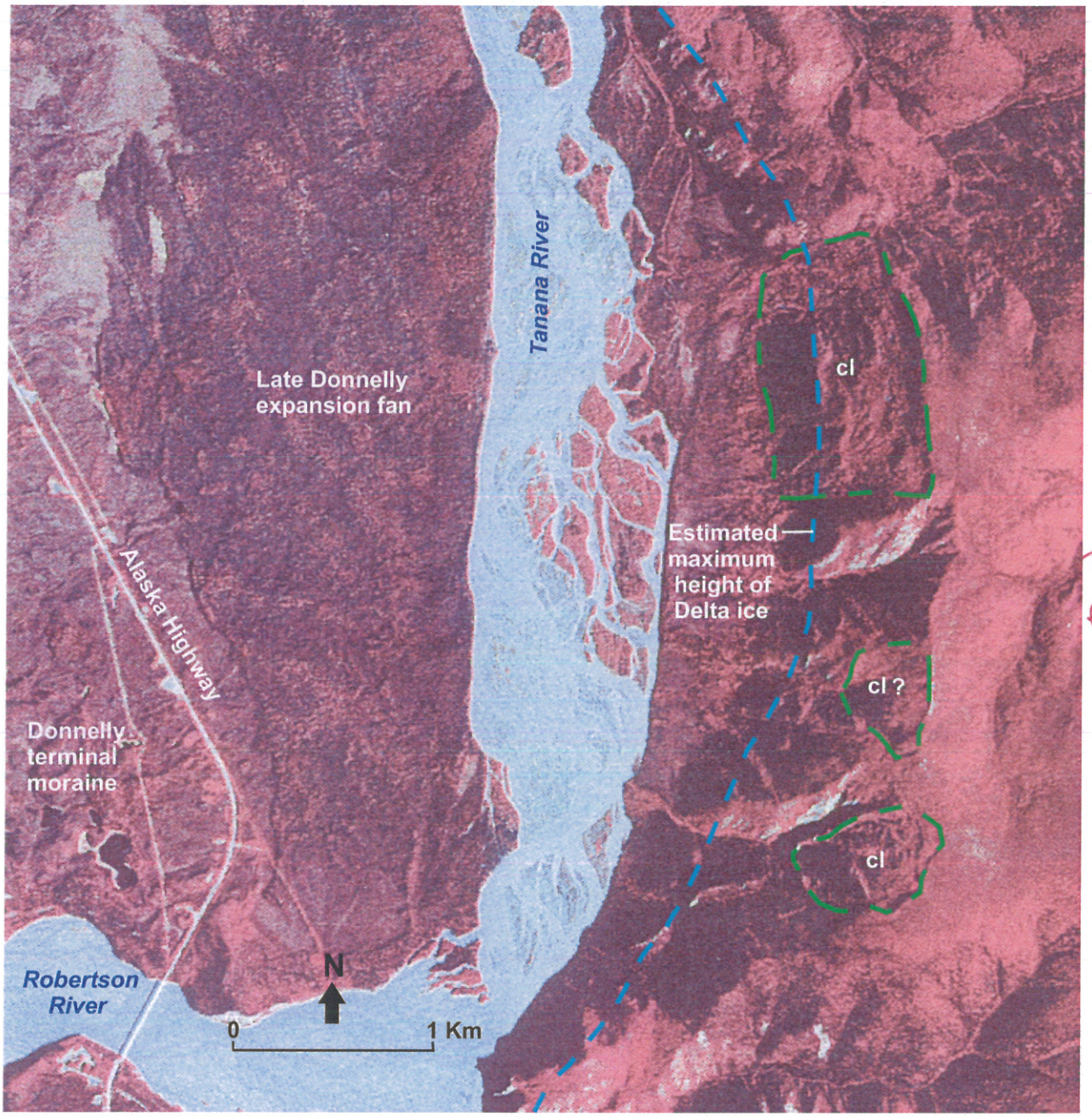
Table 4

Sample number[a]	Composition	Moisture content (percent dry weight)	
		Eolian sand	Lowland and retransported loess
M-1a M-1b	Frozen eolian sand, well bonded, no visible ice Unfrozen, wet, silty retransported loess, thixotropic	45	21
M-2	Frozen, well-bonded, black, peaty and woody retransported organic silt, scattered clear ice crystals ≤3 mm across	—	345
M-3	Frozen, well-bonded, silty loess, no visible ice, thixotropic when thawed	—	39
M-4	Frozen, well-bonded, fine to medium eolian sand with trace silt, thixotropic when thawed	28	—
M-5	Frozen, well-bonded, fine to medium eolian sand, no visible ice	19	—
M-6	Frozen, moderately bonded, medium eolian sand with trace silt, no visible ice	19	—
M-7	Frozen, well-bonded, retransported organic silt, no visible ice	—	76
M-8	Frozen, moderately bonded, clean, fine to medium eolian sand, no visible ice	17	—
M-9	Frozen, well-bonded, medium eolian sand, no visible ice, thixotropic when thawed	25	—
M-10	Frozen, well-bonded, retransported organic fine sand with some silt, no visible ice	—	60
M-11	Frozen, well-bonded retransported silt, no visible ice	—	33

[a] *Sample locations shown in permafrost map sheets 5 and 6. Samples M-1 through M-9 collected 07-20-09. Samples M-10 and M-11 collected 08-01-09.*

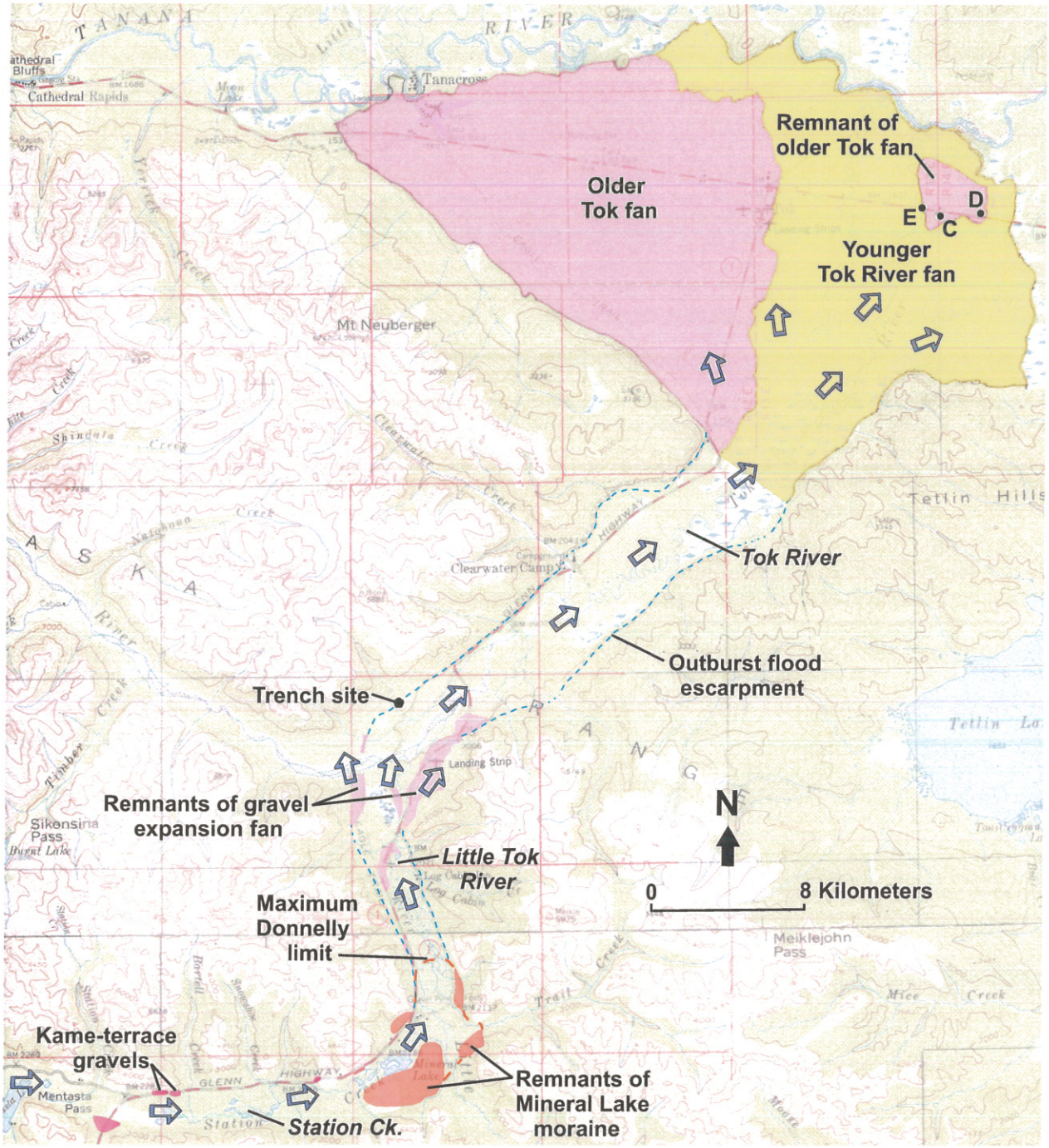
Check for correct sheet numbers.

