EI-13269 ~~EI-13268~~

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August 19, 2008

Ms. Victoria J. Rutson
Chief, Section of Environmental Analysis
Surface Transportation Board
395 E Street, S.W.
Room 1106
Washington, D.C. 20423

Re: Finance Docket No. 34658, The Alaska Railroad Corp. -- Petition For Exemption From 49 U.S.C. §10901 To Construct and Operate a Rail Line Between North Pole, Alaska and Delta Junction

Dear Ms. Rutson:

On behalf of the Alaska Railroad Corporation, attached please find information relating to the bridge design for the Tanana River crossing at Flag Hill.

Please let me know if you have any questions.

Sincerely,

Kathryn Floyd

Kathryn Kusske Floyd

Enclosure

cc: David C. Navecky, SEA ✓
Alan Summerville, ICF
Brian Lindamood, ARRC (w/o encl.)

August 19, 2008

The Alaska Railroad Corporation's ("ARRC") provides this response to the concerns raised by the Alaska Department of Fish and Game ("ADF&G") regarding ARRC's proposed river training and channel modifications for the Tanana River crossing at Flag Hill and how they might affect salmon spawning areas (fish locations 52479, 52480, 52461 as provided by ADF&G, July 2008, Figure 1). As part of this response, ARRC is including a revised conceptual bridge design.

For your reference, attached please fine the following five figures:

Figure 1:	Salmon data tag locations in the Flag Hill area as provided in July 2008 by ADF&G.
Figure 2:	Tanana River Flag Hill area aerial photography circa 1978 as provided in July 2008 by ADF&G.
Figure 3:	Tanana River Flag Hill area aerial photography circa 1998 showing areas eroded in 1978 photography as provided in July 2008 by ADF&G.
Figure 4:	Proposed joint access bridge location near Flag Hill utilizing single bridge structure crossing the entire river, prepared by ARRC and revised July 2008.
Figure 5:	Proposed joint access bridge location near Flag Hill utilizing a reduced-length single bridge structure combined with channel optimization, prepared by ARRC and revised July 2008.

Background

As you are aware, the Tanana River in the area of proposed project is a semi-braided river with actively moving channels and sub-channels. The river system transports a significant amount of gravel, as well as trees and woody debris resulting from channel morphology. In designing a crossing concept at this location, the ARRC has taken the following key considerations into account:

- The minimum bridge opening required to convey the 100-year flood event with less than a 1-foot rise in head water elevations is estimated at 2400-feet.

- The constriction of the river to a minimum opening based solely on hydraulics will likely have long-term effects on stream bed deposition and scour, resulting in unpredictable changes in channel morphology.

- Although the north bank is relatively fixed (because the main channel is presently pinned against Flag Hill), the south bank does not have a refining feature. The river in this location consists of three main channels

whose conveyance is highly variable depending upon daily variations in conveyance, sediment transport, debris transport, and morphology. The south bank has several clear-water streams out-falling into the southern most Tanana channel, which is downstream of the crossing location.

- There are several island features between the river channels which are susceptible to erosion. A comparison of recent aerial photography with historical data has provided time series data relating to river morphology. (The data provided by ADF&G in July of 2008 clearly show this effect, see figures 2 & 3). Although vegetative growth on the islands is relatively mature, there has been a considerable amount of erosion on the upstream end of the island network. This not only raises concern over the long-term (100-year design life of the bridge) stability of the island structure, but would also likely be a factor in the division of water conveyance between the channels.

Crossing Concepts

Conceptual crossing designs historically have attempted to treat each of the three channels of the Tanana separately -- crossing each with an individual bridge structure that would be connected with embankments over the islands. This approach is based on the underlying concept that the division in river flow between the channels is fairly consistent. However, over the past few years of analysis (and certainly over the expected life span of the crossing structure), it cannot be expected that flows will be so consistent.

Two means to address this issue are: i) try to regulate the flow in each of the three channels upstream of the bridge; or ii) size each of the bridges to handle the design flow for the entire river. This latter option would require significant bank armoring on the island sections to attempt to ensure their long-term viability. Although the regulation of flow through dimensional channels or the structures is commonly used, these systems are not technically feasible at this location for several reasons.

