

OPERATING & MAINTENANCE PLAN

for the

DeLong Mountain Regional Transportation System



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LIST OF UPDATES

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|----|--|---------------|
| 1. | List of Updates | February 2005 |
| | Added List of Updates section. | |
| 2. | Table 3-1 Road Operation Rules of the Road | February 2005 |
| | Updated communication procedure. | |

SUMMARY

This Operating & Maintenance Plan (Plan) for the DeLong Mountain Regional Transportation System (DMTS) has been prepared by Teck Cominco Alaska Incorporated (TCAK) to fulfill, in part, requirements set forth in agreements between the National Park Service (NPS), NANA Regional Corporation (NANA), the Alaska Industrial Development and Export Authority (AIDEA), and TCAK that govern the establishment, operation, and maintenance of the DMTS. This Plan supercedes the *1991 Operating Plan for the DeLong Mountain Transportation System*.

The objective of this Plan is to describe how TCAK operates and maintains the DMTS with respect to its governing agreements. Toward that end, the Plan summarizes the agreement requirements applicable to operation and maintenance of the DMTS, describes DMTS facilities and their uses, and describes operations and maintenance activities.

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- A Summary of Applicable Requirements in the Governing Agreements
- B NPS Comments on the September 2002 DMTS Draft O&M Plan
- C Record of Discussion & Action Items Regarding NPS Comments on the September 2002 Draft DMTS O&M Plan, April 17, 2003
- D Review Schedule & Description of Items Incorporated by Reference into the DMTS O&M Plan
- E Material Safety Data Sheet & Product Specifications for Calcium Chloride

ACRONYMS & ABBREVIATIONS

ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish & Game
ADNR	Alaska Department of Natural Resources
AIDA	Alaska Industrial Development Authority (now AIDEA)
AIDEA	Alaska Industrial Development and Export Authority (formerly AIDA)
ANILCA	Alaska National Interest Lands Conservation Act
ANCSA	Alaska Native Claims Settlement Act
BLM	U.S. Department of the Interior, Bureau of Land Management
BMP	best management practice
CFR	Code of Federal Regulations
CSB	concentrate storage building
DMTS	DeLong Mountain Regional Transportation System
EIS	Environmental Impact Statement
EMS	Environmental Management System
EPA	U.S. Environmental Protection Agency
GIS	geographic information system
MS	material site
MSHA	Mine Safety and Health Administration
NANA	NANA Regional Corporation
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
PAC	personnel accommodation complex
SHPO	State Historic Preservation Officer
SOP	standard operating procedure
STP	sewage treatment plant
TCAK	Teck Cominco Alaska Incorporated (formerly Cominco Alaska)
TEOM	tapered-element oscillating microbalance
TWUP	Temporary Water Use Permit
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

1 INTRODUCTION

The DeLong Mountain Regional Transportation System (DMTS) was established in 1986 to support the mining district that includes Red Dog Mine, located in northwest Alaska in the Wulik River drainage of the DeLong Mountains (Figure 1). The DMTS' 52-mile road and Port Site on the Chukchi Sea are used to transport and store zinc and lead concentrates produced at Red Dog Mine, and to load the concentrates to oceangoing vessels to bring to market. The DMTS is also fundamental for storing fuel and operating supplies for the Red Dog Mine, and in their transport to the Mine Site.

The DMTS traverses NANA Regional Corporation (NANA) lands, Cape Krusenstern National Monument lands administered by the National Park Service (NPS), Alaska state lands administered by the Alaska Department of Natural Resources (ADNR), and the Cape Krusenstern National Historic Landmark Archeological District, which encompasses the entire Port Site, the National Monument, and much of the DMTS Road corridor (Figure 1).

To secure a right-of-way through Cape Krusenstern National Monument, NANA entered into a land exchange agreement with NPS in 1985. The United States Congress, through Public Law 99-96 amending the Alaska Native Claims Settlement Act (ANCSA), authorized and ratified the agreement, which grants NANA a 100-year right-of-way through the monument in exchange for the following:

1. Relinquishing all ANCSA land selections within Cape Krusenstern National Monument;
2. Agreeing to land use restrictions on certain conveyed land parcels at the Port Site;
3. Vacating conveyed NANA lands in the Sheshalik area at the mouth of the Noatak River and elsewhere in Cape Krusenstern National Monument; and
4. Granting fee title to NPS to approximately five acres at Onion Portage for administrative uses.

Teck Cominco Alaska Incorporated (TCAK) operates and maintains the DMTS on behalf of Alaska Industrial Development and Export Authority (AIDEA). AIDEA financed and retains ownership of DMTS; TCAK has a priority non-exclusive contract to use the DMTS Road and Port for exporting its zinc and lead concentrates.

Operation of the DMTS is subject to several agreements between AIDEA, NANA, TCAK, and NPS. This Operating and Maintenance Plan (Plan) has been prepared to satisfy, in part, the terms of those agreements.

The major components of the DMTS are shown on the DMTS Alignment Sheets (Figures 3-1 through 3-17).

1.1 Plan Objectives

The objectives of this Plan are to delineate how TCAK, on behalf of AIDEA, intends to operate and maintain the DMTS with respect to its governing agreements. Toward these ends, this Plan includes or addresses the following:

- A summary of the governing agreement framework for the Plan
- Facility and use descriptions
- Operating procedures

- Maintenance procedures
- Environmental review standards
- Cost control and reporting

1.2 Agreements Governing this Plan

Four agreements, listed below, govern the operation and maintenance of the DMTS. The requirements found in the agreements that are pertinent to this Plan are summarized in Appendix A. Note that where agreement titles or other agreement language is quoted, the names of the parties appear as stated in the agreements, and may not be consistent with the parties' contemporary names (e.g., TCAK was formerly Cominco Alaska Incorporated, and AIDEA was formerly Alaska Industrial Development Authority [AIDA]).

- Development and Operating Agreement between NANA and Cominco Alaska Incorporated dated October, 11 1982 ("NANA/TCAK Agreement").
- Terms and Conditions Governing Legislative Land Consolidation and Exchange between NANA Regional Corporation, Inc. and the United States of America, June 1986 ("NANA/NPS Agreement").
- Agreement for Leasing Lands and Interest in Lands for the Construction, Operation, Maintenance and Reclamation of the DeLong Mountain Transportation System and for the Sales of Sand, Gravel and Related Construction Materials and Appendices, between NANA and AIDA ("NANA/AIDEA Agreement").
- Amended and Restated Agreement for the Financing, Construction, Use, Operation and Maintenance of the DeLong Mountain Transportation System, dated March 12, 1997, between Cominco and AIDEA ("TCAK/AIDEA Agreement").

1.3 Plan Review & Revision

This Plan is a revision of the *1991 Operating Plan for the DeLong Mountain Transportation System*, prepared by Cominco Alaska Incorporated (now TCAK). This revision was guided by comments resulting from NPS' 2001 review of the 1991 Plan, and subsequent comments from AIDEA, NANA, and NPS on the 2002 draft revision. The NPS 2002 comments on the draft revision are provided in Appendix B.

On April 17, 2003, TCAK and NPS held a conference call to discuss outstanding issues raised by NPS' 2002 comments on the draft revision. A record of this conference call is provided in Appendix C. The record itemizes each NPS comment, summarizes the discussion, and identifies action items, if applicable, which were completed in order to finalize this Plan.

With regard to future revision of this Plan, the governing agreements do not specify a review or revision cycle, except to make the following two points:

- "A proposal to supplement or revise a plan of development and operations may be made by NANA or NPS to adjust the plan to changed conditions or to address conditions not previously contemplated by notifying the appropriate party in writing of the proposed alteration and the justification" [NANA/NPS Agreement, Exhibit B, Section (D)]
- Prior to any surface disturbing activity, other than the construction of subsistence cabins and related facilities, which would result in an expenditure of more than \$10,000 in 1984 dollars (assuming an inflation rate of 2.5%, this is the equivalent of about \$16,000 in 2003), including the cost of labor and materials, NANA, or its successor in interest, shall

draft a development and operation plan and shall provide it to NPS for review at least 60 days in advance of filing any applications for necessary state or federal authorizations, or at least 60 days in advance of its implementation if no authorizations are required [NANA/NPS Agreement, Exhibit B, Section (A)].

Any revision cycle could be inappropriate to address evolving circumstances and changed conditions; therefore, no review cycle is proposed. Instead, TCAK and NPS will meet at Red Dog annually (see Section 1.4). During this meeting, NPS will have the opportunity to inspect the DMTS and any new operational changes that affect the DMTS, and discuss ongoing concerns or outstanding issues. At that time, TCAK and NPS will also consider whether operational changes made during the past year (or forthcoming year) warrant revision of this Plan.

The intent of the NANA/NPS Agreement regarding the planning process is to keep NPS informed and involved with significant activities occurring on the Monument. Both NPS and TCAK acknowledge that the \$10,000 threshold for Plan revision is not reasonable or practicable. The annual TCAK/NPS inspection / review meetings will facilitate information sharing, and proactively address NPS concerns that cannot be addressed appropriately or in a timely manner in a DMTS O&M Plan revision.

1.4 Annual Inspection / Review Meeting

NPS shall have the opportunity to travel annually to Red Dog to inspect DMTS facilities, share information, and review DMTS-related activities and outstanding issues. At that time, TCAK and NPS will also consider whether operational changes made during the past year (or forthcoming year) warrant revision or amendment of the DMTS O&M Plan.

The following issues have been identified by TCAK and NPS for continuing consideration during the annual inspection / review meetings (for further information, see Appendices B & C) and ongoing collaboration:

- *Forthcoming Operating, Closure & Reclamation Plan for DMTS Material Sites within Cape Krusenstern National Monument* (see Appendix C, item 6).
- Reclamation research (TCAK to share results with NPS; see Appendix C, item 69).
- Investigation of the legal status of the landfill at MS-2 (see Appendix C, item 7).
- Inspection of geomorphic stability and stream channel or wetland conditions, and potential natural/cultural resource conflicts (see Appendix C, item 12).
- *Caribou Migration Monitoring Plan* revision (see Appendix C, item 24)
- *Forthcoming Red Dog Cultural Resources Management Plan* (see Appendix C, item 67).
- Concept of an administrative public record webpage to facilitate document review (see Appendix C, items 2 and 68).
- Information sharing of ongoing efforts to address fugitive dust, including hard surface test results (see Appendix C, items 8, 11, and 13).

1.5 Review of Documents Incorporated by Reference

The agreements governing this Plan outline requirements that are also mandated by other regulatory agencies; for example, spill prevention and response planning, adherence to certain health and safety standards, and environmental monitoring. Because NPS is the only agency

required to review this Plan, and in the interest of avoiding duplication of planning efforts, this plan incorporates by reference other plans, reports, manuals, handbooks, and standard operating procedures (SOPs), where appropriate, to satisfy the agreement requirements. NPS shall be given the opportunity to review these items according to Appendix D. Appendix D lists each document incorporated by reference into this Plan, along with the following review & submittal information:

- The date each document was last provided to NPS for review (as of the publication of this Plan)
- TCAK's internal revision schedule for each document
- The next required submittal to NPS (if applicable)

Numerous permits issued by regulatory agencies of the federal government and the state of Alaska also govern the operation and maintenance of the DMTS. As per Exhibit B of the NANA/NPS Agreement, TCAK must copy NPS on permit applications and permits for activities occurring on National Monument or A2 Lands. Such permits are referenced, as appropriate, throughout this Plan.

2 DESCRIPTION AND USE OF DMTS FACILITIES

The major components of the DMTS are a 52-mile gravel road, material sites needed to construct, maintain, expand, and reclaim the road, and a port facility on the Chukchi Sea. Zinc and lead concentrates produced at the Mine Site are transported via the DMTS to oceangoing vessels on the Chukchi Sea for shipment to market, while fuel, equipment, chemical reagents, operating supplies, and construction materials are hauled from the Port to the Mine Site. The DMTS is also used to transport riprap, embankment fill, and surface coarse from material sites. The following subsections describe the major components of the DMTS and their uses.

2.1 DMTS Road

The DMTS Road is constructed of crushed rock and gravel. The road bed, as constructed, consists of a minimum of 5 feet of fill on a geotextile liner, finished with 12 inches of 1-inch minus crushed surface coarse for a total minimum depth of 6 feet. The road surface is approximately 30 feet in width, with turnouts situated at roughly 2-mile intervals. The DMTS Road alignment includes nine bridges and three major culvert batteries, with an additional 445 minor culvert crossings. Minor culvert crossings facilitate natural surface runoff patterns when surface water is present. Major culvert batteries, consisting of multiple pipes in series, are located at major stream crossings that may experience flow year-round. During winter months, the DMTS Road is marked every 100 feet with reflective delineators, staggered in 50-foot intervals on either side of the road.

The DMTS Road alignment and locations of bridge and culvert crossings are presented on the DMTS Alignment Sheets (Figures 3-1 through 3-17) following the main text of this Plan.

2.1.1 *Commodities Moved Over DMTS Road*

The DMTS Road is used on a daily basis to haul concentrates, bulk fuel, and supplies between Red Dog Mine and the Port. TCAK contracts with NANA-Lynden for the transport of these goods. Table 2-1 summarizes the quantities of commodities expected to be hauled over the DMTS Road during the course of a typical year. These quantities may be subject to change.

Zinc concentrate is a fine powder with an average elemental composition of 55.4% zinc, 4.9% iron, 3.36% silica, and 3.2% lead. Lead concentrate is a fine powder with an average elemental composition of 56.7% lead, 11.3% zinc, 5.6% iron, and 3.78% silica. Lead concentrate contains an average of 376 grams of silver per wet metric ton, and zinc concentrate contains an average of 124 grams of silver per wet metric ton (Malone 2003). The concentrates are transported from the Mine Site to the Port with specialized trucks (see following section).

Table 2-1 Commodities Moved Over DTMS Road in 2003

Item	Average Quantity Per Trip	Total Quantity/Day (Annual Average)	Trips/Year ^A	Total/Year ^A
Zinc & Lead Concentrates	109 tons	3,939 tons	13,168	1,437,709 tons
Bulk Fuel	Up to 24,900 gallons	48,400 gallons	633	15,499,000 gallons
Supplies	1 to 4 Connex containers	69 tons	449	32,000 tons

^A Based on NANA-Lynden shipping records (provided by Dale Roper); actual for January - November, estimated for December.

Bulk fuels (No. 1 diesel, No. 2 diesel, Jet A) arrive by barge during the summer months at the Port, and are transported to the Mine by tanker truck throughout the year.

“Supplies” consist primarily of chemicals and reagents used in ore processing, and may occasionally include heavy equipment or gasoline (in 55-gallon drums). Chemicals and reagents are shipped from the manufacturer in reinforced bulk containers within Connexes to the Port, which are then hauled on the DMTS Road. A list of chemicals, reagents, hazardous materials, and estimated quantities moved over the DMTS Road can be found in TCAK’s *Hazardous Material Operations Manual*, which is subject to review and updating annually.

2.1.2 Transportation

A fleet of eleven 130-ton trucks operated by NANA-Lynden transports the concentrates from the Mine Site to the Port Concentrate Storage Buildings (CSBs). The trucks are specially designed tractor units towing tandem trailers using a B-Train assembly. The trailers have hydraulically operated steel covers that seal in concentrates during transport (these trailers replaced older side-dump trailers with rolling tarp covers in fall of 2001). Although a total of 11 trucks make up the fleet, only 7 to 8 trucks are used on a daily basis, allowing for a continuous maintenance program. A maximum of three round trips per truck can be made per 12-hour shift, depending upon road and weather conditions. Typically, 36 trips per day (averaged on an annual basis) are made to the Port Site CSBs. Each truck hauls approximately 109 tons of concentrate per trip. The maximum practical limit on trips for the concentrate fleet per day, given current staffing, fleet configuration, and system capacity, is 48. Table 2-2 shows the average trips per day for all types of traffic traveling on the DMTS Road.

NANA-Lynden delivers fuel from the Port Site to the Mine an average of 1.7 times per day (annual average) using a 24,900-gallon single trailer tanker truck. A second (backup) hauling unit consists of a flatbed truck carrying two 5,000-gallon ISO tanks and pulling one 5,000-gallon trailer-mounted ISO tank. The second hauler is typically used, in addition to the 24,900-gallon tanker, an average of 15 days per year.

Supplies shipped into the Port are transported to the Mine using a fleet of 4 flat bed trucks capable of carrying 1 to 4 Connex containers. During winter months, one supply truck makes one round trip per day, weather permitting. Upon arrival of supply barges during summer months, the supply fleet may make up to 8 round trips per day (practical limit).

Table 2-2 DTMS Traffic

Traffic Category	Number of Units in Use/Day	Average Trips/Day per Unit^A	Maximum Trips/Day per Unit^B	Total Average Trips/Day^A
Concentrate Trucks	7 or 8	5	6	36
Fuel Trucks	Up to 2	1.7	4	1.7
Supply Trucks	1 to 2	1.2	4	1.2
Maintenance Equipment	Up to 5	N/A ^B	N/A ^B	N/A ^B
Light Vehicles	3 to 10	1	2	10
TOTAL				49

^A Based on NANA-Lynden shipping records for 2003.

^B Maintenance equipment generally does not make "trips," but remains in its working area.

Light vehicle traffic includes the Surface Crew, which travels the DMTS Road up to twice per day monitoring operations, road conditions, and maintenance needs. Other departments, such as Mill Operations and Materials Management, routinely make trips between the Port and Mine as required to support operations; and regulatory agency, AIDEA, and Red Dog administrative personnel travel between the Mine and Port in light vehicles on an irregular basis. Once per week, 2 passenger vans transport Port employees to/from the airport to the Port. The estimated total daily average of light vehicle trips (per annum) is 10.

2.2 DMTS Material Sites

Material sites in the DMTS corridor provide sand & gravel, rip rap, embankment fill, and surface coarse to operate and maintain the road according to its design specifications. There are two actively mined material sites (MS-2 and MS-9) within the corridor, neither of which are within National Monument boundaries. Material sites located within the National Monument (MS-3, MS-4, MS-5, and MS-6) are currently inactive with regard to material extraction but have the potential for future use. A plan of operations and closure will be established for the sites within the National Monument in accordance with Section 1.4. Table 2-1 provides a summary of all DMTS material sites and their status with regard to land ownership, material types, volumes extracted, and permits.

Seven material sites (MS-2, MS-3, MS-5, MS-6, MS-9, MS-10, and MS-11) are currently permitted for water withdrawal under ADNRC Temporary Water Use Permit (TWUP) F2002-10, which authorizes withdrawal of up to 200,000 gallons per day from each site, year-round.

An area within MS-2 is permitted as a sanitary landfill under Alaska Department of Environmental Conservation (ADEC) Solid Waste Disposal Permit 0132-BA003.

A portable crusher is operated intermittently at the active material sites. Emissions from this unit are regulated by General Air Quality Operating Permit GP-9 under 40 CFR 60, Subpart OOO (non-metallic mineral processing).

Table 2-3 DTMS Material Sites and Status Summary

Material Site	Mile Post	Land Ownership & Rights	Material Use	Estimated Volume Extracted (yd ³)	Other Authorized Uses	Reclamation or Use Status	Notes
1-1E	N/A	NANA-owned	Embankment fill, surface coarse	N/A	N/A	Closed	Intertidal borrow areas during construction of Port
2A	0.75	NANA-owned	Offshore cell fill, surface coarse	N/A	N/A	Closed	Adjacent to Port CSBs; operated during DMTS construction
2	1.9	NANA-owned (A-2 land conveyed by NPS)	Embankment fill, surface coarse, rip rap, road "sand"	N/A	Water withdrawal & sanitary landfill	Active	ADNR Temporary Water Use Permit F2002-10; withdrawal not to exceed 200,000 gallons per day, year-round usage. ADEC Solid Waste Disposal Permit #0312-BA003.
3	8.1	Easement on Nat'l Monument	Embankment fill, surface coarse, rip rap	Data forthcoming	Water withdrawal	Active	ADNR Temporary Water Use Permit F2002-10; withdrawal not to exceed 200,000 gallons per day, year-round usage.
4	11.7	Easement on Nat'l Monument	Embankment fill	Data forthcoming	N/A	Inactive, potential for future use	
5	17.0	Easement on Nat'l Monument	Embankment fill, surface coarse, rip rap, road "sand"	Data forthcoming	Water withdrawal	Inactive, potential for future use	ADNR Temporary Water Use Permit F2002-10; withdrawal not to exceed 200,000 gallons per day, year-round usage.
6	18.3	Easement on Nat'l Monument	Embankment fill, surface coarse, rip rap	Data forthcoming	Water withdrawal	Active	ADNR Temporary Water Use Permit F2002-10; withdrawal not to exceed 200,000 gallons per day, year-round usage.
7	25.5	Easement on ADNR land	Embankment fill	N/A	N/A	Inactive (access road partially reclaimed)	
8	29.3	Easement on ADNR land	Embankment fill	N/A	N/A	Inactive (access road partially reclaimed)	
8A	30.6	Easement on ADNR land	Embankment fill, rip rap	N/A	N/A	Inactive (access road partially reclaimed)	
9	33.5	Easement on ADNR land	Embankment fill, high float test material, surface coarse	N/A	Water withdrawal	Active	ADNR State Land Use Permit ADL415967; limit 25,000 cubic yards/year. ADNR Temporary Water Use Permit F2002-10; withdrawal not to exceed 200,000 gallons per day, year-round usage.
10	38.3	Easement on ADNR land	Embankment fill, surface coarse, rip rap	N/A	Water withdrawal	Inactive	ADNR Temporary Water Use Permit F2002-10; withdrawal not to exceed 200,000 gallons per day, year-round usage.

Material Site	Mile Post	Land Ownership & Rights	Material Use	Estimated Volume Extracted (yd ³)	Other Authorized Uses	Reclamation or Use Status	Notes
11	40.5	Easement on ADNR land	Embankment fill, surface coarse	N/A	Water withdrawal	Inactive	ADNR State Land Use Permit ADL416299; limit 25,000 cubic yards/year. ADNR Temporary Water Use Permit F2002-10; withdrawal not to exceed 200,000 gallons per day, year-round usage.
12	42.8	Easement on ADNR land	Embankment fill, surface coarse, rip rap	N/A	N/A	Inactive	
13	46.2	NANA-owned	Embankment fill, surface coarse, rip rap	N/A	N/A	N/A	Rock cut that was incorporated into DMTS Road design.
14 (Buddy Creek Cut)	47.5	NANA-owned	Embankment fill, rip rap	N/A	N/A	N/A	Rock cut that was incorporated into DMTS Road design.

2.3 Port Site Description

The Port facilities were designed to provide the necessary infrastructure to store and ship concentrates. Concentrates are stored in two CSBs for approximately 9 months of the year while the Chukchi Sea is frozen. In the summer, when the sea is ice-free, concentrates are transported with lightering barges to ships and delivered to smelters worldwide.

The Port facilities consist of the following:

- Concentrate facilities, which include two CSBs with two wash bays, conveyor system, unloading station, surge bin, and barge loader.
- Six 2.34-million gallon steel bulk fuel storage tanks in lined secondary containment. Descriptions of the design and operation of these tanks and their containment systems are contained in the Red Dog Operations Oil Discharge Prevention & Contingency Plan. The Port Site consumes some 4,500 gallons of diesel fuel daily for power generation, equipment operation, and vehicle use. Approximately 18 million gallons of fuel are delivered during the summer to the Port Site by barge and transferred to the six bulk fuel storage tanks. Fuel is hauled from this facility to the Mine Site year-round on a daily basis in a 24,900-gallon capacity tanker (see Section 2.1.2).
- A supply laydown area for storage of annual supplies.
- Fire bay for housing of fire engine and ambulance.
- A personnel accommodation complex (PAC), which accommodates up to 96 people and is heated by a glycol waste heat recovery system, backed up by two 2.7 million BTU/hour diesel-fired boilers.
- Powerhouse/Warehouse complex. The Port Powerhouse burns approximately 9.2 million gallons of diesel fuel per year three 650-kilowatt and one 1,250-kilowatt diesel-fired generator sets (maximum permitted amount is 11 million gallons). Operation of fuel-burning equipment at the Port Site is regulated under ADEC Air Quality Permit to Operate 9632-AA001.
- Heavy Equipment Shop for maintenance of vehicles and equipment.
- Shallow water dock and barge loader structures.
- Two desalination plants (installed in 1991 and 1997) with pump rates of 5,000 gallons per day to supply potable water to the PAC.
- A domestic sewage treatment plant (Port STP) with a 12,000 gallon per day capacity and a biosolids press. Effluent from the plant is discharged in accordance with National Pollutant Discharge Elimination System (NPDES) Permit AK-004064-9 from Port Outfall 001 (one of two outfalls).
- The Port Site sanitary landfill located at MS-2, which operates under ADEC Solid Waste Disposal Permit 0132-BA003. The permit stipulates that only demolition debris, construction wastes, and ash or incinerator wastes may be disposed at the landfill.
- Two Advanced Combustion Systems Inc. refuse incinerators (with capacities of 500 pounds/hour and 125 pounds/hour respectively), to burn biosolids and food wastes from the Port STP. Operation of the incinerators at the Port Site is regulated under ADEC Air Quality Permit to Operate 9632-AA001. The ash is disposed in the Port Site sanitary

landfill in accordance with the Solid Waste Disposal Permit and best management practices (BMPs) outlined in the Cominco Biosolids Plan.

- A CSB drainage treatment facility, which includes an ion exchange plant and stormwater / groundwater collection system, constructed and installed in Spring 2001 to gather and treat water from the drainage areas surrounding the CSBs before discharge into a pipeline to a diffuser located offshore. Treated CSB drainage is discharged in accordance with NPDES Permit AK-004064-9 from Port Outfall 005 (one of two outfalls).

3 DMTS OPERATING PROCEDURES

3.1 General DMTS Operations

3.1.1 Safety

Safe operating procedures for the DMTS are subject to conditions imposed by TCAK and its contractors, as well as the laws and regulations of Alaska Department of Labor, Division of Labor Standards and Safety (Port), Occupational Health & Safety Administration (DMTS Road), and the Mine Safety and Health Administration (active material sites).

TCAK's personnel policy prohibits use and possession of alcohol and controlled substances for all employees, contractors, and visitors to any Red Dog facility. Persons in violation of this policy are immediately dismissed from employment and evicted from the property.

The following safety precautions apply to general DMTS operations, and are detailed in TCAK's *Road Procedure – Port Road Traffic* and the *Red Dog Employee Safety and Lockout Procedures Manual*:

- Prior to operation of any vehicle or mobile equipment, employees shall be task-trained.
- Each operator, prior to operating any vehicle or piece of mobile equipment, completes a written walk-around inspection (per shift).
- Following the walk-around inspection, and prior to normal operation, the operator shall perform a brake check on the vehicle.
- Personnel shall carry sufficient cold weather gear when traveling the DMTS Road.
- All equipment operators shall carry, at a minimum, a portable radio when traveling the DMTS Road.

Equipment and its operators can and will be inspected for compliance.

3.1.2 Fire Prevention, Response & Reporting

It is the responsibility of all employees and contractors of the operation to take precautionary measures to prevent man-made fires. Fire prevention and control measures presented in the *Red Dog Operations Employee Safety and Lockout Procedures Manual* shall be followed by every employee and contractor. These measures include the following:

- Strict observation of designated non-smoking areas.
- Prohibition of smoking during fueling operations.
- Prohibition of fuels or flammables storage in vehicles or equipment, unless within an approved container.
- Prohibition of fuel as cleaning agent (only approved cleaning solvents may be used).

- Storage of flammable liquids in safety containers and/or approved flammables storage cabinets.
- Disposal of oily rags and other combustible materials in approved metal containers.
- Requirements for hot work permits prior to initiation of work.
- Maintenance of appropriate firefighting equipment in accessible locations, especially in the vicinity of hot work.

Actions taken to suppress fires will be in accordance with the *Red Dog Operations "911" Emergency Procedures Handbook*, the *Red Dog Fire Department Operations Manual*, and, when applicable, the Bureau of Land Management's (BLM's) *Alaska Interagency Wildland Fire Management Plan* (BLM 1998). The TCAK Fire Chief on duty oversees all fire response and reporting activities. Response shall be carried out by TCAK's Fire Department.

If a fire starts within the DMTS corridor as a result of road operations or maintenance activities, steps to be taken shall include:

- Immediately respond to the fire in accordance with applicable plans.
- Notify NANA, AIDEA, and NPS according to procedures set forth in the *Fire Department Operations Manual*.

TCAK will not fight fires caused by natural occurrences unless human life or operations are threatened.

3.1.3 Wildlife Incident Response & Reporting

If a person is injured by an animal, TCAK's Fire Department will respond according to tactical procedures detailed in the *Fire Department Operations Manual* and *Emergency Medical Operations Manual*.

Any free-ranging carnivorous wild animal that bites a person must be euthanized immediately and submitted to the Alaska Department of Health & Social Services, or to a laboratory designated by the Department for rabies testing (Chapter 27 Part 020, Title 7 Alaska Administrative Code [7 AAC 27.020]).

The Environment Department will notify the appropriate NPS and Alaska Department of Fish & Game (ADF&G) representatives in the event of a wildlife road kill or injury involving caribou, bear, fox, wolf, wolverine, musk ox, moose, or raptors. If a federally-listed threatened or endangered species (see Section 5.5) is injured or killed, the Environment Department will also immediately notify the U.S. Fish & Wildlife Service (USFWS). For an incident involving a marine mammal, the Environment Department will notify National Marine Fisheries Service.

3.1.4 Accident Response & Reporting

TCAK's Fire Department and Trauma Team will respond to accidents according to tactical procedures detailed in the *Red Dog Fire Department Operations Manual* and the *Red Dog Medical Emergency Operations Manual*. Accident reporting is detailed in the above-mentioned manuals, as well as in the *Red Dog Operations "911" Emergency Procedures Handbook*, which applies to the entire operation, including the DMTS. TCAK senior management has access to the *"911" Handbook*, and is responsible for communicating response and reporting procedures to employees.

An accident that does not result in lost time is considered minor, and immediately reportable to the involved individual's direct supervisor. The supervisor shall complete a formal written

investigation report explaining the circumstances of the incident and the extent of injuries (if any) and file it with the Loss Control Department within 24 hours.

A major accident (an incident involving a lost-time or hospitalization) is immediately reportable to TCAK's General Manager or designated representative. In the event of a fatality, TCAK's General Manager shall notify AIDEA, the Alaska Division of Labor Standards and Safety, the Mine Safety and Health Administration (MSHA), and the Alaska State Troopers by telephone, telegram, radio, or in person, immediately and no later than 24 hours after learning the incident has occurred; and no equipment, material, or product may be moved or altered until clearance is given by the Troopers and Division of Labor Standards and Safety, except when compliance with this requirement would interfere for an unreasonable length of time with work or create additional hazards (Chapter 18.60, Title 18 Alaska Statutes, Section 058).

3.1.5 Spill Prevention

Prevention of spills is TCAK's primary concern in the transportation, storage, and handling of fuels, chemicals, and concentrates. TCAK's Environmental Management System ensures employee awareness, training, and proper safety and operational practices, in order to prevent spills and minimize the impact of those that occur.

The potential for spills on the DMTS include diesel fuel, chemicals used in the mining and milling operation, and lead and zinc concentrates. Spills to land or water could occur during the transport of these items on the DMTS, during storage at the Port Site, or during fueling of trucks and equipment at the Port Site or material sites.

Because this Plan does not undergo annual review by all agencies with jurisdiction over the spill prevention and response aspects of the DMTS, TCAK's spill prevention methods and BMPs are set forth in the following documents and incorporated here by reference (for descriptions of these documents, see Appendix D):

- *Red Dog Operations Oil Discharge Prevention & Contingency Plan*
- *Red Dog Hazardous Material Operations Manual*
- *Red Dog Mine Port Site Pollution Prevention and BMP Plan*

3.1.6 Spill Response & Reporting

Because this Plan does not undergo annual review by all agencies with jurisdiction over the spill response and reporting aspects of the DMTS, TCAK's spill response and reporting methods are set forth in other documents and incorporated here by reference. In the event of a spill, response personnel shall implement the following plans (for descriptions of these documents, see Appendix D):

- Red Dog Operations Oil Discharge Prevention & Contingency Plan
- Red Dog Hazardous Material Operations Manual
- Concentrate to Water Response Plan
- Port Road Concentrate Spill Cleanup Standard Operating Procedure (SOP)

In the event of a reportable spill on National Monument lands, NPS shall be notified according to reporting procedures in these plans. TCAK must request permission from NPS to operate equipment off road surfaces within the Monument for spill response purposes.

3.1.7 Search and Rescue

TCAK's Fire Department and Trauma Team is responsible for any search and rescue activities required for TCAK personnel. Appropriate vehicles or aircraft will be made available at the time a need arises. If additional assistance is required, TCAK may elect to contact NPS, the Alaska State Troopers, or the Civil Air Patrol (all in Kotzebue).