Rc



Label Tower Blu
for clari

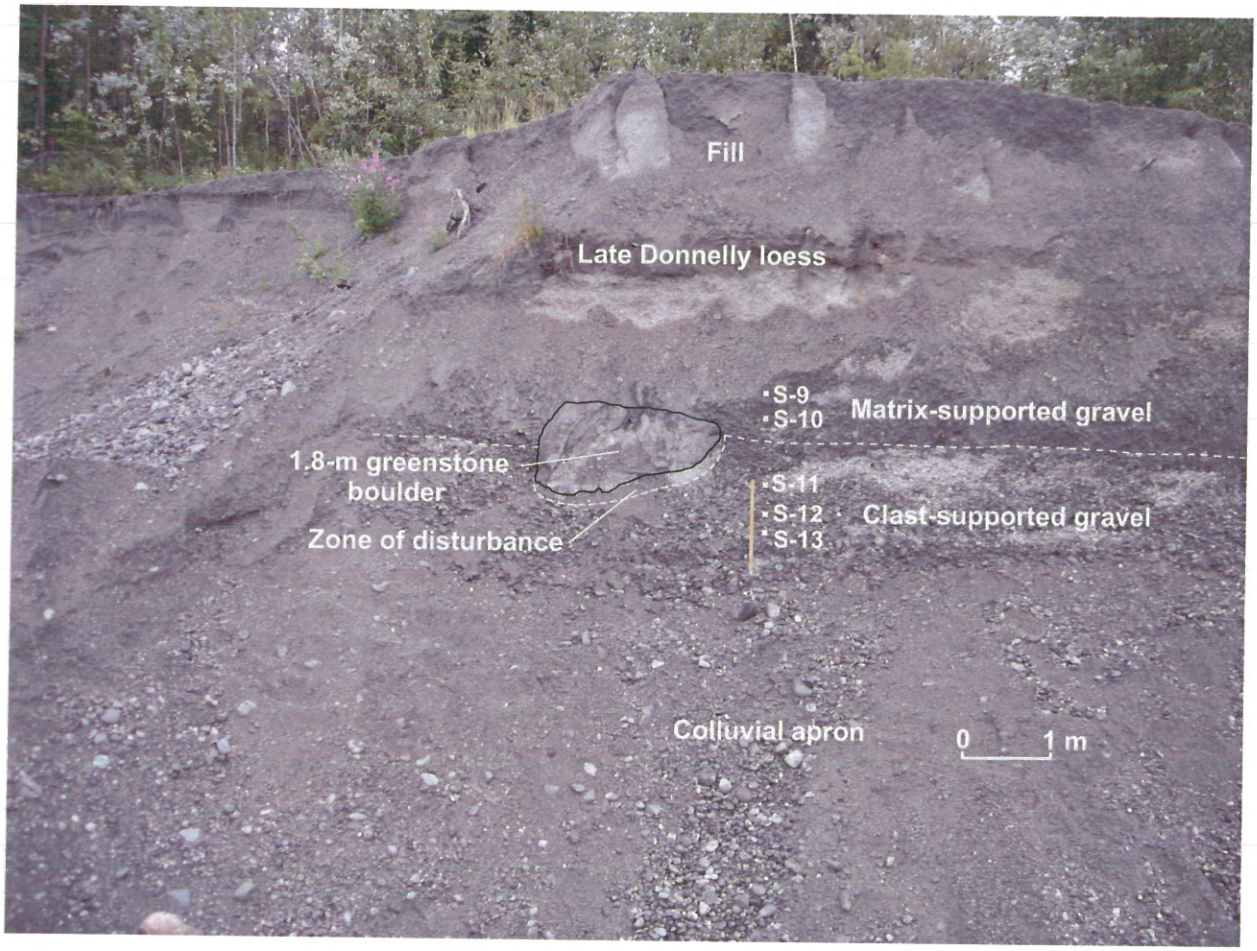
Fig 14



Show location of material
site 62-2-005-2

OK RC

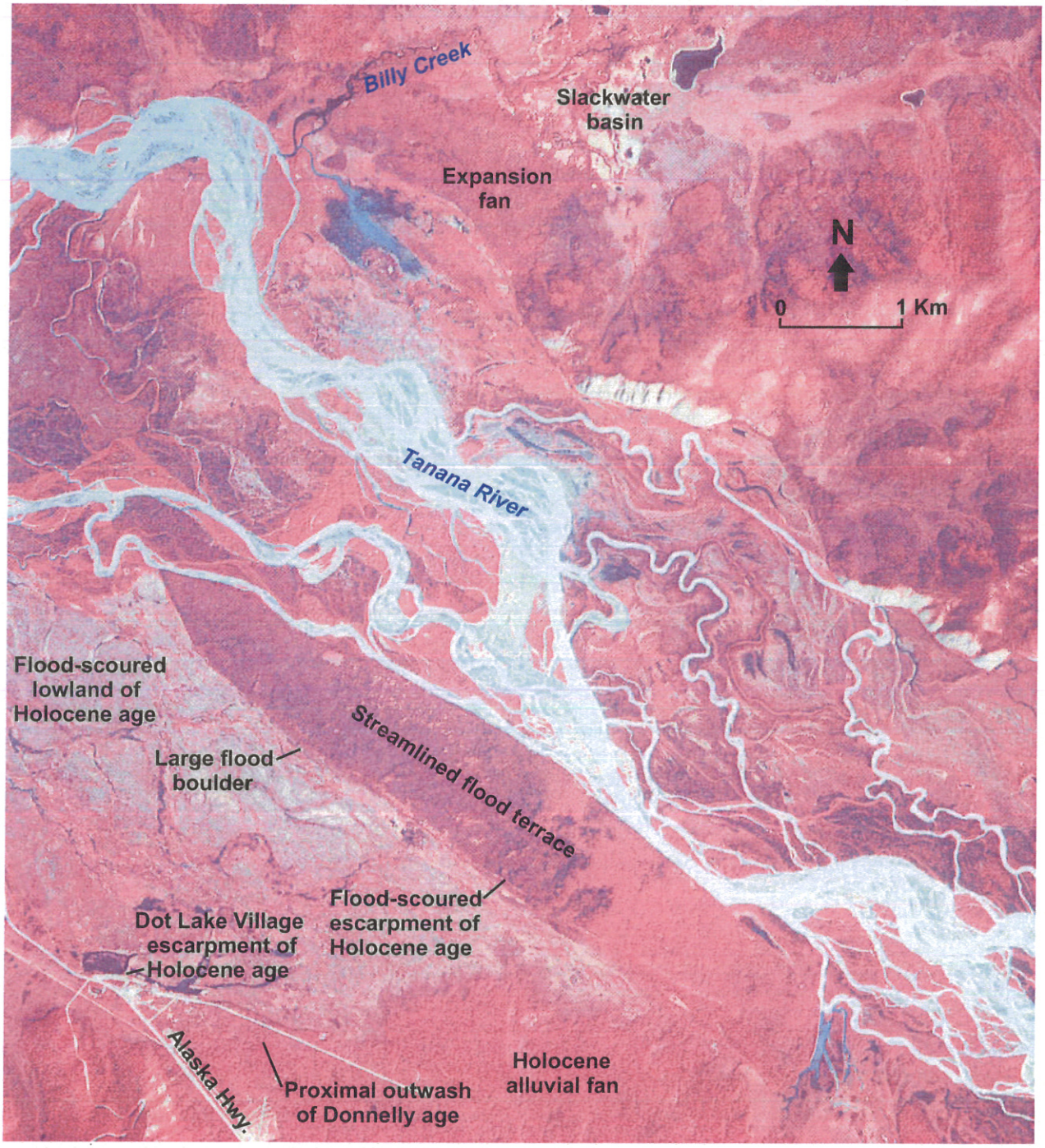
Fig 19



1.8 m appears to be the short or intermediate dimension of the greenstone boulder (based on the 1-m scale). It might be more instructive to give the length (e.g. "2.x-long greenstone boulder")

OK RC

Fig 20



Is the bedrock knob (fig. 23) in this image? If so, label.

