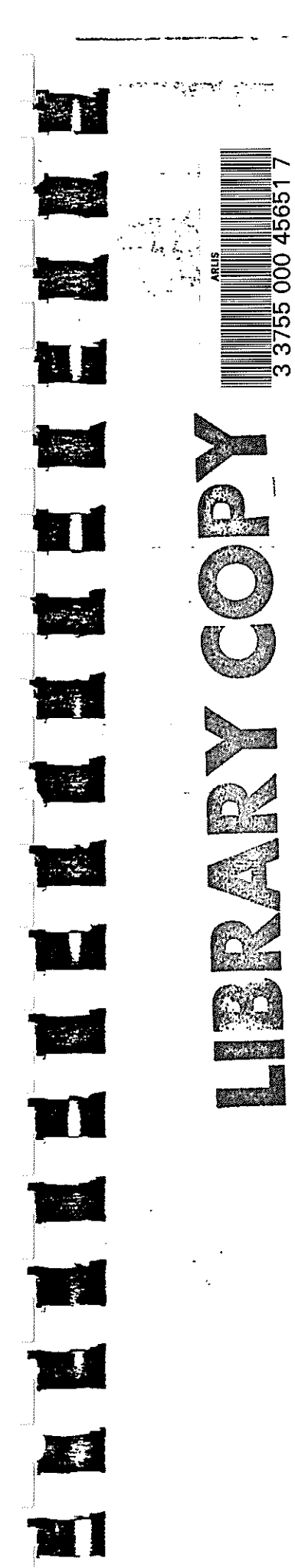


Glossary

BROAD LAND ALLOCATION: Long-range land use program formulation.

CULTURAL FEATURES: Products of man's action.

~~DEGREE OF~~ RECREATION OPPORTUNITY: Relative numerical rating of the Recreation Opportunity Classes.

~~ENCOUNTER SPACE~~: Those portions of the land base which are topographically suitable and which people normally use in their pursuits of recreation.

ESTIMATION CONSTANTS: The values established to help determine the recreation visitation capacity estimates.

GAOT: Groups at one time. Most people engage in recreation pursuits in numbers of two or more. Group size is limited to a maximum of four persons in Preferences Types I and II, and five persons in Preferences Types III, IV, and V.

LAND MANAGEMENT OPTIONS: Sub-categories of major land uses such as recreation, timber management, etc., that describe management intents in use intensity and actual use practice terms.

LAND USE PLANNING: Formulating courses of action that effectively contribute to the multiresource use and environmental protection of National Forest lands.

LAND USE PLANNING ALTERNATIVES: Formulating a choice of reasonable management actions for a given unit of land.

MANAGEMENT ACTIONS: Implementing activities such as road building, timber harvesting, recreation facility construction, etc., which can change the existing environmental characteristic of an REU to differing extents.

MANAGEMENT OBJECTIVES: End result, goals, targets, an end to be achieved; a future condition or result to be accomplished.

MANAGEMENT OPTIONS: Individual or combinations of various management actions.

NATURAL FEATURES: Products of non-man-caused proceses.

NFRS: National Forest Recreation Survey.

PAOT: People at one time.

PHYSICAL CARRYING CAPACITY: When congestion and use becomes intense enough to cause excessive deterioration and damage to the point where the physcial environment is unacceptably altered.

QUALITATIVE DEFINITIONS: The value of existing recreation opportunities on National Forest lands.

QUANTITATIVE DEFINITIONS: The number of people who can take advantage of available recreation opportunities without diminishing the quality of the recreation experiences that are sought after.

~~RATING VALUES~~: A set of values assigned to the characteristic subvariables to determine the degree of recreation satisfaction one may experience while pursuing his recreation preference.

RECREATION CHARACTERISTICS: Natural and cultural attributes, sensual stimulation, access, remoteness, and pollution encounters to which people may be drawn in their recreation pursuits.

~~RECREATION EXPERIENCE UNITS~~ (REU): Discrete portions of the Forest land base to which people relate while engaging in Forest outdoor recreation.

RECREATION MOTIVATIONS: The basic reasons for which people engage in outdoor recreation pursuits.

RECREATION OPPORTUNITIES Favorable environmental and social circumstances that can satisfy the visiting public's various outdoor recreation preferences.

7-8-72

RECREATION OPPORTUNITY CLASS: Numerical rating values which determine the qualitative rating for each recreation Preferences Type.

RECREATION OPPORTUNITY INDEXES: Numerical rating value subtotals resulting from the Qualitative Evalution.

RECREATION PREFERENCES: Orientations that people exhibit in their selection of recreation settings and recreation activities for satisfying recreation motivations.

RECREATION SETTINGS: Discrete portions of the Forest land base when viewed from an outdoor recreation standpoint.

RESPONSE ESTIMATES: Predictions of how much recreation opportunities are likely to change if the environmental characteristics of an REU are altered.

RIM: Recreation Information Management.

SOCIAL VISITATION CAPACITY: The point at which feelings of congestion become intense enough to cause the aggregate recreation satisfaction of all visitors to decline.

SPATIAL DEFINITION: The three-dimensional concave elements of the geomorphic base or vegetative enclosure, or a combination of both.

TIMESTREAMS: The duration of effect that may occur to the recreation environment as a result of management actions on the land base.

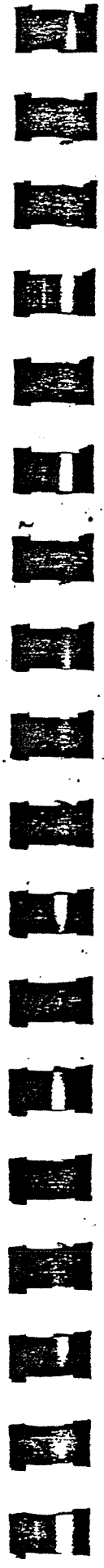
VISITATION CAPACITY: The number of people that can take advantage of the supply of recreation opportunity without substantially diminishing the quality of the experience that is sought after.

VISITATION CAPACITY ELEMENTS: The physical characteristics that are utilized in the estimation of REU Social Visitation Capacities.

VISITOR DAYS (VD): One visitor day equals 12 hours. (One person for 12 hours, or 12 people for one hour, or any combination thereof.)

YEARLY VISITATION CAPACITY (VC): The number of visitor days that an acre of land or an REU could reasonably accommodate annually for each Preferences Type.

YEARLY VISITATION POTENTIAL (VP): Considering the yearly VC and the Qualitative Definitions, the number of visitor days an acre of land or an REU could reasonably accommodate annually for each Preferences Type.



