EI-6760

second original

GREGORY E. STRONG

Mr. David Navecky
STB Finance Docket No: 35095
Surface Transportation Board
395 E st. SW
Washington D.C.
20423-0001

February 28, 2008

RE: The Castle Mountain Earth Quake Fault vs The Houston South Rail Proposal

Dear Mr. Navecky

At an earlier Assembly Meeting our local elected officials were provided with an "Evaluation Matrix" for the proposed routes for the Port MacKenzie Rail Extension Project (Exhibit A). The Matrix reviewed ten (10) categories for eight (8) proposed routes. A map reflecting each of the proposed routes is included (Exhibit B).

What is of concern, and the reason for this letter is that the status of the sub surface geologic estate is NOT part of the Evaluation Matrix. The proposed Houston South route runs perfectly parallel for its entire length of travel with the Castle Mountain Earthquake Fault (Exhibit C). Let me be clear, we're not talking about the proposed rail line merely crossing the fault, but rather the proposed route runs directly on top of or directly along side of the fault from the Susitna River to the Parks Highway. Dr. Peter Haeussler of the USGS states that this fault could fail at anytime with an expected 7.2 magnitude earthquake(1). This fault line has failed every 650-700 years for the last 2500 years. The last time this fault line failed was 650 years ago.

The construction of a portion of a quarter of a billion dollar rail project paid for with taxpayer dollars on top of a known, well documented and well studied earthquake fault is something prudent officials, such as your self, should avoid.

Even minor quakes could create frequent rail alignment failures resulting in numerous, expensive derailments. Let me urge you to remove from consideration the Houston South route as it is certainly not a safe, viable, commercial transportation route.

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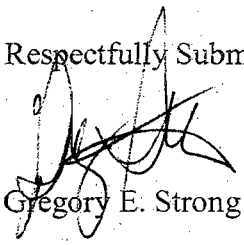
In January of this year the Alaska Rail Road's "Preliminary Environmental and Alternatives Report" finally acknowledged the existence of this fault. Unfortunately the Alaska Rail Road gave it "short shrift" sighting the 1964 earth quake in Alaska did little damage to the railroad. Of course they failed to mention that the 1964 quake occurred twenty miles out at sea, and five miles below the earth's surface, which is far and away an entirely different scenario than building a rail line virtually on top an active seismic fault. Because of its potential significance the USGS has studied the Castle Mountain Fault for nearly 35 years. The Castle Mountain Fault, according to Drs. Labay and Haeussler of the USGS, "is one of several major east-northeast striking faults in southern Alaska, and is the only fault with historic seismicity and Holocene surface faulting"(2). For your convenience and review I have enclosed an abstract of that report.

I am not expert on the matter, but I suspect that a bonding company may be reluctant to commit funding to a project designed (in part) to be constructed virtually on top of an "active seismic fault". It is my belief that individuals at the following agencies may express serious chagrin at such a proposal: Alaska Earthquake Information Center, Alaska Division of Geological and Geophysical Surveys, Applied Technology Council, Alaska Division of Homeland Security and Emergency Management, Earthquake Engineering Research Institute, Federal Emergency Management Agency, U.S. Geological Survey. I know as I have spoken with many of them.

The Houston South route was removed from consideration in the 2003 study of rail line extensions. Just 5 years ago the Alaska Rail Road endorsed the westerly route, which is now referred to Connection 3 or the "Willow Route". Because of the length of track and subsequent cost this "Willow Route" appears to be less favorable today than the shorter Houston South route. The problem remains of the potential of a 7.2 magnitude earthquake under the entire length of the Houston South Route. I urge you to again make the Connection 3 route, or Willow Route the preferred route of the Surface Transportation Board.

Respectfully Submitted,



Gregory E. Strong Ph.D.