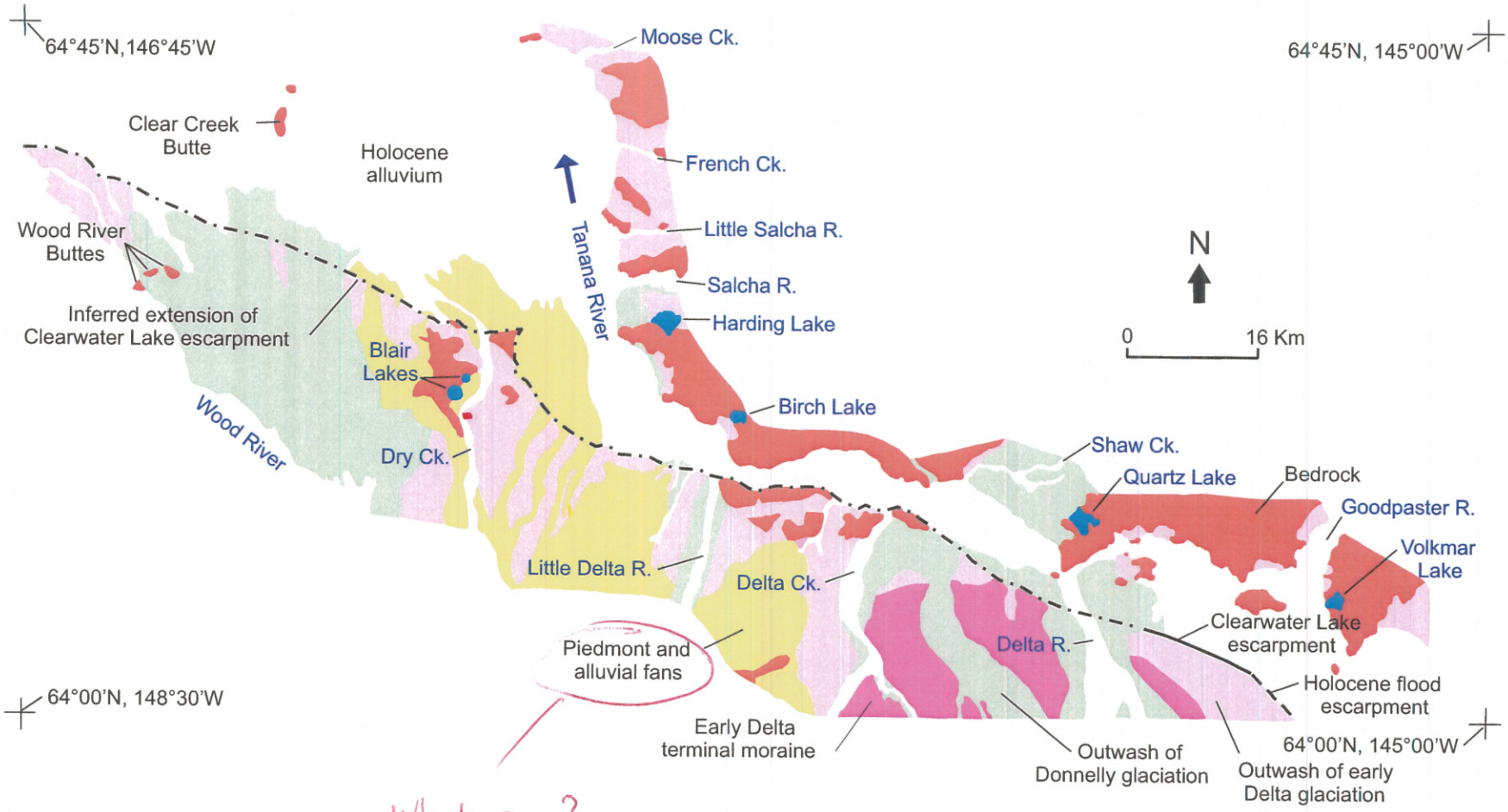
RC

Fig 22

Label flood ripples
(may not be obvious to some)

OK RC

Fig. 28

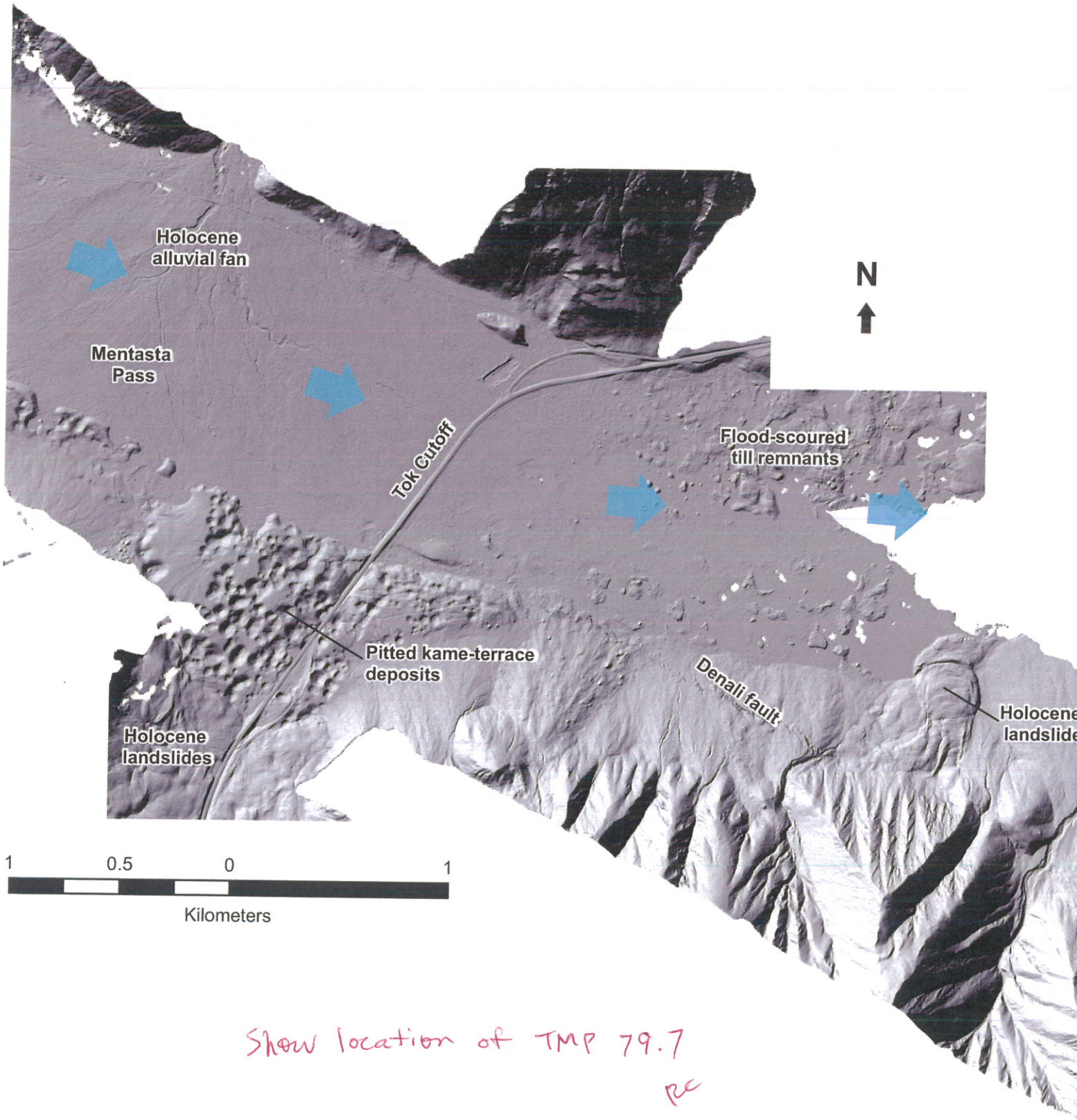


What age?

Post-Donnelly?