First, these systems result in a pressure head differential, or hydraulic jump, such that the permeability of underlying materials becomes a concern. If the water pressure is unable to be equalized at the surface, the head differential will result in the tendency of water being sucked under or around the regulating structure. In areas of fine clays (low permeability) this can be managed, often through headers driven vertically down to a pre-determined depth at the entrance of the structure. The soil in this location consists of highly permeable gravel to depths exceeding 50-feet. It is not possible to control the seepage around (under or flanking) traditional open channel regulating structures. In fact, the permeability is such that the entire structure will become unstable during high-flow events.

Second, the location required for such a facility would most certainly destroy spawning habitat at the up-stream end of the southern-most channel. Accordingly, any sort of flow regulation would raise ADF&G's core concern about the potential destruction or impact to spawning habitats.

The only remaining means to retain each of these channels is to size the bridge structures for each to handle the full conveyance of the river. To have three 2400-3000' structures in this area would result in the lengths over-lapping (the bridge lengths would total more than space allows). Thus, a single bridge over the entire river would be required. ARRC's latest conceptual estimate of such a structure is approximately 6100 feet in length (Figure 4). A bridge of this length would result in a construction cost nearly 80% higher than the other alternative crossing location at Salcha. Due to the significant cost increase (an order of magnitude of $80-$100 million), ARRC believes that this option is cost-prohibitive and impracticable.

ARRC's Revised Crossing at Flag Hill

To address ADF&G's concerns, ARRC has revised and refined its most recent Flag Hill concept (Figure 5) to limit the in-water work in the spawning areas of concern. The bank-hardening revetments have been moved off the existing bank inland, and then wrap around the south abutment face. The south channel is then re-directed into the center channel downstream of the spawning area. The material sourcing area has been removed, and the clear-water channel outfalls downstream of the crossing would be un-impeded in their connections to the Tanana River. These revisions provide the most reasonable and practicable means to cross the Tanana River at this location. ARRC supports this approach as a preferred option to address ADF&G's concern relating to the spawning habitat.