Attachments (4)

(1) Haeussler, Peter J., Seismic Disturbances of Upper Quaternary Deposits along the Castle Mountain Fault near Houston, Alaska: US Geological Survey Open File Report 1998

(2) Keith Labay and Peter Haeussler, GIS Coverages of the Castle Mountain Fault, South Central Alaska.US Geological Survey, Open File Report 01-504

Cc: Members of the" Friends of the Lakes"

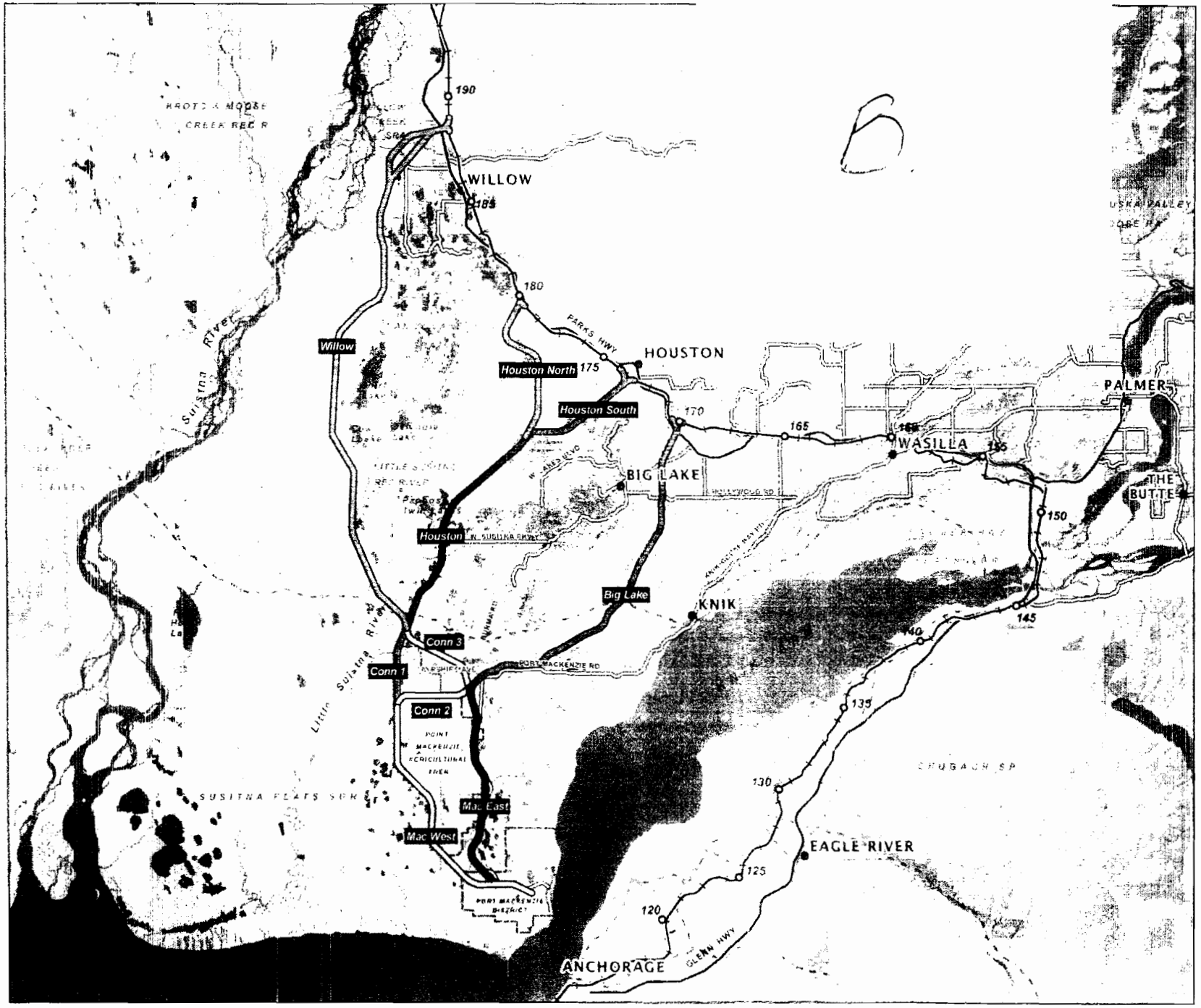
Bcc: (12)