RC

Fig 28



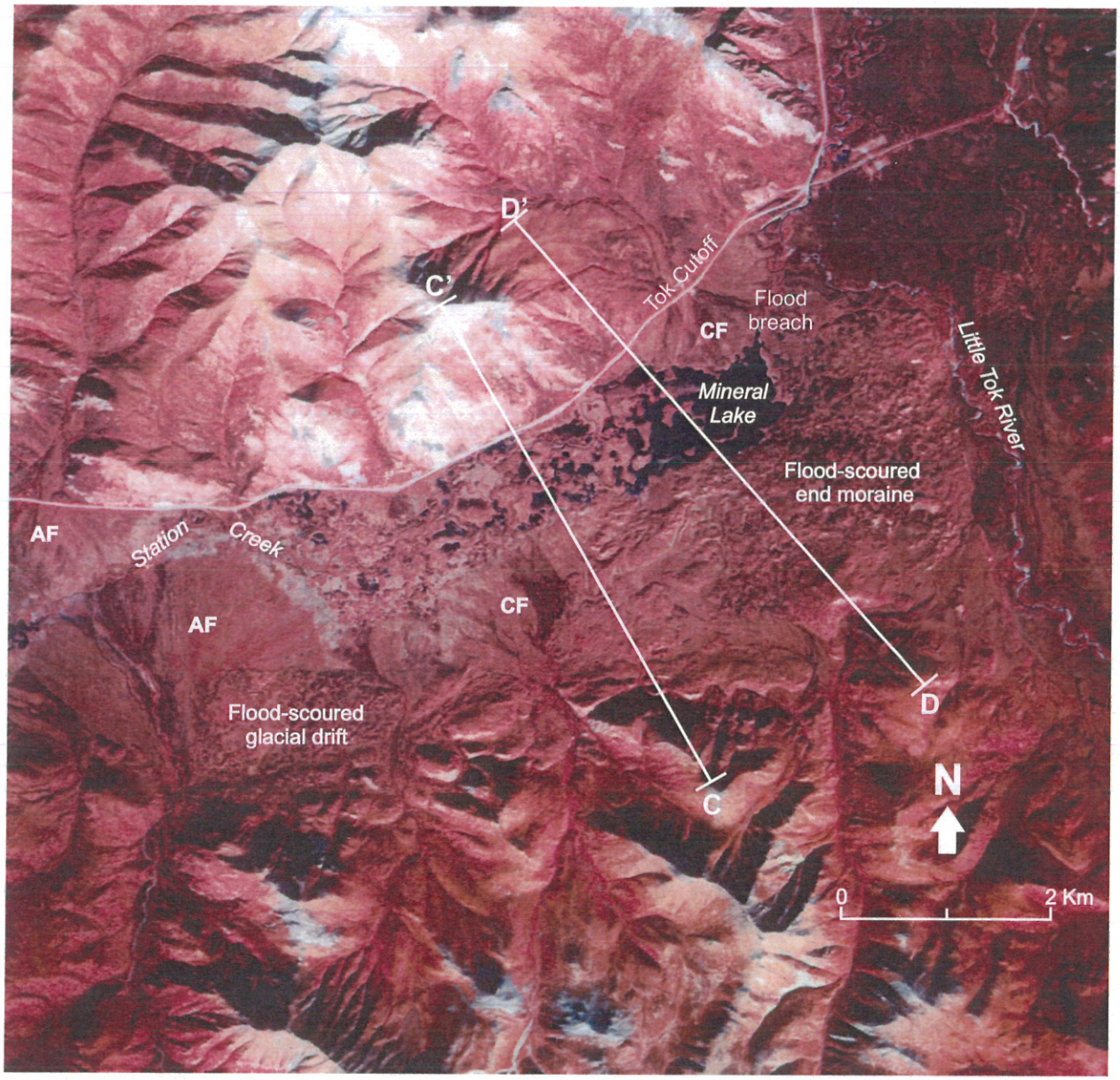
Show location of TMP 79.7

RC

Fig. 38

OK pc
check #

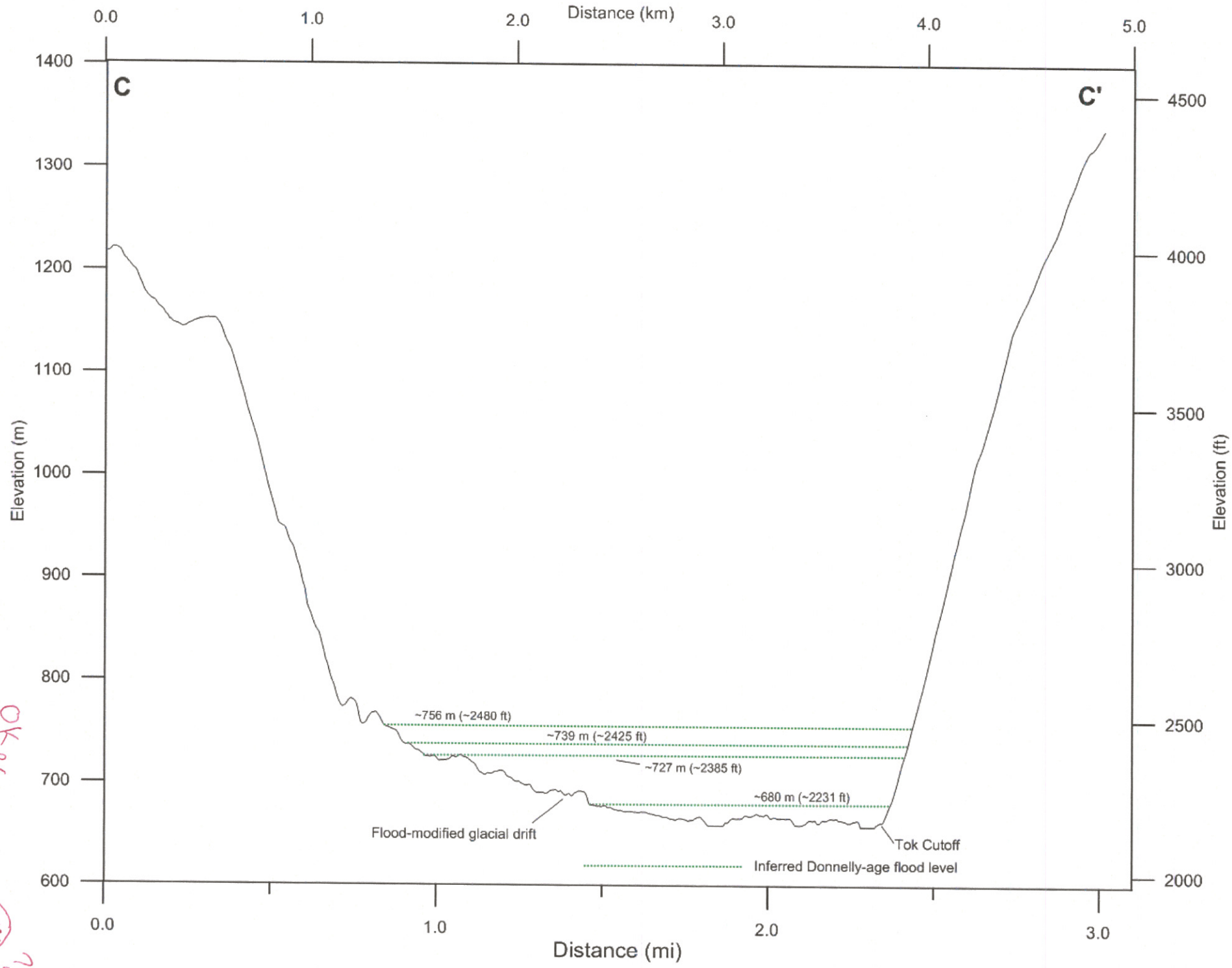
Fig 37



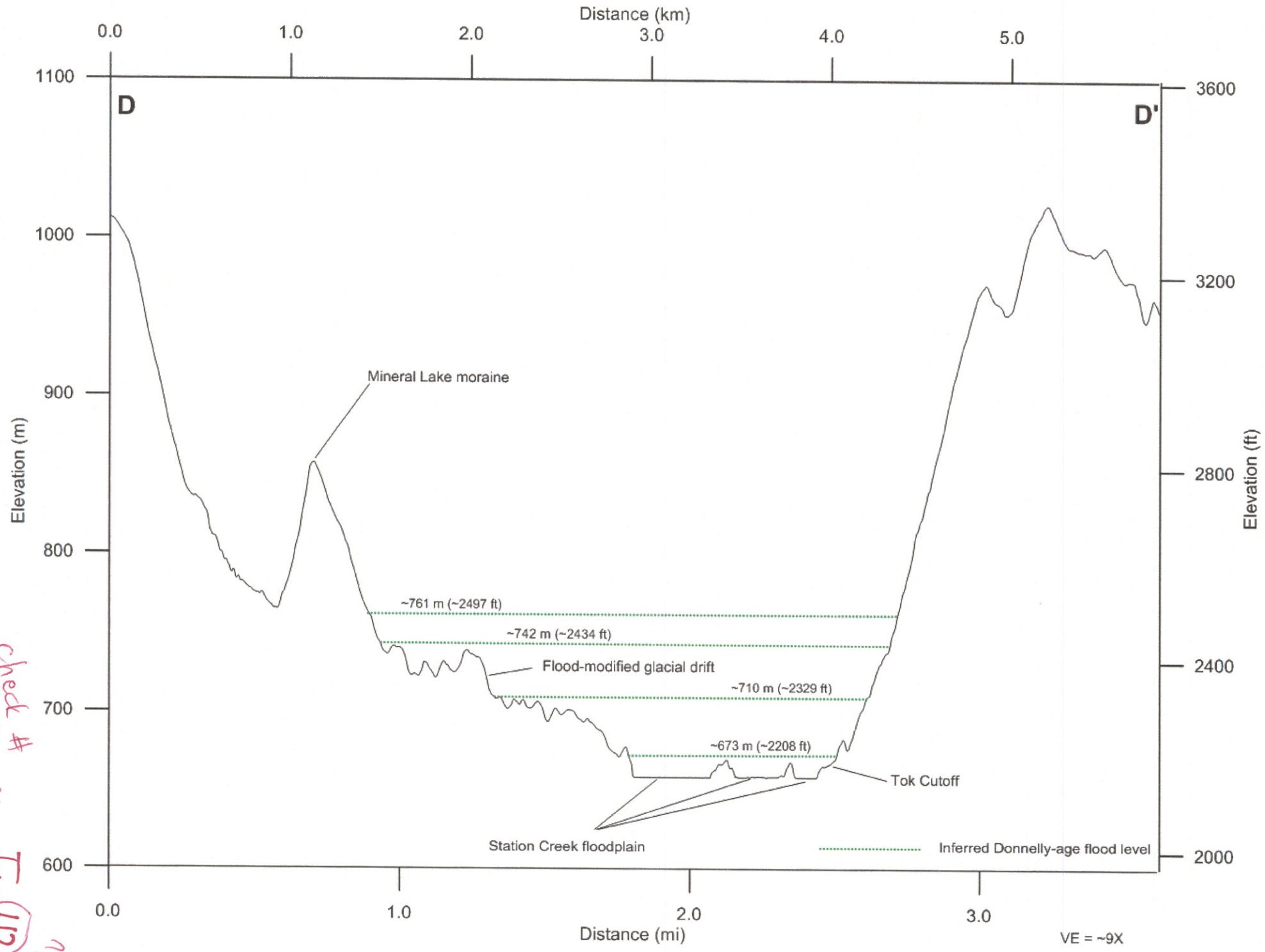
OK RC