All search and rescue procedures shall be conducted in accordance with the *Red Dog "911" Operations Emergency Procedures Handbook* and in the *Red Dog Fire Department Operations Manual*.

3.1.8 Employee Training and Orientation

TCAK provides its employees and contractors with orientation training on safe work practices, familiarization with mining and milling processes as required by MSHA, chemical reagent handling, waste management, arctic conditions, environmental policy, and the Red Dog Operations Environmental Management System (EMS).

Specifically, each employee or contractor of TCAK is provided with environmental orientation training covering the following general environmental policy items:

- All spills are to be reported to the supervisor immediately.
- Immediate attention must be given to all spills, and response actions must be guided by the appropriate spill response plan.
- Waste handling and disposal must comply with Red Dog's Waste Management Program.
- No wetland may be disturbed without obtaining the appropriate permit.
- No water, waste, or other substance may be discharged to a wetland or body of water without obtaining the appropriate permit.
- No streambed may be disturbed by crossing or with construction activity without obtaining the appropriate permit.
- No water may be withdrawn from any water body, natural or manmade, until a water use permit has been obtained.
- No hunting or fishing.
- Wildlife may not be harassed in any way.
- Any activity that has the potential to adversely affect their environment should be reported to the Environmental Department through the supervisor.

These general environmental policy items are also available to each employee and contractor in the *Red Dog Operations Employee Safety and Lockout Procedures Manual* and Red Dog's *Environmental Pocket Reference*.

The physical, biological, and cultural values of the area, including Cape Krusenstern National Monument, are communicated to all employees during their environmental orientation training. NPS personnel may attend trainings and give presentations to Red Dog Operations personnel regarding the surrounding park units upon making arrangements with TCAK. NPS may also provide Red Dog Operations personnel with pamphlets and literature regarding NPS policy.

Mine operations and safety training are provided to new employees and contractors during a separate MSHA training program.

3.2 DMTS Road Operations

3.2.1 Rules of the Road

Red Dog Operations vehicle and road procedures are communicated to all employees during their MSHA training, are detailed in the *Employee Safety and Lockout Procedures Manual* available to each new TCAK hire and contractor, and can also be accessed on the EMS web site on Rover (the Red Dog Operations intranet site). Standard procedures for operating vehicles on the public highway system in the state of Alaska apply to the DMTS Road, as well as the rules included in Table 3-1, DMTS Road Operations – Rules of the Road.

Table 3-1 Road Operations - Rules of the Road (updated February 2005)

All vehicles must yield right-of-way to emergency vehicles, concentrate haul trucks, tankers, and vehicles in tow. Working equipment has right-of-way over light vehicles. No vehicle may block or impede traffic on the DMTS Road. Drive at safe and prudent speed. No vehicle operator may attempt to pass any equipment until the operator of the rig being followed gives specific clearance by radio, the vehicle operator is positive the verbal clearance has been directed at the vehicle wishing to pass, and there is ample room and visibility to complete the pass safely. All drivers traveling the Port Road will have a working channel #3 and channel #2 radio. While on the Port Road, drivers shall monitor channel #3 at all time. Before entering the Port Road all north and south bound drivers must contact the Port Hopper Crew on Channel #3 or by calling ext. 692 and provide the following information: operator name, equipment or vehicle number, number of occupants in the vehicle, destination, and the estimated time of return. Upon completion of the trip, the driver of the vehicle will call the Port Hopper Crew to confirm the return. All traffic will announce its position, north or south, at designated and posted "call in" locations (Buddy Creek, Material Site 13, Material Site 10, Material Site 6, and Material Site 3).	When meeting a concentrate truck or tanker on the road, slow to 30 miles per hour or less and pull as far right as safely possible. When approaching road crews, slow to 15 miles per hour or less. Avoid meeting concentrate trucks, tankers, or other equipment at bridges or areas of limited visibility (corners, back sides of hills). Sound the horn twice before backing up a vehicle from the bull rail. Radio or visual contact must be made when entering work areas. All vehicles and equipment must operate with illuminated headlights and strobes. Vehicles may not be driven over electrical power cables, airlines, or water hoses. Safety belts must be worn at all times by vehicle operators and passengers. Personnel riding in or operating machinery must keep their arms and legs completely inside the cab at all times. No person may ride in the bed of a pickup truck. No person may stand on the outside of a moving vehicle or piece of machinery without authorization. Doors must remain closed when vehicles are in motion. Be aware that other encounters are possible on the road: with wildlife, pedestrians, snowmobiles, etc.
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3.2.2 Road Restrictions / Closures

The TCAK General Manager, the Port Road Supervisor, the Loss Control Department, Concentrate Haul Contractor's Managers, or the Lead Concentrate Haul Driver on shift have the authority to impose road restrictions as needed.

Generally, road restrictions constitute reduced speeds due to impaired visibility, or restriction of travel of concentrate trucks due to road conditions (drifted snow, rough road, road maintenance activities). Restrictive measures when migrating caribou are in the area, or when weather conditions are marginal, may include limiting non-essential traffic and requiring traffic to travel in convoy.

Road closures may be necessary in times of extreme weather and active caribou migration. Partial road closures may occur during road maintenance or when migrating caribou approach the road.

A traffic light at both the north and south end of the DMTS Road indicates the condition (traffic restrictions) of the road as follows:

<u>Green</u>	Open to all vehicle traffic
<u>Yellow</u>	Open only to concentrate trucks and Surface Crew
<u>Red</u>	Closed to all traffic

3.2.3 Caribou Policy

Procedures for restricting travel and for appropriate activity on the DMTS Road when caribou are in the vicinity are detailed in TCAK's *Caribou Policy* and summarized below.

TCAK's *Caribou Policy* distinguishes between migrating and non-migrating caribou. When the location of migrating animals is observed by any person on the DMTS, that person shall notify TCAK's Port Road Supervisor and the NANA/Lynden base station. The NANA/Lynden base station will inform all DMTS traffic of the migrating animals' location. When migrating caribou are on or approaching the road, all traffic must come to a stop when in sight of the crossing locations. Traffic shall not proceed until the group of animals has crossed and continued at least 300 feet from the road, or, have withdrawn from the road to a distance of over 300 feet away and are showing no signs of trying to cross.

When migrating caribou are near the DMTS Road, emergency traffic will be limited to officially designated response trips, as specified by TCAK's *Caribou Policy*.

For the majority of the year, caribou in the vicinity of the DMTS Road will be grazing, not migrating. When dispersed non-migrating caribou are grazing next to the road, vehicle traffic shall stop until the caribou naturally move a safe distance from the road. When the animals are within 300 feet of the road, vehicle speed will be reduced to a level that does not frighten or otherwise affect the animals. If a slow or creeping vehicle does affect the animals, the vehicle shall stop until the animals move more than 300 feet away on their own volition.

3.2.4 Concentrate Transportation

While in transit on the DMTS Road, safety protocols ("rules of the road") shall control traffic (see Section 3.2.1). All vehicles shall be in radio contact with each other and the operations base. Concentrate haul trucks have right-of-way over other vehicles.

3.2.5 Concentrate Truck Cleaning

After the zinc or lead concentrate has been loaded at the Mine Site, the trailers are visually inspected and any concentrate on the outside is removed. During the summer months, until temperatures drop below freezing in September, the trucks pass through a truck wash before they leave the Mine Site. During the winter months, washing would create numerous safety hazards, such as freezing brakes and hydraulics. Summer truck washing will remain in place until adequate alternative measures are installed to keep the trucks clean. TCAK is conducting

engineering studies on how to modify the loading facility to ensure the outsides of the units are not contaminated during the loading process. The work is scheduled for 2004.

3.3 DMTS Materials Site Operations

3.3.1 Standard Operating Procedures / Extraction Plan

Material sites are currently mined according to design specifications approved by the appropriate permitting agency. In general, working benches or rock faces at material sites are kept to an approximate maximum height of 25 feet. All sheer quarry walls or benches are blasted or excavated producing a slope of not less than $\frac{1}{2}$ to 1 (angle of repose), or as otherwise required by specific permits to mine.

Blasting is performed as described in Section 3.3.2. Broken rock is stockpiled in pre-designated areas using 966 or 988-type front-end loaders, and processed (crushed and sorted) using a portable crusher powered by a diesel-fired generator, as needed.

Prior to mining in a new area, organic material is stripped and stockpiled in a pre-designated location within the material site boundaries. A buffer of at least 20 feet is maintained between material sites and nearby surface water bodies.

To protect the quality of nearby water bodies during the life of a material site, erosion and drainage control methods are employed. Erosion and drainage control methods at material sites are specific to each site's topographic and geologic characteristics, and techniques may vary over the life of the material site. Material sites may be designed to natural contours, or with an approximate slope of 2 percent on the quarry floor, with the aspect oriented toward a drainage trench with a series of dikes, filter cloths, or silt fences to control sediment in runoff. Another approach to controlling drainage and erosion at material sites is to mine such that a depression is left on site to serve as a collection basin (pond).

Mining at material sites must be performed such that wildlife is protected. No heavy equipment shall be operated in the vicinity of an actively nesting raptor [NANA/NPS Agreement, Exhibit B Section (C) part 5.r.(1)].

Equipment fueling at material sites, as stipulated by land use permits, must be conducted with secondary containment (drip pans or catch buckets) placed under outlets, valves, hose connections, and hose ends. Fueling operations must not take place within the 100-year floodway or tidelands, and fuel containers may not be stored within 100 feet of a water body. Spill response equipment is kept on hand during fuel transfers at material sites.

3.3.2 Blasting Procedures

Explosives transportation, handling, storage, and use will comply with the agreements governing the operation of the DMTS (see Section 1.2) and the following federal and state regulations:

- U.S. Department of Labor MSHA Standards – 30 CFR 56 & 57, Safety Standards for Explosives at Metal and Nonmetal Mines. These standards govern on-site transportation, safe storage, inspection, safe use, and notification requirements.
- Alaska Department of Labor/Occupational Safety and Health, Explosives Compliance Division Requirements – 8 AAC 61.1020, Additional Explosive and Blasting Standards. These standards govern safe blasting practices and department notification requirements.

- ADNR Requirements – 11 AAC 95.335, Blasting Standards. These requirements prohibit blasting in certain riparian or stream areas unless a variance is obtained.

In mining of material sites, placement of explosives is generally in series at approximately 9-foot intervals with 11 feet of overburden; however, the number, pattern, and depth of explosives vary according to bench height, rock type, hardness, and structure of the material. The ratio of explosives to rock is generally 0.8 pounds per cubic yard, and may be adjusted to achieve the desired fragmentation. Production blast holes range from 10 to 30 feet deep. Blasts are produced using a Class 1.4 detonator and Class 1.1 boosters. The blast is initiated with a “nonel” shock tube initiator.

When blasting is to be performed, the designated blaster is responsible for insuring that all tie-ins are complete, placing guards at safe designated distances, giving the required blast signals, initiating the blast, inspecting the blast, and giving the “all clear” signal.

Blasting at material sites must be performed such that wildlife is protected. No explosive shall be detonated within ½ mile of any caribou or musk ox herd, or known denning bear [NANA/NPS Agreement, Exhibit B Section (C) part 5.a]. No explosive shall be detonated within 1 mile of any actively nesting raptor.

3.3.3 Water Withdrawal

The TCAK Surface Crew pumps water from permitted withdrawal sources at material sites according to permit stipulations, using trailer-mounted 6-inch pumps discharging to 9,000-gallon water tankers (Section 5.2).

3.4 Port Site Operations

General Port support operations consist of PAC housekeeping and foodservice, power generation, water desalination, sewage treatment, and heavy equipment maintenance. General support operations are performed according to appropriate SOPs, operations manuals, and manufacturer specifications, and in accordance with TCAK’s EMS and Waste Management Program. Major Port operations include fuel, freight, and concentrate transfer and storage. Major Port operations are described in the following subsections.

3.4.1 Fuel & Freight Transfer and Storage

Transfers of fuel and freight from delivery barges to onshore facilities are performed in accordance with the *Red Dog Port Operations Manual* and *Red Dog Operations Oil Discharge Prevention & Contingency Plan*. Fuel is transferred from the bulk tanks to tanker trucks using a dual mode tanker fill system controlled by a barrel counter and protected from overflow by a Scully System.

3.4.2 Concentrate Unloading

The concentrate haul trucks unload concentrates at the Port by opening the front trailer lid halfway, then rotating the trailer body along its long axis to deposit the concentrates into a hopper. If concentrates remain at the bottom of the trailer following dumping, the trailer is rotated back into the cradle position, and is then re-rotated. Once the front trailer body is back in the cradle position, the truck moves forward, and the same process is repeated with the rear trailer. The manner in which the concentrates are dumped from the self-rotating trailers into the hopper minimizes air displacement and dust generation during unloading.

The hopper that receives the concentrates feeds them into a fully enclosed conveying system that carries them to one of the two CSBs. Stilling curtains were installed in 2001, and have been customized to effectively trap airborne dust in the hopper during the dumping process to

minimize dust escapement or dust deposition on the trucks. In Spring 2002, an air handling system was installed in the hopper area. The system uses a negative pressure pickup system and a baghouse to collect fugitive dust and filters the air before discharge.

The original haul trucks, replaced in Fall 2001 by the trucks currently in service, were covered with heavy-duty tarps. The trucks would pull into the "racetrack" loop at the Port CSBs, and stop to roll back the tarps covering the trailers. This procedure was a potential source of fugitive dust emissions. Trucks would then proceed into the truck unloading building, and were dumped using a platform that rotated the entire truck and trailer. The sudden displacement of air resulting from the release of the concentrate load into the hopper tended to result in dust being blown back onto the truck and trailers, which resulted in carry-out of concentrate dust from the unloading building onto the road.

3.4.3 Concentrate Storage

The concentrates are delivered year-round to two CSBs. These buildings are approximately 218 feet wide, 140 feet high, and 1,425 feet long (CSB-2 is 1,200 feet long). Together, these storage buildings can hold all of the concentrate produced in about 9 months of mill operation, allowing mining to proceed year-round, between shipping seasons. The CSBs protect the concentrates from the weather and from loss to the environment.

3.4.4 Concentrate Conveyor System

Concentrates are loaded from the CSBs with front-end loaders into rail-mounted feeder-hoppers on the conveyor system. The fully enclosed conveyors transfer the concentrates from the CSBs to the barge loader. The main overland conveyor (P8) transfers the concentrates into a surge bin (1,500 ton-capacity for zinc concentrate, 1,200-ton capacity for lead concentrate). The surge bin receives a discontinuous flow of concentrate and delivers a steady flow into conveyors P9A and P9B, which are twin variable-speed feeders underneath the surge bin. Finally, the concentrates are fed onto conveyor P10, and then P11, which is the barge-loader conveyor.

Extensive modifications to control dust have been completed on the concentrate handling system. Initially, the conveyor system was covered but not fully enclosed. In the summer of 1992, the conveyor belt from the CSB-1 to the dock was enclosed with an industrial tent-like structure. During the construction of CSB-2 in 1996-1998, all of the associated conveyors were enclosed in solid steel tubes. In 2000, the long conveyor (P8) from CSB-1 to the surge bin was also enclosed in a steel tube. Dust control improvements were made to the surge bin in the spring of 2002 (additional enclosure methods, baghouse improvement and cleaning systems) and the P10 and P11 conveying system in the spring of 2003. In addition, SOPs have been developed to ensure proper operation.

3.4.5 Concentrate Loading (Conveyor to Barge)

The fully enclosed P10 conveyor moves the concentrates to a barge loader. This barge loader can rotate to load either the north or south side of the barge berth. The barge berth is composed of three steel sheet-pile cells, about 75 feet in diameter each. While at rest in the barge berth, lightering barges are loaded from the enclosed barge-loader conveyor (P11) using a snout-like canvas tube that lowers into the barge and slowly raises as the barge is filled to minimize the free-fall distance of the concentrate. Two front-end loaders work to move the concentrate to the corners of the barge as it is loading. The barge is covered during the entire process by fixed tarps except for a lengthwise slot through which the snout is lowered. The loaders work beneath the fixed tarps.

3.4.6 Concentrate Transfer (Barge to Deepwater Ship)

Tugs are used to tow enclosed lightering barges from shallow water at the Port to anchored deepwater ships, 3 to 4 miles offshore. Each barge has a built-in conveyor that transfers the concentrates to the deepwater ships. Two front-end loaders that reside on each barge are used to feed the built-in conveyors. Prior to the start of the 2003 shipping season, the lightering barges were modified to improve dust control. These modifications included improved discharge chutes, better enclosures, and the installation of negative pressure systems and baghouses. Concentrates can be transferred from the barges to the ship holds as long as waves are less than 6 feet high. Once the concentrates are loaded into the ships, they are delivered throughout North America, Europe, and Asia.

4 DMTS MAINTENANCE PROCEDURES

4.1 DMTS Road Maintenance

The DMTS Road is maintained by TCAK's Surface Crew to ensure uninterrupted transport of concentrate, fuel, and supplies. DMTS Road maintenance generally consists of regular surface grading, surface coarse replacement, snow control, dust control, culvert de-icing and aufeis control, bridge and culvert repairs, and delineator installation.

The entire DMTS Road alignment is visually monitored daily, weather allowing, by the TCAK Surface Crew to identify areas of wear, snow drifts, or areas requiring dust control. Table 4-1 lists equipment used to maintain the DMTS Road.

Table 4-1 DMTS Maintenance Equipment

Qty.	Equipment ^A	Use(s)
2	¾ or 1-Ton 4WD crew cab pickups	Surface Crew DMTS Road transportation
1	300-gallon pickup bed-mounted fuel tank	Hauling equipment fuel
1	500-gallon fuel tank trailer (pickup pull)	Hauling equipment fuel
1	5-Ton flat-deck service unit with knuckle crane	Hauling dust suppressant
3	10-ton tractors with 9,000-gallon water tankers	Hauling water / applying dust suppressant
1	Plow truck with sander	Plowing/sanding
1	Plow truck with 8-12 yd dump box	Plowing/hauling sand or gravel
5	Belly dump trailers (hailed by NANA-Lynden trucks)	Haul/apply gravel
1	966-type front-end loader (4.5 yd)	Move snow or gravel
1	966 snow blower attachment	Move snow
1	966 hammer attachment	Install delineators
1	988 front-end loader (7 yd)	Crush/load/move gravel
2	16G graders	Grading/scarifying road & ice – all seasons
1	Stevenson 1250-type snow blower (4,000 ton/hr)	Primarily for Airport, but available for removing snow from DMTS Road
1	Eductor unit	Mix water & dust suppressant
1	Portable crusher & generator	Crush gravel at material sites

Qty.	Equipment ^A	Use(s)
3	Trailer mounted 6-inch "trash" pumps	Water withdrawal for dust suppression
1	40-horsepower steam generator or a modified welder	Culvert ice clearing
1	2.4 - 4.0 yd backhoe (trackhoe)	Clearing culverts and bridges of snow/debris
1	D-4 Dozer (low ground pressure)	Build snow berms (to function as snow fences), clear culverts and bridges
1	D-9 Dozer	Primarily serves Mine Department, available to push snow

^A Information provided by Surface Crew Supervisor, July 2002.

4.1.1 Surface Coarse Replacement

Gravel roads, such as the DMTS Road, lose their surface coarse over time due to breakdown, dust emissions, and loss of material by grading. Each spring, TCAK's Surface Crew assesses the DMTS Road for areas of wear to determine where surface coarse replacement is needed. The Surface Crew replaces approximately 5 miles of surface coarse (on average) per year on the DMTS Road. Generally, approximately 15,000 yards of surface coarse are prepared and applied to the DMTS Road per year to protect the road base. This amount can vary significantly depending on conditions.

MS-2, MS-9, and DD2 provide suitable material ($\frac{3}{4}$ -inch minus) for use as surface coarse. Surface coarse is prepared at the material sites using a portable crusher and a 966-type, or a 988-type front-end loader. The surface coarse is applied in a 6-inch lift using belly dumps and finished using a 16G-type grader.

4.1.2 Dust Control

Due to dust control measures, the DMTS Road surface remains fairly stable during periods of dry weather. Windblown road dust control on the DMTS Road is achieved by a combination of the following measures:

- **Palliative (calcium chloride) application:** Calcium chloride is applied according to TCAK's SOP for dust control on the DMTS Road. Approximately 800 tons of calcium chloride per year is applied to stabilize the road bed and control dust on the DMTS Road. The application rate is approximately 2 to 6 tons per mile per application. Calcium chloride prill may be applied dry using a sanding truck with a rotating spreader device and then watered, or in water solution using a water tanker equipped with a spray bar. An eductor mechanism is used to achieve consistent mixing of prill and water when applying solutions. Water is pumped from permitted withdrawal sources according to permit stipulations (see Table 2-3 and Section 5.2.1) using trailer-mounted 6-inch pumps. Generally, calcium chloride is applied to the entire road alignment approximately 3 to 4 times per year.
- **Water application:** Water is pumped from permitted withdrawal sources, primarily material sites, according to permit stipulations (see Table 2-3 and Section 5.2.1) using trailer-mounted 6-inch pumps, and applied using a 9,000-gallon water truck equipped with a spray bar. In general, water is withdrawn from material sites from May through September, with peak withdrawals totaling an average of about 3 million gallons in June. The volume of water withdrawn and applied to the DMTS Road surface is weather-dependent. Less water application is typically required in September, when average

withdrawals total about 700,000 gallons (all figures averaged over the period of 2001 through 2003).

- Snow application: During the winter, snow may be applied to the DMTS Road surface to control dust. In this procedure, available snow is spread across the surface of the road with a grader.

4.1.3 Palliative Selection

After considering various palliatives during the early years of operation, TCAK determined calcium chloride was the most effective, economical, and most environmentally sensible palliative for use in arctic conditions. With repeated application, calcium chloride binds the road surface, preventing breakdown, erosion, and dust emissions.

Use of calcium chloride was approved by NPS prior to the first application (Tingey 1990). A material safety data sheet and product specifications for calcium chloride are provided in Appendix E.

Palliatives considered during the early years of DMTS operation and the reasons for ruling them out were as follows:

- Calcium lignosulfonate: Difficulty achieving even mixing of powder and water in cold temperatures, and impracticality of mixture storage during freezing temperature. Tends to make road surfaces slick under certain conditions.
- Magnesium chloride: Not environmentally acceptable to NPS. Difficulty achieving consistent mixing of powder and water in cold temperatures, and impracticality of mixture storage during freezing temperature.
- Magnesium lignosulfonate: Not environmentally acceptable. Difficulty achieving consistent mixing of powder and water in cold temperatures, and impracticality of mixture storage during freezing temperature.
- Liquid palliatives (e.g., soil cement, resinous "Entac," Penzoi "Suppress"): Prohibitively expensive during winter months because these products must be stored in heated ISO tanks to preserve integrity.

Should alternative palliatives come under consideration for future use, a testing protocol would be designed in coordination with NPS based on the characteristics of the palliative to be tested.

4.1.4 Hard Surface Testing

TCAK is testing a hard surface on an approximately 5-mile segment of the DMTS Road beginning at the fuel island at the Port Site to approximately Milepost 5, and on the oval road encircling CSB-2 (the "racetrack"). The hard surface was constructed using high float, which is a "foamed" asphalt emulsion applied to a surface coarse of mineral aggregate. When cured, the resulting high float "asphalt" does not flow at high temperatures or become brittle at low temperatures, but forms a water barrier that protects the road base. The purpose of the hard surface test is to assess the durability of such a surface under site-specific conditions, and to evaluate the suitability of the paving system for minimizing fugitive dust emissions from the DMTS Road into the environment. Hard surfacing is also anticipated to reduce or eliminate the need for palliative application, and reduce the frequency of maintenance of the DMTS Road surface.

The hard surface application process and test program is described in the April 18, 2002 technical memorandum, *Hard Surfacing Test Plan* (Exponent 2002a). Hard surfacing was applied to the test section during July 2002 by a contractor using belly dumps and end dumps.

Approximately 4,100 tons of “high-float chips” and 36,000 tons of D1 produced at MS-9 were used for the test section.

4.1.5 Erosion Control

Erosion control is a major component in protection of water quality and habitat in fish-bearing streams. Erosion control on the DMTS corridor depends on sound road design and consistent and appropriate BMPs. Erosion control measures for the DMTS Road, material sites, and Port are specified in the *Red Dog Mine Port Site Pollution Prevention and BMP Plan* and outlined below:

- Apply palliative and replace surface coarse as necessary to keep roadbed stable.
- Restrict traffic when road conditions deteriorate.
- Clear bridges and culverts of snow or debris prior to spring runoff and after precipitation events—blockage can cause channel damage and erosion.
- Ensure culverts terminate on material that will not readily erode, such as riprap, the original streambed if stable, or other suitable material.
- Control drainage at material sites as specified in Section 3.3.1.
- Keep culverts free of obstructions that may impede water flow.
- Stabilize soil of exposed slopes (if susceptible to erosion) by revegetating with appropriate native species. If native plant species are not available, feasible and practicable, NPS concurrence must be obtained prior to revegetation with non-native species on National Monument lands.

The DMTS Road alignment is not susceptible to landslides.

4.1.6 Snow Removal

For up to eight months of the year, keeping the DMTS Road clear of snow is essential for continued DMTS operations. The DMTS Road was designed to be “self-cleaning”—in other words, given the climate (dryness of the snow and frequent winds typical of the area), and given the road’s elevation above the surrounding ground surface, much of the season’s snowfall tends to be removed from the road by natural means (wind).

When snowfall accumulates or when snowdrifts establish on the DMTS Road or on bridges, the following methods of removing the snow (or a combination of those) may be employed:

- Use of a 16G-type grader or plow truck to push the snow from the centerline to either side of the road;
- Use of a 16G-type grader or plow truck to push snow across bridge crossings;
- Use of a 966-type front-end loader equipped with a snow blower attachment to disperse drifted snow or snow pushed to the roadside. Snow is dispersed uniformly to surrounding tundra away from the roadbed;
- Use of a large-capacity snow blower to disperse heavily drifted snow uniformly to surrounding tundra, away from the roadbed.

Exhibit B Section (C)3.c of the NANA/NPS Agreement prohibits snow removal vehicles from operating off road surfaces. TCAK must request permission from NPS to operate off road surfaces within the Monument, and must notify ADF&G for snow removal activities performed around bridges and culverts at fish-bearing streams.

4.1.7 Snow Storage

Because of the relatively low snowfall in the area, and because of the Surface Crew's success in managing snow removal with the methods described above, no snow storage areas related to DMTS operations have been established.

4.1.8 Snow Drift Control

Constant attention to the control of drifting snow is essential if snow removal activities are to be minimized. Areas where drifting snow has been particularly challenging are Anxiety Ridge, MS-10, Little Creek, Ailuuraq, Mud Lake, Straight Creek, Aufeis Creek, Deadman Creek, and New Heart Creek. Measures to control drifting snow include the following:

- Snow fences: The Surface Crew maintains two series of snow fences along the DMTS Road; one set is situated at the entrance of MS-10 and a second set is situated approximately ¼-mile south of the entrance to MS-10. Due to the challenges posed by maintaining the existing fences, TCAK has elected not to install additional fences at other locations.
- Snow berms: During the past several winters, the Surface Crew has used a low-ground-pressure D4-type dozer to create snow berms as needed, which perform the same function as snow fences, but are temporary in nature and do not involve the maintenance challenges that permanent snow fences pose (MacCay 1994).
- Constant attention to bridge and culvert crossings, delineators, and sign locations: Snow drifts tend to establish where sharply defined objects on the landscape slow the wind speed and cause blowing snow to drop out of suspension and accumulate. Snow is plowed or blown from these locations using snow removal procedures described previously.
- Minimization of guard rail and sign installations: TCAK's Surface Crew has noted that guard rails and signs tend to cause the formation of hazardous snow drifts.
- Proper location of signage: TCAK's Surface Crew installs signs on the predominantly downwind side of road to prevent cross-road drifting.
- Snow removal: When snow is pushed off road surface, care is taken not to create snow banks on upwind side, which could lead to drifting.
- Control of irregularities in the road surface: TCAK's Surface Crew grades or plows to control irregularities in the road surface, which could lead to establishment of drifts.

4.1.9 Ice Sanding

To provide safer driving conditions on the DMTS Road surface during freeze-thaw periods in the fall and spring (when snowmelt thaws and refreezes into slick ice), the Surface Crew scarifies the ice with a 16G-type grader with a blade equipped with carbide teeth.

When scarification does not provide sufficient traction to vehicles traveling on the DMTS Road, the Surface Crew uses a sand truck or a dump truck and 16G-type grader to apply sand to the road. Generally, only grades, corners, and bridges are sanded, although other icy sections may be treated as needed. Sand is prepared concurrent with surface coarse preparation at Material Sites MS-2 and DD2 (located near the Mine Site). The material is not technically sand, but "3/4-inch minus" gravel containing few fines. This material becomes incorporated into the road base following thaw periods. Annual volume requirements are based on operating conditions.

4.1.10 Delineator System

During winter (dark) months, delineators mark the entire length of the DMTS Road to provide safer driving conditions when visibility is poor. The delineators are fiberglass-reinforced plastic posts with reflective tips, placed at 100-foot staggered intervals along both sides of the road.

The Surface Crew installs the delineators each year when the ground freezes, and removes them following breakup so that they are not damaged by summer road maintenance work. To install a delineator, the Surface Crew uses a 966-type front-end loader with a hammer attachment to drive holes into the gravel shoulder of the road. The delineators are then pushed into these holes.

4.2 DMTS Bridge and Culvert Maintenance

4.2.1 Routine Maintenance

Routine bridge maintenance may include painting, grouting, guard rail replacement, replacement of riprap, removal of snow and ice from channels, and similar tasks. Culvert crossings require varying degrees of attention. In the spring, it may be necessary to clear streambeds of drifted snow, ice, or debris to minimize impacts to the stream channels during breakup.

Should streambed clearing be necessary adjacent to culverts and bridges, TCAK's Surface Crew may position a 2- to 4-cubic yard backhoe on the DMTS Road or bridge, and use the bucket to remove potential water flow obstructions. In some cases, manual removal of debris may be necessary. To protect fishery resources, culvert and bridge maintenance activities, water withdrawal for dust control, and instream activities are conducted only as permitted by ADF&G (see Section 5.2.1).

4.2.2 Culvert Ice and Aufeis Control

Aufeis is ice formed by successive freezing of stream overflows during winter. As ice layers form on rivers or streams and grow thicker, the water underneath is put under increasing pressure, which forces the stream to seek cracks and finally break its ice cover and overflow the frozen surface. Layer upon layer, the overflows refreeze, and the aufeis grows thicker. During breakup, remaining aufeis can obstruct spring flows, causing channel erosion, and in some cases, culvert washout. Aufeis can create structural engineering problems if it forms upstream of, or within, culverts. On the other hand, like glaciers, melting aufeis steadies flow through dry seasons, regulating water supply often into late summer.

The TCAK Surface Crew clears ice from culverts at stream crossings by using a device called an "ice worm." The ice worm is a length of insulated wire fixed within a culvert and heated with a modified pickup-mounted welding machine. Alternatively, a small-diameter steel rod may be heated using a 40-horsepower steam generator and forced by increments into a culvert to help restore flow and control ice. If aufeis should become a problem near culverts or bridges, a 2- to 4-cubic yard backhoe, positioned on the DMTS Road or bridge, is used to break up the ice, or in-stream work may be performed under certain conditions using a low-ground-pressure D4-type dozer.

4.2.3 Bridge & Culvert Inspections

TCAK contracts with an engineering consultant to perform regularly scheduled technical bridge inspections (every three years) on behalf of AIDEA. The inspections include the following components:

- Inspection of each bridge approach, including an evaluation of fill slope erosion, guardrail damage, and approach-bridge transition.
- Inspection of each bridge, including evaluation of deck, abutments, guardrails, girders, sheet piles, and pipe piles.
- Inspection of channels, including evaluation of rip rap, scour, and channel alignment.
- Inspection of culverts immediately proximate to bridges, including evaluation of scour, sediment buildup, perching, or compromised fish passage.

ADF&G also conducts periodic inspections of bridges and culverts at fish-bearing streams in the DMTS corridor. Improvements suggested by ADF&G are implemented.

4.3 Port Site Maintenance

Regularly scheduled preventive maintenance is performed for all Port Site support facilities in accordance with appropriate SOPs, manufacturer specifications, and maintenance manuals.

Periodically, maintenance to control sediment deposition at the Port dock must be performed. This work is conducted in accordance with U.S. Army Corps of Engineers (USACE) Wetland Permits CC-830589 and Z-830359.

Permit CC-830589 allows for the dredging of 50,000 cubic yards per year of sediments from 9 acres between the high tide line and the 20-foot isobath (a depth of up to 20 feet below mean sea level) on the north side of the Port dock, and discharge of the material into 9.2 acres south of the Port dock on the beach between mean sea level and the high tide line. The footprint of the discharge may be up to 2,500 feet long by 150 feet wide by 12 feet thick.