PORT MACKENZIE RAIL EXTENSION

Evaluation Matrix

PROPOSED ROUTES	CRITERION										
	1	2	3	4	5	6	7	8	9	10	
	Poor or highly compressible soils (cubic yards)	New road crossings (#)	Land availability[3] (acres/mile)	Developed parcels (#)	Designated land use[4] (acres)	Train Energy (horsepower-hours)	Wetlands (acres)	Mapped anadromous fish streams (#)	High potential for archeological sites[a] (acres)	Fragmentation of designated refuges and recreation areas (yes/no)	Preliminary Cost Estimate (millions)[5]
Mac West - Willow	0	+	0	0	-	0	0	0	-	-	$320
Mac West - Houston North	-	+	0	+	-	+	-	0	+	-	$250
Mac West - Houston South	0	+	0	+	-	0	-	0	+	0	$220
Mac West - Big Lake	+	-	-	-	-	-	0	-	-	0	$290
Mac East - Willow	0	0	0	+	+	0	+	+	-	-	$330
Mac East - Houston North	-	0	0	+	+	+	0	0	+	-	$260
Mac East - Houston South	0	0	+	+	+	0	+	+	+	+	$230
Mac East - Big Lake	+	-	0	-	+	-	+	-	-	+	$285

1. (+) Positive; (0) Neutral; (-) Negative
2. Criteria not weighted / Routes are unranked
3. Large parcels of undeveloped land owned by State of Alaska MSB, University of Alaska, Mental Health Trust, and Alaska Native corporations
4. Lands that are designated for parks, refuges, residential, or agricultural uses
5. Costs do not include approximately $10 million for loop track construction within the port (all alterna



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A

Preliminary Alt
Mac East
Mac Wes
Conn 1
Conn 2
Conn 3
Houston
Houston
Houston
Willow
Big Lake

*These lines generally
corridors which are su
further refinement.