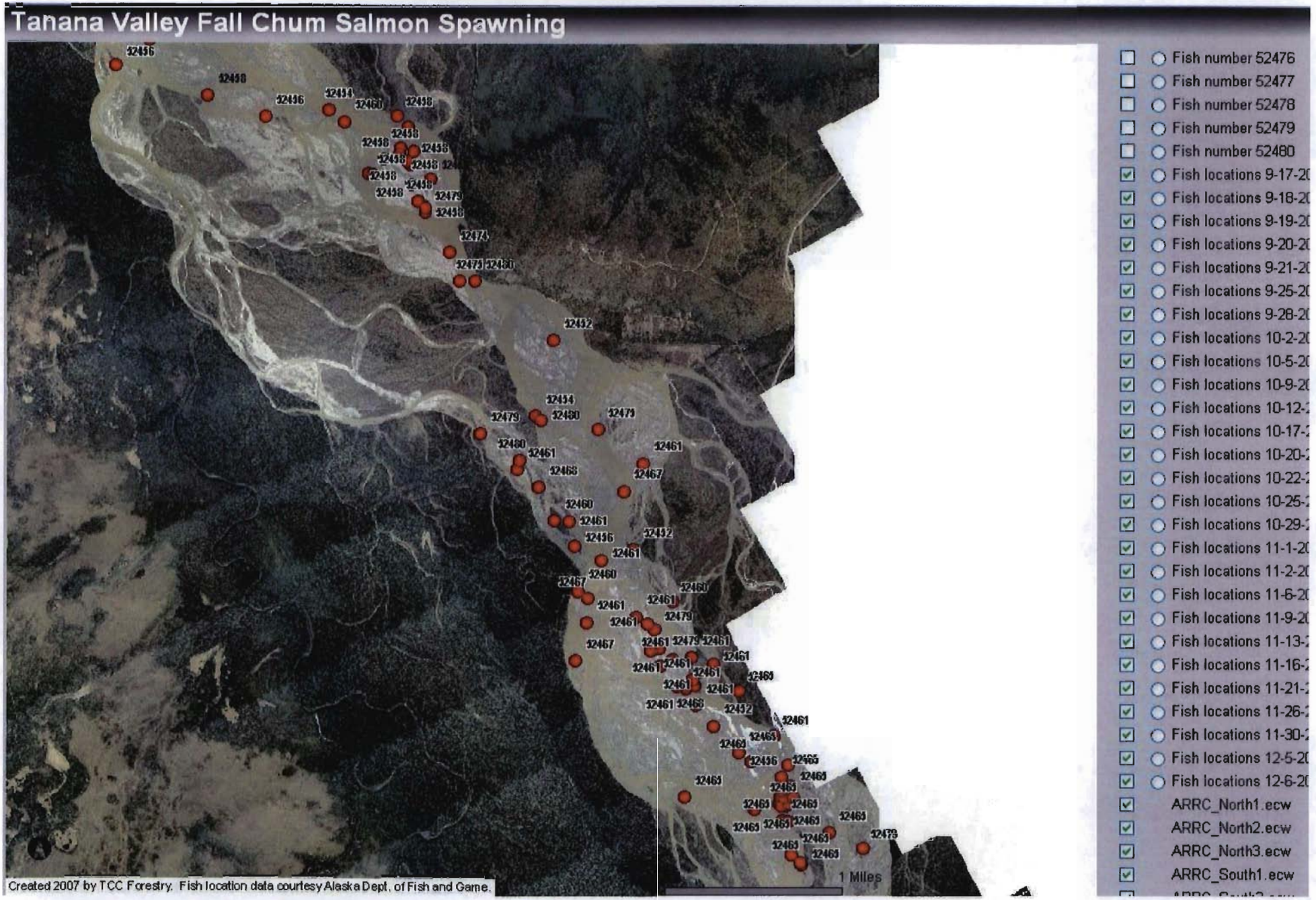
Tanana Valley Fall Chum Salmon Spawning
Fish number 52476
Fish number 52477
Fish number 52478
Fish number 52479
Fish number 52480
Fish locations 9-17-20
Fish locations 9-18-20
Fish locations 9-19-20
Fish locations 9-20-20
Fish locations 9-21-20
Fish locations 9-25-20
Fish locations 9-28-20
Fish locations 10-2-20
Fish locations 10-5-20
Fish locations 10-9-20
Fish locations 10-12-
Fish locations 10-17-
Fish locations 10-20-
Fish locations 10-22-
Fish locations 10-25-
Fish locations 10-29-
Fish locations 11-1-20
Fish locations 11-2-20
Fish locations 11-6-20
Fish locations 11-9-20
Fish locations 11-13-
Fish locations 11-16-
Fish locations 11-21-
Fish locations 11-26-
Fish locations 11-30-
Fish locations 12-5-20
Fish locations 12-6-20
ARRC_North1.ecw
ARRC_North2.ecw
ARRC_North3.ecw
ARRC_South1.ecw
1 Miles
Created 2007 by TCC Forestry. Fish location data courtesy Alaska Dept. of Fish and Game.