Permit Z-830359 allows for dredging of 30,000 cubic yards per year of material from around the shallow water dock and placement into a maximum of 4.6 acres below high tide line south of the shallow water dock. Dredging would be performed by standard mechanical methods (e.g., clamshell or floating dredge).

5 ENVIRONMENTAL PROTECTION & MITIGATIVE MEASURES

The section describes measures TCAK is taking or has taken to address the following six environmental protection & mitigation criteria against which NPS is required to review this Plan [Exhibit B, Section (A) of the NANA/NPS Agreement]:

- Prevention or mitigation of significant adverse visual impacts in the location and construction of any improvements and in the location and extraction of materials from material sites;
- Protection of fish and wildlife and their habitat to avoid significant adverse impacts during construction and operation of any improvements and in the location and extraction of materials from material sites;
- Protection of cultural and paleontological resources during construction and operation of any improvements, and in the location and extraction of materials from material sites;
- Reclamation of all material sites and construction camps;
- Protection of threatened or endangered fish, wildlife, and plants; and
- Protection of water quality to avoid significant adverse impacts from development activities.

5.1 Prevention or Mitigation of Visual Effects

Material sites and their associated access roads have been sited, to the extent possible, to minimize adverse visual effects on Cape Krusenstern National Monument lands. One issue originally raised in the 1984 *Environmental Impact Assessment* (EIS) was the visual effect of the concentrate storage area located at Material Site 2 (U.S. Environmental Protection Agency et al 1984). Following adoption of the EIS, further engineering work determined the location of the CSB should be moved closer to the Port Site, away from Krusenstern National Monument land. To mitigate further visual effects, the second CSB was sited adjacent to the original CSB, approximately one mile inland from the Chukchi Sea on NANA-owned lands.

5.2 Protection of Fish & Wildlife and Their Habitat

The following general fish and wildlife protective policy is observed by all TCAK employees and contractors and actively enforced by TCAK:

- Personnel will not harass wildlife in any manner. Harassment means to pursue, hunt, take, capture, molest, collect, harm, shoot or kill, or attempt to engage in any of the preceding by an either intentional or negligent act or omission. Access for hunting, fishing, or trapping on all transportation easement lands is prohibited for employees and contractors during operation and maintenance of the DMTS. (This does not apply to the subsistence activities of local residents as provided for under Section 201(3) and Title VIII of the Alaska National Interest Lands Conservation Act [ANILCA] and shall not apply to activities authorized by ADF&G under a permit to import, export, take or possess live game for scientific, educational or other purposes.)
- Bringing pets to Red Dog is prohibited.
- Feeding wildlife is prohibited.
- Possession of firearms by employees and contractors for personal use is prohibited (possession of a firearm by a trained and permitted bear guard may be warranted during the summer season).
- Wildlife is given right-of-way by all vehicles.

5.2.1 Fish Passage & Habitat Protection

The DMTS Road crosses 14 anadromous fish-bearing streams. These crossings are depicted on the DMTS Alignment Sheets (Figures 3-1 through 3-17). Fishery resources at these crossings have been protected through the installment of bridges and culvert batteries designed and maintained to allow uninterrupted and safe passage of fish. Culvert crossings at fish-bearing streams match the natural course of the stream channels, and are not permitted to be “perched” at their inlets or outlets.

TCAK has acquired maintenance permits from ADF&G for clearing each culvert battery and bridge crossing to ensure the protection of fish habitat and to provide for free passage of fish for the life of the structures. These permits stipulate that plans for maintenance of these crossings must be approved by ADF&G prior to conducting work, and a written summary of work performed must be submitted to ADF&G within two weeks of work completion.

Table 5-1 lists the fish-bearing streams crossed by the DMTS Road and the applicable maintenance permits. Each permit is valid until the road crossing at that particular stream is closed.

Table 5-1 Fish-Bearing Streams Crossed by DMTS and ADF&G Maintenance Permits

Name of Stream Crossing	ADF&G Fish Habitat Permit	Type of Crossing
Ailuuraq Creek	FG-99-III-0231	Bridge and culvert
Anxiety Ridge Creek	FG-99-III-0034	Bridge and culvert
Aufeis Creek	FG-99-III-0237	Bridge
Deadman Creek	FG-99-III-0236	Culvert battery
East Fork New Heart Creek	FG-99-III-0238	Culvert
East Fork Straight Creek	FG-99-III-0234	Culvert
Evaingiknuk Creek	FG-99-III-0228	Culvert
Little Creek	FG-99-III-0229	Bridge and culvert
Mud Lake Creek	FG-99-III-0232	Bridge and culvert
New Heart Creek	FG-99-III-0239	Bridge
Omikviorok River	FG-99-III-0233	Bridge
Straight Creek	FG-99-III-0235	Bridge
Tutak Creek	FG-99-III-0230	Bridge and culvert
West Fork New Heart Creek	FG-99-III-0240	Culvert

TCAK routinely withdraws water from surface sources for DMTS Road maintenance activities. The primary withdrawal sources are material sites (also permitted by ADNR under TWUP F2002-10; see Table 2-3); however, streams are occasionally utilized. To ensure adequate water volume and flow in fish-bearing streams, TCAK has obtained permits from ADF&G that place appropriate restrictions on water withdrawal. Table 5-2 identifies fish-bearing streams permitted for water withdrawal, and daily withdrawal limits.

Table 5-2 Permitted Water Withdrawals from Fish-Bearing Streams

Name of Stream	ADF&G Water Use Permit	Withdrawal Limit
Ailuuraq Creek	FG-91-III-0089-2, exp 5/15/06	Not to exceed 10,000 gallons per day
Anxiety Ridge Creek	FG-91-III-0088-2, exp 5/15/06	Not to exceed 20,000 gallons per day
Aufeis Creek	FG-91-III-0090-2, exp 5/15/06	Not to exceed 20,000 gallons per day
Omikviorok River	FG-91-III-0091-3, exp 5/15/06	Not to exceed 20,000 gallons per day
Tutak Creek	FG-91-III-0092-2, exp 5/15/06	Not to exceed 20,000 gallons per day

Each ADF&G permit stipulates that water withdrawal be performed for dust control only, and that withdrawal takes place only during summer months. To prevent fish entrapment, entrainment or injury, suction hose intakes are centered and enclosed in screened boxes and maintained such that suction at the screen/water interface does not cause fish to be held on screened surfaces. ADNR has also authorized water withdrawal from each of these streams under TWUP F2002-10.

5.2.2 Protection of Migratory Birds

The Migratory Bird Treaty Act of 1918 prohibits activities that directly or indirectly result in the mortality of birds or eggs or the abandonment of nests. DMTS operations and maintenance activities that could affect migratory birds and their nesting behavior include blasting and operating heavy equipment at material sites during nesting season.

Peregrine falcons (*Falco peregrinus*) and rough-legged hawks (*Buteo lagopus*), both protected under the Migratory Bird Treaty Act, occasionally establish nests on or near the high-walls of DMTS material sites. Both species initiate nesting during the first part of May, and average fledge dates occur between August 1 and August 15 (Taylor 1999).

To prevent abandonment and mortality of raptor eggs and nestlings due to material site operations, blasting within 1 mile, and operation of heavy equipment in the vicinity of active nests, is prohibited. Additionally, blasting and operation of heavy equipment at material sites is prohibited when nesting or molting waterfowl are present at adjacent lakes, wetlands, or streams [NANA/NPS Agreement, Exhibit B Section (C) part 5.r.(1)]. Prior to any planned activity at a material site, mine personnel shall inspect the area for raptor nests and waterfowl.

5.2.3 Protection of Caribou

Caribou are a major element of the subsistence culture of the NANA region. The DMTS Road traverses an area of irregular fall migration, and a wintering area that may be used by several thousand caribou each year.

The movements of migrating caribou in the vicinity of the DMTS are monitored under the auspices of the Caribou Migration Monitoring Program executed by a team comprised of NPS, ADF&G, NANA, TCAK, and Subsistence Committee representatives. The primary period of concern for monitoring caribou movements is from August through October in years of major fall coastal migrations.

If it is determined that a major caribou movement is likely to approach or cross the road corridor (by aerial survey or by any person traveling on the DMTS Road), TCAK will follow its *Caribou Policy* with regard to caribou (see Section 3.2.3).

5.3 Protection of Cultural & Archaeological Resources

Prior to construction of the DMTS, Hall & Associates identified many archeological or cultural resource sites within the general DMTS alignment area (Hall 1986). All of these sites were avoided or effects mitigated during the DMTS Road and material site development.

In 1987 and 1988 NPS initiated an additional effort to record archeological sites in Cape Krusenstern National Monument. The NPS survey, which focused on six drainage systems in the monument and certain areas along the coastline, resulted in the identification of 146 new sites (McClenahan and Gibson 1990). Nine of these sites are located in the vicinity of the DMTS corridor.

In order to ensure a comprehensive approach to the protection of cultural resources, TCAK has contracted with Northern Land Use Research, Inc. for the preparation of a *Cultural Resources Management Plan*. TCAK will offer this plan to NANA, AIDEA, NPS, and the Alaska State Historic Preservation Officer (SHPO) for comment, and incorporate it into a forthcoming Programmatic Agreement among the SHPO, NPS, TCAK, and NANA. Thenceforth, all DMTS operating and maintenance activities will be conducted in accordance with the *Cultural Resources Management Plan* and the Programmatic Agreement.

The *Cultural Resources Management Plan* will outline a long-term approach to protection and management of cultural resources and will include:

- A synthesis of prehistory, history, and ethnography for the Red Dog area.
- An archaeological database for all sites in the Red Dog area.
- A geographic information system (GIS) based map showing all sites and previous cultural resource survey areas within the Red Dog area.
- A heuristic predictive model for site occurrence with probabilistic statements about potential site locations.
- A summary and description of all applicable laws, regulations, executive orders, requirements relating to cultural resource management in the Red Dog area.
- A discussion of mining/construction/maintenance activities and their relationship to regulatory compliance and review.
- Procedures for avoidance and mitigation of adverse effects on historic properties.
- Procedures for addressing inadvertent discoveries of archaeological sites, historic sites, and burial grounds.
- Procedures for monitoring historic properties.

5.4 Reclamation

The overall objectives of the reclamation of material sites, related access roads, and other disturbed areas within the DMTS corridor is to restore the sites to be compatible with the surrounding landscape, and in doing so, create functional habitat for wildlife, control erosion, and mitigate visual impacts.

Reclamation methodology, following removal of trash, debris, and structures, and remediation of any contaminated soils or water per applicable federal and state regulations, may include:

- Minor recontouring of disturbed sites to stabilize the soil and control erosion;
- Surface preparation by scarification and/or replacement of overburden material;
- Addition of soil amendments, as appropriate, including fertilizer;
- Seeding with commercially available indigenous seeds or seeds collected from indigenous plants in the area (non-native species may not be used within National Monument lands without prior approval from NPS);
- Transplantation (sprigging) when appropriate, of indigenous plant species from adjacent areas;
- Monitoring of reclaimed sites to evaluate effectiveness of rehabilitation; and
- Implementation of corrective measures where appropriate.

Reclamation methodology, where appropriate, may also follow guidance provided in *North Slope Gravel Pit Performance Guidelines* (ADF&G undated), methods found in *Best Management Practices for Reclaiming Surface Mines in Washington and Oregon*, and guidance found in *NPS Reference Manual 77*.

Reclamation efforts along the DMTS corridor which have been carried out to date include partial closure and partial natural revegetation of access roads to Material Sites 7, 8, and 8A;

demonstration revegetation at a disposal site near the Port; and revegetation of crossings at Aufeis Creek, Mud Creek Ailuuraq, Tutak, Little Creek, and Anxiety Ridge. The demonstration and crossing reclamation efforts have helped establish the success of several native grass species suitable for revegetation in the DMTS corridor (Wright 1990a).

Reclamation planning efforts for the DMTS corridor to date include recommendations from ADNR's Plant Material Center (Wright 1990b). Reclamation shall be performed according to plan(s) yet to be developed (see Section 1.4) and schedules jointly approved by NPS, AIDEA, NANA, and TCAK.

5.5 Protection of Threatened & Endangered Species

Currently, no federally-listed threatened or endangered species protected under the Endangered Species Act are known or expected to occur within the DMTS Road corridor. The Arctic peregrine falcon (*Falco peregrinus tundrius*) was delisted in its entire range in 1994, and the American peregrine falcon (*Falco peregrinus anatum*) was delisted in 1999. Both subspecies are considered recovered; however, the American peregrine falcon's recovery will be monitored by USFWS for five years following delisting. The Arctic peregrine falcon is considered a "species of special concern" by ADF&G. Protective measures regarding falcons are presented in Section 3.3.2.

Spectacled eider (*Somateria fischeri*) and Steller's eider (*Polysticta stelleri*), listed by USFWS as threatened in 1993 and 1997 respectively, may occur along the seacoast as occasional migrants. DMTS facilities are not within breeding, molting, or winter range of these birds or within critical habitat designated by USFWS (Balogh 2003). These sea ducks are susceptible to collisions with tall structures such as powerlines or radio towers, and may be susceptible to collisions with tall structures at the Port Site. No known collision incidents with DMTS structures have occurred (Martinisko 2003).

The single listed marine mammal known to occur in the vicinity of the Port Site is the bowhead whale (*Balaena mysticetus*), a nearshore and pelagic zooplankton feeder designated by USFWS as endangered 1970.

No incidents involving threatened or endangered species in the DMTS corridor have been reported (Martinisko 2003). Any incidents involving threatened or endangered wildlife shall be handled as described in Section 3.1.3.

Impacts to threatened and endangered species listed prior to 1984 from the construction and operation of DMTS were analyzed in the EIS for the Red Dog project (U.S. Environmental Protection Agency et al 1984). Major expansion projects requiring federal authorizations must undergo environmental analysis in accordance with the National Environmental Policy Act (NEPA) and consultation with USFWS regarding potential effects to threatened and endangered species in accordance with Section 8 of the Endangered Species Act.

5.6 Protection of Water Quality

Operation and maintenance of the DMTS could affect water quality via the following pathways:

- Wind-blown road dust reaching waterways.
- Concentrate escapement from haul trucks reaching waterways.
- Runoff of fines from the roadbed to waterways.

- Chloride loading in waterways from roadbed runoff where palliative (calcium chloride) is applied (a material safety data sheet and product specifications for calcium chloride are provided in Appendix E).
- Sediment release during snow or ice removal or grading at bridge and culvert batteries.
- Sediment-laden drainage from material sites reaching waterways.

Water quality effects may include elevated concentrations of metals, suspension and deposition of sediments, and increases in alkalinity. To protect water quality, the following BMPs or design measures are employed during the operation and maintenance of the DMTS:

- Transport concentrates in closed concentrate haul trucks.
- Conduct storage and handling of concentrates within enclosed structures.
- Clean concentrate haul trucks at the Mine Site before they return to the DMTS Road (summer operation only).
- Use covered/enclosed conveyor system to move concentrate from storage to lightering barges.
- Operate lightering barges with tarp covers.
- When grading or managing snow on bridges or near stream crossings, avoid pushing material into waterways.
- Rehabilitate/revegetate unstable or erodable exposed soils by revegetation with appropriate native species (including banks at stream crossings and material site drainages).
- Stabilize road surface with appropriate dust control measures, including palliative, snow, and/or water application.
- Keep road surface crowned, outsloped, or otherwise left in a condition not conducive to erosion.
- Keep culverts and bridges clear and in good repair.

The *Red Dog Mine Port Pollution Prevention and BMP Plan* identifies potential sources of pollution that may reasonably be expected to affect the quality of water discharges associated with industrial activity at the Port. In addition to providing guidance for the Port facilities that are subject to NPDES permit AK-004064-9 requirements, the plan contains management practices intended to control water pollution from all water runoff drainage areas. These management practices help protect water quality and the overall quality of the environment.

All runoff and shallow subsurface flow generated from disturbed areas surrounding the CSBs is captured and directed into the CSB drainage treatment retention/settling pond. Cut slopes associated with CSB drainage collection system are rip-rapped to minimize the potential for erosion and thermal degradation of the permafrost. Disturbed areas such as roadways and laydown areas around the CSBs are gently sloped toward a collection ditch such that overland sheet flow velocity is minimized to prevent erosion. Drainage collected by the CSB treatment system is treated in the ion-exchange treatment plant prior to discharge from outfall 005 to the Chukchi Sea in accordance with NPDES Permit AK-004064-9.

6 OVERVIEW OF DMTS-RELATED ENVIRONMENTAL MONITORING

TCAK and governing agencies have undertaken a number of environmental studies and monitoring programs designed to evaluate baseline conditions, monitor environmental impacts, and measure the effectiveness of emissions control measures since Red Dog operations began. The following paragraphs provide an overview of past and ongoing environmental studies and monitoring related to the operation and maintenance of the DMTS.

6.1 Port Site NPDES Monitoring Program

Extensive NPDES permit-mandated monitoring is conducted at the Port to assess the quality of discharges to waters of the U.S. associated with industrial activity at the DMTS Port. The monitoring program includes regular inspection and testing of influents and effluents for water quality parameters (pH, salinity, total suspended solids, biochemical oxygen demand, and metals) and monthly reporting to the U.S. Environmental Protection Agency (EPA). Permitted discharges are described in Section 2.3, and in the Port's NPDES Permit. TCAK's ability to comply with permit limits and conditions are described in the *Red Dog Mine Port Site Pollution Prevention and BMP Plan* (see Appendix D for description).

6.2 Port Site Air Quality Monitoring Program

From 1997 through the present, TCAK has conducted an air monitoring program at the Port Site. This program is intended to monitor fugitive dust emissions and to facilitate operational improvements to reduce fugitive dust emissions. The program has included dustfall collection jars, snow surveys, and air sampling using high-volume air samplers and two tapered-element oscillating microbalance (TEOM) PM10 monitors. The two PM10 monitors are located 1) 500 feet north of CSB-1; 2) just east of "North Lagoon." A grid of 38 dustfall collection jars surround the Port CSBs. Along the DMTS Road, an additional 7 dustfall collection sites are used to monitor the particulate emissions from road activity. The Port Site Air Monitoring Program is summarized in a 2001 Exponent presentation (Exponent 2001).

6.3 2001 Fugitive Dust Study

Exponent performed a study in 2001 to evaluate the sources and patterns of elevated levels of metals along the DMTS Road and at the Port Site (Exponent 2002b). Samples included road surface soil, road soil cores, fine-grained material on the road shoulder, dustfall collected along the road, and vegetation (moss, lichen, willow, and berries). Soil and water samples were also collected from material sites along the DMTS Road, from which construction rock for road grading and water for road watering have been obtained. The Exponent study included surface water samples collected by TCAK from five creeks that the DMTS Road crosses between the Mine Site and the Port Site. The samples were analyzed for a suite of metals, including aluminum, arsenic, cadmium, calcium, iron, lead, magnesium, and zinc.

6.4 Port Site Monitoring Program

The initial Port Site Monitoring Program was conducted from June 1990 through August 1996 with the purpose of monitoring lead, zinc, and diesel-range organic concentrations in soil, sediment, and surface water (from the tundra, lagoons, and nearshore marine) at the Port Site. Samples were collected from areas near CSBs, conveyor, dock, turnaround loop at the CSBs, pipeline, fuel storage tank farm, the four lagoons near the Port Site, and the nearshore marine area of the Chukchi Sea (Cominco et al 1999).

6.5 USGS Synoptic Water Quality Study

This study was initiated by the U.S. Geological Survey (USGS) during Summer 2002 to characterize the water quality of the small streams in Cape Krusenstern National Monument in both general terms (major ions, nutrients, conductance, pH, etc.) and in specific terms (trace elements); to characterize the water quality of streams that drain areas that have been impacted by zinc/lead dust deposition; to characterize the aquatic habitat of streams, both unaffected and affected by zinc/lead concentrate deposition; and to develop a lead-zinc monitoring plan for the Monument in conjunction with concurrent air and non-vascular plant investigators (Brabets 2002).

6.6 ADF&G Bio-Assessment Study

This study is intended to collect fish and chemistry data from “background” streams to compare with streams in the drainage receiving mine discharge, and to look at the effects of DMTS Road dust on the aquatic environment. Stream chemistry is determined by a water sampling program conducted by TCAK. The bio-assessment study was initiated in the summer of 2001.

6.7 Transportation Corridor Monitoring Program

ENSR conducted a dust monitoring program designed to delineate the extent and concentrations of lead and zinc along the DMTS Road as a result of the passage of concentrate trucks and other vehicular traffic. To accomplish this, transects along the DMTS Road were established in June 1991. Soil samples and opportunistic water samples were collected along transects and at spill sites in June 1991 and September 1992. Transects were established approximately 10 miles apart at intervals of 5, 50, and 500 feet from the road in both directions (ENSR 1993).

6.8 Caribou Migration Monitoring Program

An annual caribou migration monitoring program was implemented in 1984 by NANA in coordination with NPS, ADF&G, and the Subsistence Committee. The objectives of this program are to observe the seasonal activity of the caribou herd in the Red Dog Mine area, as well as to determine whether mining control measures are effective in protecting the herd. Through reconnaissance aerial surveys, the program has estimated caribou population, migration, calving, and feeding patterns. Surveys have shown (Pollard 1994) that caribou have been able to successfully cross the DMTS Road, aided by TCAK's *Caribou Policy* (see Section 3.2.3).

6.9 Caribou Harvest Studies

In April 2002, TCAK, in cooperation with ADF&G, harvested 10 caribou in the vicinity of the DMTS Road and collected tissue samples for lead, cadmium, arsenic, and zinc (Dau 2002). Results from this study are forthcoming. In another study in 1996, a North Slope Research Biologist collected liver, kidney, and muscle tissue samples of 15 caribou harvested along the DMTS Road. The samples were tested the samples for lead, zinc, cadmium, and other metals (O'Hara 1999).

6.10 National Park Service Moss and Soil Study

The DMTS Road traverses 24 miles of Cape Krusenstern National Monument, which is managed by NPS. NPS performed a preliminary study in Summer 2000 to determine whether elevated lead, zinc, and cadmium levels were present near the DMTS Road (Ford et al 2001). To achieve this objective, NPS collected soil and moss at transects along the road and compared the data to other studies done in the Arctic and elsewhere. Transects were placed

perpendicular to straight stretches of the DMTS Road (within National Monument land). Moss samples (recent 3-year growth) were collected within a 2-meter radius at 3, 50, 100, 250, and 1,000 meter transect points. Samples were also taken at 1,600 meters at two transects. Soil samples were collected at the same locations with a hand drill, and soil depths of up to 45 centimeters were obtained. Dust samples were collected from willow leaves. NPS conducted a follow-up study in 2001 which was designed to examine the geographic extent of heavy metals deposition in the Monument.

6.11 Fugitive Dust Risk Assessments

An ongoing risk assessment, initiated in 2002, will assess whether adverse impacts to human health of the environment could occur as a result of direct or indirect exposure to metals from fugitive dust from the DMTS transportation corridor. The focus of the assessment is on evaluating the incremental risks from fugitive dust deposition associated with the DMTS. The assessment relies on analysis of existing data sets (including those developed during monitoring and studies described above) and a conceptual site model (Exponent 2003a) describing sources, transport mechanisms, and receptors of chemicals of potential concern. The results of the risk assessment will help risk managers determine what actions, if any, are necessary to reduce those impacts. A draft *Risk Assessment Work Plan* (Exponent 2003b) has been made available for public comment, and the *Fugitive Dust Background Document* (Exponent 2002c) explains the history and impetus for the risk assessment.

7 COST CONTROL

TCAK performs DMTS maintenance at a charge to AIDEA of \$1 per year. The costs of performing this work are collected as part of the general ledger of Red Dog Operations. These accounts are reported to AIDEA, by activity, for information purposes.

DMTS maintenance costs are controlled in a manner similar to other operating costs at TCAK. This process begins with the establishment of an annual budget by each department. The budget undergoes a thorough review by senior management to ensure it conforms to the goals of the operation. Once approved, it becomes the yardstick against which all expenditures are measured.

Department personnel compare costs against the budget and report variances monthly to senior management. In general, each department head is accountable for the costs performance within that area, thus ensuring the review is thorough and that all costs can be properly justified.

TCAK has procedures for review and approval of purchase orders and authorization of invoice payments that ensure proper and timely payment of receivables. Similar methods are in place for warehouse inventory control.

7.1 Direct Charges

Cost codes exist in the general ledger to accumulate all direct charges of the operation. These include labor, direct-order and warehouse-issue supplies. Each type of activity is provided with a separate code (e.g. dust control, bridge maintenance) to ease budgeting and control functions.

The Finance and Materials Management Departments are responsible for applying the unit rates for labor and stores issues. Labor is charged at a labor class rate. This consists of the average of direct wages (including overtime), benefits, and statutory loading of all the employees within a particular labor class. Warehouse-issue supplies are valued at the average

invoiced cost of the stock of each item. No charges for interest, warehouse operation, or freight is added.

Direct-order supplies are charged to the codes at the invoiced cost. No charges for freight are added. Receipt of an item ordered is confirmed by the initiator of the purchase requisition and payment of the invoice is through the Finance Department.

Each fleet of mobile equipment (e.g. haulage trucks, graders, loaders) constitutes a separate cost code. The labor and supplies required to operate and maintain that fleet are charged against it. These costs are then calculated as an hourly operating cost and charged to the operating codes according to the usage determined from the time cards.

Fuel is dispensed through flow meters which monitor and record powerhouse generator consumption, quantity hauled to the Mine Site, and equipment fleet consumption. The cost of the fuel includes the invoiced purchase price and haulage costs between the Port Site and the Mine Site.

7.2 Indirect Charges

Indirect charges are credited against specific cost codes in the general ledger. These charges include:

- Maintenance shop operation
- Rotational airfares
- Camp operation and catering
- Freight
- Warehouse operation
- Interest
- Engineering and surveying
- Exploration drilling

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FIGURES

- 1 DMTS Location & Vicinity Maps
- 2 DMTS Land Status Map
- 3-1 through 3-17
DMTS Alignment Sheets

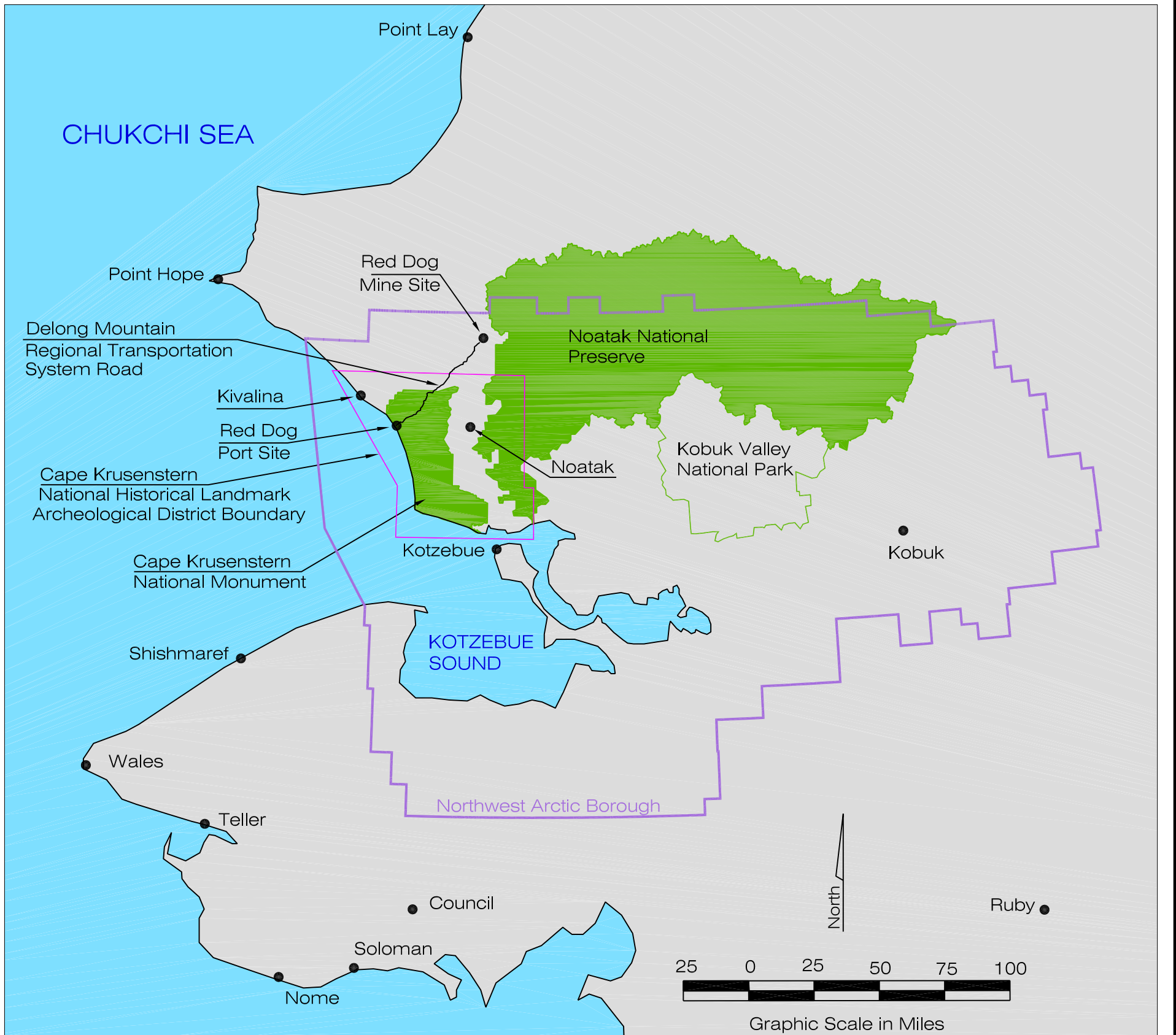
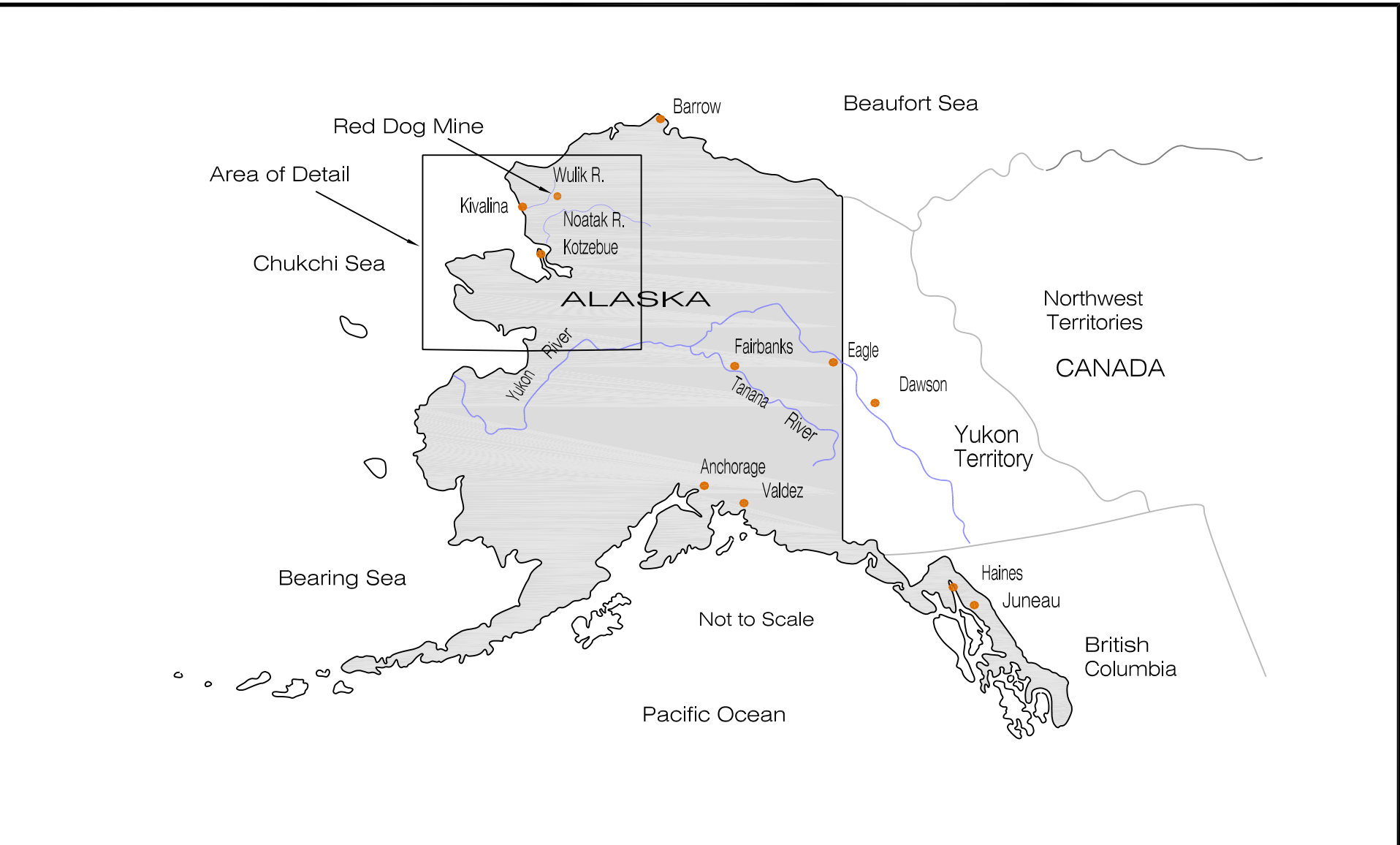