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7-8-74

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7-8-75

Appendices

7-8-76

FIGURE D

ATTRACTIVE FEATURES — INVENTORY DATA FORM

RECREATION EXPERIENCE UNIT DESIGNATION _____

INVENTORIED BY: _____ DATES: _____

SIGNIFICANCE RATINGS	H	M	L	NOTATIONS
MOUNTAIN PEAKS			1	ROUGH PEAK
GEOLOGICAL INTEREST SITES				
ROCK/MINERAL COLLECTION SITES		1		GOLD PANNING IN STREAM
LAKES	1			
RIVERS & STREAMS			1	
BIG GAME HUNTING HABITATS		2	1	M- MOOSE & DEER L-ELK
SMALL GAME HUNTING HABITATS			1	
WATERFOWL HUNTING HABITATS			1	
UPLAND BIRD HUNTING HABITATS		1		
FISHING HABITATS	1			TROUT IN LAKE & STREAM
WILDLIFE OBSERVATION AREAS				
SPECIAL WATER FEATURES			1	SMALL WATER FALLS
BOTANICAL INTEREST SITES				
FLORA GATHERING AREAS		1		SOME HARVESTING OF MUSHROOMS
ARCHEOLOGICAL INTEREST SITES				
HISTORICAL INTEREST SITES				
RESERVOIRS				
CAMPGROUNDS		1		10 F.U.
PICNIC GROUNDS				
SWIMMING FACILITIES				
BOATING FACILITIES		1		
WINTER SPORTS SITES				
PUBLIC VISITOR CENTERS				
COMMERCIAL PUBLIC SERVICE SITES				
ORGANIZATION SITES				
TOURS - SELF GUIDED				

7-8-77

FIGURE F

ACCESSIBILITY AND REMOTENESS CHARACTERISTICS — INVENTORY DATA FORM

RECREATION EXPERIENCE UNIT DESIGNATION: _____

INVENTORIED BY: _____ DATE: _____

ACCESSIBILITY

✓	KIND OF TRAVEL FACILITIES CONTAINED IN REU	APPROXIMATE LENGTHS* (in miles) OF TRAVEL FACILITIES CONTAINED IN REU
	NONE	N/A
	TRAILS	
	4-WHEEL DRIVE ROADS	
✓	2-WHEEL DRIVE ROADS	2½ MILES (SINGLE LANE GRAVEL)
	MAJOR TRAVEL ROUTES	

*PORTIONS THAT ARE WITHIN THE FOREST BOUNDARIES

REMOTENESS

✓	DISTANCE FROM GEOGRAPHICAL CENTER OF REU TO THE NEAREST ROADS THAT ARE NOT CONTAINED IN THE UNIT.
	≥ 3 MILES FROM NEAREST 4-WHEEL DRIVE ROAD
	≥ 1.5 MILES FROM NEAREST 4-WHEEL DRIVE ROAD
	≤ 1.5 MILES FROM NEAREST 4-WHEEL DRIVE ROAD
	≥ 5 MILES FROM NEAREST 2-WHEEL DRIVE ROAD
	≥ 3 MILES FROM NEAREST 2-WHEEL DRIVE ROAD
	≥ 1.5 MILES FROM NEAREST 2-WHEEL DRIVE ROAD
	≤ 1.5 MILES FROM NEAREST 2-WHEEL DRIVE ROAD
✓	≥ 5 MILES FROM NEAREST MAJOR TRAVEL ROUTE
	≥ 3 MILES FROM NEAREST MAJOR TRAVEL ROUTE
	≥ 1.5 MILES FROM NEAREST MAJOR TRAVEL ROUTE
	≤ 1.5 MILES FROM NEAREST MAJOR TRAVEL ROUTE

(≥ EQUAL OR GREATER THAN: ≤ EQUAL OR LESS THAN)

NOTES:

_____

_____

7-8-78

FIGURE I

VISUAL RESOURCE CHARACTERISTICS — INVENTORY DATA FORM

RECREATION EXPERIENCE UNIT DESIGNATION: _____

INVENTORIED BY: _____ DATE: _____

#	CRITERIA CATEGORIES	RATING SUBTOTALS
1	BASIC TERRAIN VARIETY	+ 20
2	GEOLOGIC FEATURE VARIETY	+ 14
3	WATER FEATURES VARIETY	+ 12
4	VEGETATIVE PATTERN VARIETY	+ 6
5	LAND USE EFFECTS	− 4
	PROBABILITY OF VISUAL APPEAL INDEX →	48

NOTES

7-8-79

FIGURE N

DISCORD ELEMENTS CHARACTERSITCS -- INVENTORY DATA FORM

RECREATION EXPERIENCE UNIT DESIGNATION: _____

INVENTORIED BY: _____ DATE: _____

✓	DISCORD ELEMENTS IMPACT LEVELS	DISCORD ELEMENTS DESCRIPTIONS
✓	LEVEL I: NONE	N/A
	LEVEL II: MINOR	
	LEVEL III: MODERATE	
	LEVEL IV: HIGH	
	LEVEL V: SEVERE	

NOTES

7-8-80

FIGURE N

VISITATION CAPACITY ELEMENTS – Inventory Data Form

Recreation Experience Unit Designation: _____ ___ _____

Inventoried By: _____ Date: _____

1. REU Acreage (Portion lying w/in Forest Boundary) N.F. 9000 ; Other 3000

2. % of REU Acreage in Encounter Space .25 (Express as Decimal)

3. % of Encounter Space in Forest Cover .5 (Express as Decimal)

4. Miles of trail within REU 4
5. Miles of 4-WD road within REU 2
6. Miles of 2-WD road within REU 1
7. Miles of MTR road within REU .5

(Portion of REU lying w/in Forest Boundary)

8. PAOT Estimates for Existing Recreation Facilities: (RIM)

	T-III	T-IV	T-V
a. Campgrounds	90	—	—
b. Picnicgrounds	15	15	15
c. Swimming Facilities	—	—	—
d. Boating Facilities	10	10	10
e. Winter Sports Sites			1000
f. Public Visitor Centers		—	—
g. Commercial Public Service Sites		—	—
h. Organization Sites		—	—
i. Other	—	—	—
PAOT SUMS:	115	25	1025
Divide PAOT Sums by 5 to convert number of people to groups of people (GAOT) →	23	5	205
	(8-1)	(8-2)	(8-3)

9. % of Year REU May be Used for Each Preferences Type: (RIM)

TI .3 (a.) TII .85 (b.) TIII .6 (c.) TIV .6 (d.) TV .6 (e.) (Express as Decimals)

7-8-81

TABLE VIII

CURRENT RECREATION OPPORTUNITY INDEXES – EXTENSIVE APPRAISAL SUMMARY FORM

RECREATION EXPERIENCE UNIT DESIGNATION: _____

NATIONAL FOREST: _____

APPRAISED BY: _____ DATE: _____

REU CHARACTERISTICS VARIABLES		RECREATION PREFERENCE TYPES														
		T-I			T-II			T-III			T-IV			T-V		
		H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
ATTRACTIVE FEATURES / NATURAL FEATURES	MTN. PEAKS			10												
	GEOLOGICAL INT. SITES															
	ROCK/MIN. COLLECTION SITE		5			20			5			25				
	LAKES	30			30			40			30			30		
	RIVERS/STREAMS			5			5			5			3			3
	B. GAME HUNT. HABITATS					70	20									
	S. GAME HUNT. HABITATS						10									
	WATERFOWL HUNT. HABITATS						10									
	U. BIRD HUNT. HABITATS					25										
	FISHING HABITATS	10			50			20								
	WILDLIFE OBSERV. AREAS															
	SP. WATER FEATURES			10			6			10			10			
	BOT. INT. SITES															
	FLORA GATHER. AREAS		5			10			5			5				
CULTURAL FEATURES	ARCH. INT. SITES															
	HIST. INT. SITES															
	RESERVOIRS															
	CAMPGROUNDS					10			50			35			25	
	PICNIC GROUNDS															
	SWIM. FACILITIES															
	BOAT. FACILITIES					5			20			10			20	
	WINTER SPORTS SITES															
	PUB. VIS. CENTERS															
	COM. PUB. SERV. SITES															
	ORG. SITES															
	TOURS - S. GUIDED															
→	SUBTOTALS	+75			+261			+155			+118			+78		
→	ACCESSIBILITY	−40			+5			+20			+35			+50		
→	REMOTENESS	−34			+12			+32			+36			+32		
→	VISUAL RESOURCE	+120			+96			+72			+48			+24		
→	DISCORD ELEMENTS	0			0			0			0			0		
→	RECREATION OPPORTUNITY INDEXES & CLASS	121 (4)			374 (8)			279 (10)			237 (9)			184 (5)		