Figure 1

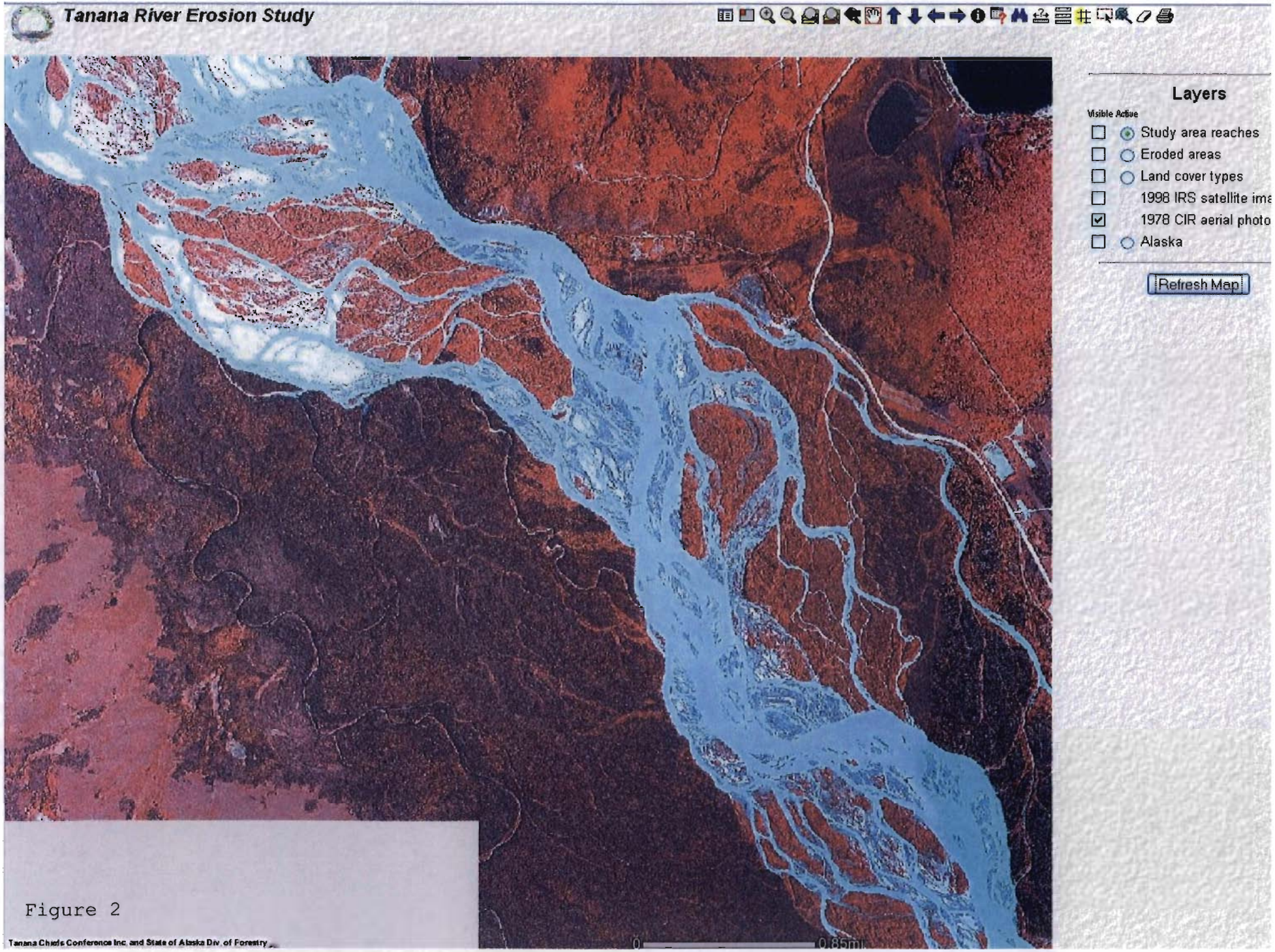
Tanana River Erosion Study
Layers
Visible Active
Study area reaches
Eroded areas
Land cover types
1998 IRS satellite ima
1978 CIR aerial photo
Alaska
Refresh Map
Tanana Chiefs Conference Inc. and State of Alaska Div. of Forestry
0
0.85mi