Check fig#

Fig 40 ?

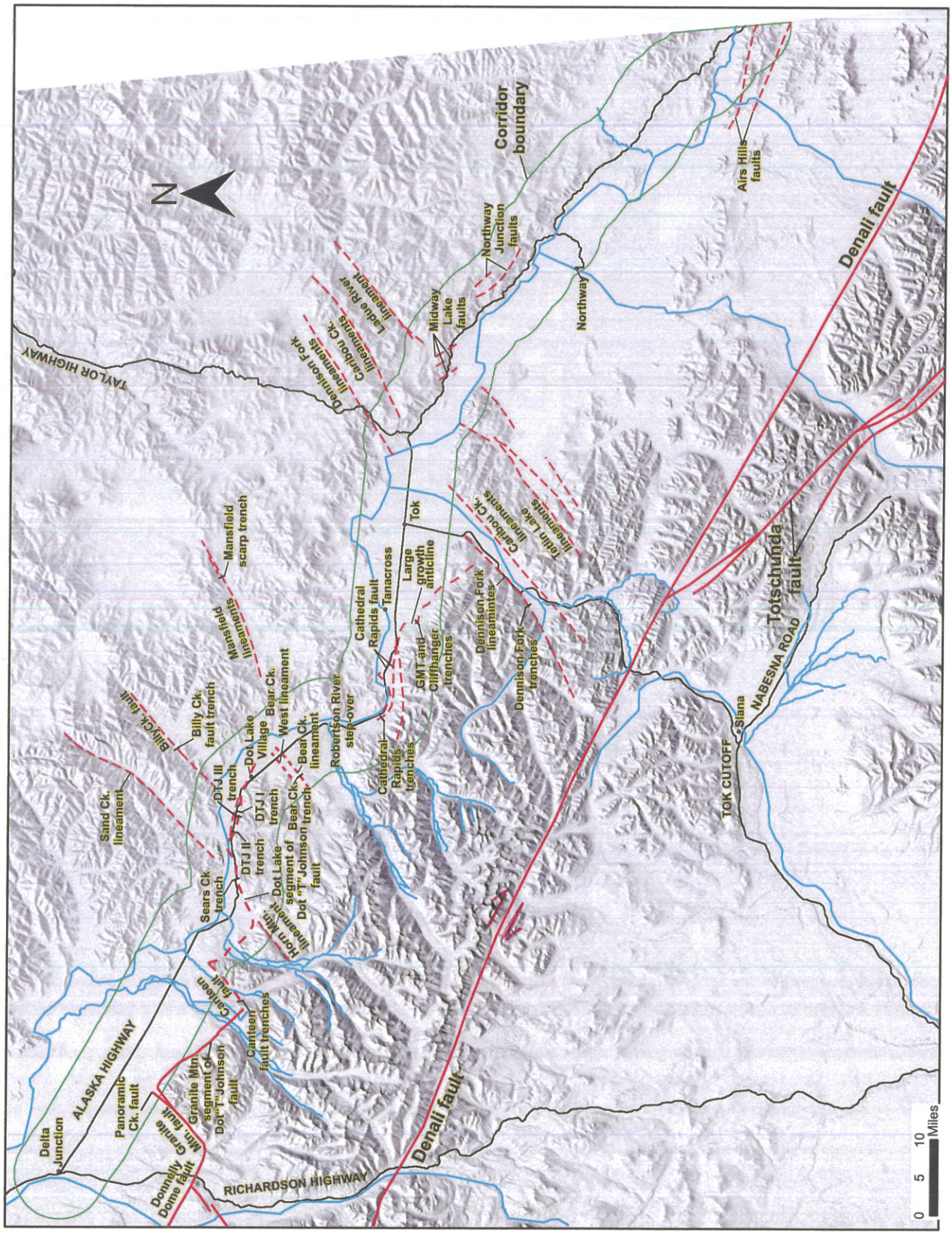


OK RC
Check # Fig 41 ?



check # and reference

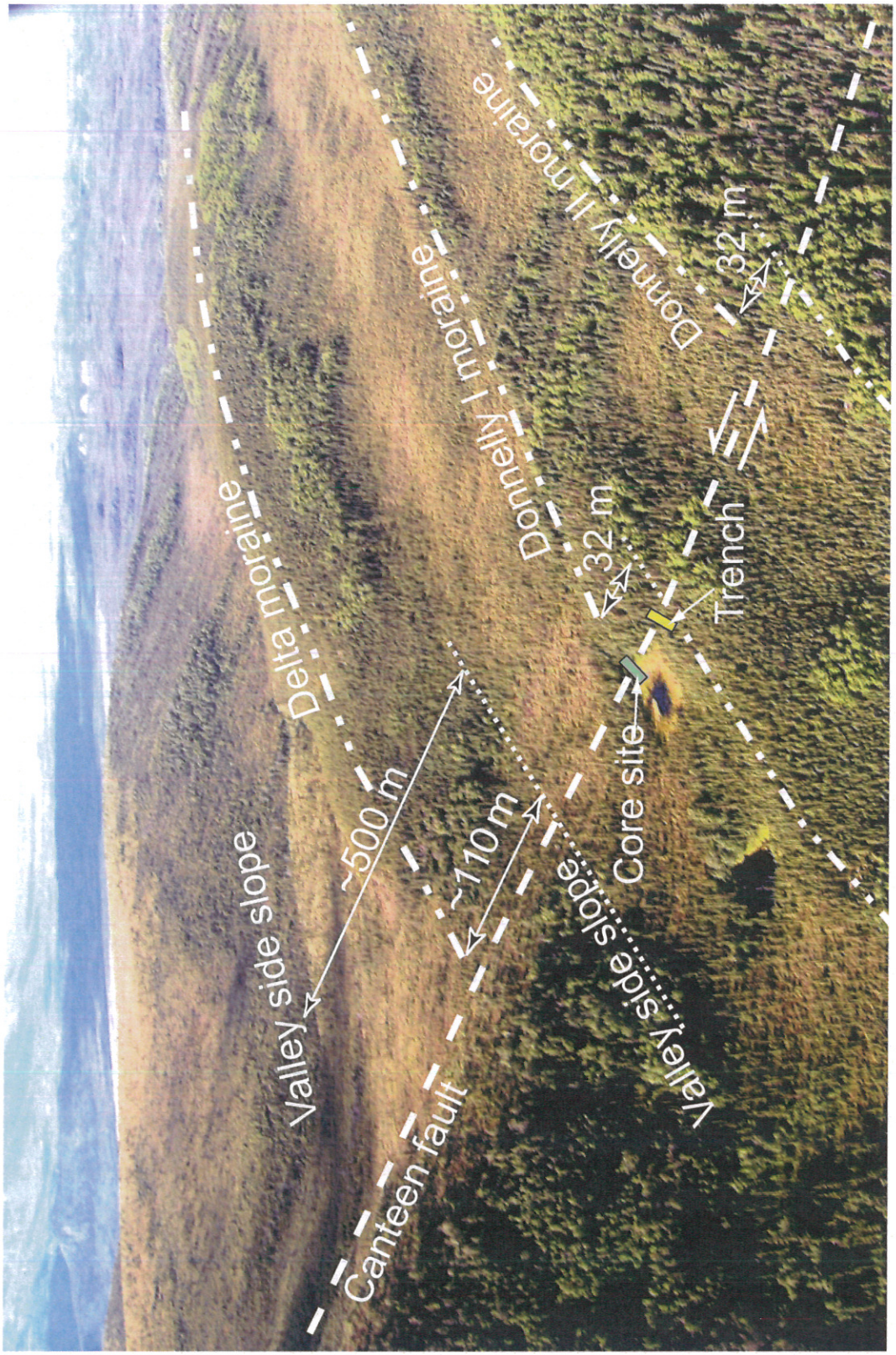
Fig 42



Show sense of motion along Denali fault.