7-8-82

FIGURE O

VISITATION CAPACITY ESTIMATES – SUMMARY DATA FORM

RECREATION EXPERIENCE UNIT DESIGNATION: _____

CALCULATED BY: _____ DATE: _____

VISITATION ESTIMATES		RECREATION PREFERENCES TYPES				
		TYPE I	TYPE II	TYPE III	TYPE IV	TYPE V
PEAK CAPACITY ESTIMATES (GAOT)		6	15	28.12	7.93	205.52
YEARLY VISITATION CAPACITY ESTIMATES	VD/A/YR.	.11	.78	1.03	.29	7.50
	VD/REU/YR.	1320	9360	12,360	3480	90,000
YEARLY VISITATION POTENTIAL ESTIMATES	VD/A/YR.	.03	.62	.72	.26	3.75
	VD/REU/YR.	360	7440	8640	3120	45,000

NOTES:

7-8-83

T! MIN. ACRES PARTY CONSTANT DERIVATION RATIONALE

GIVENS: — THE SIZES (IN ACRES) AND REPORTED RECREATION USE DENSITIES (IN VISITOR DAYS) OF 11 WILDERNESS UNITS.

EXAMPLES OF REPORTED RECREATION-USE DENSITIES FOR WILDERNESS AND PRIMITIVE AREAS FOR CY . . . 1970

(SELECTED FROM EXPECTED HIGH DENSITY USE WILDERNESS UNITS)

NAME OF UNIT	SIZE (ACRES)	TOTAL REPORTED USE CY 1971	VISITOR-DAYS USE PER ACRE
DESOLATION	63,000	298,800	4.7
SAN GORGONIO	36,000	94,100	2.8
MISSION MOUNTS.	73,000	9,600	.13
TETON	563,000	118,700	.20
RAWAH	26,000	17,200	.66
BOUNDARY WATERS	1,029,000	1,515,000	1.5
STRAWBERRY MTN.	32,000	22,600	.8
THREE SISTERS	196,000	193,500	.9
EAGLE CAP	220,000	135,000	.6
MINARETS	109,000	303,100	2.7
JOHN MUIR	500,000	825,300	1.6

— The total reported use spanned a 100 day use season, on the average.

— One days equals two visitor days.

ASSUMPTIONS — Wilderness recreation use parallels Type I recreation use:

The current (1970) reported use rates for the above listed wilderness units, when averaged, approximate their aggregate esthetic visitation capacity.

7-8-84

TRAVEL FACILITIES PAOT MILE CONSTANTS DERVIATION RATIONALE

GIVENS:

The rate of encounter for visitor groups spaced at one mile intervals while traveling at a speed of 2 miles/hour in opposite directions on a given trail is 4/hour.

The rate of enounter for vehicles spaced at one mile intervals while traveling at a speed of:

a. 10 miles/hour in oppostie directions on a given 4WD road is 20/hour
b. 30 miles/hour in opposite directions on a given 2WD road is 60/hour
c. 50 miles/hour in opposite directions on a given major travel route is 100/hour

ASSUMPTIONS:

People travel at a speed of:

a. 2 miles/hour while hiking on trails
b. 10 miles/hour while driving on 4-WD roads
c 30 miles/hour while driving on 2-WD roads
d. 50 miles/hour while driving on Major Travel Routes

4-WD roads and most forest 2-WD roads are of single lane construction; major travel routes are of double lane construction and, therefore, have twice the inherent vehicle/mile capacity of 2-WD roads.

People expect to encounter fewer other people on trails than on 4-WD roads; fewer on 4-WD roads than on 2-WD roads; fewer on 2-WD roads than on major travel routes.

Forest visitors who wish to gain satisfacions for Type III preferences desire to encounter fewer other people than those wishing to gain satisfactions for Type IV V and preferences.

The maximum time that people will continously travel is 4 hours.

People normally travel in groups of two or more when engaging in recreation pursuits (e.g., hiking, pleasure driving travel to particular recreation settings).

FIND:

The maximum number of visitor groups accommodated per mile of travel facility over a given time period while still maintaining conditions (i.e., group encounter frequency levels) that will satisfy Types III, IV and V recreation preferences.

7-8-85

METHOD: Calculate the total number of encounters that any one visitor group would be subject to over a 4 hour period (based on the above givens):

Type of Travel Facility	Calculated Enounter Rate. Hr.	Number of hrs. in period	Total Encounters Per Period
Trail	4	4	16
4-WD Road	20	4	80
2-WD Road	60	4	240
Major Travel Rt.	100	4	400

a. Based on the givens and the assumptions, estimate the maximum number of encounters per time period that will maintain conditions for satisfying Type III IV and V recreation preferences:

PREFERENCES TYPE	KIND OF TRAVEL FACILITY	MAXIMUM ENCOUNTERS PER PERIOD
TYPE III	TRAIL → 8	(1 encounter every 30 min.)
	4-WD ROAD → 16	(1 encounter every 15 min.)
	2-WD ROAD → 24	(1 encounter every 10 min.)
	MTR → 48	(1 encounter every 5 min.)
TYPE IV	4-WD ROAD → 24	(1 encounter every 10 min.)
	2-WD ROAD → 40	1 encounter every 6 min.)
	MTR → 80	(1 encounter every 3 min.)
TYPE V	2-WD ROAD → 56	(1 encounter every 4.3 min.)
	MTR → 112	(1 encounter every 2.1 min.)

b. Based on the step b. estimates, calculate the maximum number of visitor groups that can be accommodated per mile of travel facility at any one time (GAOT*):

ANSWER:

PREFERENCES TYPES	KIND OF TRAVEL FACILITY	GAOT / MI. ESTIMATE
	TRAIL →	1 visitor group/mile
	4-WD ROAD →	.4 visitor group/mile
	2-WD ROAD →	.2 visitor group/mile
	MTR →	.24 visitor group/mile
TYPE IV	4-WD ROAD →	.6 visitor group/mile
	2-WD ROAD →	.33 visitor group/mile
	MTR →	.4 visitor group/mile
TYPE V	2-WD ROAD →	.465 visitor group mile
	MTR →	.57 visitor group mile

*Assuming a one hour "at one time" duration.

7-8-86

Formula: $\left(\begin{array}{l}\text{Time Between}\\ \text{encounter in}\\ \text{minutes.}\end{array}\right)\left(\begin{array}{l}\text{Speed} -\\ \text{in mi.}\\ \text{per min.}\end{array}\right) = \begin{array}{l}\text{Minimum group}\\ \text{spacing at}\\ \text{outset - in miles}\end{array} \rightarrow \frac{1 \text{ mile}}{\begin{array}{l}\text{minimum group}\\ \text{spacing at outset}\\ \text{in miles}\end{array}} = \begin{array}{l}\text{GAOT} \cdot \text{mi}\\ \text{Estimate}\end{array}$

* U.S. GOVERNMENT PRINTING OFFICE: 1974—799-640 178

7-8-87

FIND: The minimum number of acres that are required to provide a satisfying Type I recreation experience.