Figure 2

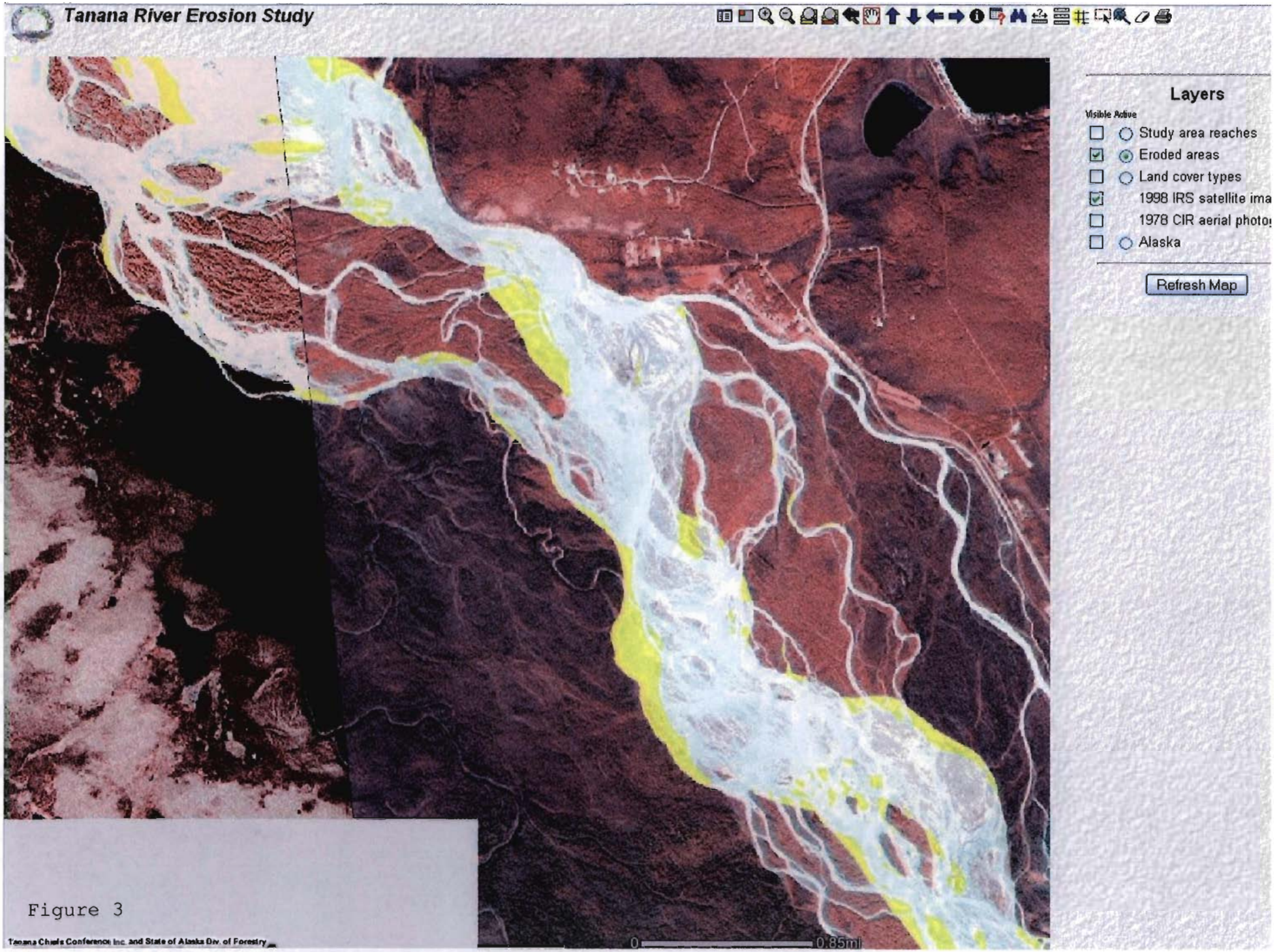
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Figure 3