Figure 1 DeLong Mountain Regional Transportation System Location & Vicinity Maps			Drawn by: SOH	Design Date:	Department	Reviewed By	Date
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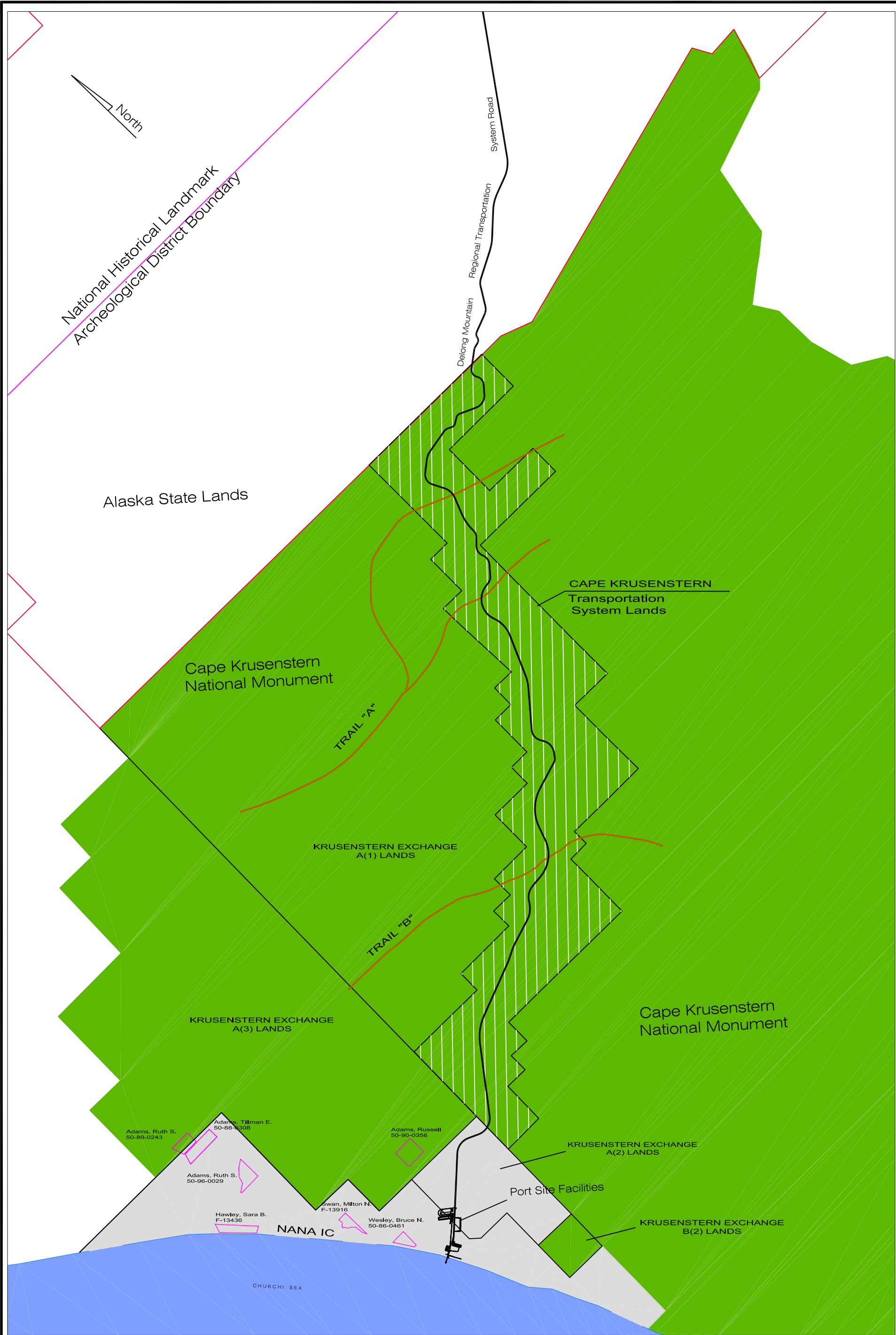


Figure 2
DeLong Mountain Regional
Transportation System
Land Status Map

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Scale:
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Department

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Date

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Mine Operations

Survey

Geology

Approved by:

Date:
05/22/03

Legend

Native Allotments

Krusenstern Exchange
Transportation System Lands

Cape Krusenstern
National Monument

NANA Owned

Winter Trail

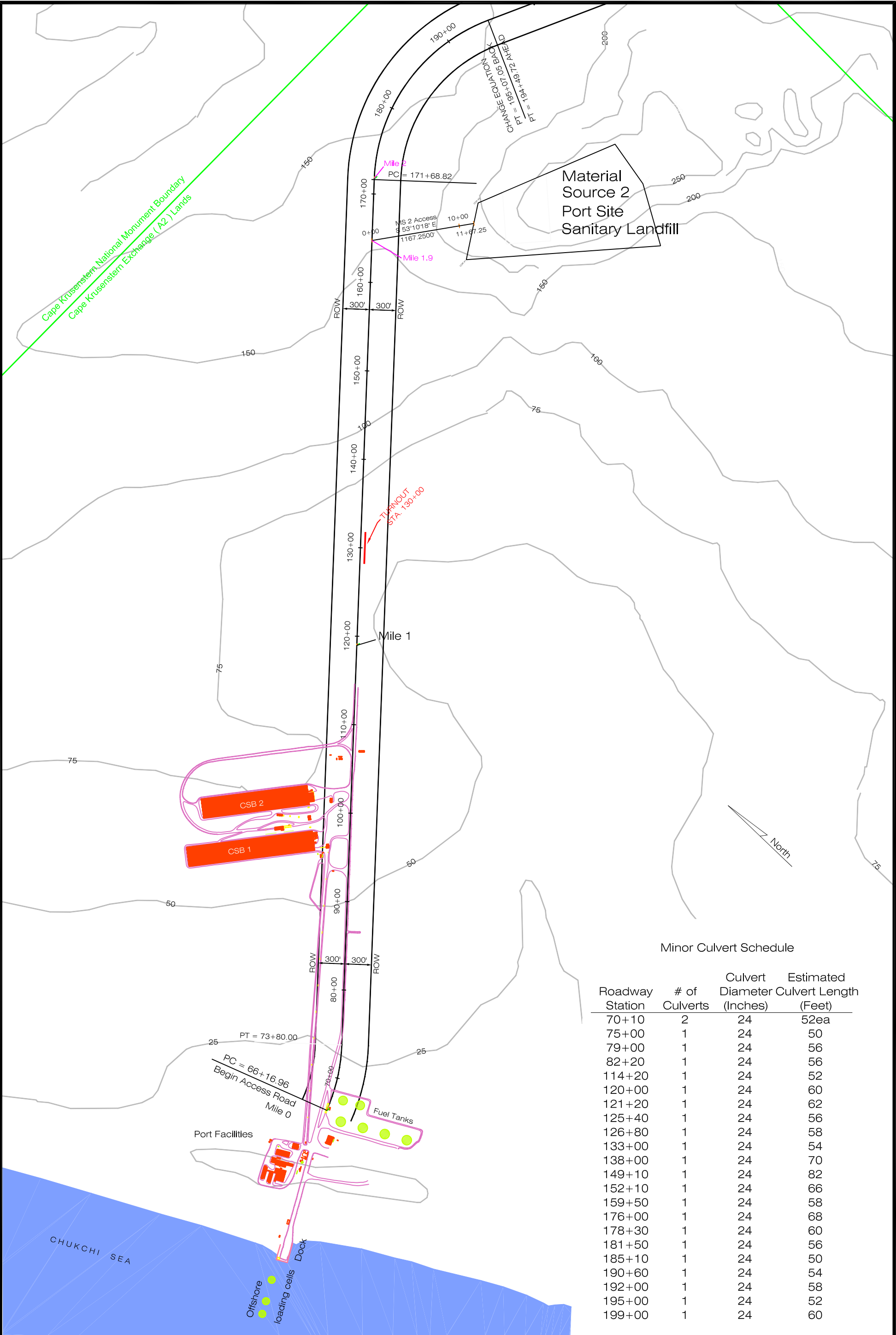


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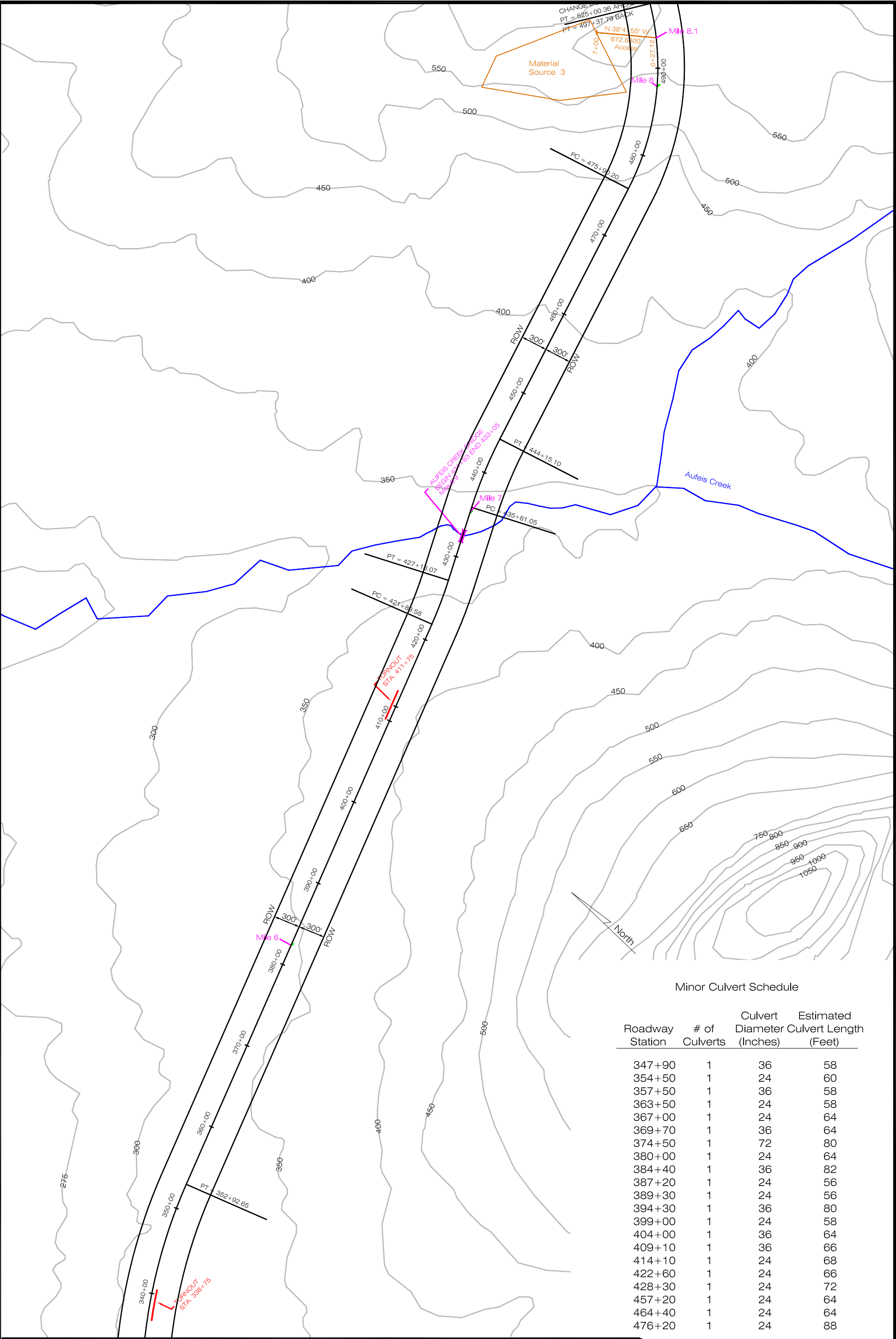
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Minor Culvert Schedule

Roadway Station	# of Culverts	Culvert Diameter (Inches)	Estimated Culvert Length (Feet)
347+90	1	36	58
354+50	1	24	60
357+50	1	36	58
363+50	1	24	58
367+00	1	24	64
369+70	1	36	64
374+50	1	72	80
380+00	1	24	64
384+40	1	36	82
387+20	1	24	56
389+30	1	24	56
394+30	1	36	80
399+00	1	24	58
404+00	1	36	64
409+10	1	36	66
414+10	1	24	68
422+60	1	24	66
428+30	1	24	72
457+20	1	24	64
464+40	1	24	64
476+20	1	24	88

Figure: 3-3
Alignment Sheets:
DeLong Mountain Regional
Transportation System

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Mine Operations

Survey

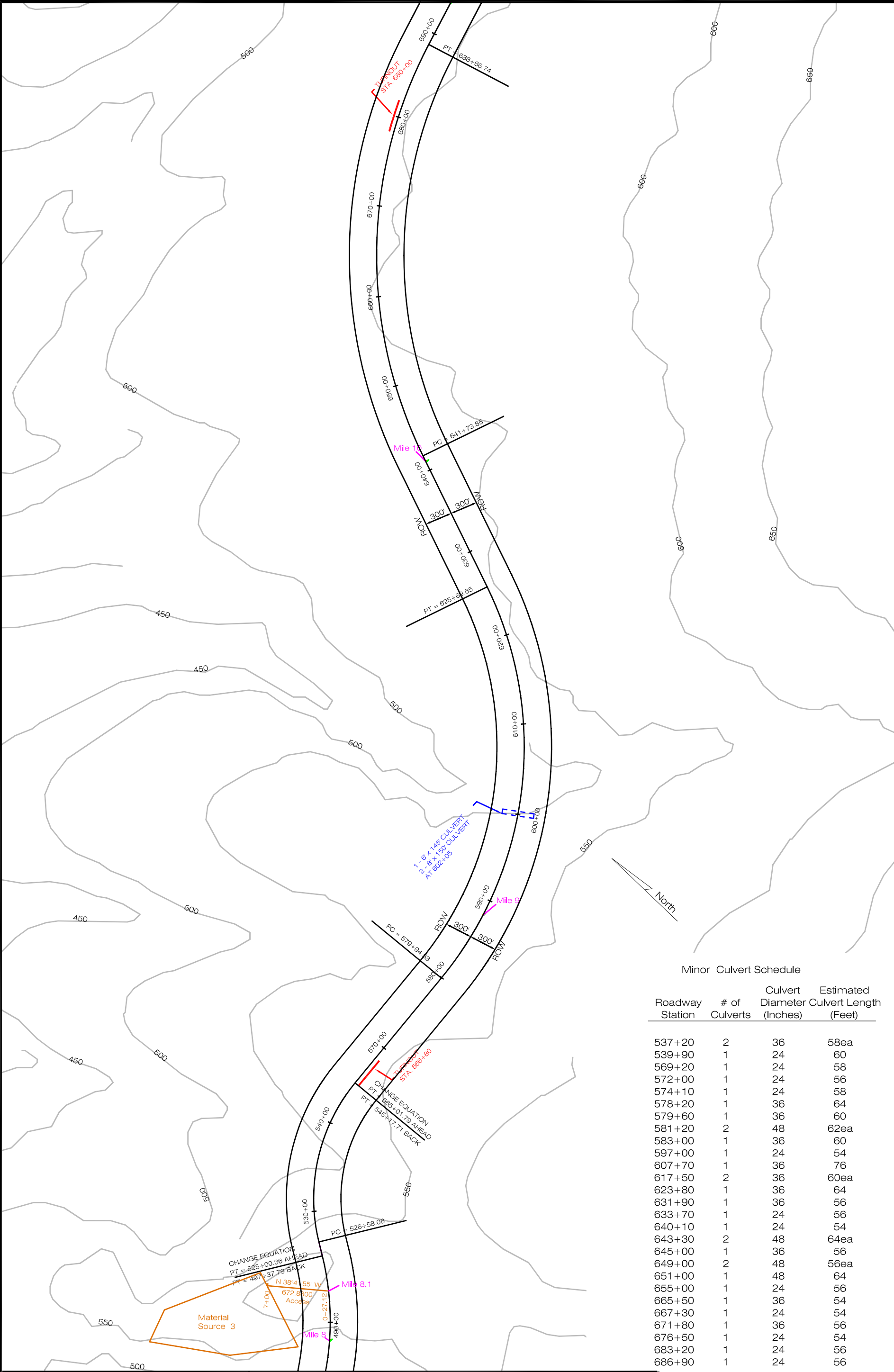
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Minor Culvert Schedule			
Roadway Station	# of Culverts	Culvert Diameter (Inches)	Estimated Culvert Length (Feet)
537+20	2	36	58ea
539+90	1	24	60
569+20	1	24	58
572+00	1	24	56
574+10	1	24	58
578+20	1	36	64
579+60	1	36	60
581+20	2	48	62ea
583+00	1	36	60
597+00	1	24	54
607+70	1	36	76
617+50	2	36	60ea
623+80	1	36	64
631+90	1	36	56
633+70	1	24	56
640+10	1	24	54
643+30	2	48	64ea
645+00	1	36	56
649+00	2	48	56ea
651+00	1	48	64
655+00	1	24	56
665+50	1	36	54
667+30	1	24	54
671+80	1	36	56
676+50	1	24	54
683+20	1	24	56
686+90	1	24	56

Figure: 3-4

Alignment Sheets:

DeLong Mountain Regional

Transportation System

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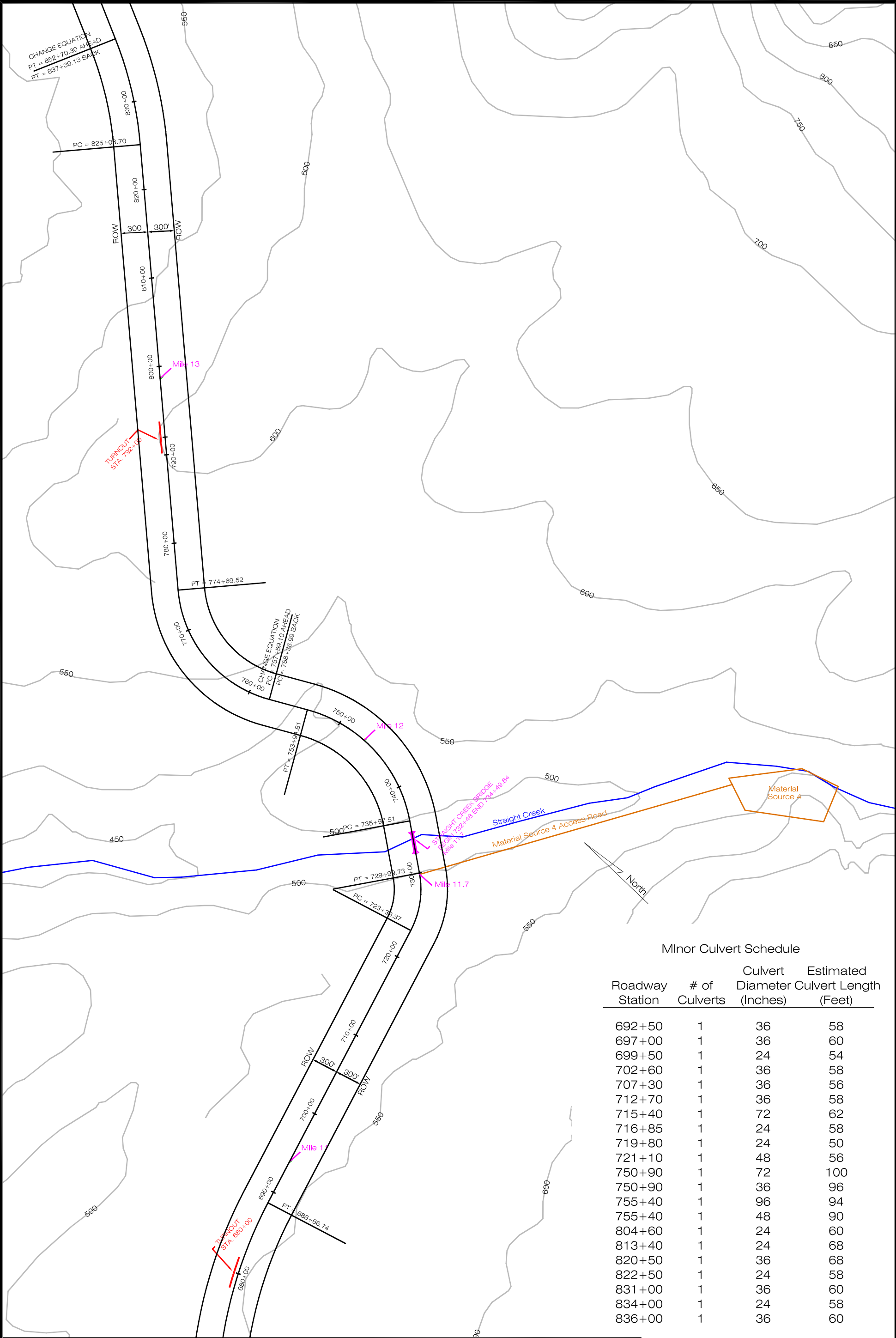


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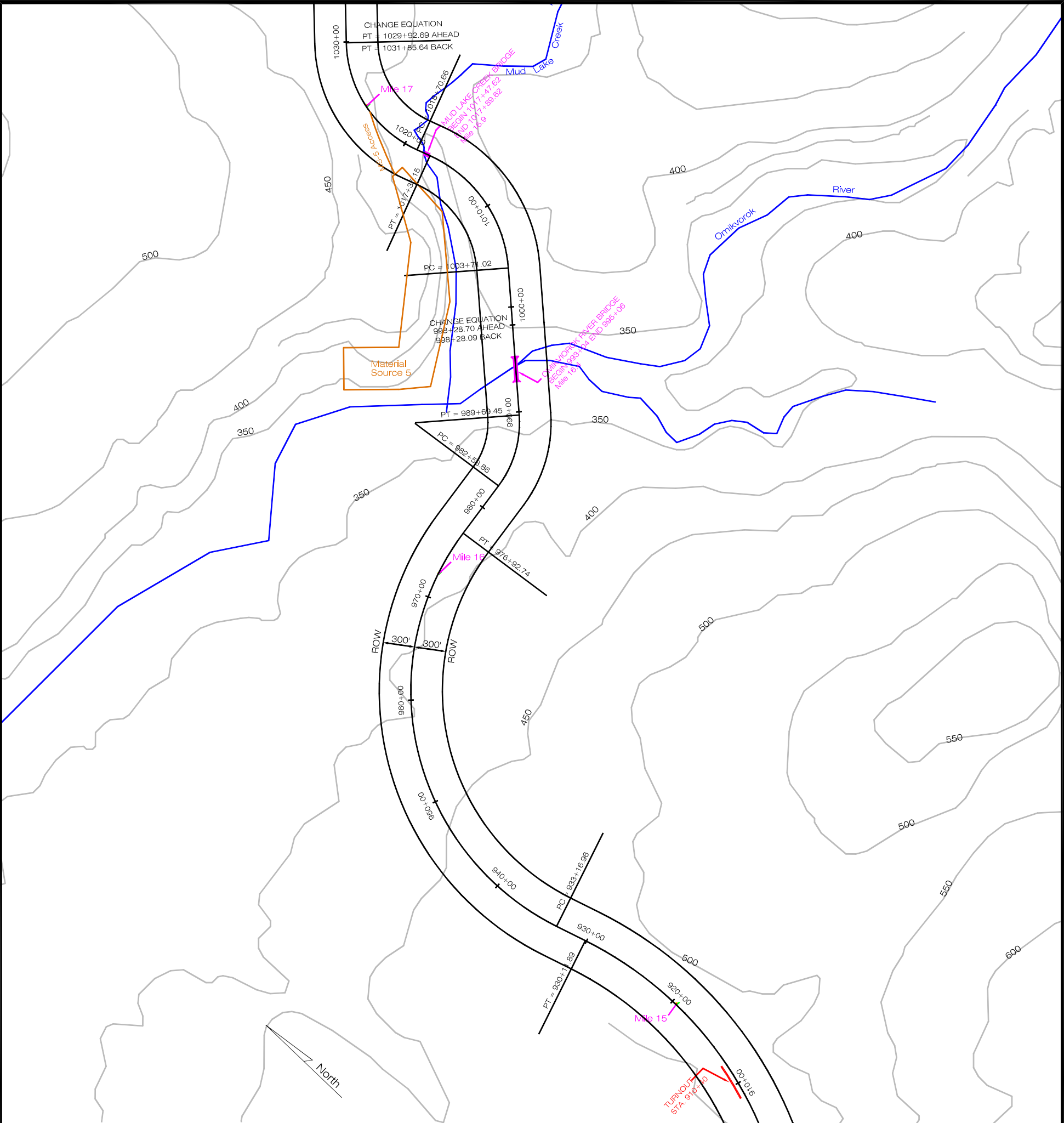
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Minor Culvert Schedule

Roadway Station	# of Culverts	Culvert Diameter (Inches)	Estimated Culvert Length (Feet)
853+80	1	36	62
857+10	1	36	62
876+90	1	24	58
883+30	1	36	66
889+50	1	24	62
893+60	1	48	78
898+20	1	24	58
904+50	1	48	60
907+70	1	48	62
913+00	1	24	72
914+30	1	48	72
918+50	1	24	56
940+40	1	24	70
944+00	1	24	60
958+50	1	36	88
965+70	1	36	56
972+40	1	48	72
980+00	1	48	88
1007+30	1	24	62
1011+40	1	24	62
1013+50	1	24	56
1026+40	1	24	68
1029+00	2	48	90ea

Figure: 3-6
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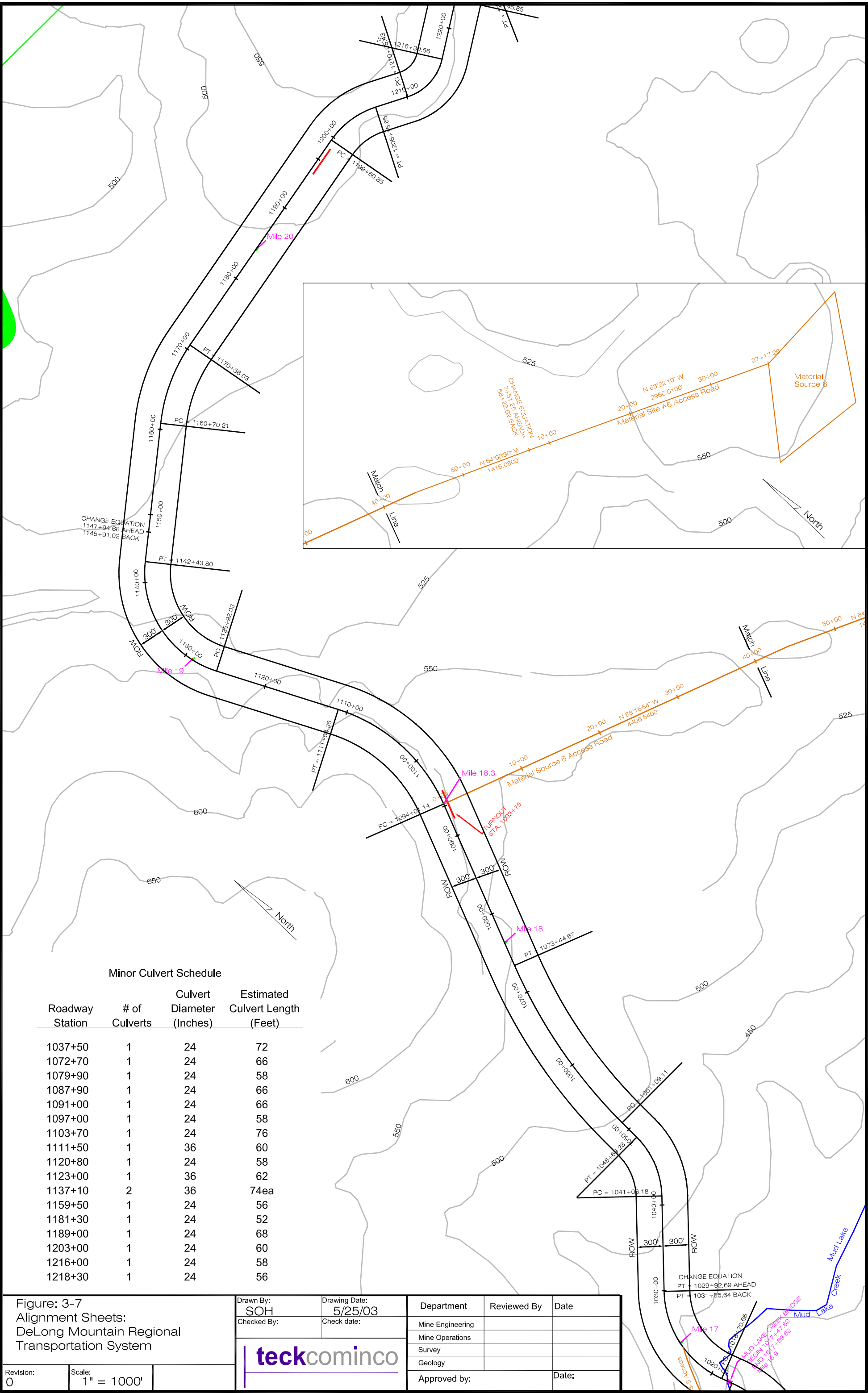
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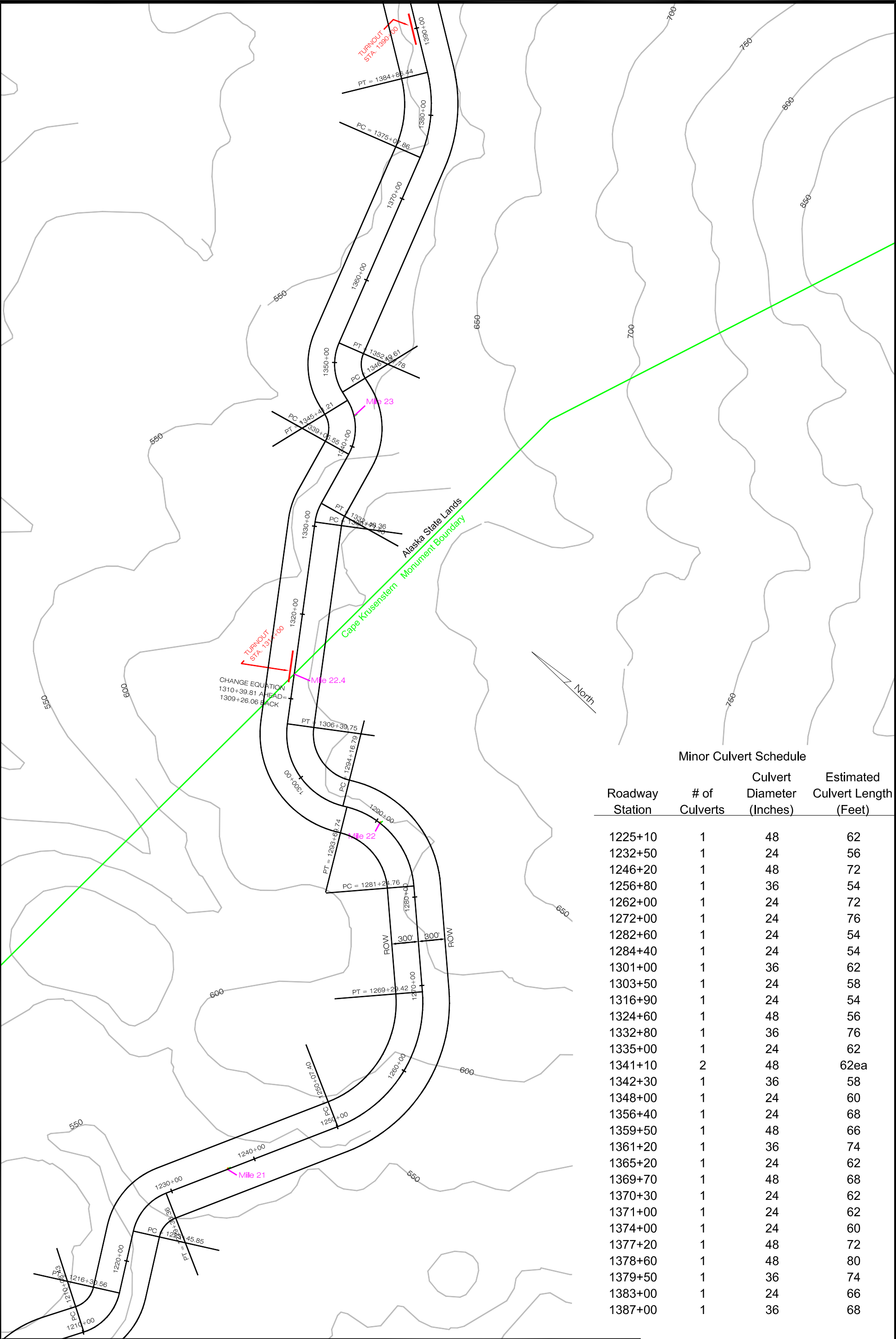
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Minor Culvert Schedule