METHOD:
a. Sum acreages of all units listed (2,847,000 acres)
b. Sum total reported uses for all units listed (3,530,700 VD)
c. Divide total acres by total use to find the seasonal visitor day density per acre (.8 VD/A/Season)
d. Disaggregate seasonal usage by dividing .8 VD/A/Season by the season length (100 days x 2 = 200 VD)
$\left(\frac{.8}{200} = .004\right)$
e. Divide .004 into 1.0 to find the minimum number of acres.

ANSWER: 250 acres/visitor group. (Max. of 4 people/group)

T II
MIN. ACRES/PARTY CONSTANT DERIVATION RATIONALE

GIVENS:

- Area 319 is comprised of approximately 133,000 acres.
- The number of hunter trips on opening day that were recorded are: 1361 in 1971
  1647 in 1972
  1189 in 1973
- Individuals normally hunt with one or more other hunters.
- The general feeling (statistically based) is that hunting pressure is high in area 319.

ASSUMPTIONS:

- Area 319 is being used at, or very nearly at, its esthetic visitation capacity on the opening day of the elk and deer hunting season.
- Area 319 is typical of the physical characteristics of other portions of the Forest that are used for elk and deer hunting.

FIND:

- The minimum number of acres that are required to provide a satisfying hunting experience.

METHOD:

- Divide the average number of opening day hunter trips for the years1971,72 and 73 into the total number of acres that comprise area #319.

ANSWER

100 acres/visitor group
(Max.of 4 people/group)

7-8-88

EXHIBIT E

7. Recreational Resources

Comment 9a (p. E-7-69, Section 5.4.1)

Compare information common to Section 5.4.1 through Section 5.4.5, Section 6.1.6, Tables E.7.17 and E.7.18, and Figures E.7.7 through E.7.17 and correct all discrepancies with respect to (1) phasing of development, (2) proposed facilities to be provided, and (3) estimated costs of "recreation plan project features".

Response

Item #9a

SECTION 5.4 REVISIONS

The recreation sites listed on p. E-7-69 of Chapter 7, Exhibit E of the License Application should read as follows:

Phase One - Watana Construction Phase

Key Letter	Name
E	Brushkana Campground
D	Tyone Confluence with Susitna
B	Butte Creek/Susitna River
A	Middle Fork-Chulitna River
C	Watana Townsite (part of Project Facility Program)
F	Portal Entry

Phase Two - Watana Implementation Phase

O	Watana Damsite
U	Watana Townsite (part of Project Facility Program)
H	Tsusena Creek
I	Tsusena Butte
L	Deadman/Big Lake
J	Clarence Lake
K	Watana Lake

Phase Three - Devil Canyon Construction

G	Mid-Chulitna/Deadman Mountain

Phase Four - Devil Canyon Operation

Q	Devil Creek
S	Devil Canyon Damsite
R	Mermaid Lake

Phase Five - To Be Developed Only If Demand Requires

T	Soule Creek
M	Southern Chulitna Mountains
N	Fog Lakes

Future Additions - To Be Considered Through Demand Monitoring

P	Stephan Lakes
W	Rehabilitation Sites

Section 5.4.1(a)(v) on p. E-7-70 should read as follows:

Twenty-five new campsites similar to the existing development, with .025-mile (0.4 km) circulation road for proposed site, 3 toilet facilities, and other equipment.

Section 5.4.2(a)(v) on p. E-7-77 should read as follows:

Parking, 20 cars;
Exhibit building (3,000 sq. ft.);
- Souvenir shop;
- Museum;
- Restrooms; and
- Food service.

Interpretive trail;
Four picnic sites; and
One bulletin board.

Note: Powerhouse tour headquarters to be located on north side of dam at operations headquarters.

Section 5.4.2(c)(v) on p. E-7-79 should read as follows:

Two shelters, one trailhead, three parking spaces, and 20 miles (32 km) of primitive trail development.

Section 5.4.2(d)(v) on p. E-7-80 should read as follows:

Primitive trail development, 4 miles (6.4 km);
Trailhead, with 6 parking spaces; and
Two to four undesignated campsites.

Section 5.4.2(e)(v) on p. E-7-81 should read as follows:

Primitive trail development, 4 miles (6.4 km);
Five to six undesignated campsites; and
Trailhead, with 6-space automobile parallel parking.

Section 5.4.2(f)(v) on p. E-7-83 should read as follows:

Primitive trail development, 9 miles (14.4 km) and signage.

Section 5.4.2(g)(v) on p. E-7-84 should read as follows:

Primitive trail development, 3 miles (4.8 km);
Two to three undesignated campsites; and
1 footbridge.

Section 5.4.3(a)(v) on p. E-7-85 and E-7-86 should read as follows:

Ten parking spaces, 15 miles (24 km) of trail, one trailhead and 2-4 primitive campsites.

Section 5.4.4(a)(v) on p. E-7-87 should read as follows:

Primitive trail development, 9 miles (14.4 km);
1 trailhead, 5 parking spaces, 1 bench, and signage.

Section 5.4.4(b)(v) on p. E-7-88 should read as follows:

One shelter;
Visitor center (5,000 sq. ft.);
- Food service;
- Dam exhibit
- Souvenir shop; and
- 1 single vault latrine.

Eight picnic sites;
Fifteen parking spaces;
Interpretive trail (0.5 miles);
Signage; and
Three benches.

SECTION 6.1.6 REVISIONS

Section 6.1.6 on pp. E-7-107 through E-7-109 should read as follows:

6.1.6 - Elements of the Recreation Plan According to Their Phases of Development

(a) Phase One (Sites E, D, B, C, A, F)

E	Brushkana Camp	0.25 miles (0.4 km) of road; 25 campsites; 3 single vault latrines; 1 bulletin board; 8 trash cans; and 1 water well.
D	Tyone River Confluence with Susitna	1 shelter.

B	Butte Creek/Susitna	1 boat launch at Susitna Bridge.
C	Watana Townsite	Temporary camp and town facilities.
A	Middle Fork Chulitna River	2 overnight shelters; 25 miles (41 km) primitive trail; trailhead; trash cans; bulletin board; signage; and 6 parking spaces.
F	Portal Entry	Explanatory entry sign; and 2-3 car pullout.

(b) Phase Two (Sites O, U, H, I, L, J, K)

O	Watana Damsite Visitor Center	20 parking spaces; 3,000 sq. ft. visitor exhibit building with food service, souvenir shop, museum, and 2 single vault latrines; 1 interpretive trail; 4 picnic sites; and 1 bulletin board.
U	Watana Townsite (Phase Two)	2 miles (3.2 km) of primitive trail to Tsusena Falls; trailhead; and parking.
H	Tsusena Creek	2 shelters; 20 miles (32 km) of primitive trail to Tsusena Falls; 1 trailhead; and 3 parking spaces.
I	Tsusena Butte	4 miles (6.4 km) of primitive trail; 1 trailhead; 6 parking spaces; and 2-4 capacity primitive camp.