This map represent
information displayed
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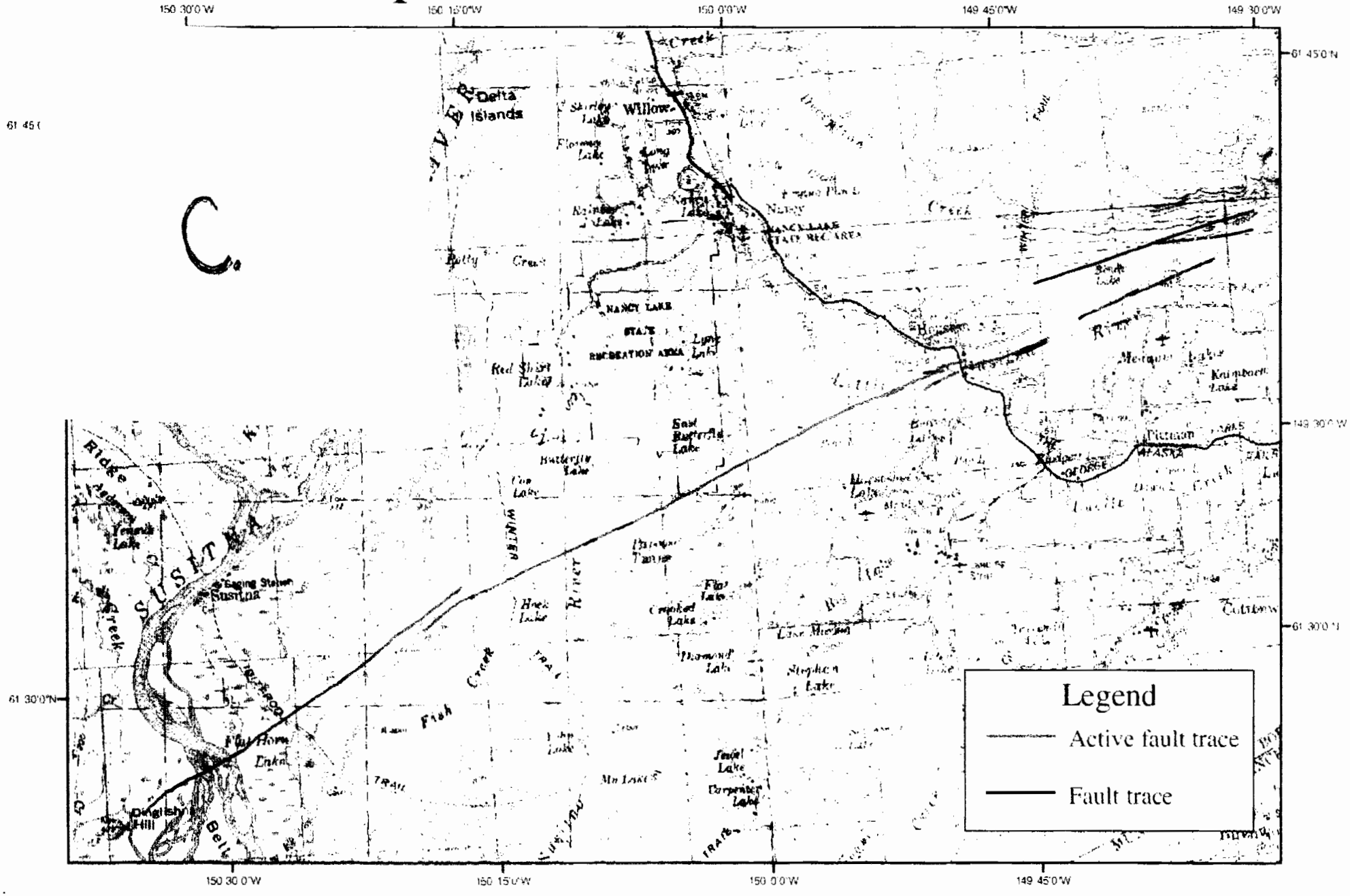
Projectio

Source

Western portion Castle Mountain Fault



U.S. Geological Survey
Open-File Report 01-504

GIS Coverages of the Castle Mountain Fault, South Central Alaska

By Keith Labay and Peter J. Haeussler

View toward the west-southwest along the Castle Mountain fault, west of Houston, Alaska, with Mt. Susitna in the distance. The upthrown, north, side of the fault is on the right.

ABSTRACT

The Castle Mountain fault is one of several major east-northeast-striking faults in southern Alaska, and it is the only fault with had historic seismicity and Holocene surface faulting. This report is a digital compilation of three maps along the Castle Mountain fault in south central Alaska. This compilation consists only of GIS coverages of the location of the fault, line attributes indicating the certainty of the fault location, and information about scarp height, where measured. The files are presented in ARC/INFO export file format and include metadata.