Roadway Station	# of Culverts	Culvert Diameter (Inches)	Estimated Culvert Length (Feet)
1225+10	1	48	62
1232+50	1	24	56
1246+20	1	48	72
1256+80	1	36	54
1262+00	1	24	72
1272+00	1	24	76
1282+60	1	24	54
1284+40	1	24	54
1301+00	1	36	62
1303+50	1	24	58
1316+90	1	24	54
1324+60	1	48	56
1332+80	1	36	76
1335+00	1	24	62
1341+10	2	48	62ea
1342+30	1	36	58
1348+00	1	24	60
1356+40	1	24	68
1359+50	1	48	66
1361+20	1	36	74
1365+20	1	24	62
1369+70	1	48	68
1370+30	1	24	62
1371+00	1	24	62
1374+00	1	24	60
1377+20	1	48	72
1378+60	1	48	80
1379+50	1	36	74
1383+00	1	24	66
1387+00	1	36	68

Figure: 3-8
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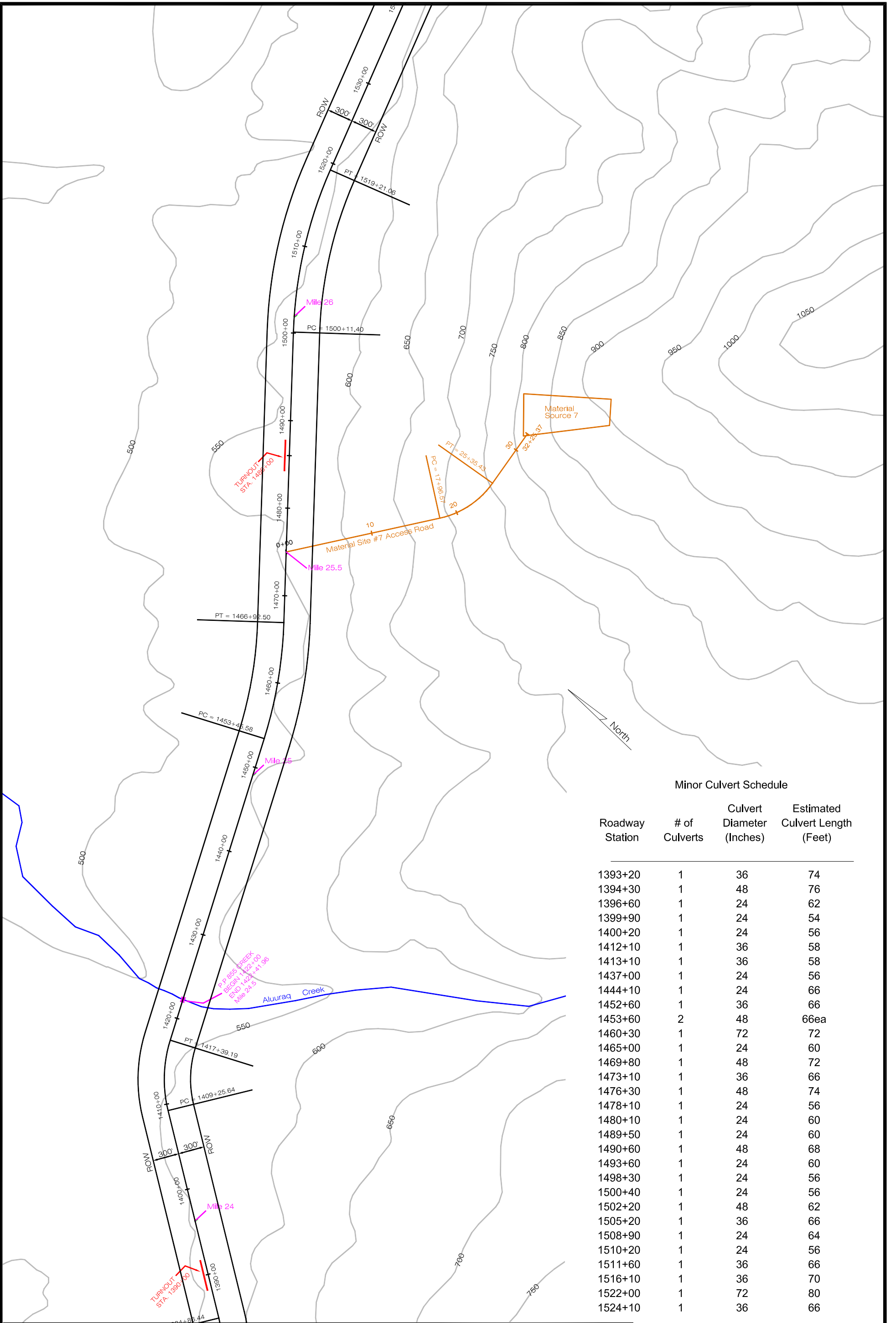
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Minor Culvert Schedule			
Roadway Station	# of Culverts	Culvert Diameter (Inches)	Estimated Culvert Length (Feet)
1393+20	1	36	74
1394+30	1	48	76
1396+60	1	24	62
1399+90	1	24	54
1400+20	1	24	56
1412+10	1	36	58
1413+10	1	36	58
1437+00	1	24	56
1444+10	1	24	66
1452+60	1	36	66
1453+60	2	48	66ea
1460+30	1	72	72
1465+00	1	24	60
1469+80	1	48	72
1473+10	1	36	66
1476+30	1	48	74
1478+10	1	24	56
1480+10	1	24	60
1489+50	1	24	60
1490+60	1	48	68
1493+60	1	24	60
1498+30	1	24	56
1500+40	1	24	56
1502+20	1	48	62
1505+20	1	36	66
1508+90	1	24	64
1510+20	1	24	56
1511+60	1	36	66
1516+10	1	36	70
1522+00	1	72	80
1524+10	1	36	66

Figure: 3-9
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DeLong Mountain Regional
Transportation System

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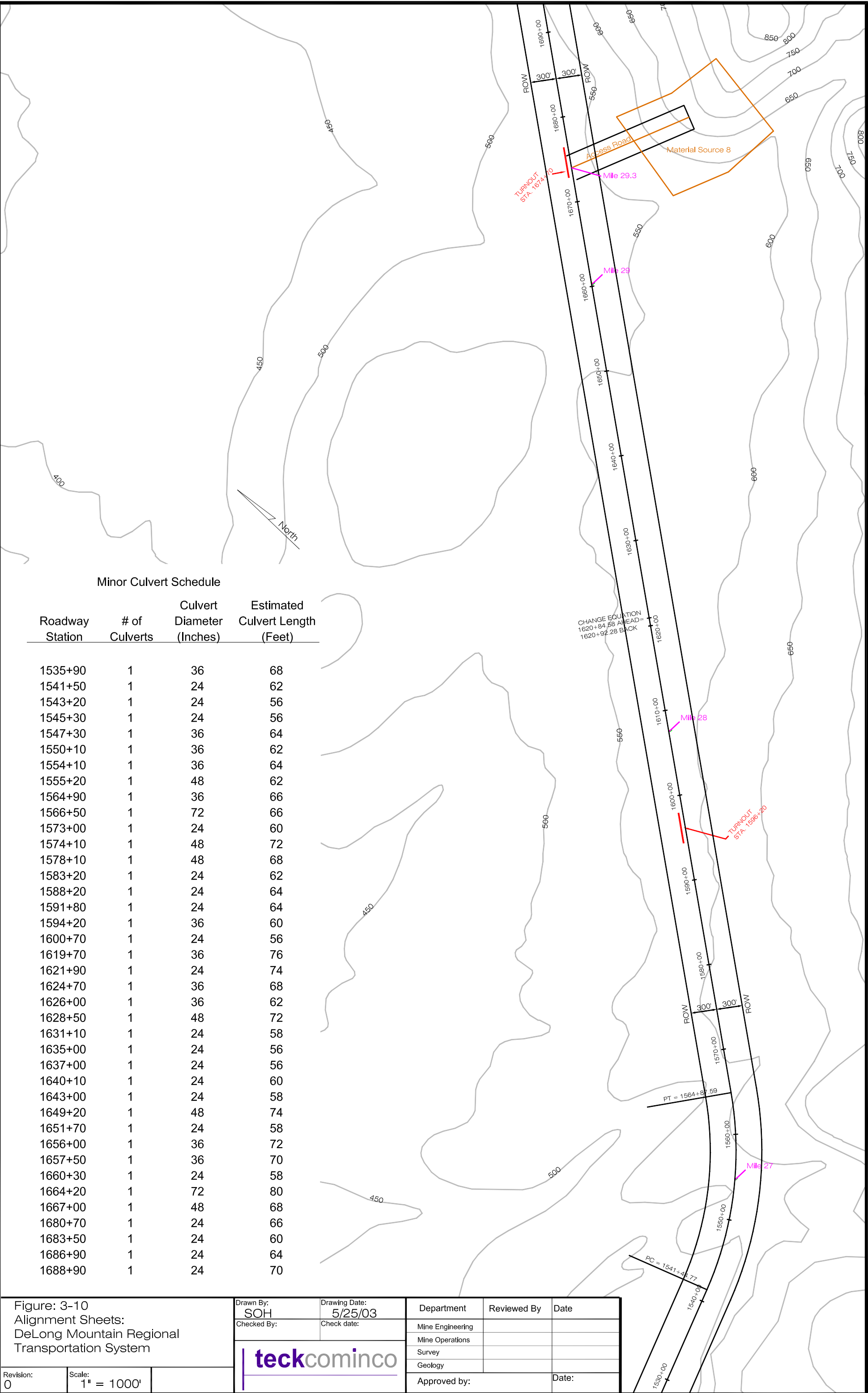
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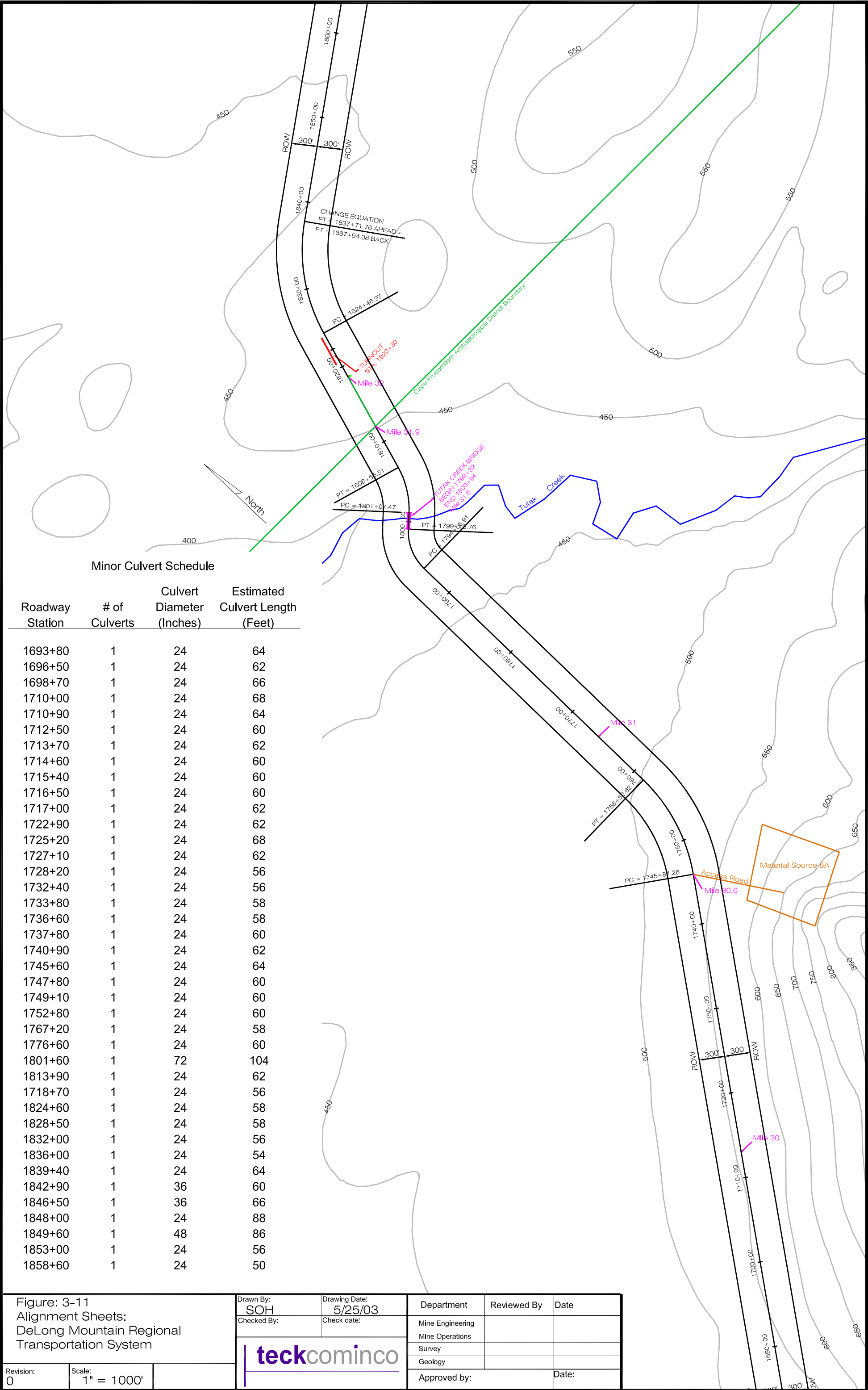


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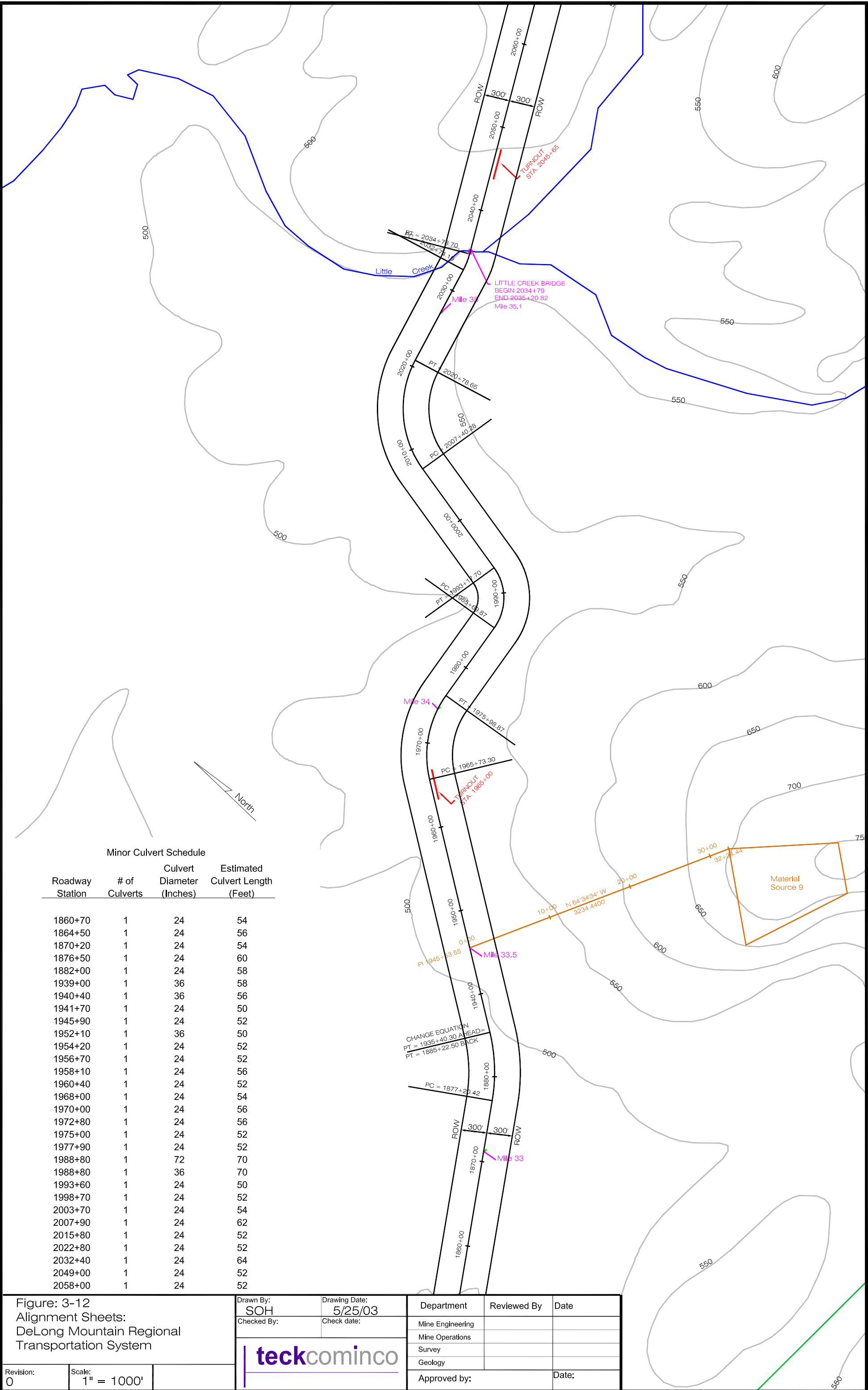
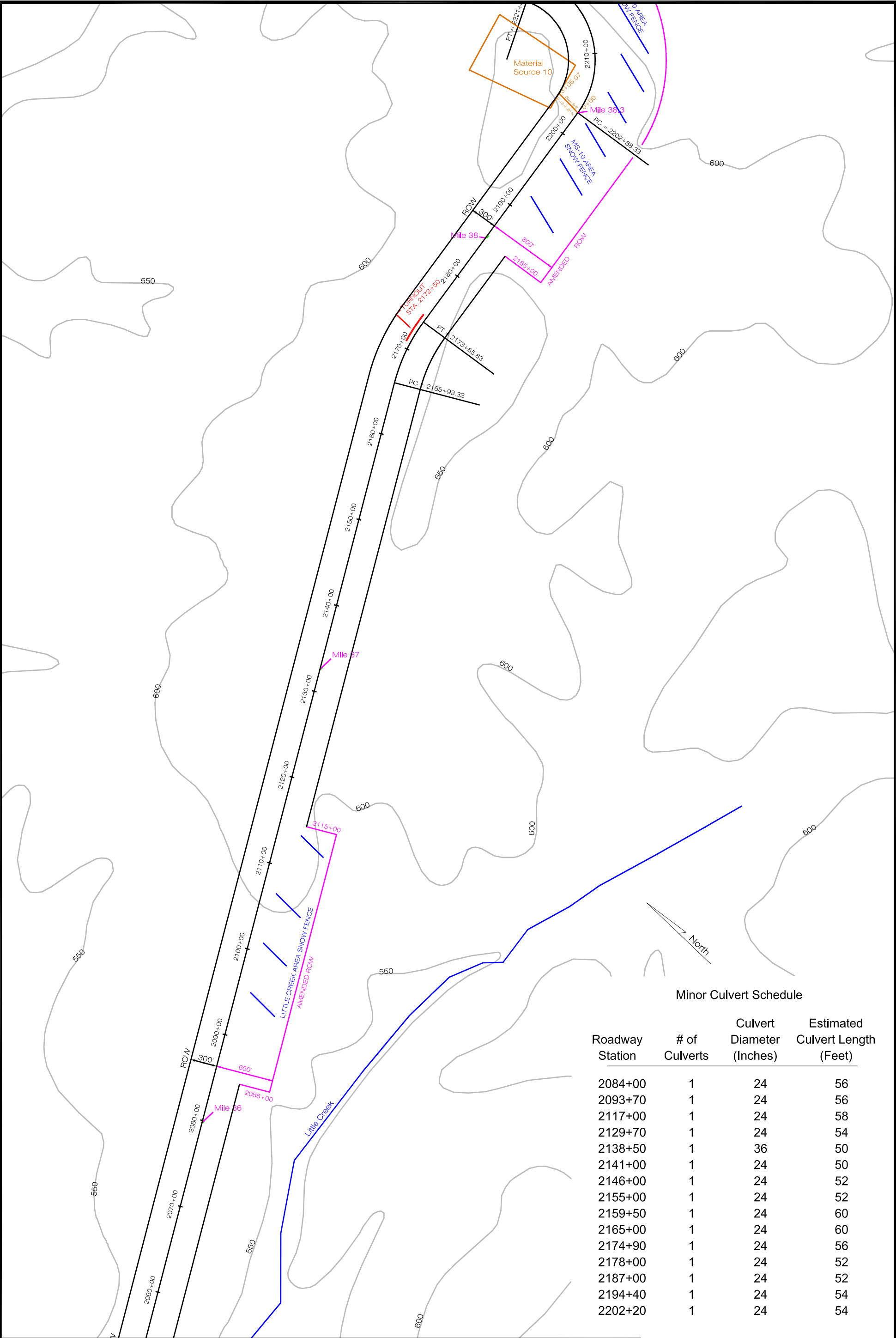


Figure: 3-12
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		Geology		
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Minor Culvert Schedule

Roadway Station	# of Culverts	Culvert Diameter (Inches)	Estimated Culvert Length (Feet)
2084+00	1	24	56
2093+70	1	24	56
2117+00	1	24	58
2129+70	1	24	54
2138+50	1	36	50
2141+00	1	24	50
2146+00	1	24	52
2155+00	1	24	52
2159+50	1	24	60
2165+00	1	24	60
2174+90	1	24	56
2178+00	1	24	52
2187+00	1	24	52
2194+40	1	24	54
2202+20	1	24	54

Figure: 3-13

Alignment Sheets:

DeLong Mountain Regional Transportation System

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Scale: 1" = 1000'

Drawn By: SOH

Checked By:

teckcominco

Drawing Date: 5/25/03

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Department: Mine Engineering

Department: Mine Operations

Department: Survey

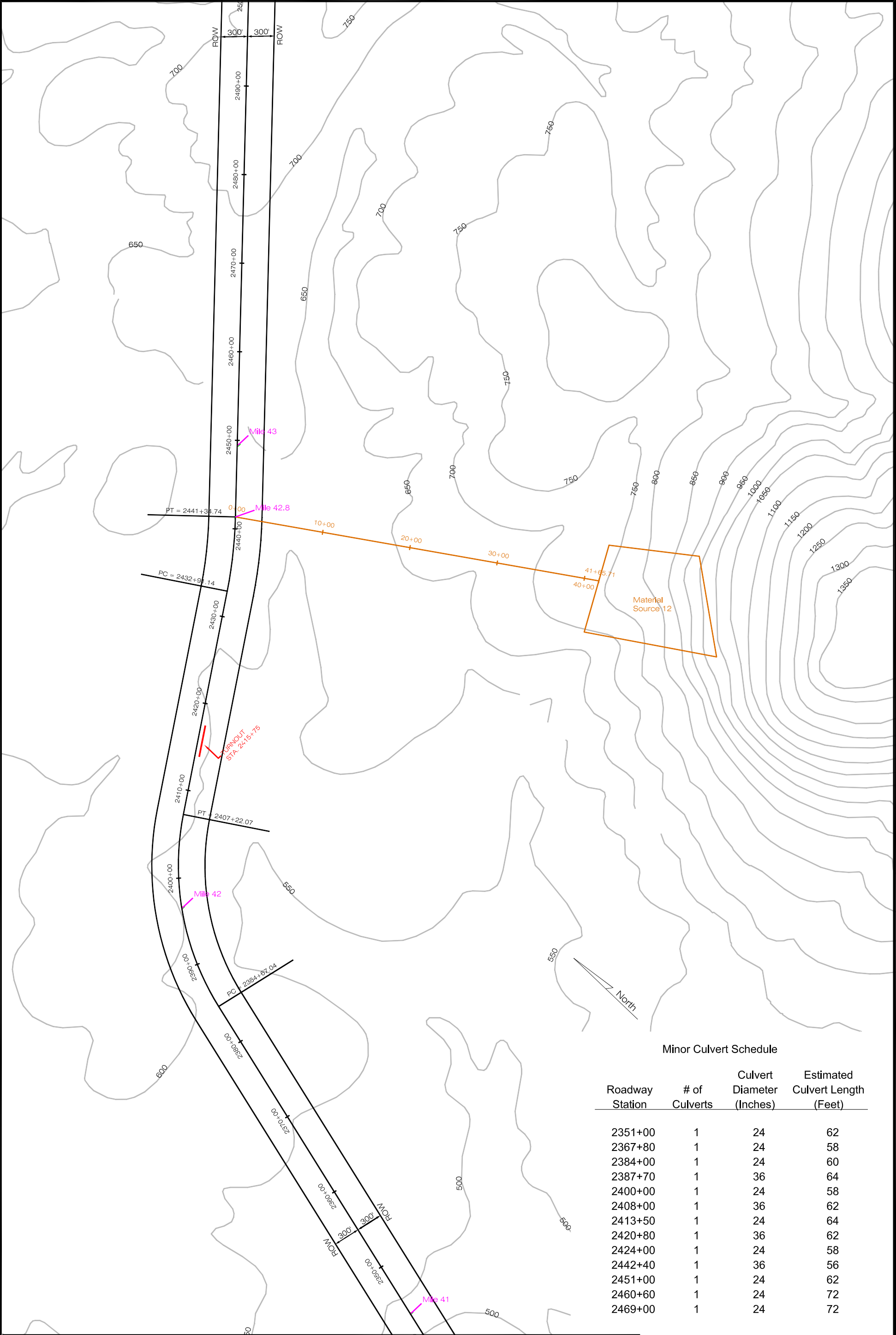
Department: Geology

Approved by:

Reviewed By:

Date:





Minor Culvert Schedule			
Roadway Station	# of Culverts	Culvert Diameter (Inches)	Estimated Culvert Length (Feet)
2351+00	1	24	62
2367+80	1	24	58
2384+00	1	24	60
2387+70	1	36	64
2400+00	1	24	58
2408+00	1	36	62
2413+50	1	24	64
2420+80	1	36	62
2424+00	1	24	58
2442+40	1	36	56
2451+00	1	24	62
2460+60	1	24	72
2469+00	1	24	72

Figure: 3-15
Alignment Sheets:
DeLong Mountain Regional
Transportation System

Revision:
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Scale:
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Drawn By:
SOH

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Drawing Date:
5/25/03

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Survey

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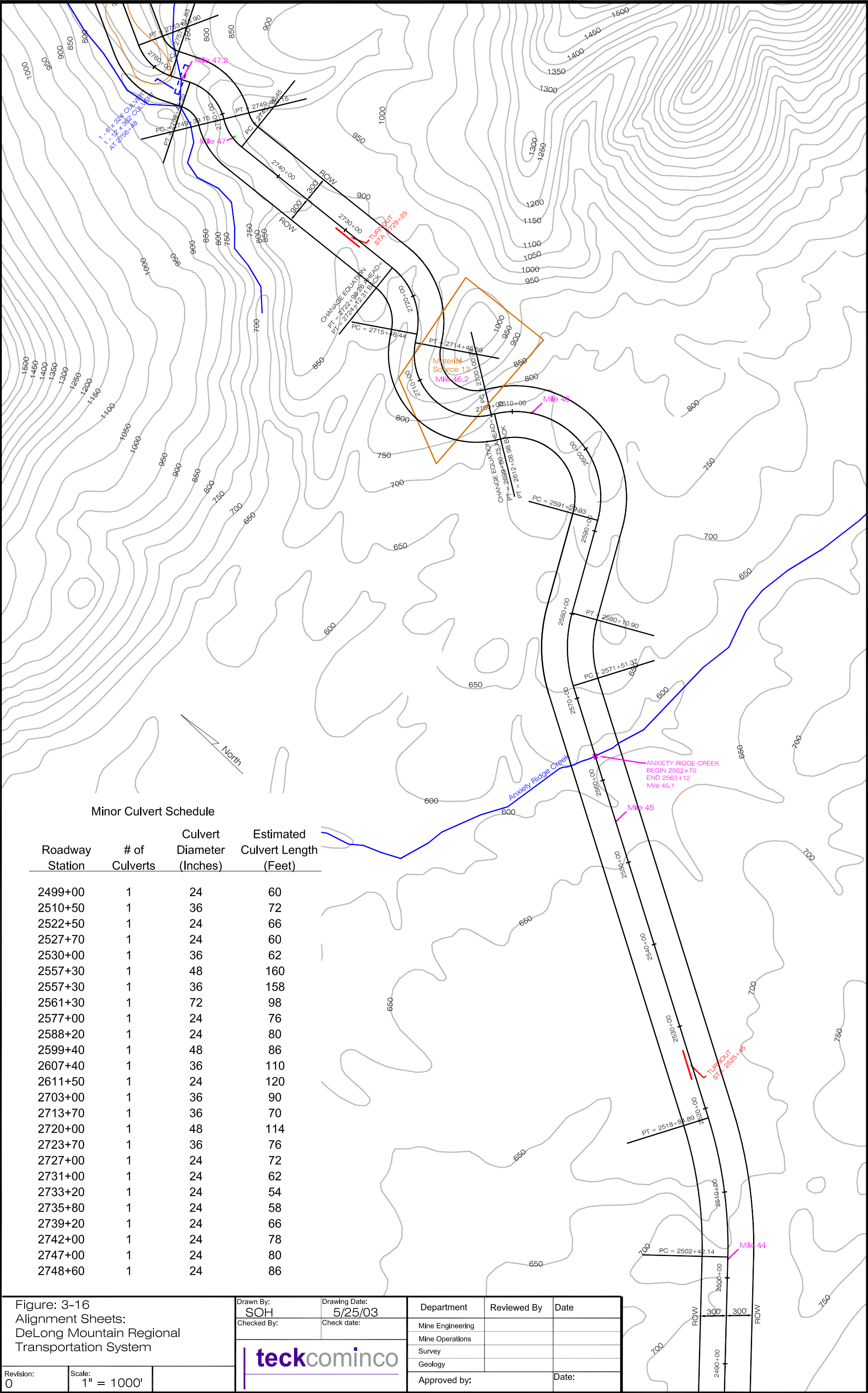
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Minor Culvert Schedule

Roadway Station	# of Culverts	Culvert Diameter (Inches)	Estimated Culvert Length (Feet)
2499+00	1	24	60
2510+50	1	36	72
2522+50	1	24	66
2527+70	1	24	60
2530+00	1	36	62
2557+30	1	48	160
2557+30	1	36	158
2561+30	1	72	98
2577+00	1	24	76
2588+20	1	24	80
2599+40	1	48	86
2607+40	1	36	110
2611+50	1	24	120
2703+00	1	36	90
2713+70	1	36	70
2720+00	1	48	114
2723+70	1	36	76
2727+00	1	24	72
2731+00	1	24	62
2733+20	1	24	54
2735+80	1	24	58
2739+20	1	24	66
2742+00	1	24	78
2747+00	1	24	80
2748+60	1	24	86

Figure: 3-16
Alignment Sheets:
DeLong Mountain Regional
Transportation System

Revision:
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Scale:
1" = 1000'

Drawn By:
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teckcominco

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5/25/03

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Mine Engineering

Mine Operations

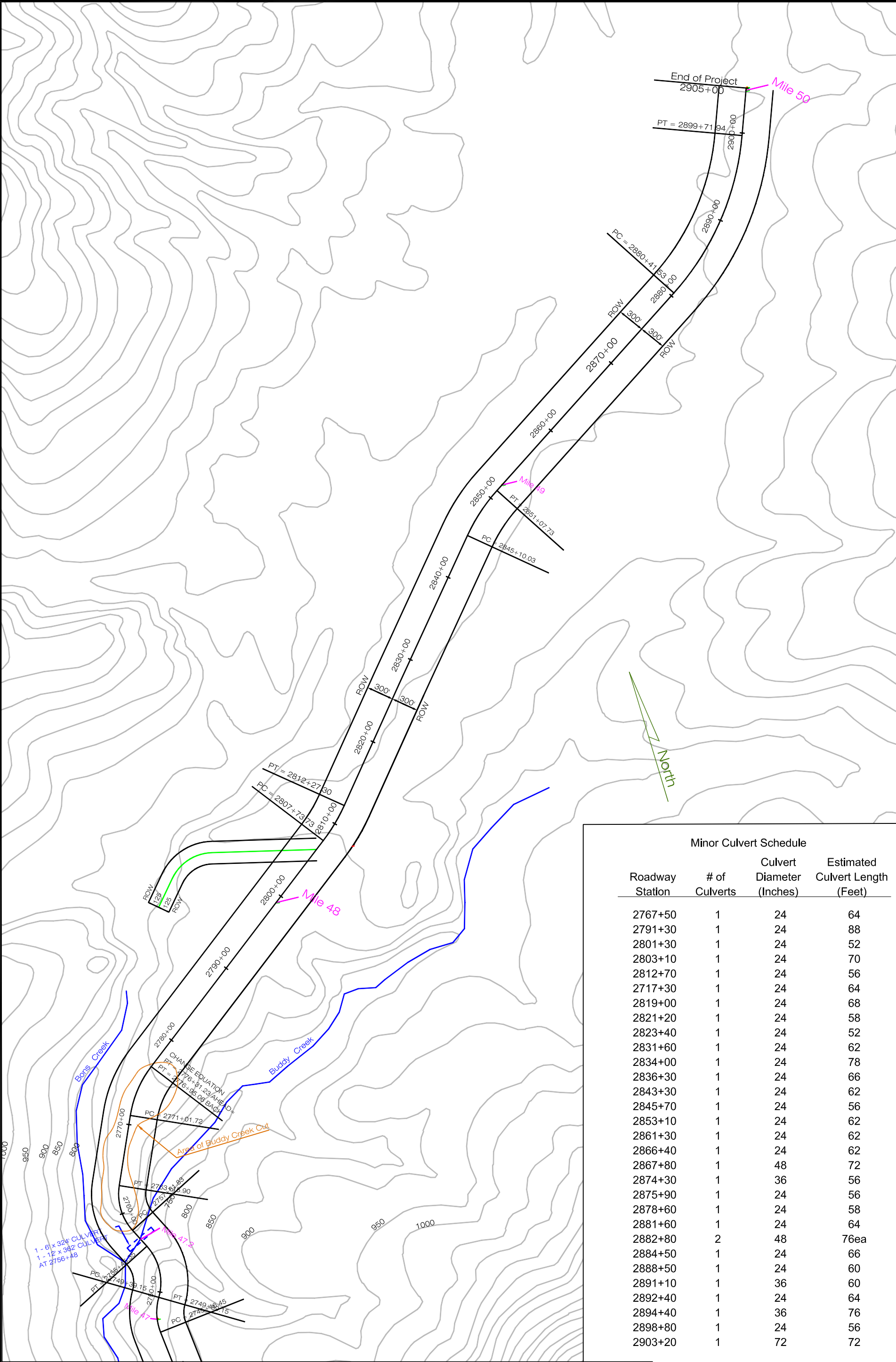
Survey

Geology

Approved by:

Reviewed By

Date:



Minor Culvert Schedule			
Roadway Station	# of Culverts	Culvert Diameter (Inches)	Estimated Culvert Length (Feet)
2767+50	1	24	64
2791+30	1	24	88
2801+30	1	24	52
2803+10	1	24	70
2812+70	1	24	56
2717+30	1	24	64
2819+00	1	24	68
2821+20	1	24	58
2823+40	1	24	52
2831+60	1	24	62
2834+00	1	24	78
2836+30	1	24	66
2843+30	1	24	62
2845+70	1	24	56
2853+10	1	24	62
2861+30	1	24	62
2866+40	1	24	62
2867+80	1	48	72
2874+30	1	36	56
2875+90	1	24	56
2878+60	1	24	58
2881+60	1	24	64
2882+80	2	48	76ea
2884+50	1	24	66
2888+50	1	24	60
2891+10	1	36	60
2892+40	1	24	64
2894+40	1	36	76
2898+80	1	24	56
2903+20	1	72	72

Figure: 3-17
Alignment Sheets:
DeLong Mountain Regional
Transportation System

Revision:
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Scale:
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Drawn By:
SOH

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teckcominco

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Department

Mine Engineering

Mine Operations

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APPENDIX A

Summary of Applicable Requirements in the Governing Agreements

APPLICABLE REQUIREMENTS OF THE “NANA/TCAK AGREEMENT”

(Development and Operating Agreement between NANA and Cominco Alaska Incorporated dated October 11, 1982
[“NANA/TCAK Agreement”])

Operations requirements applicable to the DMTS in the NANA/TCAK Agreement, which covers the entire mining operation and associated facilities, deal exclusively with cultural/archaeological and reclamation issues. No specific maintenance requirements for the DMTS are set forth in the agreement. The applicable requirements are summarized as follows:

Article IX Section 9.5, “Cultural and Archaeological Finds,” specifies the following:

- Operator shall immediately notify NANA whenever, in the course of conducting operations pursuant to this Agreement, any cemetery, archeological, anthropological, or historic site or artifact is discovered.
- Upon being so notified, NANA shall promptly, but not later than 10 days after such notice, inspect such objects or sites and shall take such action as it deems necessary and desirable to protect and preserve such objects or sites, and to that end, on lands owned by NANA, may require the Operator to halt any part of the operations that affect or endanger such objects or sites until such time as such objects are removed or sites preserved.
- If NANA halts any part of the operation, it shall proceed expeditiously so as to minimize to the extent reasonably possible the duration of the interruption caused to the project.
- All objects discovered in any site shall belong exclusively to NANA except as otherwise provided by law.
- If Operator elects to undertake development activities, other than exploration work, on any areas not previously the subject of an archeological study, such activities shall not commence until an archeological study has been completed.