L	Deadman/Big Lake	1 trailhead; 5-6 capacity primitive campsite; 4 miles (6.4 km) of primitive trail; and 6 parking spaces.
J	Clarence Lake	9 miles (14.4 km) of primitive trail; and signage
K	Watana Lake	3 miles (4.8 km) of primitive trail; 2-3 capacity primitive campsite; and 1 foot bridge.

(c) Phase Three (Site G)

G	Mid-Chulitna Mountains Deadman Mountain	1 trailhead; 15 miles (24 km) of primitive trail; 2-4 capacity primitive campsite; and 10 parking spaces.

(d) Phase Four (Sites Q, S, R)

Q	Devil Creek Drainage	1 trailhead; 5 parking spaces; 9 miles (14.4 km) of trail; 1 bench; and signage.
S	Devil Canyon Damsite Visitor Center	1 shelter; 5,000 sq. ft. visitor center with dam exhibit, food service, souvenir shop, and 1 single vault latrine; 8 picnic sites; 15 parking spaces; 0.5 miles (0.8 km) of trail; signage; and 3 benches.

R	Mermaid Lake	8 campsites; 1 shelter; 2 single vault latrines; 1 water well; 1 bulletin board; 5 garbage cans; and signage.

(e) Phase Five - To be developed only if demand requires (Sites T, M, N, P, W).

T	Soule Creek	8 miles (12.8 km) of primitive trail; 5-6 capacity primitive campsite; 1 trailhead; and 5 parking spaces.
M	Southern Chulitna 3 Mountains	3 miles (4.8 km) of primitive trail; capacity primitive campsite; 1 trailhead; and 3 parking spaces.
N	Fog Lakes	15 miles (24 km) of primitive trail; 15 unit campground; 1 single vault latrine; 15 parking spaces; 1 trailhead; and signage.
P	Stephan Lake	5 miles (8 km) of primitive trail; 5 campsites, semi-primitive; signage; and canoe boat ramp.
W	Rehabilitation Sites	As appropriate.

FIGURE REVISIONS

Figure E-7-6

The location designated "Phase 1 & 2, C-Watana Townsite", should read as follows:

C/U - Watana Townsite Phase 1 & 2

The location designated "Phase 5, P - Stephan Lake" should read as follows:

Future Addition, P - Stephan Lake

Figure E-7-7

The facilities list for E-Brushkana Camp should read as follows:

25 campsites
0.25 miles (0.4 km) road
3 single vault latrines
1 bulletin board
8 trash cans
1 water well

The facilities list for F-Portal Entry should read as follows:

1 entry sign
2-3 car pull-out

Figure E-7-8

The facilities list for O-Watana Damsite and Visitor Center should read as follows:

20 parkings spaces
3,000 sq. ft. visitor building
2 single vault latrines
1 interpretive trail
4 picnic sites
1 bulletin board

Figure E-7-9

The facilities list for I-Tsusena Butte should read as follows:

4 miles (6.4 km) trail
1 trailhead
6 parking spaces
2-4 undesignated campsites

Figure E-7-10

The facilities list for L-Deadman and Big Lake list should read as follows:

1 trailhead
6 parking spaces
4 miles (6.4 km) trail
5-6 undesignated campsites

Figure E-7-11

The facilities list for K-Watana Lake should read as follows:

3 miles (4.8 km) trail
1 footbridge
2-3 undesignated campsites

Figure E-7-12

The facilities list for G-Mid-Chulitna Mountains, Deadman Mountain should read as follows:

10 parking spaces
15 miles (24 km) trail
1 trailhead
2-4 primitive campsites

Figure E-7-13

The facilities list for S-Devil Canyon Damsite should read as follows:

1 shelter
5,000 sq. ft. building
8 picnic sites
1 single vault latrine
15 parking spaces
0.5 miles (0.8 km) trail
Signage
3 benches

TABLE REVISIONS

Table E-7-17 should read as follows:

TABLE E.7.17: ESTIMATED CAPITAL COSTS FOR THE SUSITNA HYDROELECTRIC PROJECT RECREATION PHASES

Capital Costs 1982 Dollars	
Phase One	$ 673,866
Phase Two	904,789
Phase Three	127,432
Phase Four	910,197
Total Facilities	$2,616,284*

*These estimates are based upon January 1, 1982 cost figures.

TABLE E.7.18 REVISION

TABLE E.7.18: ESTIMATED COSTS OF PROPOSED RECREATION PLAN PROJECT FEATURES*
*Does not include potential phase 5 and future additions

Recreation Setting		Facilities	1982 Unit Cost	1982 Total Cost	Facility Total	Phase Total
PHASE ONE						
E	Brushkana Camp	0.25 miles of road	$386,400/mi	$ 96,600	$	$
		25 campsites	9,047	226,175		
		3 single vault latrines	9,157	27,471		
		1 bulletin board	762	762		
		8 trash cans	157	1,256		
		1 water well	19,040	19,040	371,304	
						371,304
D	Tyone/Susitna	1 shelter	17,920	17,920		
					17,920	
						389,224
B	Butte Creek/ Susitna River	1 boat launch	44,800	44,800		
					44,800	
						434,024
A	Middle Fork - Chulitna River	2 shelters	17,920	35,840		
		25 miles of trail	7,238	180,950		
		6 auto parking	1,810	10,860		
		1 trailhead (Trash cans, bulletin board, signs)	762	762		
					228,412	
						662,436
C	Watana Townsite	Not included in Recreation Costs	NA	NA	NA	
F	Portal Entry	Entry sign	6,000	6,000		
		2-3 car pull-out	1,810	5,430		
					11,430	
						673,866

TABLE E.7.18 REVISION (continued)

Recreation Setting		Facilities	1982 Unit Cost	1982 Total Cost	Facility Total	Phase Total
PHASE TWO						
O	Watana Damsite	20 parking spaces	$ 1,810	$ 36,200	$	$
	Visitor Center	3,000 sq.ft. building	$120/sq ft	360,000		
		2 single vault latrines	9,157	18,314		
		1 interpretive trail	$5/sq ft	50,000		
		4 picnic sites	2,027	8,108		
		1 bulletin board	439	439		
					473,061	
						473,061
U	Watana Townsite	Not included in Recreation Program Costs	NA	NA		
H	Tsusena Creek	20 miles of trail	7,238	144,760		
		2 shelters	17,920	35,840		
		1 trailhead	762	762		
		3 parking spaces	1,810	5,430		
					186,792	
						659,853
I	Tsusena Butte	4 miles trail	7,238	28,952		
		1 trailhead	762	762		
		6 parking spaces		10,860		
		2-4 undesignated campsites	NA	NA		
					40,574	
						700,427
L	Deadman/Big Lake	1 trailhead	762	762		
		4 miles of trail	7,238	28,952		
		6 parking spaces	1,810	10,860		
		5-6 primitive campsites	NA	NA		
					40,574	
						741,001
J	Clarence Lake	9 miles of trail	7,238	65,142		
		Signage	300	300		
					65,442	
						806,443
K	Watana Lake	3 miles of trail	7,238	21,714		
		1 footbridge	15,052	15,052		
		2-3 primitive campsites	NA	NA		
					36,766	
						843,209

TABLE E.7.18 REVISION (continued)