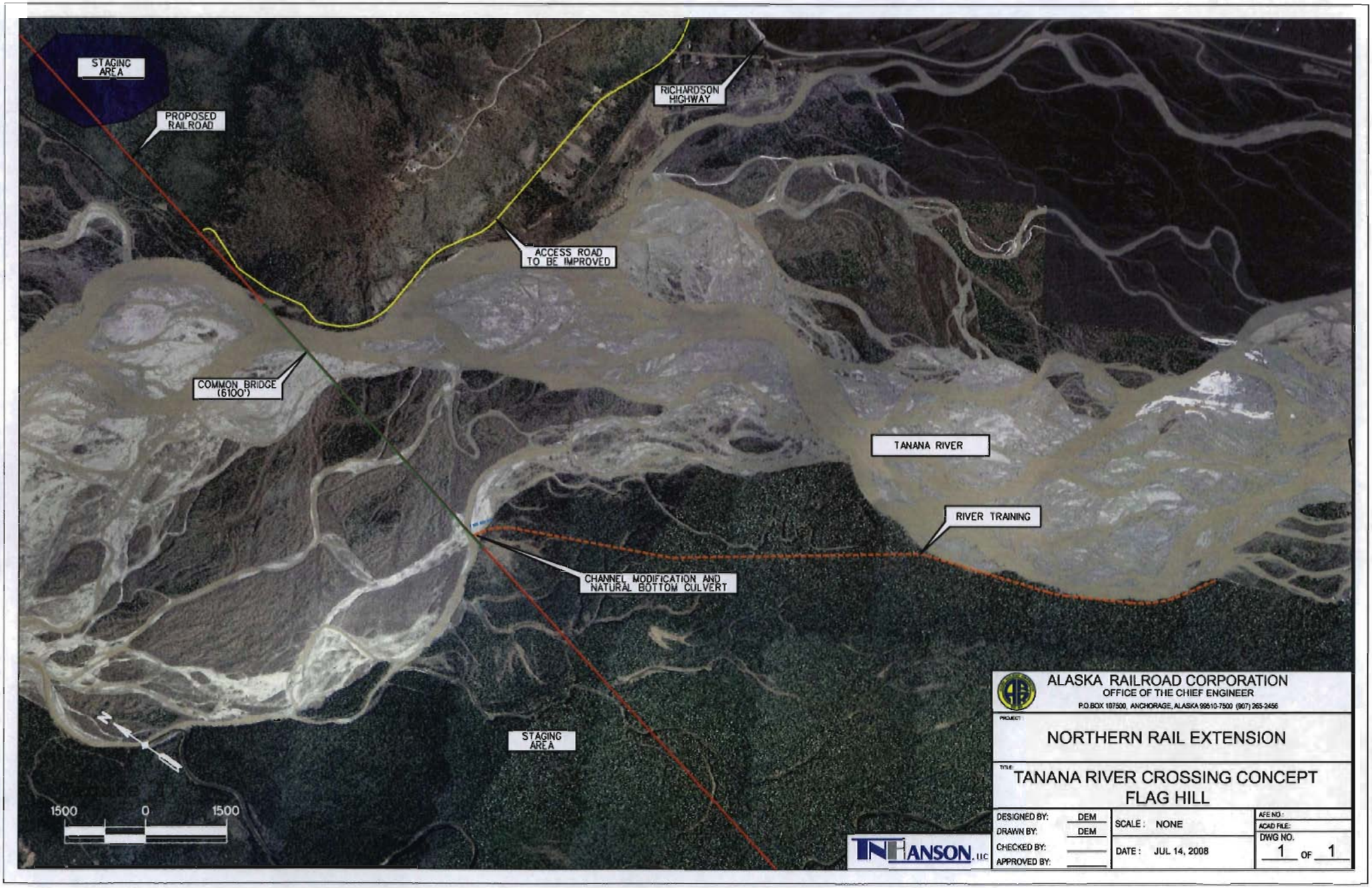
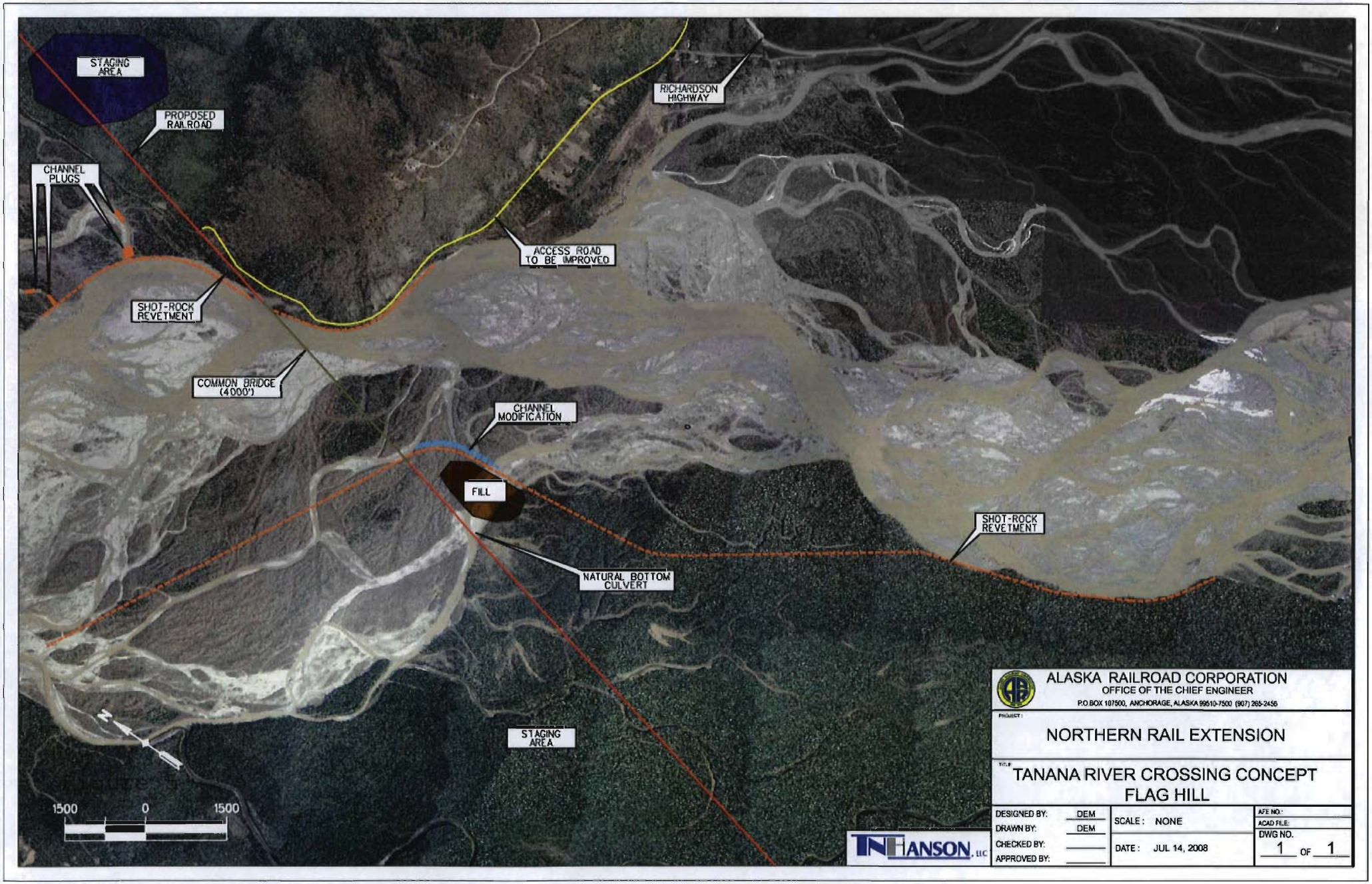