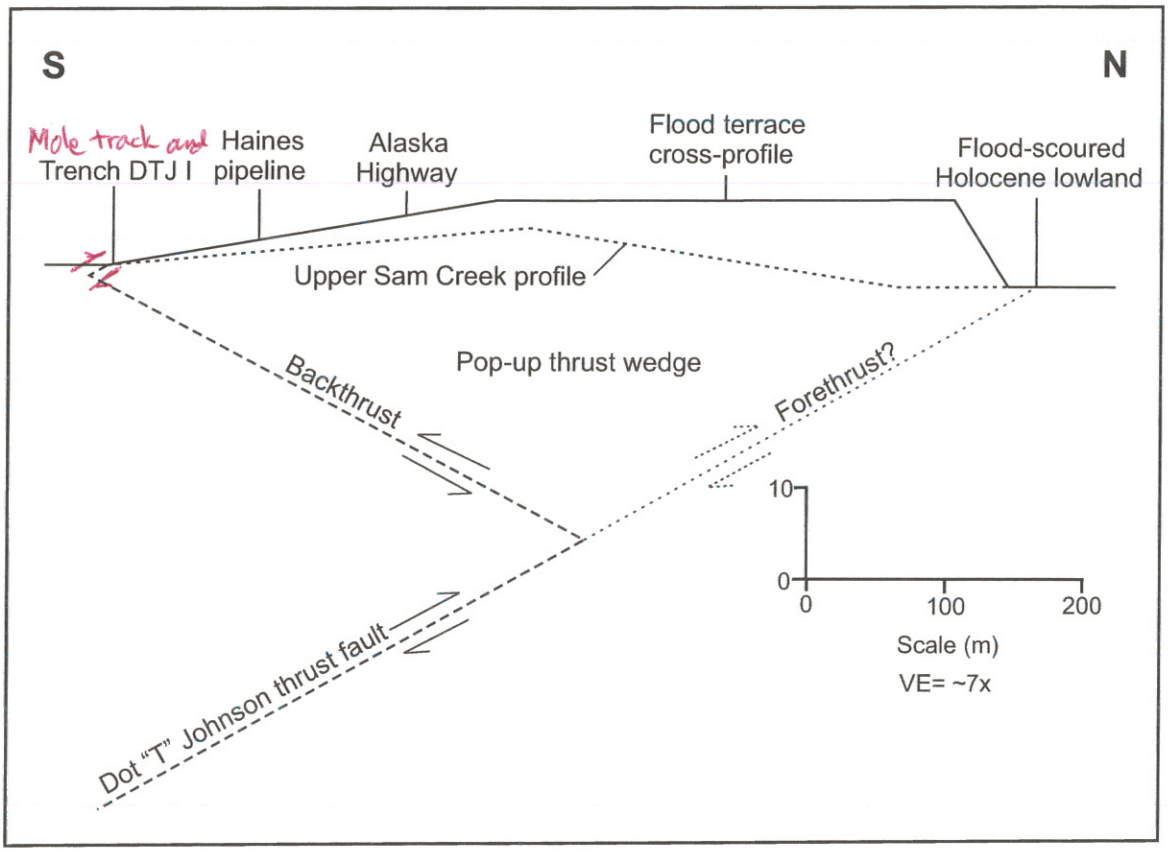
Rc

Fig 54



OK but see caption
Rc

Fig. 55

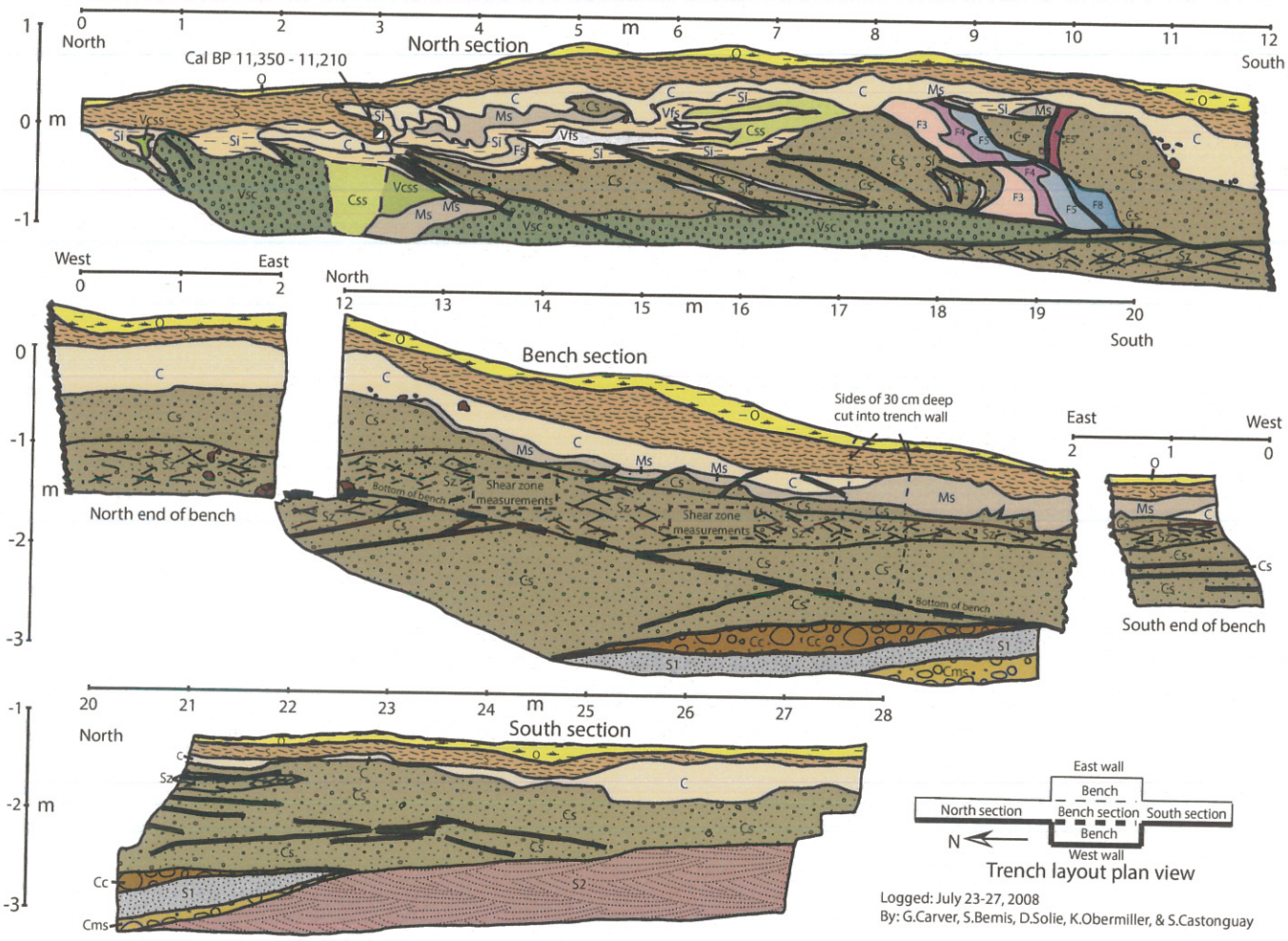


Show position of moletrack.