Article IX Section 9.6., “Reclamation and Post-Production Expenditures,” specifies the following:

- All lands owned by NANA disturbed as a result of the operations pursuant to this agreement shall be reclaimed by the Operator in accordance with a reclamation plan (the “Reclamation Plan”) to be prepared by the Operator prior to commencement of operations pursuant to this agreement and any laws or regulations applicable to such reclamation activities.
- The Reclamation Plan and its modifications from time to time shall be subject to the approval of the Management Committee.

Generally, the Reclamation Plan shall provide for reclamation within the following guidelines (selected and applicable to the DMTS):

- The parties recognize that reclamation of disturbed lands is desirable.
- Reclamation shall be generally designed to mitigate potential long-term danger to human life or the subsistence needs of natives of the NANA Region, to mitigate any adverse visual or unaesthetic conditions, and to the extent reasonably practicable, to restore the land to a condition compatible with surrounding land.
- Disturbed land shall be restored to natural looking contours compatible with the surrounding terrain.

- Where available in appropriate quantities, topsoil shall be removed and stockpiled for final application after reshaping of disturbed areas have been completed, provided that the parties recognize that permafrost conditions could cause long-term stockpiling of topsoil to be impractical.

APPLICABLE REQUIREMENTS OF THE “NANA/NPS AGREEMENT”

(Terms and Conditions Governing Legislative Land Consolidation and Exchange between NANA Regional Corporation, Inc. and the United States of America, June 1986 [“NANA/NPS Agreement”])

The NANA/NPS Agreement, specifically Exhibit B, contains the bulk of the requirements applicable to this Plan. Several of the applicable requirements are general, but most are specific. The requirements are outlined below (abbreviated as appropriate), generally organized as they appear in Exhibit B.

Exhibit B, part (A) of the NANA/NPS Agreement states that NPS shall review the operating plan to assure that all reasonable measures are taken to meet the following standards:

1. Prevention or mitigation of significant adverse visual impacts in the location and construction of any improvements and in the location and extraction of materials from material sites;
2. Protection of fish and wildlife and their habitat to avoid significant adverse impacts during construction and operation of any improvements and in the location and extraction of materials from material sites;
3. Protection of the cultural and paleontological resources during construction and operation of any improvements, and in the location and extraction of materials from material sites;
4. Reclamation of all material sites and construction camps;
5. Protection of threatened or endangered fish, wildlife, and plants; and
6. Protection of water quality to avoid significant adverse impacts from development activities.

Operations

Exhibit B part (B) subparts 5.a – r (“General and Miscellaneous”) specify the following operational requirements for the DMTS (abbreviated):

- a. Explosives - NANA will comply with all Alaska state and federal requirements for explosives, and with ADF&G requirements in connection with fish. No explosives shall be detonated within ½ mile of any caribou or musk ox herd, or known denning brown bear.
- b. Fire - All precautionary measures shall be taken to prevent man-caused fires and NANA or its designee shall be responsible for the suppression of fires caused by construction, operation, and maintenance of the road. NANA or its designee shall notify NPS of any fire not immediately extinguished. Subsequent action by NPS or NANA regarding the fire shall be taken in accordance with the *Kobuk Interagency Fire Plan*.¹ NANA shall provide a contingency fire plan to NPS.
- c. Feeding of Wildlife - The feeding of wildlife is prohibited, including leaving garbage or edibles in a place which would attract wildlife. Garbage shall be kept in covered animal-proof containers while awaiting transport from A(1) and A(2) lands or incineration.

¹ The *Kobuk Interagency Fire Plan* has been superseded by the *Alaska Interagency Wildfire Management Plan* (per Miller, 2002).

- d. Wildlife Protection - Wildlife shall not be harassed in any manner (except for takes authorized by ADF&G or subsistence as provided by law).
- e. Training and Education - NANA or its designee shall be required to inform all contractors involved in the construction, operation and maintenance of the road of the terms and conditions herein and the regulations and limitations contained herein relating to construction, operation and maintenance of the road for the protection of the natural and cultural resources of the lands within the boundaries of the Monument.
- f. Emergencies - Aerial search and rescue and/or evacuations necessary in the event of accidents or emergencies that occur in the course of construction, operation and maintenance of the DMTS shall not be the responsibility of the NPS. NANA shall develop and supply a copy of the contingency plan for search and rescue to the NPS for review.
- g. Water Quality - NANA will use all reasonable means to minimize water pollution and will comply with Alaska state water quality standards.
- h. Air Quality - NANA will use all reasonable means to minimize air pollution and will comply with Alaska state air quality standards.
- i. Monitoring - NPS and other agency representatives shall have reasonable access to the area of operations on lands described in A(1) and A(2) of this Agreement as is necessary to properly inspect, monitor and ensure compliance with the relevant terms and conditions of this Agreement and applicable regulations and permits.
- j. Pesticides - Insecticides and herbicides shall be used only in a manner consistent with NPS policy and Alaska state pesticide control standards.
- k. United States Held Harmless - NANA will hold harmless the United States and its employees from any damages or claims for injury.
- l. Water Use - In the event that water from streams and lakes which support fish populations is necessary for construction, operation and maintenance of the transportation system, the quantity of water used must be consistent with minimum flows or volumes necessary to avoid significant adverse impact on such fish, in accordance with applicable state and federal regulations. Water uses from lakes, ponds and streams during winter shall not deplete the available supply below that necessary to protect overwintering fish, and shall not be allowed between November 1 and June 1, unless specifically permitted by ADNIR after concurrence from ADF&G. All state water use applications shall be submitted to NPS at the time they are filed with the state agency.
- m. Fuel and other Hazardous Substances - Comprehensive fuel spill prevention and control procedures shall be developed and implemented prior to road construction and operations. The plan, which must meet the regulatory requirements of the U.S. Environmental Protection Agency (EPA) and Alaska Department of Environmental Conservation (ADEC), will be submitted to NPS at the same time it is submitted to EPA and ADEC for review.
- n. Waste Disposal - All solid waste shall be removed from the land for disposal in accordance with applicable federal, state, and local laws and regulations. Gray water may be discharged under certain conditions.
- o. Soil Erosion - Construction of the system shall be conducted to minimize soil erosion. In the event revegetation is considered practical or feasible in conjunction with slope erosion control, NANA shall consult with NPS on possible vegetative covers. If

indigenous plant species are not available, feasible and practicable, NPS concurrence must be obtained prior to any other revegetation on the lands.

- p. Rehabilitation - NANA will assure reasonable rehabilitation of all lands disturbed by construction and operation of the system, including:
 - (1) Removal of all temporary facilities including storage facilities, equipment, unused materials and supplies, and restoration of disturbed areas.
 - (2) Revegetation of all disturbed ground with indigenous plant species, if available, feasible, and practicable.
 - (3) Reclamation of material sites and access roads, when closed.
 - (4) Reasonable measures to reduce visual impact on the surrounding area.
- q. Peregrine Falcons - During construction, operation, maintenance and abandonment of the system, the following stipulations will be followed with respect to all active peregrine falcon nests.
 - (1) Within 1 mile of the nest site:
 - (i) Aircraft will maintain minimum altitudes of 1,500 feet above nest level from April 15 through August 31, weather conditions permitting.
 - (ii) No ground level activity will be permitted from April 15 through August 31, except on existing thoroughfares.
 - (iii) Construction of permanent facilities is prohibited. For the purposes of this section, an active nest is one that has been used by a peregrine falcon within three years preceding commencement of construction.
- r. Material Site Development - Development of material sites and extraction of materials within sections 13 and 14, T. 27 N., R. 22 W., Kateel River Meridian.
 - (1) Development of any material site and the extraction of materials shall be in accordance with all of the provisions of Exhibit B as supplemented by this subparagraph.
 - (2) No activities shall take place easterly or southerly of or within 0.2 miles of the stream draining from the southeast side of the lake in the SW1/4 sec. 12, T. 27 N., R. 22 W., Kateel River Meridian, and descending to the Omikviorok River through sections 12, 13, 14, 15, 21 and 22, T. 27 N., R. 22 W., Kateel River Meridian.
 - (3) The access road to any material site shall avoid wetlands to the greatest extent possible, shall minimize visual intrusions and shall be as short as practical.
 - (4) Any vehicle access to a material site, prior to construction of the DMTS to the immediate proximity of the material site, must take place within the road corridor as defined in subparagraph (B)3 b.
 - (5) No blasting shall take place during the period May through August if such blasting adversely impacts nesting raptors and nesting or molting waterfowl at adjacent lakes, wetlands, or along the stream described in subparagraph r (2).
 - (6) Material sites and access roads will be shut down and rehabilitated as soon as no longer needed.

- (7) No vehicular use of the access road shall be allowed except in conjunction with extraction of materials. Use of the access road may be restricted by the NPS if such use adversely impacts on nesting raptors and nesting or molting waterfowl at adjacent lakes, wetlands, or along the stream described in subparagraph r (2).
- (8) Use of the surface of these lands is limited to that necessary for the extraction, processing, storage and transportation of materials and rehabilitation of the site. No permanent structures shall be constructed on these lands.

With regard to vehicle use, Exhibit B part (B) subpart 3 of the NANA/NPS Agreement states:

- All vehicle requirements and uses shall be governed by state law and regulation. All motor vehicles shall be equipped with a muffler that meets Alaska state and federal requirements.
- No vehicle associated with the construction and operation of the DMTS shall be operated outside the road corridor, off access road routes to material sites, or outside the perimeters of the material sites. Road corridor is defined for this purpose as the minimal amount of land necessary to construct the road, including culverts, bridges and other structures included within the road design, or necessary to support road construction in a sound and prudent manner. The use authorized herein shall be conducted in a manner to minimize loss and damage to soils and vegetation and to maintain water quality. This subparagraph does not apply to the use of equipment in conjunction with fire suppression in accordance with the *Kobuk Interagency Fire Management Plan*.
- Vehicles involved in snow removal shall not be operated off road surfaces.

With regard to authorizations from other federal or state agencies for the construction or operation of the DMTS, part (B) subparts 7 and 8, and part (D) of Exhibit B of the NANA/NPS Agreement state:

- NANA shall submit to the NPS at the time of submission to the appropriate federal or state permitting agency a copy of every permit application relating to the construction and operation of the System. The NPS will provide comments and recommendations to the appropriate agencies according to the permitting agencies' procedures. Once all required approvals have been issued by the appropriate federal and state agencies for the System, NANA shall not exercise those approvals for at least 30 days if all NPS recommendations to meet the standards provided herein have not been adopted by the appropriate federal or state agency or if the NPS comments and recommendations are outside the jurisdiction of the approving agencies, or if public comments received by the approving agencies indicate that the NPS overlooked a significant issue relating to the standards provided herein [subpart 7].
- All plans and applications reviewed under this section (i.e., subpart) for the DMTS shall be enforced according to section (i.e., part) (D) of this exhibit as if they were an approved development and operation plan [subpart 8].
- If NANA violates its plan and if the violation does not pose an immediate threat of significant adverse effect on the resources or values which the standards [part (A)] were established to protect, the NPS may notify NANA in writing to correct the violation in the shortest practicable time, not to exceed 30 days. If the violation is not corrected within 30 days, the United States may litigate to suspend the development or operation until the violation is corrected [part (D)].

- If a violation poses an immediate threat of significant adverse effect on the values or resources which the standards were established to protect, upon request of NPS, NANA agrees to either immediately correct the violation, or to suspend the development or its operation for 10 days, during which time the United States may initiate litigation to enforce the provisions of the plan; provided, however, that if the United States does not file suit within 10 days of its request, NANA shall be free to resume operations [part (D)].
- NANA agrees to provide a copy of each permit issued by NANA for activities on these lands to the NPS within 5 days of issuance of the permit. NANA further agrees to include in each permit issued for activities on its lands a requirement of immediate notification to NANA of the location of any cultural or paleontological resources found during the activity [part (D)].

With regard to protection of caribou, Exhibit B part (E) of the NANA/NPS Agreement is summarized as follows:

- NANA, its assignees or successors in interest shall be responsible for a caribou migration monitoring program designed to provide advance notice of seasonal migrations which are likely to cross the DMTS so that proper measures may be taken during construction and operation to minimize or prevent adverse effects on caribou migration patterns.
- Such monitoring shall be conducted by NANA, its assignees or successors in interest. NANA shall contract with an individual or organization with expertise in wildlife biology and/or behavior to assist it in designing and operating the monitoring program. NANA shall consult with and receive the approval of NPS and ADF&G in developing the specifications of the contract and in selecting the contractor.
- The monitoring program shall be in effect at the time construction of the system begins and shall continue as required during active use of the system, unless otherwise agreed by NANA, the NPS, and ADF&G, or until responsibility for the program is transferred or terminated by consent of NANA, the NPS, and ADF&G.
- Periodic reports for the monitoring program shall be transmitted to ADF&G and the NPS on a schedule to be determined by NPS, ADF&G and NANA.
- NANA shall ensure that a study of caribou distribution and migration begun in 1981 by Dames & Moore and titled "The Red Dog Project Baseline Studies 1982 & 1983" shall be continued until commencement of such monitoring program.
- NANA shall impose temporary restrictions on construction or control of traffic on the system if reports from the monitoring program indicate that significantly adverse impacts on seasonal migration are resulting or could reasonably be expected to result from construction or vehicular activities. NANA shall give due consideration to the views of the NPS and ADF&G on the imposition of temporary restriction beyond those recommended by the monitoring contractor. [In the event of a disagreement, see remaining agreement language in this part].

With regard to protection of cultural and archaeological resources, Exhibit B part (F) of the NANA/NPS Agreement states:

- Prior to any land-disturbing activity that might disturb or damage cultural, archaeological, or paleontological resources, a field inspection, meeting contemporary professional standards, shall be completed to locate/identify any sites of possible significance.

- All cultural, archaeological, or paleontological resources within Cape Krusenstern National Monument are listed on in the National Register of Historic Places and are afforded the procedural protection conferred by that status. With respect to sites, and upon the discovery of any such resources on these lands, all reasonable measures shall be taken to ensure that a site is not further disturbed until it is adequately investigated and protected in accordance with the following procedures.
 - Prior to proceeding with the planned development, NANA shall employ a qualified professional archaeologist or geologist, as appropriate, to conduct an investigation of any threatened site and prepare plans and recommendations. This shall be done in a manner meeting contemporary professional standards, regarding the avoidance of the site, preservation of the site or specimens, or preparation of a data recovery plan. Contemporary professional standards as used herein shall mean Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation or their equivalent. Any data recovery plans shall be developed in consultation with the NPS and the SHPO. Plans shall be submitted to the Advisory Council on Historic Preservation for review pursuant to the "No Adverse Effect" determination for this exchange of lands and interest in lands as concurred by the Advisory Council on Historic Preservation on December 31, 1984.
 - At least 10 days prior to beginning such an investigation, written notice shall be provided to the NPS. NPS may participate in all aspects of the investigation, and the development of plans and recommendations. A copy of any and all reports prepared shall be furnished to NPS, or to NANA, as appropriate.
 - Upon discovery of a resource site during construction, operations, maintenance, or any other activity along the DMTS corridor, all activity within 500 feet of the site will cease. The person discovering the site shall contact the area supervisor, who shall contact an Environmental Coordinator, who in turn, shall contact the SHPO and NPS. No activity shall occur within 500 feet of the potential site until such time as qualified personnel have had an opportunity to review or investigate the site. NPS will make every reasonable effort to reach the site as soon as possible. NPS will review the site and determine if any mitigation needs to be undertaken.
 - Concurrent with notification of NPS, the SHPO shall be notified upon discovery of a resource site, and prior to investigation of the site. Information provided to the SHPO regarding the location of such sites will be compatible with Alaska Heritage Resources Survey form. The SHPO shall also receive copies of all investigation reports.
 - All employees and contractors working within the DMTS corridor shall protect all cultural, archaeological, and paleontological resources discovered and use best efforts to protect such resources from the activities of DMTS licensees, invitees, and permittees.

With regard to protection of endangered or threatened species – peregrine falcons, Exhibit B part (G) of the NANA/NPS Agreement states:

NANA will take all applicable measures to assure the protection of peregrine falcons nesting or otherwise using these lands during the development or operation of any improvements on the lands. Applicable measures shall include compliance with all applicable laws, regulations, or

stipulations developed by the NPS in consultation with USFWS for the protection of the threatened peregrine falcon.

With regard to the study of cultural and archaeological resources, Exhibit B part (H) of the NANA/NPS Agreement is summarized as follows:

1. Employees of NPS and its permittees or contactors shall have the right to enter the lands for purposes of scholarly study of cultural or paleontological resources located on these lands or other research related to the purposes for which the Monument was established. NANA shall be provided copies of such study reports.
2. Prior to entering the lands for such purposes, the NPS must provide notice to NANA of the intended activity, including purpose location, duration, conduct, personnel involved and other pertinent factors.
3. If removal of cultural or paleontological resources from their original site is necessary because of excavation, needed protection, or is otherwise desirable, the NPS in consultation with NANA, shall determine in accordance with contemporary professional standards how the resource shall be removed and the disposition thereafter.

Maintenance

Road maintenance requirements that must be addressed in this Plan include the following items, set forth in Exhibit B, part (B), subpart 2.c of the NANA/NPS Agreement:

- Expected use of the system.
- Frequency and means of road maintenance, including types of equipment anticipated to be used and use of material sites.
- Method of landslide and debris flow removal and disposal areas for potential landslide debris.
- Snow removal methods.
- Dust control measures (dust control is to be conducted after consultation with NPS, as required by ADEC, pursuant to applicable laws and regulations to protect air quality [Exhibit B, Section (C), part 2b]).
- Erosion control measures.
- Culvert icing and aufeis control, and
- Fish passage measures.

Further, Exhibit B, part (B) subpart 2 ("Operations and Maintenance") of the NANA/NPS Agreement states:

- Base inspections and prompt surface repair will be conducted during the spring and summer months.
- Snow removal will occur during the winter months to allow winter use.
- Stream crossings and culverts will be regularly inspected for damage and blockage.
- NANA shall, in the event of extended non-use of the system or temporary mine closure, conduct sufficient maintenance of the roadbed to prevent significant erosion of the road and, at stream crossings and culverts, to prevent blockage and siltation of fish streams.

APPLICABLE REQUIREMENTS OF THE “NANA/AIDEA AGREEMENT”

(Agreement for Leasing Lands and Interest in Lands for the Construction, Operation, Maintenance and Reclamation of the DeLong Mountain Transportation System and for the Sales of Sand, Gravel and Related Construction Materials and Appendices, between NANA and AIDA [“NANA/AIDEA Agreement”])

The NANA/AIDEA Agreement adopts all requirements from Exhibit B of the NANA/NPS Agreement.

APPLICABLE REQUIREMENTS OF THE “TCAK/AIDEA AGREEMENT”

Amended and Restated Agreement for the Financing, Construction, Use, Operation and Maintenance of the DeLong Mountain Transportation System, dated March 12, 1997, between Cominco and AIDEA [“TCAK/AIDEA Agreement”]

The TCAK/AIDEA Agreement is largely concerned with TCAK’s non-exclusive rights to the use of the DMTS, finance and cost considerations, and the circumstances under which TCAK’s use of the DMTS may change. Operating, maintenance, environmental, and reclamation requirements are relatively general, and are summarized as follows:

Operations

Article 2, “Operation, Maintenance and Use of DMTS” of the TCAK/AIDEA Agreement stipulates:

- So long as TCAK is the predominant non-exempt user of the DMTS (meaning that during the preceding year other non-exempt users did not in the aggregate use more than twenty-five percent of DMTS capacity), TCAK shall, at a commercially reasonable rate of compensation, operate and maintain the DMTS [Section 2.3 (c)].
- In the event that AIDEA, pursuant to its contractual obligations to NANA, is required to impose temporary restrictions on the use of the DMTS due to caribou migrations, or if any other governmental authority with jurisdiction thereover imposes such temporary restrictions, AIDEA shall have no liability to Cominco for any loss or damage sustained by Cominco as a result thereof [Section 2.8].

Maintenance

Article 2, Section 2.3(a) specifies: “AIDEA shall keep and maintain DMTS in good order and repair during the entire term of this Agreement, including any extensions thereof, in a manner which will assure reasonably proper functioning of the DMTS. Maintenance of the DMTS shall conform to the maintenance standards and specifications contained in Exhibit A.”

Exhibit A – “Maintenance Standards and Specifications” specifies: “The DMTS shall be maintained in accordance with applicable state of Alaska maintenance standards and specifications. If, as of the effective date of this Agreement, there are no published general state maintenance standards and specifications applicable to the road, port, and related facilities, then the DMTS shall be maintained in accordance with standards mutually agreed to by AIDEA and Cominco, until such time as the state adopts applicable maintenance standards.”

Environmental

Cominco shall abide by, and shall cause its employees, agents and any contractors and subcontractors it employs to abide by all environmental laws in their use, occupancy or construction of the DMTS” [Article 13, Section 13.2].

Reclamation

TCAK “shall consult with AIDEA prior to proposing any final plan for remediation of any portion of the DMTS required to be filed with any governmental agency with the authority to conduct, monitor, or oversee any enforcement or remedial action” [Article 13, Section 13.4].

APPENDIX B

NPS Comments on the September 2002 Draft DMTS O&M Plan
October 2002

NPS Natural Resource Program Center
Review of the Draft Operating & Maintenance Plan
for the Delong Mountain Transportation System
Cape Krusenstern National Monument
September 2002

The following is a technical review of the Draft Operating & Maintenance Plan for the Delong Mountain Transportation System (DMTS), dated September 2002 (Operating Plan) performed by specialists in the Natural Resource Program Center (NRPC). The purpose of the review is to:

- I. Determine the overall adequacy of the Operating Plan to meet the resource protection goals of the Monument and to meet the spirit and intent of the National Park Service (NPS) / NANA Agreement, and
- II. Identify specific portions of the Operating Plan that are in need of revision or clarification, including specific examples of additional information needed in each section.

I. Overall Assessment of the 2002 Draft Operating and Maintenance Plan

A. Resource Documents

The NRPC understands Teck Cominco Alaska Inc.'s (TCAK) desire to simplify the Operating Plan by incorporating supplementary documents by reference. However, none of these documents (identified in Section 8) are included in the Operating Plan, or available for NPS review. Indeed, it is our understanding that several of these documents are incomplete, being revised, or do not exist (Pers. Comm. Dalle-Molle/Reeder 10/21/02). Without access to these documents, the NRPC cannot determine if TCAK procedures are adequate or even extant with regard to resource concerns identified in the previous plan review (NPS, March 2001).

Exhibit B, Section (A) of the NPS/NANA Agreement requires TCAK to provide the NPS with an operation plan that meets the each provisions and resource protection mandate in the Agreement. Under the same section, the NPS must then review the plan to assure that all reasonable measures are taken by NANA to meet the six standards and other provisions of the Agreement. Without complete information directly incorporated into the plan, TCAK has not met a fundamental responsibility under the Agreement - to provide the NPS with an operating plan that meets each provision and resource protection mandate in the Agreement. Without a complete plan, the NPS cannot discharge its responsibility to review the plan and ensure compliance with the Agreement.

Thus, the NRPC recommends that TCAK incorporate documents, or portions of documents listed in Section 8 of the Operating Plan that are specifically relevant to the construction, operation, or maintenance of the DMTS within Cape Krusenstern National Monument (CAKR). If the entire document is relevant, the entire document should be included as an attachment (for example the Caribou Mitigation Monitoring Plan). If only portions of the document are relevant, the relevant portions should be included or summarized in the appropriate Operating Plan sections (for example the Red Dog Operations Oil Discharge Prevention and Contingency Plan). Excerpts or summaries should reference the parent document, including section, page and paragraph, for

more detailed review if needed. Attachment 1 provides a preliminary list of documents that need to be included, whole or in part, for the document to constitute a complete plan.

In addition the NRPC suggests that TCAK, NANA, or possibly the state, establish and maintain an administrative record of pertinent permits and documents related to activities at the site. These documents should be accessible through the internet for parties who cannot easily obtain hard copies. Attachment 1 lists the documents that the NRPC suggests for inclusion in this system.

B. Agreements

TCAK refers to 4 separate agreements in its draft plan: 1) 1982 NANA/TCAK Agreement, 2) 1997 TCAK/AIDEA Agreement, 3) NANA/AIDEA Agreement, and 4) NANA/NPS Agreement. While the NPS has a copy of the NANA/NPS agreement and is familiar with its contents, the NPS would like to review copies of the first three agreements to determine what other rights and responsibilities parties have regarding the operation and maintenance of the Delong Mountain Regional Transportation System (DMTS). As the agency charged by Congress with the duty to administer the resources and values in the Monument, an assessment of all the rights and responsibilities associated with the operation and maintenance of the DMTS will assist the NPS in carrying out its duty. The NRPC recommends that TCAK provide the NPS with copies of each of these agreements.

II. Specific Comments

§ 1 Introduction

Page 1, Paragraph 2

This paragraph indicates the DMTS traverses both CAKR National Monument and National Historic Landmark lands, yet no differentiation of these two entities occurs in Figure 1 or subsequent figures. Boundaries of these two NPS entities should be determined and shown along with those of other lands similar to the detailed map provided as Fig. 1 of the Supplemental Road Sampling and Surface Material Verification Report. [Penoyer]

§ 1.2.3 Requirements of the NANA/NPS Agreement

Page 4, Paragraph 2

Under heading “Operations,” change reference from “Exhibit B, § (C) parts 5.a-r” to Exhibit B § (B) parts 5.a-r. [Kassman]

Page 4, Paragraph 2

In the discussion section of the NANA/NPS Agreement, the draft plan omits pertinent sections of NANA/NPS Agreement. While discussion of some sections are included later in the draft plan, all pertinent sections of the agreement should be included here for sake of clarity and completeness. Thus, the NRPC recommends that section 1.2.3 be revised to include a summary, or verbatim language, of the requirements of:

- 1) Exhibit B, § (A) Development and Operations Planning, Standards 1 – 6
- 2) Exhibit B, § (E) Caribou Monitoring Program
- 3) Exhibit B, § (G) Endangered or Threatened Species – Peregrine Falcon
- 4) Exhibit B, § (H) Study of Cultural or Paleontological Resources. [Kassman]

Page 7, first full paragraph

Change the reference in the first sentence from, “Exhibit B § (C) part 3”, to Exhibit B § **(B)**, part 3 [Kassman]

Page 7, Paragraph 2

Change first sentence from “With regard to protection of cultural and archeological resources, . . .” to “With regard to protection of cultural and **paleontological** resources, . . .” [Kassman]

Page 8, Paragraph 4

Under heading “Maintenance,” change reference from “Exhibit B, § (C) part 2.c . . .” to Exhibit B § **(B)** part 2.c [Kassman]

§ 1.4 Documents Incorporated by Reference

Page 9, Paragraph 4

See the “Resource Documents” comment in Section I of this review.

§ 2.2 DMTS Material Sites

Page 12, Paragraph 4

In this section TCAK states that all of the material sites within the Monument are “...inactive with regard to material extraction.” It also states that 2 sites within the Monument (MS-3 and MS-6) are currently permitted by the Alaska Department of Natural Resources (ADNR) for water withdrawal and that application is pending to add MS-5 and increase water withdrawal from 160,000 gallons per day to 200,000 gallons per day. 43 USC§1629(g) and the NANA/NPS agreement provide for the development and use of material extraction sites but do not authorize the development of water reservoirs. TCAK conversion of these 3 sites from material extraction to water reservoir sites will delay the restoration of the sites indefinitely. Conversely, use of water from material sites reduces the need for water withdrawal from streams. CAKR, AKSO and NRPC should discuss the benefits and drawbacks of this conversion of use and advise TCAK on appropriate next steps. For example: 1) partial restoration to convert the site to a lake or 2) cease water withdrawal and completely restore sites. [Ziegenbein]

Table 2-3 Page 13

TCAK indicates that a Preliminary Reclamation Plan was developed for Material Sites 4 and 5 by ENSR Consulting and Engineering in 1991. These plans would be useful in evaluation of TCAK’s approach to reclamation within the context of the Operating Plan. The NRPC recommends that TCAK provide the NPS with a copy of these reports. These plans and subsequent reclamation plans should be included in the operating plan (See §5.4 below). [Eckert, Ziegenbein]

§ 2.3 Port Site Description

Page 15, Paragraph 2, bullet 11

TCAK is presently operating a Sanitary Landfill at MS-2 in noncompliance with the Agreement. By Interim Conveyances No. 1760 and 1761 (August 28, 1988), the United States conveyed both the surface and subsurface interests in the A-2 lands to NANA, subject to, among other things, “[t]he terms and conditions of the Agreement, as amended by P.L. 99-96, including Exhibits A through I and maps therein.” Even though NANA holds the A-2 lands in fee, activities occurring on this land are subject to the requirements of Exhibit B. Exhibit B, § (B) 5.n. Waste Disposal states: “*All combustible solid waste shall be incinerated or removed from the land for disposal*”

in accordance with applicable federal, state, and local laws and regulations. All non-combustible solids waste, including but not limited to, fuel containers, shall be removed from the land for disposal in accordance with applicable federal, state and local laws and regulations. Gray water may be discharged to the surface only if it is filtered, disinfected and not directly discharged into streams or lakes and the discharge is in accordance with the Alaska State wastewater disposal standards. No other wastes or sewage may be discharged.”