Go to files to download

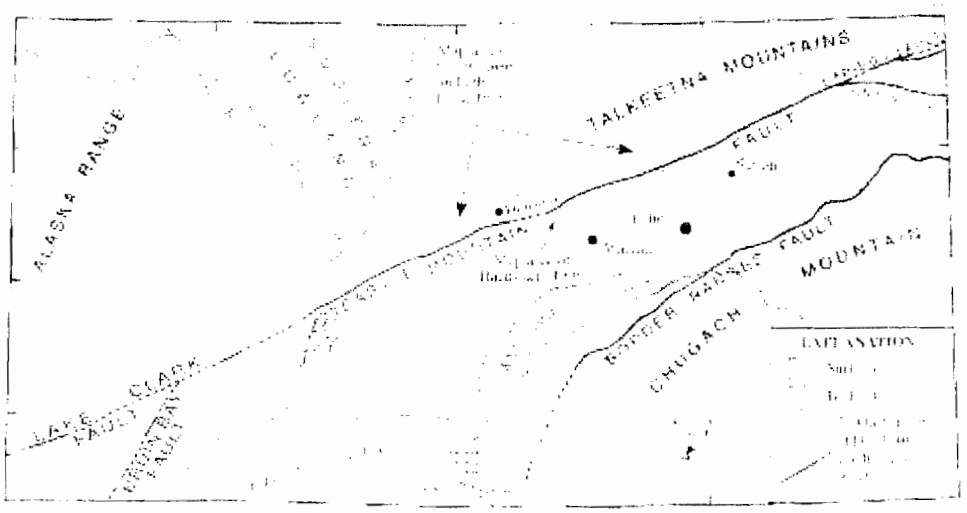


Figure 1. Location of Castle Mountain fault in south central Alaska, and previous USGS maps along the fault.

Introduction

The Castle Mountain fault is one of several major east-northeast-striking faults in southern Alaska, and it is the only fault with historic seismicity and Holocene surface faulting (Lahr and others, 1986; Detterman and others, 1974). The Castle Mountain fault is approximately 200 km long, and is one of the longest structures in the Cook Inlet basin. Martin and Katz (1912) first noted the fault, but it was delineated on a regional scale by Detterman and others (1974, 1976). They mapped and divided it into two physiographic segments: the western Susitna Lowland and eastern Talkeetna Mountains segments (Fig. 1). Haeussler (1994, 1998) mapped and examined the 30-km-long region between the two Detterman and others (1974, 1976) maps.

This report is a compilation of the three USGS maps that cover the location of the Castle Mountain fault in some detail (Detterman and others, 1974, 1976; Haeussler, 1998), with the purpose of providing land managers with an authoritative source for the location of the fault in the Talkeetna Mountains and Susitna Lowland. There are other maps that also cover parts of the Castle Mountain fault (Reger and others, 1995a,b,c; Clardy, 1974; Fuchs, 1980), but these do not alter the location of the fault. Thus far, there are no land use or building regulations associated with proximity to the Castle Mountain fault.

The surface trace of the Castle Mountain fault is not the only earthquake hazard associated with the fault. The two historic earthquakes on the Castle Mountain fault were located on the part of the fault where there is no surface expression (Lahr and others, 1984), and thus even the part of the fault with no scarp should probably be considered active. In addition, Haeussler and others (2000) showed there is a 3-4 km wide fault-cored anticline on the north side of the fault near Houston. The faults in the core of the anticline do not crop out at the surface, but certainly also represent a seismic hazard. Saltus and others (2001) use aeromagnetic data to show that this anticline continues for the length of the Castle Mountain fault in the Susitna Lowland.

Methodology

The Haeussler (1998) map was the easiest to include in this compilation. It was published at 1:25,000-scale, and was already available digitally and included metadata (http://geopubs.wr.usgs.gov/open-file/of98-480/).

The Detterman and others (1974) map along the Castle Mountain fault was the most difficult to capture. This report consisted of three 1:24,000-scale aerial photograph strips along the fault, with point annotations on the photographs. The photographs had not been registered or rectified. In order to georeference the data it was digitized in straight table coordinates, and then registration points were established between the photographs and georeferenced images of USGS topographic maps. Due to the lack of prominent features on the photographs the registration points could not be located with as much precision as desired. To compensate for this the faults and points were rubber sheeted to the images of the topographic maps after registration. However, the locations of these faults should still be considered less accurate then those from the other sources.

The Detterman and others (1976) map along the eastern end of the fault is at1:63,360-scale, and was digitized from a paper copy of the map. This map was drawn over a topographic base, so it could be registered without accuracy problems. All faults on the map were digitized. These included not only the Castle Mountain fault, but the Caribou fault as well.

There was some overlap in the three geologic maps, and we used the Haeussler (1998) map in the overlap areas. There was a slight difference in the location of the main trace of the fault at the western end of the Haeussler (1998) map and the Detterman and others (1974) map. We used the lines from the Haeussler (1998) map and adjusted the position of one fault on the Detterman and others (1974) map to match up within a half-mile distance west of the Haeussler (1998) map. At the eastern end of the Haeussler (1998) map one small fault was completely removed from the Detterman and others (1976) map while the two main fault traces were trimmed and the northern portion was matched to a fault on the Haeussler (1998) map.