RC

Also show sense of motion on thrust fault represented in fig. 57

Fig 56



Unit Key

- O — Organic mat
- S — Soil A/B
- C — Upper colluvium
- Si — Silt
- Vfs — Very fine sand, sandy silt
- Fs — Fine sand, silty sand
- Ms — Medium sand
- Cs — Coarse sand
- Sz — Shear zone in unit Cs
- Vcs — Very coarse sand
- Css — Coarse silty sand
- Vcss — Very coarse silty sand
- Cc — Cobbles in poorly sorted fine to coarse sand
- S1 — Fine and medium sand and silty sand
- Cms — Cobbles in medium to coarse sand
- S2 — Poorly sorted medium and coarse sand
- Ccc — Cobbles in poorly sorted fine to coarse sand

Folded sequence 1

- E1 — Poorly sorted fine and medium sand
- E2 — Well-sorted medium sand
- E3 — Silt
- E4 — Silty coarse sand
- E5 — Well-sorted coarse sand

Folded sequence 2

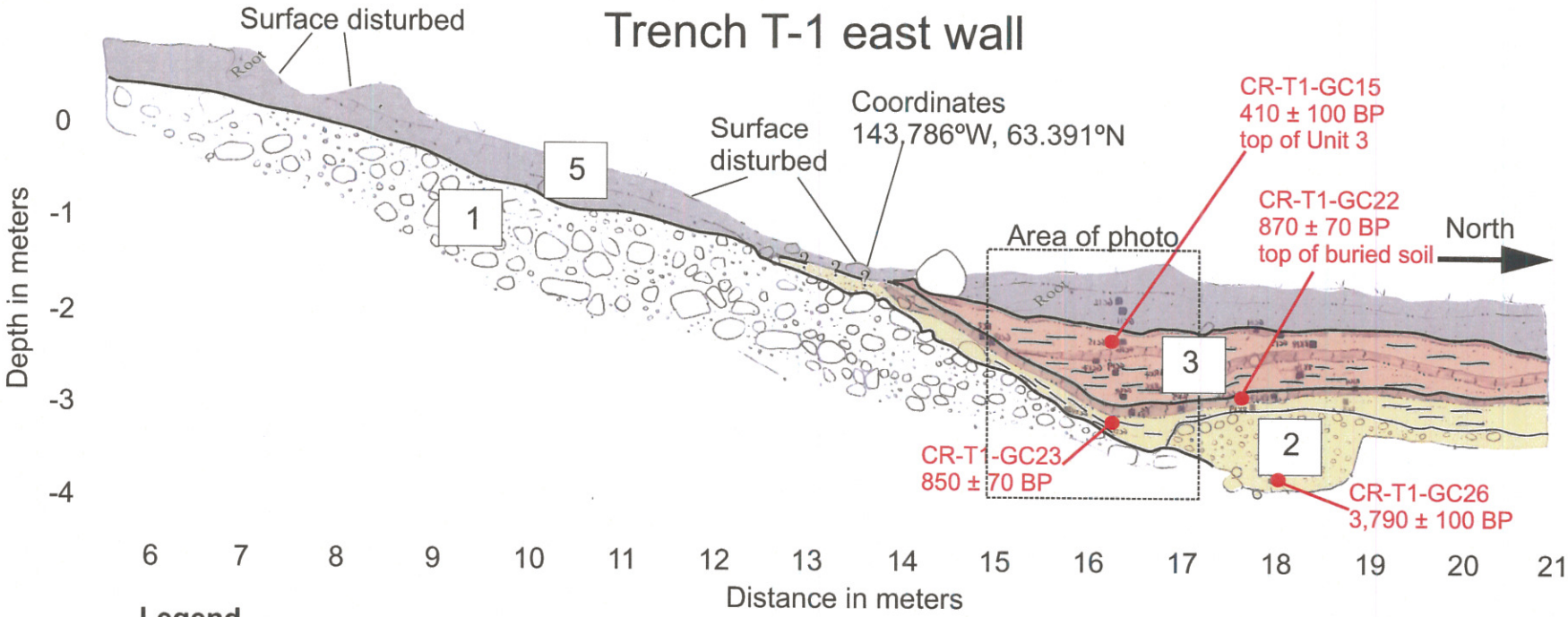
- F1 — Well-sorted very coarse sand
- F2 — Well-sorted coarse sand
- F3 — Poorly sorted silty sand
- F4 — Well-sorted medium sand
- F5 — Poorly sorted fine and medium sand
- F6 — Well-sorted medium sand
- F7 — Silt
- F8 — Poorly sorted medium and coarse sand

OK RC

Show sense of motion on faults where determined. RC

Fig 58

Trench T-1 east wall



Legend

5 Loess and modern soil

3 Horizontal, bedded silt, fine sand, and gravel with buried soils.

2 Finely bedded silt, very fine sand and clay layers. Contains local channel deposits. Beds and soil at top of unit dip north 17-24°. Dark brown indicates buried soil at the top of Unit 2.

1 Debris-flow alluvium

\ = soil development

● = ~~Carbon 14~~ sample locality

Radiocarbon

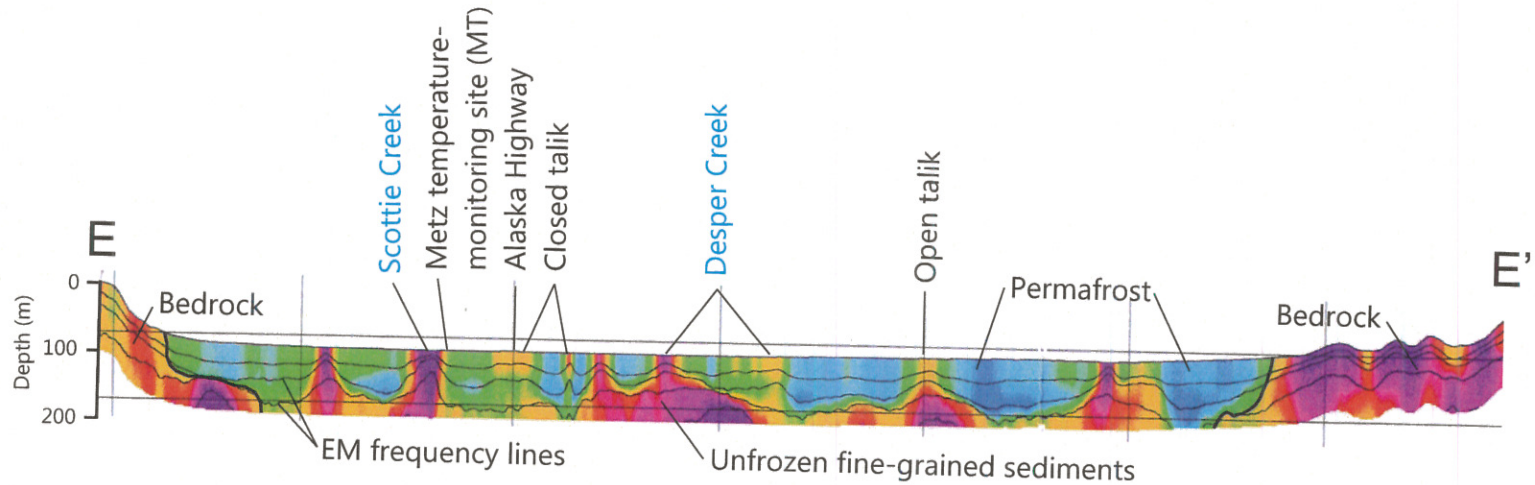
Fig 5

OK RC

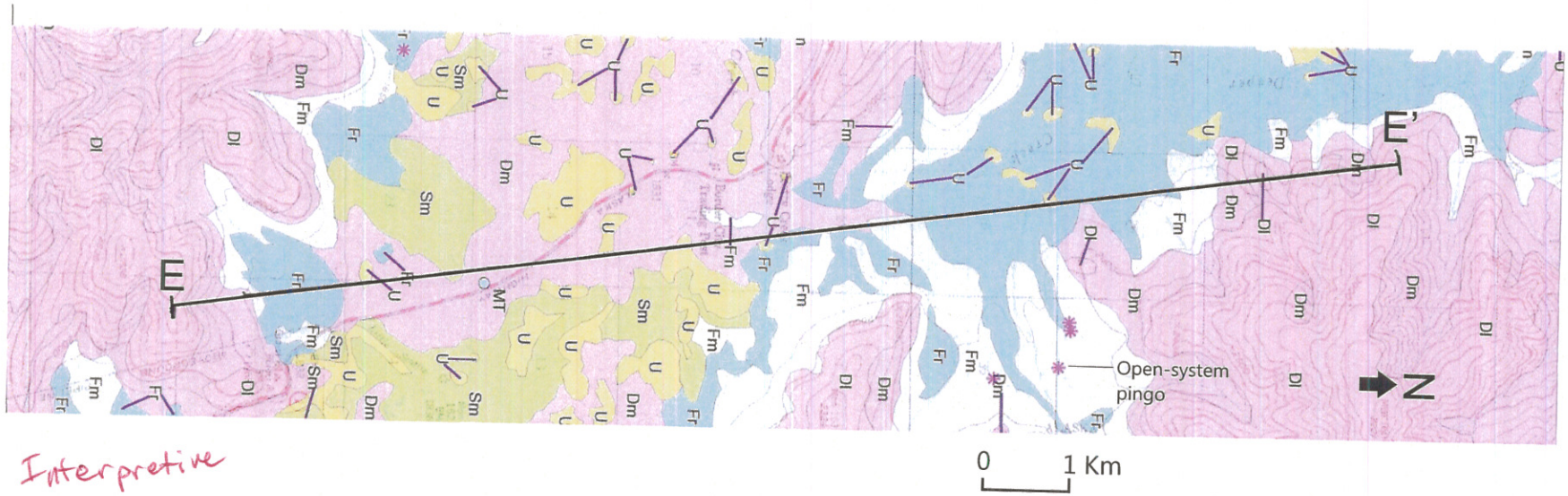
This pavement was broken up like this long before the 2002 earthquake (I have landed there many times myself). There should be photos of the ramp, and particularly the severely damaged runway, from post-earthquake surveys done by USGS and others.
RC

There are some good photos at jukebox.uaf.edu taken by Lyle Cronk. RC
Also a good one at USGS.Gov showing sand blow on top of snow.