GRD noted this noncompliance issue in its March 14, 2001 comments. TCAK’s response was: “TCAK’s understanding (drawn from NPS visits and inspections during 1990-1995) is that NPS approved/found non issues with the MS-2 Landfill. Also, TCAK’s files contain a letter from the NPS dated January 23, 1986, indicating that NPS was “willing to modify the exchange agreement to indefinitely permit the solid waste disposal site within the Monument boundary at Material Site 2.”

The NPS cannot unilaterally alter the terms and condition of a Congressionally-approved agreement. NPS’s silence on the matter of solid waste disposal during its 1990-1995 site visits and inspections does not (cannot) amount to acquiescence of an action that is in violation of the Agreement. Further, to the extent that the January 23, 1986 letter (not on file at GRD) does make the statement as indicated by TCAK, it does not (cannot) have the effect of altering the Agreement to allow a solid waste disposal site contrary to the terms of Exhibit B, § (B) 5, n. Finally, possession of a state solid waste disposal permit (ADEC SWDP #0132-BA003), does not override the prohibition in the Congressionally approved Agreement.

The NRPC recommends that the park restate that TCAK’s establishment of a solid waste disposal site on A-2 lands is in noncompliance with the Agreement, and request that TCAK cease disposal at MS-2 pending resolution of this issue. Second, the NRPC recommends that the park request TCAK to disclose the volume and nature of solid waste disposed at MS-2. Further, the NRPC suggests that TCAK prove the presence or absence of contaminating substances, the location of groundwater relative to the waste, and the mobility of potential contaminants. [Kassman, Ziegenbein]

§ 3.2.5 Concentrate Truck Cleaning

Page 22, Paragraph 5

The concentrate truck cleaning described here appears to leave concentrate dust on the haul trucks and therefore leaves the haul road susceptible to the spread of metal concentrates by truck “tracking” throughout much of the year (freezing periods). The NRPC recommends that TCAK provide the NPS with options or solutions (“adequate alternative measures”) to remedy this situation (e.g. high pressure air jet cleaning and vacuum system inside a building maintained at negative pressure). [Penoyer, Eckert, Ziegenbein]

§ 3.3.1 Standard Operating Procedures / Extraction Plan

Page 22, Paragraph 6

This section states “Material sites are mined according to design specifications approved by the appropriate permitting agency.” The NRPC recommends that TCAK provide the NPS with design specifications and site-specific operating procedures for all extraction sites within the CAKR and on A2 Lands. If site-specific mine/operating/restoration plans do not exist for MS-2, MS-3, MS-4, MS-5, and MS-6, these plans should be developed in cooperation with the NPS. [Ziegenbein]

Page 22, Paragraph 7
“Blasting is performed as described in Section 2.6.2” should read **Section 3.3.2**.

§3.3.2 Blasting Procedures

Page 23

Limits to blasting within 1 mile of an actively nesting raptor needs clarification. Please provide the rationale for selection of the 1 mile distance and for the 0.5 mile distance minimum for the listed mammals. [Eckert]

§ 3.4.2 Concentrate Unloading

Page 24, Paragraph 4

See comment at § 3.2.5 Concentrate Truck Cleaning, regarding truck washing techniques.

§ 4.1.2 Dust Control

Page 27, Paragraph 1, Bullet 1

The fate and transport of this palliative (calcium chloride) should be at least generally presented here given the tonnage applied to the haul road within the surrounding watersheds. Presumably the chloride ion being mobile, finds its way through the hydrologic system while the calcium ion largely stays put as the element that binds other road materials or acts as a cementing agent. The NRPC recommends that TCAK calculate chloride loading (worst case scenario) under representative conditions to determine if “protection of water quality to avoid significant adverse impacts from development activities” is being achieved per the NANA/NPS Agreement. [Penoyer]

Page 27

The NRPC recommends that TCAK describe how long-term accumulations of palliative are monitored and addressed. [Eckert]

§4.1.4 High Float Testing

Page 28

The NRPC recommends that TCAK explain how potential leachate from the asphalt emulsion will be monitored and addressed. [Eckert]

§4.1.5 Erosion Control

Page 28

This section provides an example format for incorporating resource documents into the DMTS operating plan, as recommended in comment I. A of this review. This section refers to the parent document(s) and provides a summary of the procedures specified in those supplementary documents. In addition, a reference to the specific document, including section page and paragraph, should accompany each procedure and the parent document should be made available for NPS review. [Ziegenbein]

§4.1.9 Ice Sanding

Page 30

The NRPC recommends that TCAK describe how long-term accumulations of sand (crushed rock) are monitored and addressed. Please see comment on §4.2.3 – Inspections below. [Eckert, Ziegenbein]

§4.2.1 Routine Maintenance

Page 30, Paragraph 6

This section states that culvert and bridge maintenance activities, water withdrawal for dust control and instream activities are permitted by ADF&G to protect fishery resources. The NRPC

recommends that TCAK summarize the mitigation measures required by these permits and provide copies of the permits for NPS review. [Ziegenbein]

§4.2.3 Inspections

Page 31

Regarding the response to comment number 31, the NRPC concurs that NPS, TCAK, NANA, and AIDEA must negotiate for more extensive inspections. Inspections may not need to be more “extensive”, however, they should be conducted regularly and cooperatively with NPS representatives and add a component such as:

- Inspection of geomorphic stability and stream channel or wetland conditions including an assessment of existing or potential natural/cultural resource conflicts.

Not only would such inspections meet the objectives stated in our original comments (e.g., assess any impacts of bridges or culverts on stream/wetland morphology), but they would also provide for evaluation (monitoring) of how well sediment control Best Management Practices (BMPs), such as those listed in § 5.6, are working. If necessary, BMPs could then be cooperatively revised to better achieve water quality protection and minimize the need for restoration. Past and future bridge inspection reports should be shared with the NPS. [Penoyer, Wagner, Ziegenbein]

§5.1 Prevention or Mitigation of Visual Effects

Page 32

Measures to mitigate the visual effects of material sites could include complete restoration or incremental/concurrent restoration of portions of sites no longer needed for DMTS operations. [Ziegenbein]

§5.2.1 Fish Passage and Habitat Protection

Page 34, Table 5-2, & paragraph 1

The rate of withdrawal and measures to ensure maintenance of minimum stream flows required for fish habitat are more germane than a gallon per day limit. The NRPC recommends that TCAK provide a summary of the ADF&G permit stipulations and copies of the permits for NPS review. [Ziegenbein]

C5.4 Reclamation

Page 36

Reclamation Research Program – NPS Comments # 4 and #5 (NPS Section II. 3.) of the Review of the 1991 Operating Plan for the DMTS still apply. The Reclamation Research Program is a specific requirement of the NANA/NPS Agreement (Exhibit B, §(B)4.b.) and was to “...commence prior to completion of construction...” This cooperative program has not yet been initiated by TCAK in direct noncompliance with the agreement.

Bullet 1 – “Minor recontouring...” Major recontouring and/or backfilling may be required at some sites to achieve the stated goals of “...restoring the site to be compatible with the surrounding landscape and in doing so, create functional habitat for wildlife, control erosion, and mitigate visual impacts.”

Bullet 2 – “...replacement of overburden...” Overburden may not be adequate seedbed material to successfully revegetate the site(s). The NRPC suggests replacing the word “overburden” with “salvaged topsoil or growth medium as defined in the Cooperative Revegetation Study.”

Bullet 3 – Insert “as defined in the Cooperative Revegetation Study” after “fertilizer”.

Bullet 4 – Insert “as defined in the Cooperative Revegetation Study” after “area”.

Bullet 6 – Insert “as defined in the Cooperative Revegetation Study” after “rehabilitation”.
[Ziegenbein]

The NRPC recommends that TCAK provide copies of recommendations and evaluations from the ADNR Plant Material Center. The reclamation methodology checklist should include evaluation and/or inoculation of soil biota. It should also include provisions for developing reclamation performance measures, including standards for remediation of hazardous substances and other contaminants, and success of native species/community re-establishment. [Eckert]

Table 2-3 on Page 13 indicates that a Preliminary Reclamation Plan was developed for Material Sites 4 and 5 by ENSR Consulting and Engineering in 1991. These plans would be useful in evaluation of TCAK’s approach to reclamation within the context of the Operating Plan. The NRPC recommends that TCAK provide the NPS with a copy of these reports. [Eckert]

For the purpose of restoration planning, and defining reclamation/restoration goals it will be helpful to establish consistent definitions of “reclamation,” to distinguish it from “restoration,” “rehabilitation,” “remediation,” or “revegetation” in this (and related) documents. See NPS 77 – Natural Resource Management Guidelines for NPS definitions of these terms. [Eckert, Ziegenbein]

§ 5.6 Protection of Water Quality

Page 36, Bullet 2

The NRPC cannot determine whether the measures TCAK is taking to address concentrate escapement to waterways are adequate without having the referenced documents to review. See Attachment 1, Protection of Water Quality. [Penoyer]

Page 37, Paragraph 1

Chloride ion should be included in this listing of potential water effects due to the use of calcium chloride as a palliative. [Penoyer]

§ 6 Overview of DMTS-Related Environmental Monitoring

Page 38, Paragraphs 1 & 2

Participation in the NPDES Monitoring Program requires to some degree, self-monitoring and self-reporting when a facility is out of compliance. Some general statement of the facilities ability to comply with permits and periods of any non-compliance (Table form) is warranted here along with type of permitted discharges that are occurring. [Penoyer]

Page A-14 Comment No. 63

The NRPC recommends that TCAK provide QA/QC on the component materials in the palliatives, to minimize risk of any other contaminants entering the environment along the road. [Eckert]

III. Reviewers - National Park Service, Natural Resource Program Center

Mark Ziegenbein – Geologist, Geologic Resources Division	303.969.2957
Ed Kassman – Environmental Protection Specialist, Geologic Resources Division ..	303.969.2957
Pete Penoyer – Hydrologist, Water Resources Division	970.225.3535
Greg Eckert – Restoration Ecologist – Biological Resources Management Div.....	303.969.2079
Joel Wagner – Hydrologist, Water Resources Division	303.969.2955

Attachment 1 Incorporation of Supporting Documents

As stated in Section I of this review:

The NRPC recommends that TCAK incorporate documents, or portions of documents listed in Section 8 of the Operating Plan that are specifically relevant to construction operation or maintenance of the DMTS within Cape Krusenstern National Monument. If the entire document is relevant, the entire document should be included as an attachment (for example the Caribou Mitigation Monitoring Plan). If only portions of the document are relevant, the relevant portions should be included or summarized in the appropriate Operating Plan sections (for example the Red Dog Operations Oil Discharge Prevention and Contingency Plan). Excerpts or summaries should reference the parent document, including section, page and paragraph, for more detailed review if needed.

The following documents need to be included in the Operating Plan as attachments, or summarized/consolidated/excerpted in the Operating Plan and made available to the NPS before the document will constitute a complete Operating Plan.

- ***Reclamation Research Program*** – as required in the NPS/NANA Agreement, Exhibit B, Section (B)4.b.
- ***Site-Specific Operating/Reclamation Plans*** – for MS-3, MS-4, MS-5 and MS-6
- ***Hazardous Materials/Concentrate Spill Prevention*** – includes, but not limited to, portions of the following documents:
 - Red Dog Operations Oil Discharge Prevention & Contingency Plan
 - Red Dog Hazardous Material Operations Manual
 - Red Dog Mine Port Site Pollution Prevention and Best Management Practices Plan
- ***Hazardous Materials/Concentrate Spill Response and Reporting*** – includes, but not limited to, portions of the following documents:
 - Red Dog Operations Oil Discharge Prevention & Contingency Plan
 - Red Dog Hazardous Material Operations Manual
 - Concentrate to Water Response Plan
 - Concentrate Spill Cleanup SOP
- ***Protection of Water Quality*** – includes, but not limited to, portions of the following documents:
 - Concentrate to Water Response Plan
 - Concentrate Spill Cleanup SOP
 - NPDES Permits within the Monument and on A2 Lands
 - ADNR Water Rights Permits within the Monument and on A2 Lands

In addition, the NRPC suggests that the following documents be included in a public administrative record in addition to those listed in §8 of the draft O&M Plan:

- *Development and Operating Agreement* between NANA and Cominco Alaska Incorporated dated October 11, 1982 (“NANA/TCAK Agreement”);
- Amended and Restated Agreement for the Financing, Construction, Use, Operation and Maintenance of the DeLong Mountain Transportation System, dated March 12, 1997, between Cominco and AIDEA (“TCAK/AIDEA Agreement”);
- Agreement for Leasing Lands and Interest in Lands for the Construction, Operation, Maintenance and Reclamation of the Delong Mountain Transportation System and for the Sales and Sand, Gravel and Related Construction Materials and Appendices, between NANA and AIDA (“NANA/AIDEA Agreement”);
- Terms and Conditions Governing Legislative Land Consolidation and Exchange between NANA Regional Corporation, Inc. and the United States of America, June 1986 (“NANA/NPS Agreement”).
- Preliminary Reclamation Plans for Material sites. Prepared by ENSR Consulting and Engineering, 1991.
- NPDES Permits within the Monument and on A2 Lands
- ADNR Water Rights Permits within the Monument and on A2 Lands

L3027 (AKSO-RER)

October 3, 2002

Memorandum

To: Jerry Post, Geologist (WEAR)

From: Bud Rice, Environmental Protection Specialist (AKSO)

Subject: Comments on Draft Operating and Maintenance Plan
DeLong Mountain Regional Transportation System

Following are my comments on the subject document from James E. Kulas of Teck-Cominco to Dave Spirtes of NPS dated September 4, 2002.

General Comments

This plan appears to be a great improvement over the 1991 Operating Plan. It appears Teck-Cominco has taken to heart the NPS 2001 review comments. I appreciate the efforts put forth by Mr. Kulas and his staff at Teck-Cominco and their contractors.

In response to the major changes in the new plan, I offer these comments:

- The revised plan format and organization is useful.
- The updated descriptive information about the DMTS is helpful.
- The example site maps and road alignment are excellent, but all landownership should be indicated on them, including the limits of the easement to NANA (we need them for all areas in the Cape Krusenstern National Monument.)
- The summary table of material sites and their dispositions is helpful.
- Referring the reviewer to the spill, fire, and other plans and manuals is reasonable, but because these are incorporated in to the operations plan, NPS must have current copies of all of them.

I recognize work is in the works or yet to be arranged. I believe the NPS looks forward to the following action items:

- Produce a Caribou Monitoring Plan with active participation by the NPS.
- Share results from the 2002 road hardening tests.
- Complete an Archeology Management Plan.

- Determine a reclamation plan and schedule for unused material sites.
- Assess geomorphic condition of streams, drainages, and wetlands in the DMTS corridor.
- Determine the appropriate use and reclamation of the port site landfill on A-2 lands.

Specific Comments

Page 2, 1.2 Review of Agreements:

I recommend switching position of bullets 2 and 4. Place the earlier 1986 agreement between NANA and USA-NPS before the 1997 amended agreement between Cominco and AIDEA. Also, this tracks better with subsequent sections in the document.

Page 2, 1.2.1 Operations, Last bullet, First line:

The word “ay” (sounds suspiciously Canadian) at the end of the line should be “any.”

Page 5, 1., Water Use:

The NPS has not always received water use applications for use of water from within Cape Krusenstern National Monument. We would appreciate receiving all of them in the future, as indicated in this procedure.

Page 5, n., Waste Disposal:

On the first line insert “be” between *shall* and *removed*.

Page 6, r (4):

The access road to MS-6 is not all within the road corridor for the DMTS. It cuts across a corner of NPS land.

Page 6, r (6):

Unused material sites have not been shut down and rehabilitated as soon as no longer needed, but we are pleased to see this operating procedure included to be consistent with the NANA-NPS Agreement.

Page 10, 2.1 DMTS Road, Paragraph 2:

We have not yet seen all figures showing the DMTS road through Cape Krusenstern National Monument and National Historic Landmark. We would like to obtain copies of all the relevant sheets to evaluate locations of the road and maintenance areas relative to sensitive natural and cultural resources.

Page 12, 2.2 DMTS Material Sites, Paragraph 2:

Does NPS and ADFG have copies of ADNIR water permits for material sites in the park?

Page 12, 2.2 DMTS Material Sites, Paragraph 3:

Is the ADEC Solid Waste Disposal Permit 0132-BA003 consistent with the NANA/NPS Agreement?

Page 15, 2.3 Port Site Description, 2nd bullet:

The six steel bulk fuel storage tanks have a combined total of about 14 million gallons, which is 4 million short of the 18 million gallons shipped to the port each summer. Are 4 million gallons used at the port or shipped to the mine in summer?

Page 17, 3.1 General DMTS Operations and 3.1.1 Safety:

What is the company policy regarding use of alcohol or drugs at the port or mine site?

Page 18, 3.1.3 Wildlife Incident Response and Reporting:

What about incidents with threatened and endangered wildlife like spectacled and common eiders?

Page 19, 3.1.5 Spill Prevention, Paragraph 1:

We doubt spill prevention measures “shall Prevent” all spills along the DMTS. We recommend the language is corrected to something like, “... spills should or would likely be prevented.”

Page 19, 3.1.5 Spill Prevention, Paragraph 2:

Has fueling or is fueling occurring at material sites in the monument? The NPS would like to know the past and present history of use in the material sites.

Page 19, 3.1.6 Spill Response Reporting:

The NPS needs copies of the four listed spill contingency plans. Does WEAR have current copies?

Page 20, 3.1.8 Employee Training and Orientation:

The NPS needs the Teck-Cominco training schedule and invitations to provide mine employees with information about the national park resources, values, and policies in the region. WEAR should provide copies of park brochures, the newsletter, and other NPS information to the mine and port. Wear could provide its public web site to Tek-Cominco.

Page 22, 3.2.3 Caribou Policy:

The first two paragraphs on this page contain conflicting directions. In the first paragraph it states a vehicle shall not proceed until caribou have crossed over the road and moved at least 300 feet away or have otherwise withdrawn at least 300 feet from the road. The next paragraph indicates a vehicle may continue at reduced speed with animals less than 300 feet from the road so long as they are not frightened or otherwise affected. We believe the caribou management group should address this issue and provide consistent guidance on vehicles passing caribou along the road.

Page 22, 3.2.5 Concentrate Truck Cleaning:

We question whether brushing a concentrate truck in winter with gloved hand, broom, or shovel is adequate to remove fugitive dust from the trucks for 8 months of winter each year. Surely a multi-million dollar mining corporation like Teck-Cominco can develop a better method to decontaminate the trucks after loading and unloading lead-zinc concentrate in winter conditions.

Page 22, 3.3.1 Standard Operating Procedures, Paragraph 2:

This paragraph refers to section 2.6.2, which does not exist. Did the author mean section 3.3.2 for blasting operations?

Page 24, 3.4.2 Concentrate Unloading:

The NPS is encouraged by the installation of stilling curtains, a negative pressure air filter system to remove dust, and the new hydraulically sealed trucks with side rolling dumps to reduce fugitive dust escapement on the road. The NPS would be interested in any measurements of the increased efficiency of the dust reduction measures.

Page 26, 4.1 DMTS Road Maintenance:

What is a snow delineator system? Is this the system of snow stakes along the road side in winter where there are snow drifts or something else? This term needs to be defined for the reader before it is first used or a glossary needs to be indicated.

Page 28, Last Bullet:

This Operating manual has no section 2.6.1; does the author mean section 3.3.1 to address drainage at material sites?

Page 29, 4.1.6 Snow Removal, Last sentence:

Does Teck-Cominco request permission from NPS and ADFG for operation of snow removal equipment off-road to recover concentrate spilled from a truck accident? Is this protocol addressed in another plan? If so, a reference should be made to a specific part of the appropriate plan, not a generic reference to the other plan.

Page 33, Table 5-1:

NPS needs copies of all of the ADFG Fish Habitat Permits that address stream crossings in Cape Krusenstern National Monument. The NPS is to be furnished this per the NANA/NPS Agreement. It is not the duty of the NPS to request the permits from ADFG. Furthermore, the NPS should be provided an opportunity to comment on any state permit for activities within the boundaries of Cape Krusenstern National Monument, including the NANA easement.

Page 34, Table 5-2:

Same as above, NPS needs copies of all permits associated with water withdrawals from streams in the monument. Furthermore, the NPS should have an opportunity to comment on all such permits and renewals in the future before they are issued.

Page 34, 5.2.3 Protection of Caribou:

The NPS is pleased to see it listed as part of the team to execute the Caribou Migration Monitoring Program. We have not been actively engaged in the past and prefer to be involved.

Page 35, 5.3 Protection of Cultural and Archaeological Resources:

The NPS is pleased to see Teck-Cominco embrace the proactive idea for an Archaeology Management Plan to incorporate into a programmatic agreement among SHPO, NPS, TCAK, and NANA.

Page 36, paragraph just above section 5.5:

The NPS is interested in reviewing the Preliminary Rehabilitation Plan for Material Sites 4 and 5. Is ENSR Consulting and Engineering, 1991, the appropriate reference for these plans?

Page 42, Section 8, Resource Documents:

Because the operating plan incorporates by reference the various Red Dog Mine Manuals as part of the operating plan, NPS must be provided current copies of all of the listed plans in section 8.1.

Page A-4, Comment 13, MS-2 Landfill:

TCAK does not satisfy the request to sample groundwater. Though the current permit may prohibit the disposal of liquids, hazardous wastes, and other wastes that could migrate to groundwater, contamination from activities previous to the current permit may have contributed these wastes. The NPS should continue to require testing at the site.

Page A-4, Comment 14, MS-2 Landfill:

NPS should supply a copy of the letter to TCAK that indicated Cominco agreed to close the MS-2 waste disposal site in 1990. TCAK's response is not satisfying, however, NPS should assist.

Page A-5, Comment 15, MS-2 Landfill:

NPS cannot modify the exchange agreement between NPS and NANA without Congressional consent. Though the NPS may have signaled a willingness in 1986 to modify the solid waste disposal site at MS-2, was this in fact accomplished, and what has this got to do with the 1998 conveyance of land from the U.S. to NANA? The bottom line question is, "Has Cominco, now Teck-Cominco, as the operator for NANA Corporation abided by the conveyance language of August 28, 1998, indicating how waste disposed in various sites should be handled?"

Page A-6, Comment 21, DMTS Map:

The NPS cannot evaluate whether the Operating Plan identifies the original 17 material sites for the DMTS Road construction and the remaining active sites and sites with other uses until a detailed map (all relevant figures) and description of these sites is supplied.

Page A-6, Comment 22, Visual Effects of Material Sites:

Others may correct me, but I believe "screening" means to shield view of the material scrapes topographically and by blending cut faces with the natural lay of the land. It does not mean the NPS requests colored screening material or fencing should be erected to shield view into a gravel pit.

Page A-7, Comment 24, Caribou Migration Monitoring Plan:

The NPS needs a copy of the stand-alone Caribou Migration Monitoring Plan. Does it now exist?

Page A-8, Comment 31, Geomorphic Assessment:

Per the NPS-NANA Agreement, NPS has a right of access to monitor resource conditions along the DMTS in Cape Krusenstern National Monument. Negotiations are fine, however, we think this assessment would be better conducted with TCAK and NPS working together. The NPS could conduct the assessment by itself if TCAK is unwilling to assist.

Page A-9, Comment 36, Facility Description:

TCAK's response is not satisfactory. TCAK needs to state the current traffic load on the DMTS Road and the projected traffic load into the foreseeable future. Major changes in the vehicle traffic that could result in greater than a \$10,000 change to the road system operations or monitoring must be addressed in a revised or amended operating plan anyway. A major production rate increase is just such a change.

Page A-12, Comment 54, Wildlife Protection:

TCAK's lack of response to the NPS request for dialogue between local NPS personnel and TCAK on matters relating to wildlife protection, including a caribou monitoring plan, is totally unacceptable.

Page A-14, Comment 64, Water Withdrawal:

Whether the ADNR permits for water withdrawal are attached is immaterial. The plan should outline the expected limits of water needs to control dust and maintain the DMTS Road. Copies of water use permits must be provided to NPS from either TCAK or the permitting agency for use of resources within the boundaries of Cape Krusenstern National Monument.

Page A-16, Comment 75, Maintenance – Bridge and Culvert:

The NPS must be provided copies of all permit applications to state agencies for use of resources within Cape Krusenstern National Monument pursuant to the NPS-NANA Agreement. The NPS must also be provided an opportunity to comment on the permit applications.

Page A-22, Caribou Migration Monitoring Plan:

The response to this question is not a duplication of a previous question or previous answer. We recommend the status column is changed to "N" or "A" and addressed in a Caribou Migration Monitoring Plan with NPS participation.

Figure 1 and Figure 2.2:

The maps need to indicate the land ownership boundaries, including NPS lands, NANA lands, ADNR lands, Native Allotments, and any other lands in the vicinity of the DMTS.

Hi Jerry -

Since I wrote you that brief message a day or two ago about the Cultural Resources section of the Red Dog Management plan, I have spoken to Steve Klingler and shared the document with him. He is a bit more discerning than I am (!!) and found several points that need to be mentioned. I am passing them along to you for your general comments back to Tek Cominco.

NLUR (Northern Land Use) proposes to provide a database and GIS data for all sites in the general Red Dog area. Steve points out, these databases, if included at all, should be considered as confidential (site sensitive) data and should not be made widely available. The state Office of History and Archaeology is the "keeper" of all this information and they do NOT make it available except to professional cultural resource specialists (archeologists, etc.).

Steve believes that predictive models should not be used in Northwest Alaska because we have knowledge of the cultural resources in the area is still being formulated and we don't have a good enough idea of what is potentially out there. My views on this subject are not as strong as his, but I do think we should be wary in thinking that a predictive model can take the place of a good old-fashioned on-the-ground survey.

Steve rightfully pointed out that what we (they) really need is an educational program to teach people who live and work in the area about cultural resources. Since this is my line of work, I definitely agree with him. This may be a component to the management plan that NLUR did not foresee, but is certainly something they should add.

Glad that Steve is around to consult with!

Let me know if you have other questions on this matter,

Becky

APPENDIX C

Record of Discussion & Action Items
Regarding NPS Comments on the September 2002 Draft DMTS O&M Plan
April 17, 2003

**RECORD OF DISCUSSION & ACTION ITEMS
REGARDING NPS COMMENTS ON THE SEPTEMBER 2002 DRAFT DMTS OPERATING & MAINTENANCE PLAN
April 17, 2003**

Present (Meeting conducted by telephone):

Jim Kulas (JEK) – Teck Cominco Alaska Incorporated (TCAK)
Jerry Post (JP) – National Park Service (NPS); Cape Krusenstern
National Monument
Chris Young – NPS; Cape Krusenstern National Monument
Dawn Reeder (DR) – TCAK Consultant

Purpose: Joint review of NPS comments (NPS Natural Resource Program Center [NRPC], October 29, 2002; Memorandum from Bud Rice [AKSO] to Jerry Post, October 3, 2002; and email from Becky Saleeby to Jerry Post, undated) on TCAK's September 2002 Draft DMTS O&M Plan.

NRPC = NPS Natural Resource Program Center
AKSO = NPS Alaska Support Office
Plan = DMTS O&M Plan

No.	Author	Comment Reference	Discussion	Action Item	Action Item Status
1	NRPC	I. Overall Assessment of the 2002 Draft Operating and Maintenance Plan A. Resource Documents	JP's stance is that resource documents need not be physically incorporated into the Plan. TCAK should ensure that NPS is copied on all relevant resource document revisions. See Item 68 about administrative record.	DR to ensure Plan requires that NPS be cc'd on relevant revisions of resource documents/docs incorporated by reference (& make sure this requirement has been captured by Red Dog's Environmental Management System [EMS]). DR: coordinate review schedule with NPS for resource documents (for some, NPS need not see every revision). JEK or DR: Continue providing outstanding resource documents to NPS as they become available.	Appendix D in Final Plan shows review schedule & status of resource documents as coordinated with JP.
2	NRPC	I. Overall Assessment of the 2002 Draft Operating and Maintenance Plan B. Agreements	JEK: may not be legally permissible to provide other agreements to NPS (i.e., the NANA-TCAK Agreement).	JEK to check whether other agreements could legally be provided to NPS; TCAK to provide other agreements if possible.	In progress.

No.	Author	Comment Reference	Discussion	Action Item	Action Item Status
3	NRPC	II. Specific Comments § 1 Introduction	National Monument Boundary is delineated on figures, but Landmark Boundary is not. JP: it will be adequate to show the Landmark Boundary on the small-scale (project location) figure.	JP to provide Landmark boundary map hard copy or digital coordinates file to TCAK.	Completed May 6, 2003.
4	NRPC	II. Specific Comments § 1.2.3 Requirements of the NANA/NPS Agreement	Typographical error & omissions	DR to correct.	Completed in Final Plan. See Appendix A (Summary of Applicable Requirements in the Governing Agreements)
5	NRPC	II. Specific Comments § 1.4 Documents Incorporated by Reference	Addressed in Item 1. JP agreed that Plan could be finalized prior to outstanding documents being provided to NPS.	DR to initiate Final Plan.	
6	NRPC	II. Specific Comments § 2.2 DMTS Material Sites	JEK & JP agreed that this issue and all other Material Site issues would be addressed in a separate document: "Operating, Closure & Reclamation Plan for DMTS Material Sites Within Cape Krusenstern National Monument." It is JP's sense that if water withdrawal is taking place at a material site, it cannot be considered reclaimed.	DR to remove reference to Preliminary Reclamation Plan for Material Sites 4 & 5 (ENSR 1991) and ensure material site reclamation plan is acknowledged in Plan. TCAK will address water withdrawal in reclamation plan.	Reference to ENSR document removed from Final Plan. Reclamation plan is an issue under continuing consideration.
7	NRPC	II. Specific Comments § 2.3 Port Site Description	JEK & JP agreed that the first step is for TCAK to get legal opinion on the status of landfill at MS-2. JP: WEAR not requesting disposal volume disclosure or investigation of contaminating substances and groundwater at this time (willing to defer issue until legal review is complete). Asked that this issue be acknowledged in Plan.	JEK: Initiate legal review of MS-2 Landfill status. DR: Make sure this issue is acknowledged in the Plan.	Legal review in progress. Issue acknowledged in Section 1.4 of Final Plan.

No.	Author	Comment Reference	Discussion	Action Item	Action Item Status
8	NRPC	II. Specific Comments § 3.2.5 Concentrate Truck Cleaning	JP indicated it is adequate for TCAK to detail the concentrate dust control measures that are in place. JEK emphasized that alternative options would not be discussed in Plan unless actions were planned, but that reducing fugitive dust is a high priority for TCAK, and offered to provide summary of related risk assessment in Plan.	DR to add brief summary of Risk Assessment of dust from concentrate loading at Mine Site.	Completed in Final Plan (Section 6.11).
9	NRPC	II. Specific Comments § 3.1.1 Standard Operating Procedures / Extraction Plan	Operating procedures, etc. addressed in Item 6.	DR correct typographical error.	Completed in Final Plan.
10	NRPC	II. Specific Comments § 3.3.2 Blasting Procedures	JP's interpretation of comment is that a reference to Exhibit B is desired.	DR to confirm 0.5 mile distance of blasting activity from mammals is Exhibit B requirement, and cite reference. If not in Exhibit B, defer to USFWS guidance.	Completed in Final Plan (Section 3.3.2).
11	NRPC	II. Specific Comments § 3.4.2 Concentrate Unloading	JEK: TCAK will look at descriptions in this section and add more descriptive text if possible. NPS comment refers back to item 8.	See item 8.	
12	NRPC	II. Specific Comments § 4.1.2 Dust Control	JP acknowledged that former NPS Superintendent approved calcium chloride "testing" on DMTS, would like chloride acknowledged as "open issue" in the Plan, but indicated NPS would not request chloride loading data at this time. JEK proposed, and JP agreed, on an annual review meeting / site visit with NPS to revisit open issues, impacts & concerns, and proposed triennial revision of the Plan—this pending approval by TCAK management.	JEK: Seek approval for establishment of TCAK-NPS Annual Site Inspection / Review Meeting DR: Provide for Annual Site Inspection / Review Meeting (if approved), and list "open issues" that parties will work collaboratively on.	Approval granted per Rob Scott (Red Dog General Manager) via email to JK May 11, 2003. Section 1.4 of Final Plan provides for Annual Site Inspection / Review Meeting and itemizes open issues.