Recreation Setting		Facilities	1982 Unit Cost	1982 Total Cost	Facility Total	Phase Total
PHASE THREE						
G	Mid-Chulitna/ Deadman Mountain	10 parking spaces	1,810	18,100	$	$
		15 miles trail	7,238	108,570		
		1 trailhead	762	762		
		2-4 primitive campsites	NA	NA		
					127,432	
						127,432
PHASE FOUR						
Q	Devil Creek	1 trailhead	762	762		
		5 parking spaces	1,810	9,050		
		1 bench	320	320		
		Signage	300	300		
		9 miles of trail	7,238	65,142		
					75,574	
						203,006
S	Devil Canyon Damsite	1 shelter	17,920	17,920		
		5,000 sq.ft. building	120/sq ft	600,000		
		8 picnic sites	2,027	16,216		
		1 single vault latrine	9,157	9,157		
		15 parking spaces	1,810	27,150		
		0.5 mile of trail	7,238	3,619		
		Signage	1,000	1,000		
		3 benches	320	960		
					676,022	
						879,028
R	Mermaid Lake	8 campsites	9,047	72,376		
		1 shelter	17,920	17,920		
		2 single vault latrines	9,157	18,314		
		1 water well	19,040	19,040		
		1 bulletin board	439	439		
		5 garbage cans	140	700		
		Signage	200	200		
					128,989	
						1,008,017
TOTAL Construction Cost Phases 1-4, 1982 $						$2,525,092

Notes: Assumes no land acquisition costs for unappropriated state or federal lands nor land acquisition costs for private land.

EXHIBIT E

7. Recreational Resources

Comment 10 (p. E-7-97, para. 3)

Indicate if the proposed airfield will be available for general public use during project construction and/or operation.

Response

Access policies and regulations for the proposed airfield cannot be finalized until the necessary implementing agreements have been developed. At this time, it is the intension of the Power Authority to limit the use of the airfield during the construction period to project-related construction activities, thereby restricting general public access. While the policy for the operation period is less certain, it is anticipated that the airfield will continue to be closed to the public. This policy would facilitate the use of the airfield for project-related activities, while helping limit and control dispersed public use areas around the major project facilities. Safety-related and emergency landings would, of course, be permitted.

The Power Authority intends to consult with the resource management agencies, adjacent land managers and owners, and the public during the concluding years of project construction and to develop an access plan addressing access road, airfield, and reservoir use. The Power Authority and management agencies would prepare management plans for approval by FERC. In the dynamic arena of Alaska land use planning, it is appropriate to re-examine management plans just prior to the conclusion of construction.

EXHIBIT E

7. Recreational Resources

Comment 11 (p. E-7-101, para. 3)

Provide target dates for finalizing plans and submission of information relative to Phase Two engineering design specifications, final site selection, and site-specific data for all Phase-One recreation developments identified in the Recreation Plan.

Response

These planning activities are scheduled to begin in late 1985 with target completion dates extending into 1987. Most of the site-specific information will be developed through the preparation of a recreation master plan (for Phase One development), which is scheduled for completion by September 30, 1985. The master plan will provide final site selection and site-specific planning information. With the exception of the Watana Townsite (Site C) facilities, design of the Phase One recreation facilities will utilize existing design standards of the Alaska Department of Natural Resources, Division of Parks, and will be completed during early 1986. Development of these sites will begin at the commencement of the 1986 construction season. Preparation of design specifications for facilities at the Watana Townsite is scheduled to occur during 1986. The first portion of the townsite construction is scheduled for 1987.

EXHIBIT E

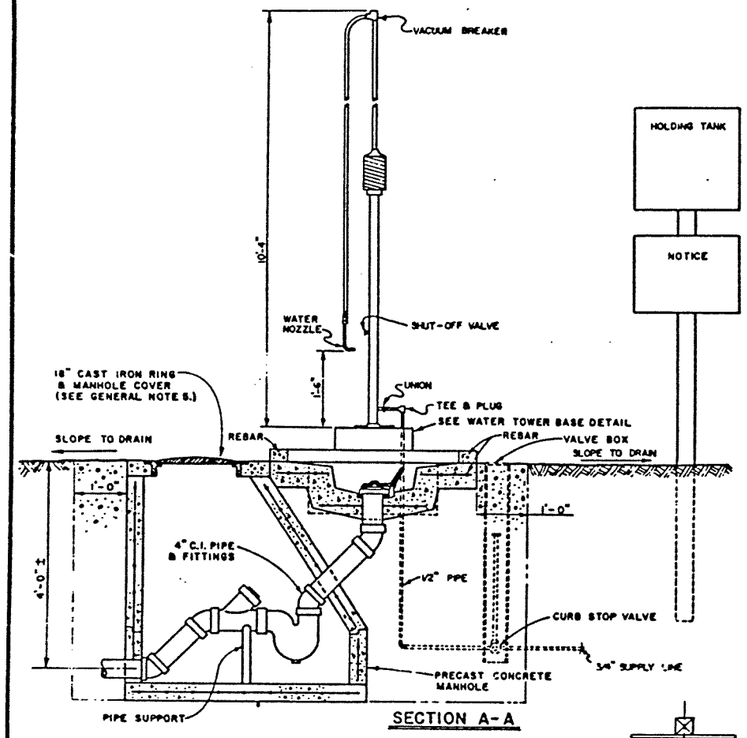
7. Recreational Resources

Comment 12 (p. E-7-101, para. 5)

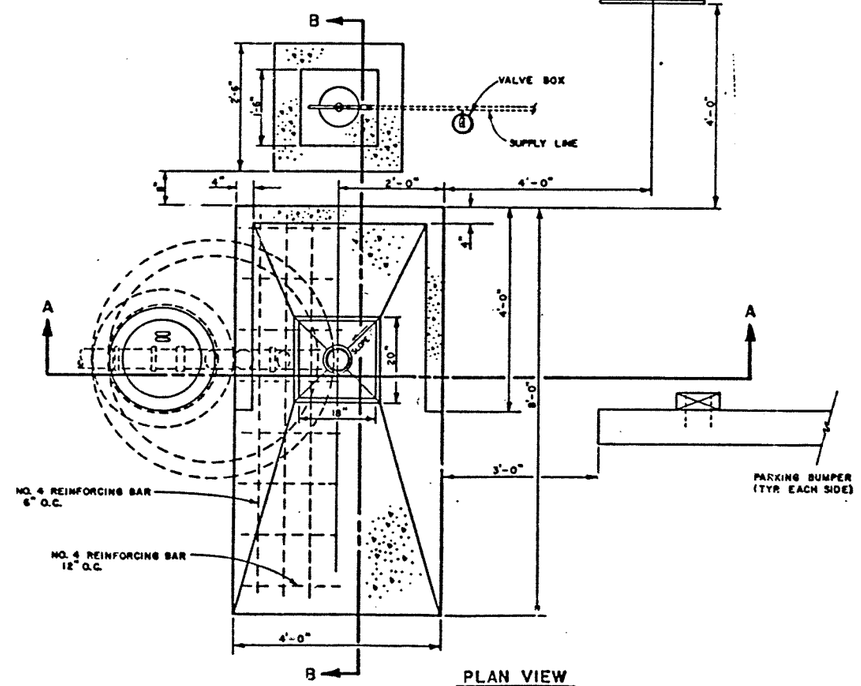
Provide "typical or similar facility design standards for the Susitna project", as proposed in the text.