Fig 65



A. Segment of EM1DFM inversion section 15290

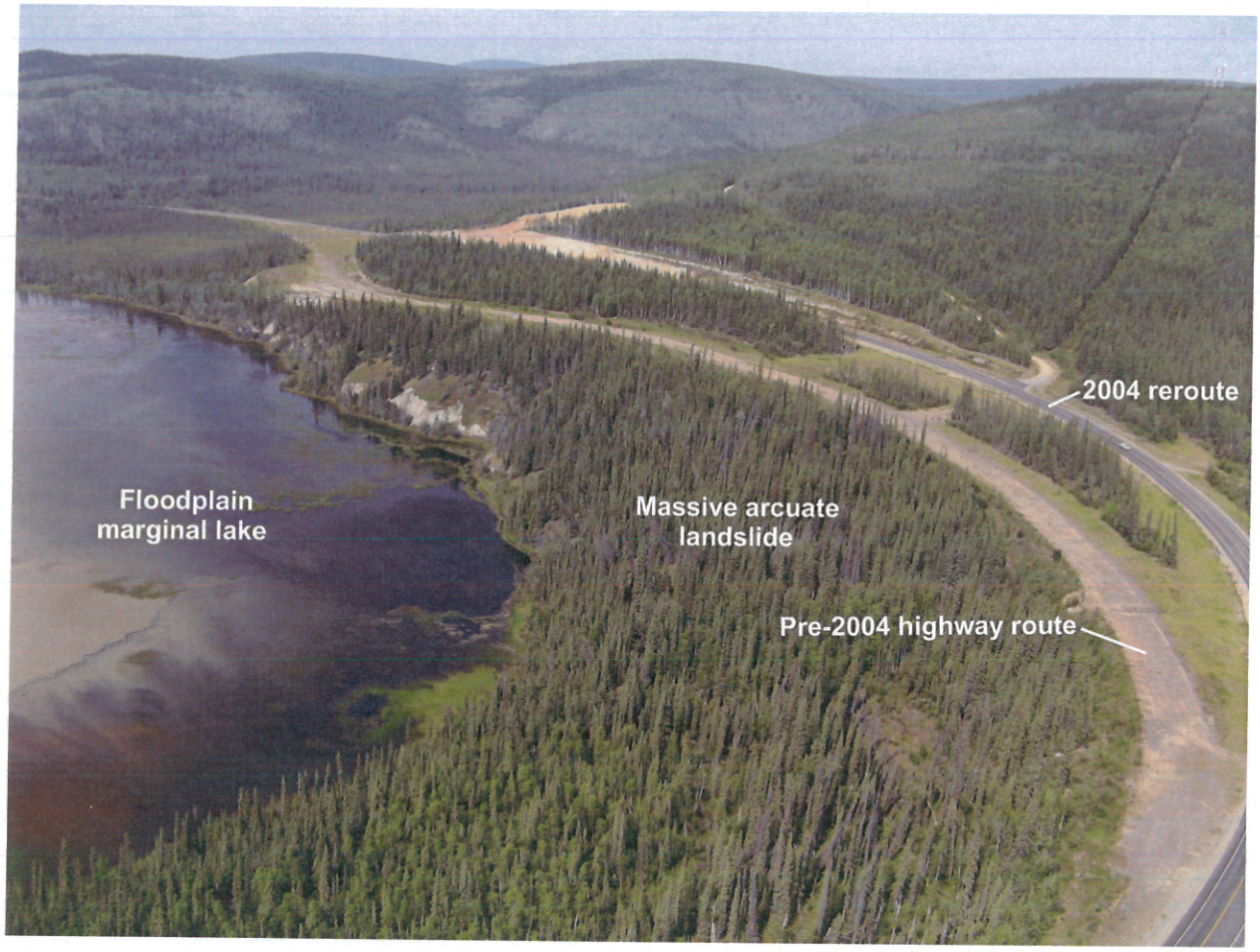


Interpretive

B. Permafrost map

Fig 8

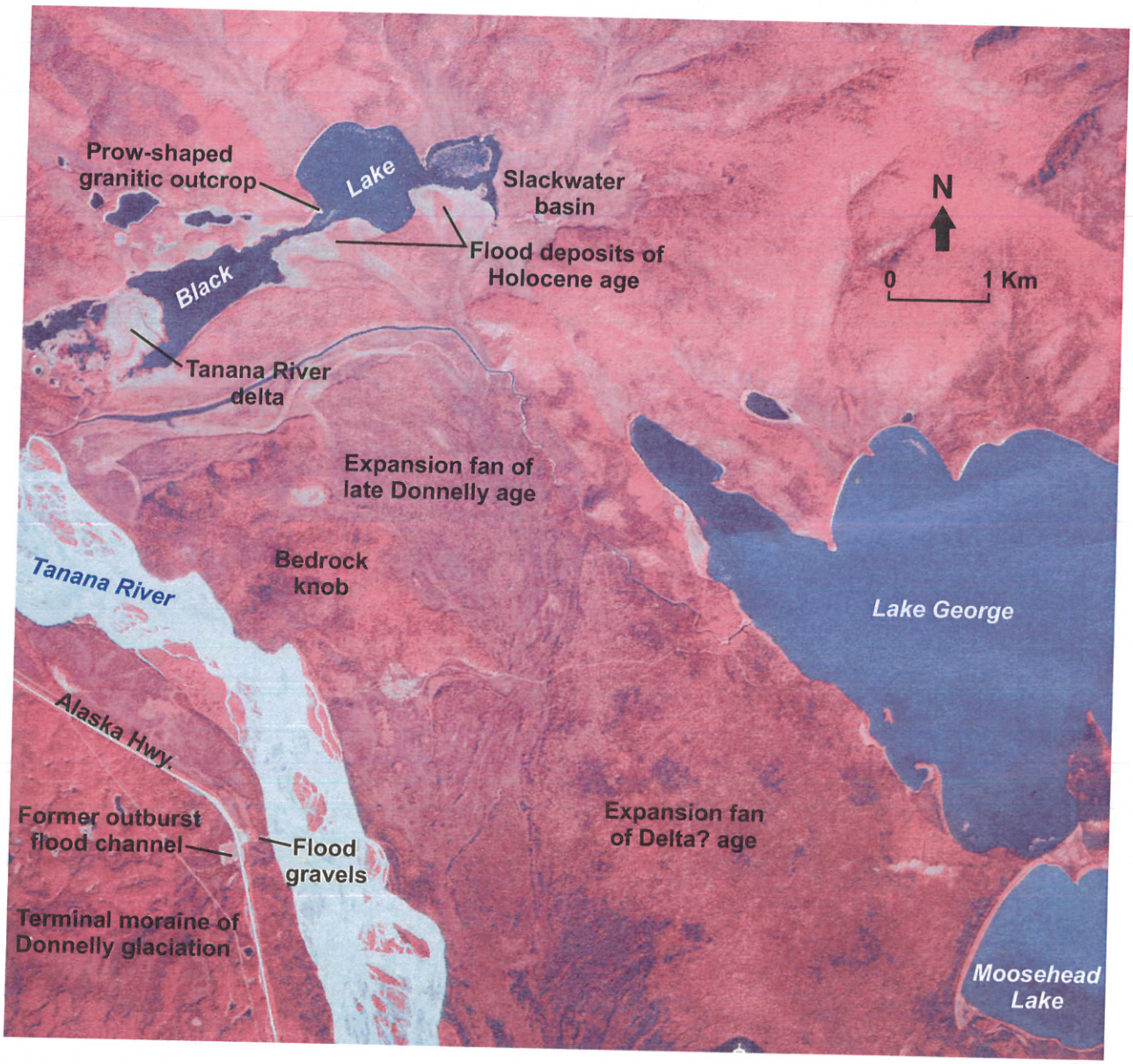
OK RC



A photo of the fresh ground cracks along the headwall of the slide would be instructive here.

RC

Fig 78



Show location of test pit near Black Lake. RC

OK RC

Fig 85