Discussion of Line Types

The Haeussler (1998) map identified the following line types: fault; fault, approximate location; fault, probable location; fault, possible location; fault, concealed; and lineations. The first four fault types are listed in descending order of certainty.

The faults for the Detterman and others (1974) and (1976) maps were attributed based on the coding scheme previously established by the Haeussler (1998) map. This allowed us to be consistent when the three maps were merged. However, based on the descriptions from the Detterman and others (1974) and (1976) maps we decided to code the faults using only three levels of uncertainty instead of four. Thus any fault whose description was equivalent to a "probable location" was given the same code as faults with an "approximate location." The faults that were lumped together have been given an additional attribute parameter that can be used to distinguish them. There is also a parameter to distinguish portions of the fault where visual evidence of movement can be seen. Refer to the metadata for more specific information about the line attributes.

Seismic reflection data demonstrate there is a 3-km wide fault-cored anticline (fold) on the north-side of the trace of the Castle Mountain fault (Haeussler and others, 2000). The faults that core this fold are probably active and also constitute a seismic source. An aeromagnetic high is associated with uplifted basement in the core of the fold (Saltus and others, 2001), which can be used to deliniate the structure on a regional scale. The high parallels the Castle Mountain fault for a length of 65 km from the Susitna River to the Houston area, and it has a separate line code in the coverage.

Discussion of Point Coverages

The Detterman and others (1974) map had annotations on the aerial photographs indicating scarp height and various observations along the fault trace. The high and low elevations for these locations are reproduced in the point coverage cmfault_pnt. Refer to the metadata for more specific information about the point attributes.

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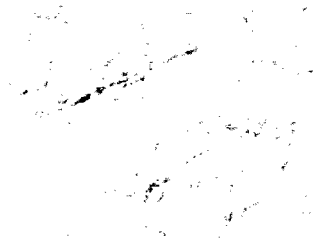
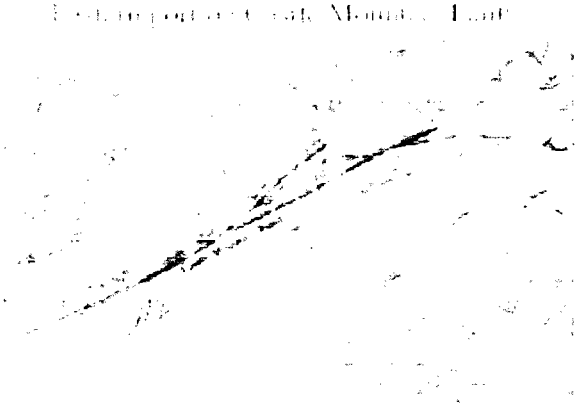


Map of entire Castle Mountain fault (jpeg file)

PDF version

Map of entire Castle Mountain fault (PDF file - note large file size 19.7 MB)