Response

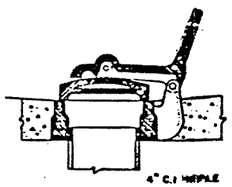
Attached are copies of design standards used by the Alaska Department of Natural Resources, Division of Parks for their facilities. These are intended to be used as the recreation facility design standards for the Susitna project.



SECTION A-A

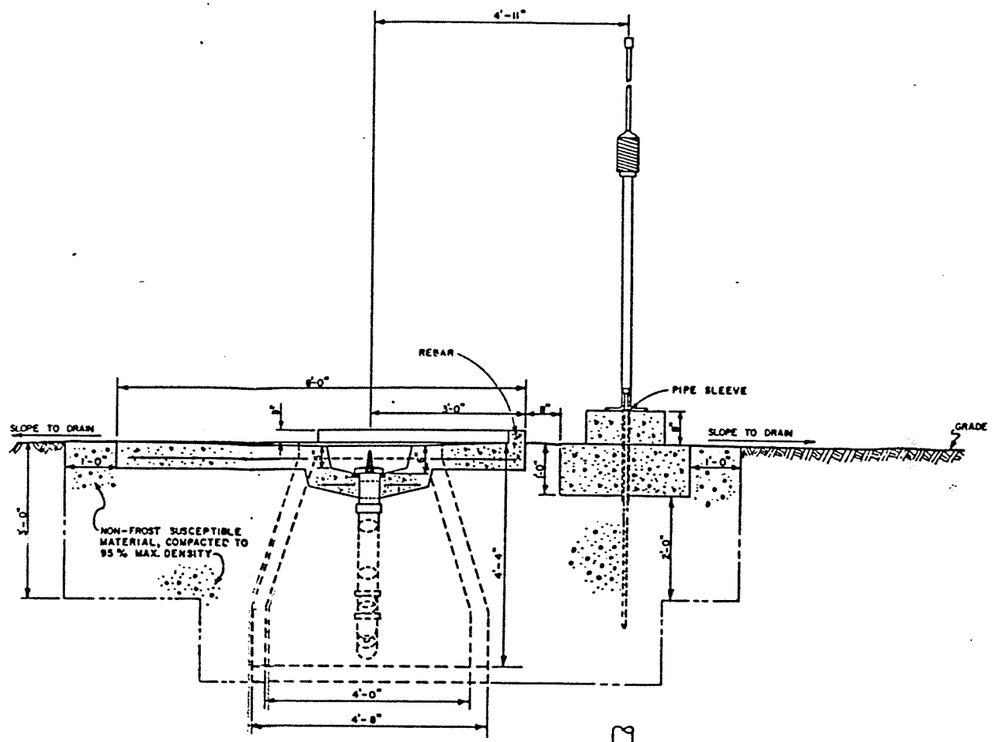


PLAN VIEW

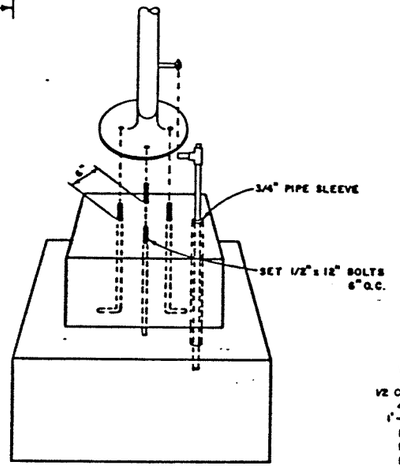


HATCH DETAIL

SCALE: 3" = 1'-0"

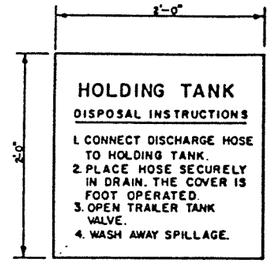


SECTION B-B



WATER TOWER BASE DETAIL

SCALE: 1 1/2" = 1'-0"



SIGN DETAIL

SCALE: 1 1/2" = 1'-0"

SIGN NOTES

1. SIGN MATERIAL 3/4" HIGH DENSITY PLYWOOD S-1-S.
2. FINISH WITH 2 COATS WHITE EXTERIOR ENAMAL.
3. HEADING LETTERS SIZE 2" - BLACK TEXT LETTERS SIZE 1", BLACK.
4. CENTER MESSAGE WITH BALANCED LAYOUT
5. 4" x 4" x 10' POST TREATED WITH PREPACO OIL BASE SOLID COLOR STAIN (RUSSETT 63-1361
6. SIGN POST TO BE PLACED IN HAND DUG OR AUGERED HOLE & BACKFILLED W/BORROW TYPE A & COMPACTED IN 6" LIFTS.

GENERAL NOTES

1. WATER TOWER MODEL S-1-3/8 ROMFORT MFG CO. OAKFIELD, WIS. 53065
2. ELEVATE SLAB TO ACCOMODATE GRADING AWAY FROM SLAB.
3. DRAIN HATCH COVER NO. 50-0011-00 ASSOCIATED CAMPGROUND SYSTEMS P.O. BOX 2258 CORONA, CALIF 91720
4. DEPTH OF DRAIN PIPE & ELEVATION OF DRAIN FITTINGS TO BE DETERMINED BY THE ENGINEER.
5. MANHOLE COVER & RING TO BE 18" DIA., CONVEX, SIDEWALK TYPE, SIMILAR OR EQUAL TO OLYMPIC FOUNDRY #5774.
6. TO DRAIN SYSTEM, SHUT OFF SUPPLY LINE & OPEN CURB STOP VALVE & WATER TOWER VALVE.

WATER SUPPLY MATERIALS

1/2 CU YD	CONCRETE
4	1/2" x 12" ∠ BOLTS W/ NUT & LOCK WASHER
1'-9"	3/4" I.D. PIPE SLEEVE
1	WATER TOWER
1	1/2" GALV. STEEL UNION
1	1/2" GALV. STEEL TEE
1	1/2" GALV. STEEL PLUG
1	1/2" GALV. STEEL 90° ELBOW
8'	1/2" GALV. STEEL PIPE
1	3/4" CURB STOP VALVE WITH 3' HANDLE
1	4" x 4' 0" VALVE BOX W/ COVER
AS REQ'D	3/4" GALV. STEEL WATER SUPPLY PIPE
1	1/2" x 3/4" x 3/4" GALV. TEE

SEWAGE DISPOSAL MATERIALS

1 CU YD	CONCRETE
7	#4 REBAR 1'-6" LONG
11	#4 REBAR 3'-6" LONG
1	HATCH WITH COVER
1	4" CAST IRON NIPPLE, 8" LONG
1	4" x 2'-0" CAST IRON PIPE
4	4" — 45° CAST IRON ELBOW
AS REQ'D	4" DIA. CAST IRON PIPE
1	4" DIA. C.I. P-TRAP W/CLEANOUT
1	4" DIA. C.I. 45° LATERAL W/PLUG
1	48" x 36" CONC. PRECAST MANHOLE CONE
1	18" DIA. C.I. RING & MANHOLE COVER
2	PARKING BUMPERS (P-3)
1	DOUBLE SIGN W/ POST & ATTACHMENTS
15 YD.	SELECT AGGREGATE MATERIAL
1	48" x 12" CONC. MANHOLE RISER