STAGING AREA
PROPOSED RAILROAD
RICHARDSON HIGHWAY
ACCESS ROAD TO BE IMPROVED
COMMON BRIDGE (6100')
TANANA RIVER
RIVER TRAINING
CHANNEL MODIFICATION AND NATURAL BOTTOM CULVERT
STAGING AREA
N
1500 0 1500
ALASKA RAILROAD CORPORATION
OFFICE OF THE CHIEF ENGINEER
P.O.BOX 107500, ANCHORAGE, ALASKA 99510-7500 (907) 265-2456
PROJECT:
NORTHERN RAIL EXTENSION
TITLE:
TANANA RIVER CROSSING CONCEPT
FLAG HILL
DESIGNED BY: DEM
DRAWN BY: DEM
CHECKED BY:
APPROVED BY:
SCALE : NONE
DATE : JUL 14, 2008
AFE NO.:
ACAD FILE:
DWG NO.
1 OF 1
TNHANSON, LLC

Figure 4


STAGING AREA
PROPOSED RAILROAD
CHANNEL PLUGS
RICHARDSON HIGHWAY
ACCESS ROAD TO BE IMPROVED
SHOT-ROCK REVETMENT
COMMON BRIDGE (4000')
CHANNEL MODIFICATION
FILL
SHOT-ROCK REVETMENT
NATURAL BOTTOM CULVERT
STAGING AREA
N
1500 0 1500
ALASKA RAILROAD CORPORATION
OFFICE OF THE CHIEF ENGINEER
P.O.BOX 107500, ANCHORAGE, ALASKA 99510-7500 (907) 265-2456
PROJECT:
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AFE NO.:
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DWG NO.
1 OF 1
TNHANSON, LLC

Figure 5