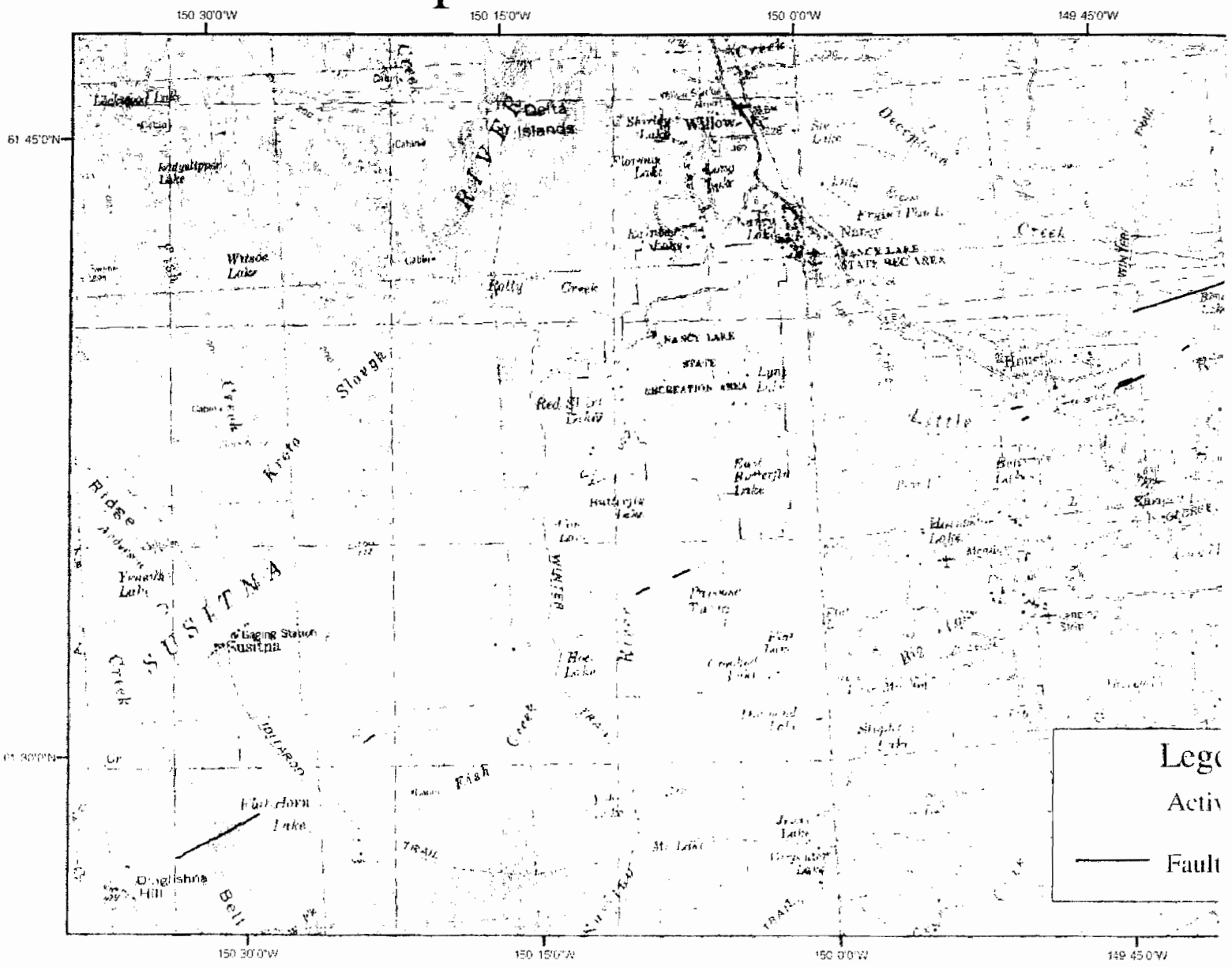
Map of western part of Castle Mountain fault (jpeg file)