No.	Author	Comment Reference	Discussion	Action Item	Action Item Status
13	NRPC	II. Specific Comments § 4.1.4 High Float Testing	JP does not see a need for this unless hard surface testing is extended farther into the Monument, in which case NPS should be included in planning process. JEK: Annual meeting would be appropriate venue to share information on such issues (see Item 12).	None	
14	NRPC	II. Specific Comments § 4.1.5 Erosion Control	DR expressed concern that including section and page references to resource documents would quickly cause the Plan to become outdated, since many resource documents are reviewed annually and revised. JP concurred.	None	
15	NRPC	II. Specific Comments § 4.1.9 Ice Sanding	JP and JEK agreed that the intent of this comment is unclear.	DR to review text and if appropriate, add language indicating that “sand” material is incorporated into road base and recovered by “pulling shoulders.” Acknowledge NRPC’s concern as open issue to visit during annual review / visit.	Completed in Final Plan (Section 4.1.9).
16	NRPC	II. Specific Comments § 4.2.1 Routine Maintenance	Mitigation measures are summarized in Draft Plan.	None	
17	NRPC	II. Specific Comments § 4.2.3 Inspections	JP and JEK concur that this concern (inspection of geomorphic stability of stream channels & wetland conditions, etc.) could be addressed during proposed Annual Review / Site Visit process (see Item 12).	DR to ensure this concern is acknowledged in Plan.	Acknowledged in Final Plan (Section 1.4).
18	NRPC	II. Specific Comments § 5.1 Prevention or Mitigation of Visual Effects	JEK and JP agreed that forthcoming Operating, Closure & Reclamation Plan for DMTS Material Sites Within Cape Krusenstern National Monument is appropriate venue to address this (see Item 6).	None	

No.	Author	Comment Reference	Discussion	Action Item	Action Item Status
19	NRPC	II. Specific Comments § 5.2.1 Fish Passage and Habitat Protection	JEK & JP agreed that this item is addressed by permits and it is not necessary to reproduce information in Plan.	None	
20	NRPC	II. Specific Comments § 5.4 Reclamation	JEK and JP agreed that forthcoming Operating, Closure & Reclamation Plan for DMTS Material Sites Within Cape Krusenstern National Monument is appropriate venue to address this complex comment (see Item 6).	None	
21	NRPC	II. Specific Comments § 5.6 Protection of Water Quality	JP can forward ADNR Water Rights Permits to NRPC (NPS already has them).	DR or JEK to arrange for outstanding documents to be sent to NPS in Kotzebue (see Item 1 action). DR to add chloride ion from palliative use to list of potential effects to water.	Resource document submission ongoing. Chloride ion concern added to Final Plan (Section 5.6).
22	NRPC	II. Specific Comments § 6 Overview of DMTS-Related Environmental Monitoring	JP: Looking for acknowledgement of how NPDES non-compliances are addressed.	DR: Add table listing permitted discharges and brief language about how non-conformances are handled? Reference NPDES permit and Port BMP Plan as appropriate.	Discharges described in Section 2.3. Language added narrative to Section 6.1)
23	NRPC	II. Specific Comments § Page A-14 Comment No. 63	JEK and JP agreed that attaching an MSDS for the palliative to the Plan would satisfy this concern.	DR: Obtain current MSDS for calcium chloride palliative and attach to Final Draft Plan.	Completed in Final Plan (Appendix E).

No.	Author	Comment Reference	Discussion	Action Item	Action Item Status
24	AKSO	General Comments, action items NPS is looking for	JEK: Caribou Migration Monitoring Plan to undergo revision to reflect current program, with input from interested parties, including NPS. JP recommends involving WACH Working Group; NPS will defer to that entity for comment. JEK & JP agree that Caribou Plan stands alone from the DMTS O&M Plan. JP: not expecting <i>formal</i> 2002 road hardening test results, just ongoing involvement and information sharing, which can happen during proposed annual meetings.	DR: Add all items to list of open issues to continue reviewing through proposed annual meeting process and ongoing discussion (see Item 12).	Completed in Final Plan (Section 1.4).
25	AKSO	Specific Comments Page 2, 1.2 Review of Agreements	Reformatting suggestion.	DR to complete.	Completed in Final Plan (Section 1.2 and Appendix A).
26	AKSO	Specific Comments Page 2, 1.2.1 Operations	Typographical error.	DR to correct.	Completed in Final Plan (Appendix A).
27	AKSO	Specific Comments Page 5, l., Water Use	Comment acknowledged.	DR: Confirm that this is covered in Plan and captured by EMS.	Completed in Final Plan (Section 1.5 and Appendix D).
28	AKSO	Specific Comments Page 5, n., Waste Disposal	Typographical error.	DR to correct.	Completed in Final Plan (Appendix A).
29	AKSO	Specific Comments Page 6, r (4)	This issue not discussed.	Revisit during annual review meeting. See Item 6.	
30	AKSO	Specific Comments Page 6, r(6)	Comment acknowledged.	None	
31	AKSO	Specific Comments Page 10, 2.1 DMTS Road, Paragraph 2	JP to provide Landmark location to TCAK (see Item3). Figures have been delivered since the date of this comment.	None	

No.	Author	Comment Reference	Discussion	Action Item	Action Item Status
32	AKSO	Specific Comments Page 12, 2.1 DMTS Material Sites, Paragraph 2	JP: NPS has copies; see Item 21.	None	
33	AKSO	Specific Comments Page 12, 2.2 DMTS Material Sites, Paragraph 3	Comment acknowledged; see Item 7.	None	
34	AKSO	Specific Comments Page 15, 2.3 Port Site Description, 2 nd bullet	Comment acknowledged.	DR: Ensure description in text is clear re: fuel storage capacity at Port and amount of fuel used per year.	Completed in Final Plan (Section 2.3).
35	AKSO	Page 17, 3.1 General DMTS Operations and 3.1.1 Safety	JEK related that Red Dog policy regarding use of alcohol & drugs is that they are prohibited, and that violators are dismissed.	DR: Add text to this effect to the Plan.	Completed in Final Plan (Section 3.1.1).
36	AKSO	Page 18, 3.1.3 Wildlife Incident Response & Reporting	JP: Interpreted comment as asking for further clarification about what threatened & endangered wildlife may be impacted by DMTS operations. DR: This section is about incident reporting, Section 5.5 is appropriate place to address this comment.	DR: Follow up with USFWS to confirm presence/absence of T&E species, and whether they could be impacted.	Completed in Final Plan (Sections 3.1.3 and 5.5).
37	AKSO	Page 19, 3.1.5 Spill Prevention, Paragraph 1	Minor content edit.	DR to modify text.	Completed in Final Plan (Section 3.1.5).
38	AKSO	Page 19, 3.1.5 Spill Prevention, Paragraph 2	JEK & JP: comment to be addressed by the forthcoming Operating, Closure & Reclamation Plan for DMTS Material Sites Within Cape Krusenstern National Monument (see Item 6).	None	
39	AKSO	Page 19, 3.1.6 Spill Response Reporting	Comment acknowledged.	DR to confirm NPS is cc'd on these items.	Yes per Larry Hagy (TCAK). Also, see Section 3.1.6.
40	AKSO	Page 20, 3.1.8 Employee Training & Orientation	See Item 67.	None	

No.	Author	Comment Reference	Discussion	Action Item	Action Item Status
41	AKSO	Page 22, 3.2.3 Caribou Policy	DR: The policy makes a distinction between migrating and non-migrating caribou.	DR: Further clarify this distinction in text.	Completed in Final Plan (Section 3.2.3).
42	AKSO	Page 22, 3.2.5 Concentrate Truck Cleaning	Comment acknowledged; see Item 8.	None	
43	AKSO	Page 22, 3.3.1 Standard Operating Procedures, Paragraph 2	Typographical error.	See Item 9.	
44	AKSO	Page 24, 3.4.2 Concentrate Unloading	Comment acknowledged; see Item 8.	None	
45	AKSO	Page 26, 4.1 DMTS Road Maintenance	JP: Explain snow delineator system for those readers who may be unfamiliar with it.	DR: Expand snow delineator description in text.	Completed in Final Plan (Section 4.1.10).
46	AKSO	Page 28, Last Bullet	Typographical error.	DR to correct section reference.	Completed in Final Plan (Section 4.1.5)
47	AKSO	Page 29, 4.1.6 Snow Removal, last sentence	JEK explained that protocol for obtaining permission for off-road travel (for snow removal or spill cleanup) is not addressed in another plan. TCAK seeks event-specific permissions for this.	DR: Make sure NPS is on notification list for spills inside the Monument. Clarify that permission is required from NPS for off-road travel with spill cleanup equipment on Monument lands.	Confirmed April 2003 by Larry Hagy (TCAK). See Section 3.1.6.
48	AKSO	Page 33, Table 5-1	JP: NPS has copies of permits but did not provide to Plan reviewers.	DR: Ensure that Plan provides for NPS comment on permitting activities in the Monument.	Completed in Final Plan (Section 1.5).
49	AKSO	Page 34, Table 5-2	Comment acknowledged; see Item 48.	None	
50	AKSO	Page 34, 5.2.3 Protection of Caribou	Comment acknowledged.	None	
51	AKSO	Page 35, 5.3 Protection of Cultural & Archaeological Resources	Comment acknowledged.	None	

No.	Author	Comment Reference	Discussion	Action Item	Action Item Status
52	AKSO	Page 36, paragraph just above section 5.5	JP: He has seen the ENSR document. JEK agrees that reference to it should be removed from Plan. See Item 6.	None	
53	AKSO	Page 42, Section 8, Resource Documents	Comment acknowledged, see Item 1.	None	
54	AKSO	Page A-4, Comment 13, MS-2 Landfill	Comment acknowledged, see Item 7.	None	
55	AKSO	Page A-4, Comment 14, MS-2 Landfill	Comment acknowledged, see Item 7.	None	
56	AKSO	Page A-4, Comment 15, MS-2 Landfill	Comment acknowledged, see Item 7.	None	
57	AKSO	Page A-6, Comment 21, DMTS Map	Comment acknowledged, see Item 31.	None	
58	AKSO	Page A-6, Comment 22, Visual Effects of Material Sites	Comment acknowledged, see Item 6.	None	
59	AKSO	Page A-7, Comment 24, Caribou Migration Monitoring Plan	JP: NPS has a copy of the 1991 Plan.	None	
60	AKSO	Page A-8, Comment 31, Geomorphic Assessment	Comment acknowledged, see Item 12.	None	
61	AKSO	Page A-9, Comment 36, Facility Description	JP explained that a \$10,000 (1986 dollar equivalent) change to the operation or monitoring of the road system requires a revision or amendment to the Plan. JEK expressed that this threshold seemed rather low. JP: revision of existing Plan or project-specific plan subject to mutual agreement (issue-by-issue). The point is, NPS needs to be informed about changes that have the potential to impact the Monument.	DR: Confirm with Red Dog's EMS Coordinator that this requirement is captured in the EMS Compliance Database to ensure notifications are made. JEK & JP agreed verbally on December 4, 2003 that annual inspection / review meetings would satisfy this need for information.	

No.	Author	Comment Reference	Discussion	Action Item	Action Item Status
62	AKSO	Page A-12, Comment 54, Wildlife Protection	Comment acknowledged, see Item 12.	None	
63	AKSO	Page A-14, Comment 64, Water Withdrawal	JP: NPS does have records of what's withdrawn or applied—but can TCAK see a trend? JEK: Use of water for dust control is weather-dependent; TCAK can make projections, but they will be rough. JP: If TCAK can look back and see obvious trends, incorporate into Plan text.	DR: Investigate potential trends and add text if appropriate.	Completed in Final Plan (Section 4.1.2).
64	AKSO	Page A-16, Comment 75, Maintenance—Bridge & Culvert	Comment acknowledged, see Item 48 (action item).	None	
65	AKSO	Page A-22, Caribou Migration Monitoring Plan	Comment acknowledged.	None	
66	AKSO	Figures	JP would like to see a land status map (added to figures) to indicating NANA easement, trail easements, nearby Native Allotments, A2 lands, and Monument boundary.	DR to initiate.	Completed in Final Plan (see Figures)
67	Saleeby & Klingler	Cultural Resources Section	Comment on predictive model not addressed during this phone call—assume issue can be revisited when the Final Archaeology Management Plan goes to NPS for review. Educational program: JEK open to “ranger presentations,” however, JP to provide presentation outline for TCAK evaluation. Revisit issue at when outline provided. TCAK has environmental awareness training that includes a cultural resources component. JP interested in reviewing.	DR: Provide JP with cultural resources component of Environmental Awareness Training.	Completed May 14, 2003 (DR emailed item to JP).

No.	Author	Comment Reference	Discussion	Action Item	Action Item Status
68		General Discussion about Public Administrative Record	JP indicated that NPS envisions a web page with an area where public documents can be accessed by reviewers (items such as the 4 agreements, permits, and resource documents). JEK related that TCAK doesn't have the resources to produce such a page, and that many documents, such as the agreements, exist only in paper copy. JP said NPS could convert paper documents to PDF format.	JEK: 1) Determine which documents can legally be made available for the public administrative record. 2) Provide paper copies or PDF files to JP.	Under consideration.
69		General Discussion about Reclamation Research Program Concept	JP: NPS not requesting formal program at this time, only knowledge that research is ongoing. Acceptable to share pertinent information with NPS during proposed annual inspection / review meeting (see Item 12).	None	

APPENDIX D

Review Schedule & Description of Items Incorporated by Reference into the DMTS O&M Plan

REVIEW SCHEDULE & DESCRIPTION OF ITEMS INCORPORATED BY REFERENCE INTO THE DMTS O&M PLAN

Item Incorporated by Reference in DMTS O&M Plan	Provided to NPS?	Red Dog Review / Revision Schedule	Next Required Submittal to NPS	Description of Item
MANUALS & HANDBOOKS				
Red Dog Mine Operations Environmental Management System (EMS) Manual	No (Not requested)	Annual	N/A	Explains how Red Dog's EMS procedures, programs, and activities form a unified system to minimize the impact of Red Dog operations on subsistence resources and the environment, through a program which conforms to International ISO 14001 voluntary standards. Not public document. Environmental/EMS Policy may be reviewed at http://www.teckcominco.com/operations/reddog/policies.htm
Red Dog Port Operations Manual	No (Not requested)	If or when relevant operations change significantly	N/A	USCG-required. Covers general operating and maintenance procedures at the Port, including concentrate handling, storage, and load-out; and fuel/supply transfer. This is a multi-part manual not available as a consolidated electronic document.
Red Dog Operations Employee Safety and Lockout Procedures Manual	Yes (11/2002)	If or when relevant operations change significantly	Not to be re-submitted unless specifically requested by NPS during next O&M Plan Review	Covers property-wide rules, policies, and procedures for safe and environmentally sound conduct. All employees are expected to know and comply with all rules and procedures presented within. It is reviewed and updated as necessary.
Red Dog Operations "911" Emergency Procedures Handbook	Yes (11/2002)	If or when relevant operations change significantly	Not to be re-submitted unless specifically requested by NPS during next O&M Plan Review	A guide for management, which provides quick reference to emergency resources, contact information, and reporting requirements. It is reviewed and updated as necessary.
Red Dog Guide to Emergency Management	No (Not requested)	Annual	N/A	Proprietary document providing TCAK Management with an operational tool to assist with overall management of emergency crises that might arise at Red Dog. Includes operational flow charts, incident management system, instructions for business/property interruptions, and emergency contact listings.

Item Incorporated by Reference in DMTS O&M Plan	Provided to NPS?	Red Dog Review / Revision Schedule	Next Required Submittal to NPS	Description of Item
Red Dog Airport Emergency Operations Manual	No (Not requested)	Annual	N/A	Directs TCAK Fire Department personnel in responding to aircraft emergencies.
Red Dog Medical Emergency Operations Manual	No (Not requested)	Annual	N/A	Directs TCAK Fire Department personnel in responding to various medical and trauma emergencies. Includes Emergency Medical Technician I, II, and III standing orders, advance cardiac life support standing orders, aeromedical evacuation standing orders, a blood borne pathogen program, mass casualty/triage program, and an EMT competency and development program.
Red Dog Fire Department Operations Manual	No (Not requested)	Annual	N/A	Guides TCAK Fire Department personnel with information pertaining to daily as well as emergency operations. Includes standard operating guidelines; building pre-fire information; competency development, and training guidelines; and forms, reports, and checklists.
Red Dog Hazardous Material Operations Manual	Yes (1/2004)	Annual	Not to be re-submitted unless specifically requested by NPS during next O&M Plan Review	Tactical guide for TCAK Fire Department personnel who respond to emergency situations where a release or potential release of a hazardous substance is present. Covers specific response, cleanup, disposal, and reporting methods for spills of bulk chemicals used in the mining and milling processes and hauled over the DMTS. This manual has a complete listing of bulk chemicals used on the property.
PERMITS				
ADEC Solid Waste Disposal Permit(s)	Yes (Upon issue or latest renewal)	N/A	Upon renewal or issue of any new relevant application	Permit #0312-BA003 to operate landfill at MS-2
ADEC Air Quality Permit(s) to Operate	Yes (Upon issue or latest renewal)	N/A	Upon renewal or issue of any new relevant permit	Permit #9632-AA001 to operate emission sources at the Port Facility General Permit to Operate GP-9 to operate mobile crusher (for non-metallic mineral processing at material sites)

Item Incorporated by Reference in DMTS O&M Plan	Provided to NPS?	Red Dog Review / Revision Schedule	Next Required Submittal to NPS	Description of Item
ADF&G Fish Habitat Permit(s)	Yes (Upon issue or latest renewal)	N/A	TCAK must copy NPS on permit applications and permits for activities occurring on Monument or A2 Lands.	Permit FG-99-III-0231, Ailuuraq Creek Permit FG-99-III-0034, Anxiety Ridge Creek Permit FG-99-III-0237, Aufeis Creek Permit FG-99-III-0236, Deadman Creek Permit FG-99-III-0238, East Fork New Heart Creek Permit FG-99-III-0234, East Fork Straight Creek Permit FG-99-III-0228, Evaingiknuk Creek Permit FG-99-III-0229, Little Creek Permit FG-99-III-0232, Mud Lake Creek Permit FG-99-III-0239, New Heart Creek Permit FG-99-III-0233, Omikviorok River Permit FG-99-III-0235, Straight Creek Permit FG-99-III-0230, Tutak Creek Permit FG-99-III-0240, West Fork New Heart Creek
ADF&G Water Use Permit(s)	Yes (Upon issue or latest renewal)	N/A	TCAK must copy NPS on permit applications and permits for activities occurring on Monument or A2 Lands	Permit FG-91-III-0089-2, Ailuuraq Creek Permit FG-91-III-0088-2, Anxiety Ridge Creek Permit FG-91-III-0090-2, Aufeis Creek Permit FG-91-III-0091-3, Omikviorok River Permit FG-91-III-0092-2, Tutak Creek
ADNR State Water Rights Permit(s)	Yes (Upon issue or latest renewal)	N/A	TCAK must copy NPS on permit applications and permits for activities occurring on Monument or A2 Lands	TWUP F2002-10 (for water withdrawal from material sites)

Item Incorporated by Reference in DMTS O&M Plan	Provided to NPS?	Red Dog Review / Revision Schedule	Next Required Submittal to NPS	Description of Item
NPDES Permit	Yes (Upon issue or latest renewal)	N/A	TCAK must copy NPS on permit applications and permits for activities occurring on Monument or A2 Lands	Permit AK-004064-9 (for water discharges from 2 outfalls at the Port)
USACE Wetlands Permit(s)	Yes (Upon issue or latest renewal)	N/A	TCAK must copy NPS on permit applications and permits for activities occurring on Monument or A2 Lands	Permit Z-830359 (for intertidal dredge and fill operations at the Port) Permit CC-830589 (for intertidal dredge and fill operations at the Port)
PLANS				
Red Dog Operations Oil Discharge Prevention & Contingency Plan	Yes (Upon latest renewal)	Annual	NPS must be copied on all relevant revisions	Reviewed by multiple agencies and updated on a schedule in accordance with applicable regulations to meet state and federal oil spill preparedness, response, reporting, and prevention requirements (different portions of plan on different annual cycles). Addresses petroleum product discharge for all Red Dog operations.
Red Dog Archaeology Management Plan ("Integrated Plan for the Management of Cultural Resources in the Red Dog Project Area," NLUR, Inc., October 2002)	To be provided when complete	N/A	If item has been revised, submit with next DMTS O&M Plan revision	A comprehensive plan outlining a long-term approach to protection and management of cultural resources in the Red Dog area. In draft form and undergoing internal review. NPS will be involved in future programmatic agreement and will have opportunity to comment.
Red Dog Mine Port Site Pollution Prevention and BMP Plan	Yes (12/2002)	Reviewed annually and revised as necessary	Copy NPS when revision of BMP Plan is submitted to EPA	Identifies potential sources of pollution that may be expected to affect the quality of water discharges associated with industrial activity at the Port, and describes practices used to reduce pollutants in water discharges and prevent spills.

Item Incorporated by Reference in DMTS O&M Plan	Provided to NPS?	Red Dog Review / Revision Schedule	Next Required Submittal to NPS	Description of Item
Biosolids Plan	Yes (11/2002)	If or when relevant operations change significantly	If item has been revised, submit with next DMTS O&M Plan revision	Outlines requirements and BMPs for disposal of biosolids ash in the Port Landfill.
Caribou Migration Monitoring Plan	Yes (Provided with 1991 DMTS O&M Plan)	If or when relevant operations change significantly or as mutually agreed upon by involved parties	N/A (NPS involved in authoring document)	A plan describing the joint caribou migration monitoring program mandated by the NANA/NPS Agreement and carried out by NANA with guidance from ADF&G, NPS, and Subsistence Committee representatives or designees. Currently under review by TCAK, NANA Subsistence Committee, and NPS (Mike Schnorr).
POLICIES				
Red Dog's Environmental Policy	No (not requested)	N/A	N/A	May be reviewed by public at http://www.teckcominco.com/operations/reddog/policies.htm .
Caribou Policy	Yes (11/2002)	If or when relevant operations change significantly	Copy NPS when item is revised	TCAK Property Management Document.
STANDARD OPERATING PROCEDURES				
Port Road Concentrate Spill Cleanup SOP	Yes (1/2004)	Annual	Copy NPS when item is revised	NANA-Lynden SOP addressing response to concentrate spills from NANA-Lynden concentrate haul trucks to land or water.
Dust Control – Port Road SOP	Yes (11/2002)	If or when relevant operations change significantly	Copy NPS when item is revised	TCAK SOP; controlled document number SRF.SOP.001, prepared by Red Dog Operations Surface Supervisor.

Item Incorporated by Reference in DMTS O&M Plan	Provided to NPS?	Red Dog Review / Revision Schedule	Next Required Submittal to NPS	Description of Item
Road Procedure – Port Road Traffic SOP	Yes (11/2002)	If or when relevant operations change significantly	Copy NPS when item is revised	TCAK SOP; controlled document number MNG.SOP.001, prepared by Mine Department.
INFORMATION SYSTEMS				
Red Dog Waste Information System (WIS)	No (Not requested)	Continuous	May be viewed on site by NPS during annual inspection visit	An on-line (intranet only) waste management tool (replaces traditional manual) explaining applicable regulations and TCAK policies governing the generation, handling, storage, and disposal of hazardous and non-hazardous wastes. WIS has an internet browser front-end, from which users may search a database and generate management instructions for specific wastes. Instructions are in the form of interlinked waste management guides and standard operating procedures. WIS also tracks generator status and other waste management statistics & records.
TRAINING MATERIALS				
Red Dog's Environmental Pocket Reference	Yes (5/2003)	If or when relevant operations change significantly	Not to be re-submitted unless specifically requested by NPS	A folding wallet-sized card summarizing key environmental rules (with emphasis on waste management, wildlife & cultural resource protection, and EMS principles). Also lists contact numbers for environmental assistance. Provided to all employees and contractors, and used as a review aid immediately following Environmental Awareness Training.
Red Dog's Environmental Awareness Training (Cultural Resources portion only)	Yes (5/2003)	Annual	Not to be re-submitted unless specifically requested by NPS	A Microsoft Power Point-based training presented to new hires & contractors. Annual refresher presented to all employees. (Overall presentations tailored depending on audience, but cultural resources portion is similar in all presentations.)

APPENDIX E

Material Safety Data Sheet & Product Specifications Calcium Chloride

Material Safety Data Sheet

WHMIS	Protective Clothing	TDG Road / Rail
		

Section 1. Product Identification and Uses

Common/Trade name	Calcium chloride 94-97%	CI#	Not available.
Synonyms	Calcium dichloride, Tetra express, Tetra 94.	DSL	CEPA DSL: Calcium chloride 94-97%
Chemical Name	Calcium chloride, anhydrous.	CAS #	10043-52-4
Chemical Formula	CaCl ₂ .	Code	I023 / Q01185
Chemical Family	Inorganic salt	Molecular Weight	110.986 g/mole
Supplier	QUADRA CHEMICALS LTD. 370, Joseph-Carrier Vaudreuil-Dorion QC J7V 5V5 Tel: (450) 424-0161, Fax: (450) 424-9458 1100, Blair Road; Burlington ON L7M 1K9 Tel: (905) 336-9133, Fax: (905) 336-9263 7930, Vantage Way; Delta BC V4G 1A8 Tel: (604) 940-2313, Fax: (604) 940-1626 12835 - 146th Street; Edmonton AB T5L 2H6 Tel: (780) 451-9222, Fax: (780) 451-1094 700 - 4th Avenue S.W.; Calgary AB T2P 5A4 Tel: (403) 232-8130, Fax: (403) 234-9474	Manufacturer	Tetra chemicals.
Material Uses	Industrial applications.		

Section 1A. First Aid Measures

Eye Contact	IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek immediate medical attention.
Skin Contact	After contact with skin, remove contaminated clothing and wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.
Hazardous Skin Contact	Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.
Slight Inhalation	Allow the victim to rest in a well ventilated area. Give artificial respiration if not breathing. Seek immediate medical attention.
Hazardous Inhalation	No additional information.
Slight Ingestion	DO NOT induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention. If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into the lungs.
Hazardous Ingestion	No additional information.

Section 2. Hazardous Ingredients

Name	CAS #	% by Weight	Exposure Limits	LC ₅₀ /LD ₅₀
1) Calcium chloride	10043-52-4	90-100	Not available.	ORAL (LD50): Acute: 1000 mg/kg [Rat].

Section 3. Physical Data

Physical State and Appearance	Solid. (Deliquescent crystals)	Odor	Not available.
pH (1% Soln/Water)	Not available.	Taste	Not available.
Odor Threshold	Not available.	Color	White to colourless.
Volatility	Not available.		
Melting/Freezing Point	782°C (1439.6°F)		
Boiling/Condensation Point	>1600°C (2912°F)		
Specific Gravity	2.15 (Water = 1)		
Vapor Density	Not available.		
Vapor Pressure	Not available.		
LogK _{ow}	Not available.		
Ionicity (Surface Active Agent)	Not available.		
Critical Temperature	Not available.		
Instability Temperature	Not available.		
Conditions of Instability	No additional remark.		
Dispersion Properties	See solubility in water, acetone.		
Solubility	Solubility in water @ 20°C, 40% by weight. Soluble in alcohol, acetic acid and acetone.		

Section 4. Fire and Explosion Data

The Product is:	Non-flammable. Avoid heat and flames.
Auto-ignition Temperature	Not applicable.
Fire Degradation Products	Toxic and corrosive fumes of chlorine and hydrogen chloride.
Flash Points	Not applicable.
Flammable Limits	Not applicable.
Fire Extinguishing Procedures	SMALL FIRE: Use DRY chemicals, CO2, water spray of foam. LARGE FIRE: Use water spray, fog or foam. Use water to cool fire exposed containers. Wear NIOSH approved self-contained breathing apparatus (SCBA) when either in confined areas or exposed to combustion products.
Flammability	Not applicable.
Risks of Explosion	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. No specific information is available in our database regarding the product's risks of explosion in the presence of various materials.

Section 5. Reactivity Data

Stability	The product is stable. Avoid water, tanks, hopper cars and combustibles.
Hazardous Decomposition Products	Toxic and corrosive fumes of chlorine and hydrogen chloride.
Degradability	Not available.
Products of Degradation	Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise. Not available.
Corrosivity	No specific information is available in our database regarding the corrosivity of this product in presence of various materials.
Reactivity	Incompatible with: Boric acid and calcium oxide, bromine trifluoride, furan-2-peroxycarboxylic acid, metals, methyl vinyl ether and zinc.

Section 6. Toxicological Properties

Routes of Entry	Absorbed through skin. Eye contact. Inhalation. Ingestion.
TLV	Not available.
Toxicity to Animals	Acute oral toxicity (LD50): 1000 mg/kg [Rat].
Acute Effects on Humans	This product is an eye skin and mucous membrane irritant. INHALATION - Irritation of the nose and throat. Causes coughing and shortness of breath. SKIN - Irritant, possibly severe. EYES - Irritation of the eyes marked by redness, pain, swelling of eyelid and eye discharge. INGESTION - May cause diarrhea, nausea, vomiting and cramps.
Chronic Effects on Humans	CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to digestive system, skin. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs. Dermatitis may occur from prolonged or repeated skin contact. EYES: May result in conjunctivitis.

Section 7. Preventive Measures

Waste Information	Not available.
Waste Stream	Not available.
Storage	Keep container tightly closed. Keep in a cool, well-ventilated place. Highly toxic or infectious materials should be stored in a separate locked safety storage cabinet or room. Store away from incompatible materials. Keep container tightly closed.
Precautions	Keep locked up. DO NOT ingest. DO NOT breathe dust. Avoid contact with skin. If ingested, seek medical advice immediately and show the container or the label.
Small Spill and Leak	Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements. Absorb with an inert material. Avoid direct discharge to natural waterways. Disposal shall be in accordance to all applicable waste regulations.
Large Spill and Leak	Our database contains no additional information in case of a spill and/or a leak of the product. Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Avoid product to get into the sewage system or water streams. Disposal shall be in accordance to all applicable waste regulations.
Protective Clothing	Splash goggles. Full suit. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product. Vapor and dust respirator.

Section 8. Classification

TDG Road / Rail	Not controlled under TDG (Canada).	
	Not applicable.	
Maritime Transportation	Not available.	
WHMIS	WHMIS CLASS D-2B: Material causing other toxic effects (TOXIC).	
Federal and Provincial Regulations	CEPA DSL: Calcium chloride 94-97%	

Section 9. Protective Measures

Protective Clothing	Be sure to use a MSHA/NIOSH approved respirator or equivalent. Gloves. Vapor and dust respirator. Full suit. Splash goggles.	
Engineering Controls	Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Eye wash stations and washing facilities should be available.	

Section 10. Other Information

References -Manufacturer's Material Safety Data Sheet.

No additional remark.

Validated by QCL on 8/15/2001.

Verified by QCL.

Printed 8/15/2001.

EMERGENCY - 24HRS/DAY - 7 DAYS/WEEK

EVERYWHERE IN CANADA / ONYX INDUSTRIES - CALL 1-800-465-0911

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

PRODUCT DATA SHEET

EXPRESS™

Premium Anhydrous Calcium Chloride

General Description

EXPRESS™ — The premium anhydrous, calcium chloride by TETRA Chemicals is a white, high purity, pellet with 94% to 97% CaCl_2 by weight.

EXPRESS exhibits uniqueness in its:

1. *Fast Dissolving* and
2. *Low Dusting* properties.

Applications

EXPRESS is widely used in oilfield applications such as *Completion* and *Workover Fluids* to increase density and *Cementing* as an accelerator.

This unique product shows the following outstanding operational benefits for the completion and workover market:

1. *Fastest Dissolving* of all pellet CaCl_2 products.
2. *Lowest Dust* of all pellet CaCl_2 products.

Chemical Properties

Chemical Formula	CaCl_2
Form	A white odorless granule
Assay	94%-97% by weight calcium chloride
Bulk Density	Approximately 55 pounds per cubic foot
pH	Dilute aqueous solution, will be slightly alkaline

Typical Analysis

Calcium Chloride	$\geq 94\%$
Alkali Chlorides (as NaCl)	$\leq 2\%$
Total Magnesium (as MgCl_2)	$\leq 0.1\%$
Other Impurities (not H_2O)	$\leq 1\%$
Iron (Fe)	≤ 10 ppm

Typical Screen Analysis

<u>Screen Number</u>	<u>%</u>
12	100% passing
40	96% retained