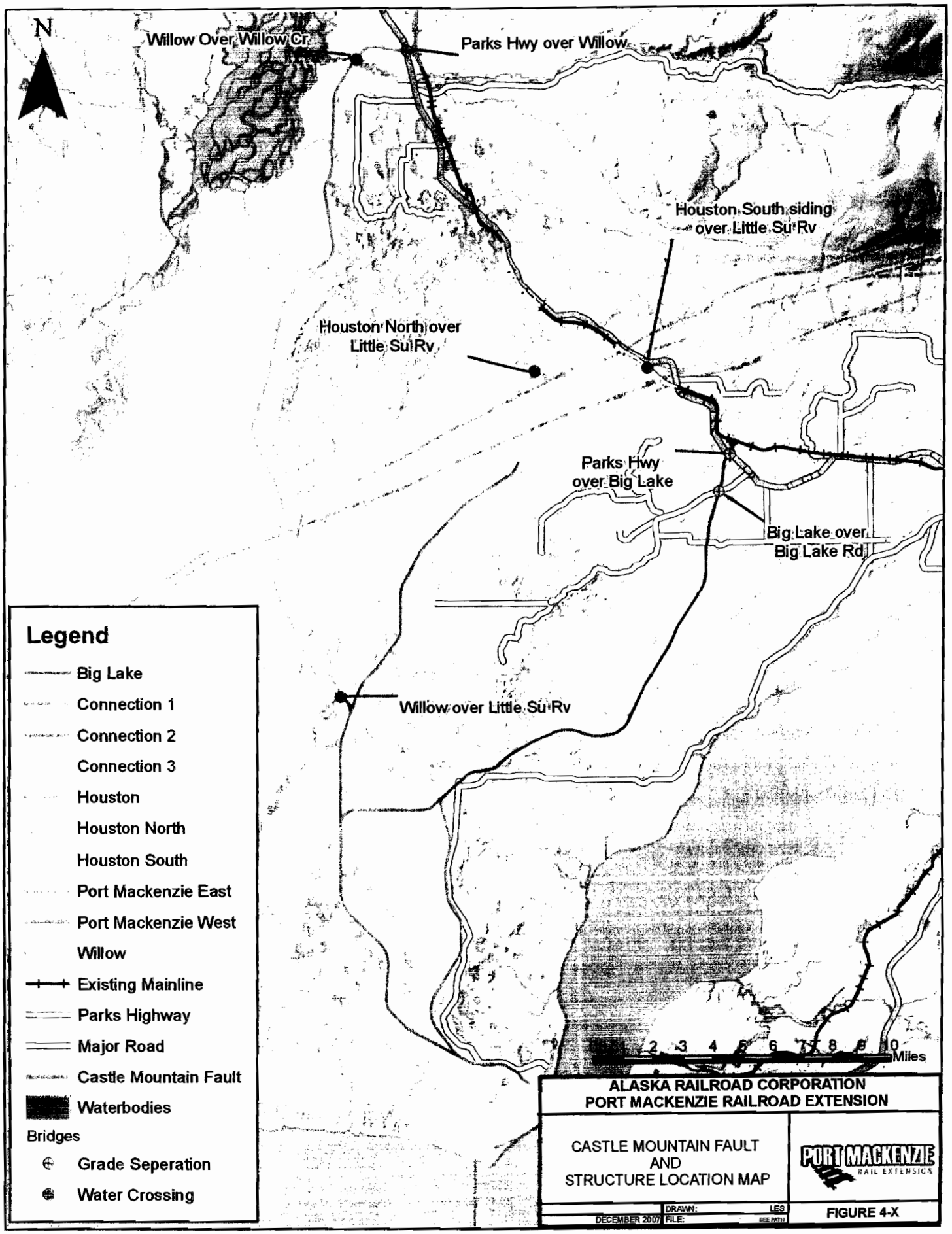


Map of eastern part of Castle Mountain fault (jpeg file)

Data

Western portion Castle Mountain Fa

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Willow Over Willow Cr
Parks Hwy over Willow
Houston South siding over Little Su Rv
Houston North over Little Su Rv
Parks Hwy over Big Lake
Big Lake over Big Lake Rd
Willow over Little Su Rv
Legend
Big Lake
Connection 1
Connection 2
Connection 3
Houston
Houston North
Houston South
Port Mackenzie East
Port Mackenzie West
Willow
Existing Mainline
Parks Highway
Major Road
Castle Mountain Fault
Waterbodies
Bridges
Grade Seperation
Water Crossing
2 3 4 5 6 7 8 9 10 Miles
ALASKA RAILROAD CORPORATION
PORT MACKENZIE RAILROAD EXTENSION
CASTLE MOUNTAIN FAULT AND STRUCTURE LOCATION MAP
PORT MACKENZIE RAIL EXTENSION
DRAWN: LES
DECEMBER 2007 FILE: SEE PATH
FIGURE 4-X