NO.	REVISION	DATE	APPVD.
3.	CHANGED DRAIN VALVE SYSTEM	9-17-82	T.D.
2	ADDED DRAIN CLEANOUT SYSTEM	8-27-82	T.D.
1	CHANGED STAIN TO PREPACO OIL BASE STAIN	6-15-76	

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF PARKS
STATE OF ALASKA

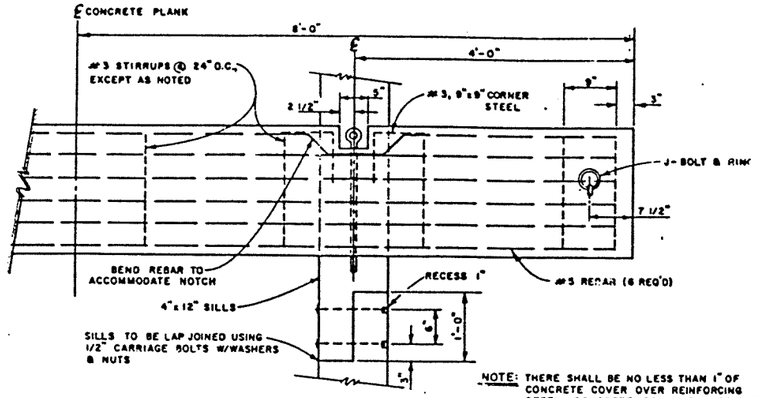
DESIGN & CONSTRUCTION SECTION

SCALE: 3/4" = 1'-0" & NOTED

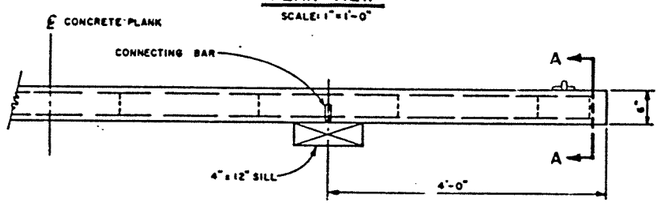
SANITARY DUMP STATION

DRAWN MJ
CHECKED J.F.S.
APPROVED
DATE

SHEET 1
U-3
OF 1 SHEETS

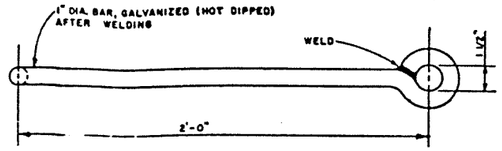


PLAN VIEW
SCALE: 1"=1'-0"

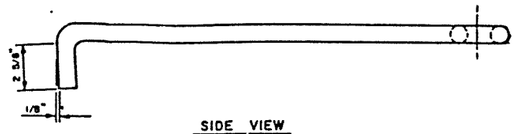


ELEVATION
SCALE: 1"=1'-0"

TYPICAL PLANK ASSEMBLY
SCALE: 1"=1'-0"

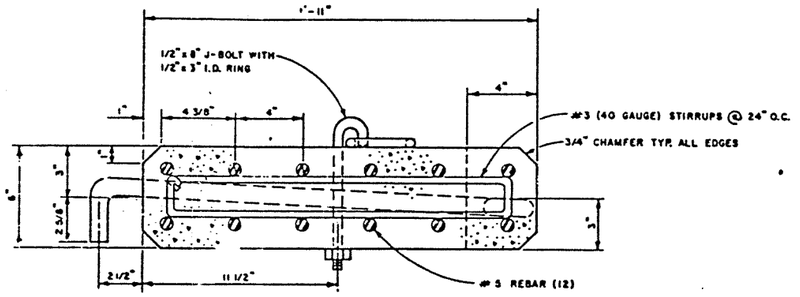


TOP VIEW

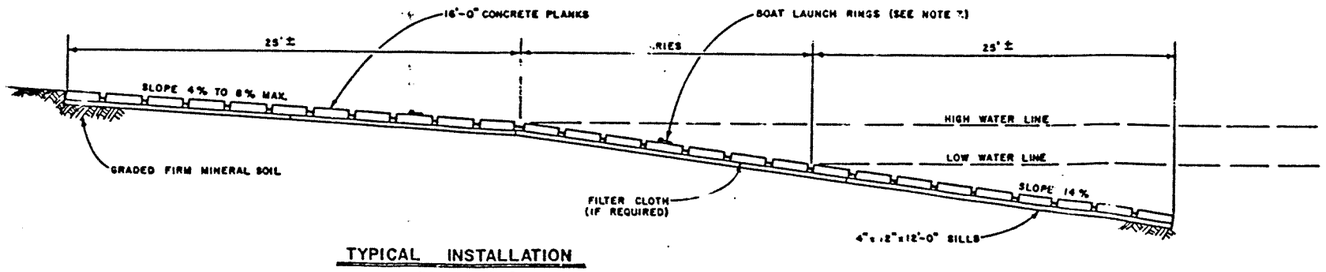


SIDE VIEW

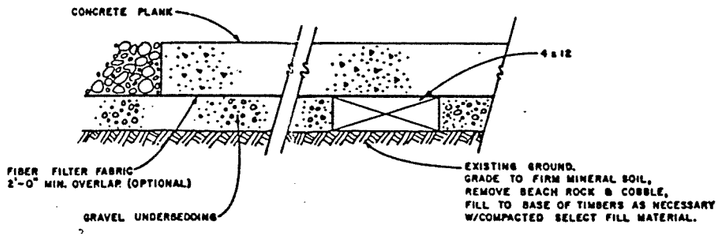
CONNECTING BAR
SCALE: 3"=1'-0"



SECTION A-A
SCALE: 3"=1'-0"



TYPICAL INSTALLATION
NOT TO SCALE



TYPICAL CROSS SECTION DETAIL
SCALE: 1 1/2"=1'-0"

GENERAL NOTES

1. REBAR TO BE WIRE TIED TO STIRRUPS.
2. NUMBER OF PLANKS PER INSTALLATION TO BE DETERMINED BY SITE LOCATION.
3. GRADE BREAK IN RAMP INSTALLATION TO BE PLACED AT ESTIMATED HIGH WATER LEVEL DURING USE PERIOD.
4. SPACES BETWEEN PLANKS AND SILLS TO BE FILLED WITH SELECT FILL MATERIAL.
5. FILTER CLOTH (IF USED) SHALL BE APPLIED OVER PREPARED SURFACE AND SILLS PRIOR TO PLANK INSTALLATION.
6. CONCRETE SURFACE TO BE ROUGH BROOM FINISH (1/4" DEEP STRIATIONS).
7. TWO PLANKS TO HAVE BOAT LAUNCH RINGS INSTALLED ON EACH END. PLANKS TO BE LOCATED ABOVE HIGH AND LOW WATER LINES, AS SHOWN.

MATERIALS LIST

SILLS FOR 48 FEET OF RAMP

10 — 4"x12"x12'-0" #1 STRUCTURAL JOISTS & PLANKS DOUGLAS FIR, S-DRY, ROUGH, PRESSURE TREATED W/COAL TAR CREOSOTE IN ACCORDANCE WITH A.W.P.A. STANDARD C-2 AND A.W.P.A. STANDARD LP-22, WITH A MINIMUM NET RETENTION OF 10 LBS. PER CU. FT.

12 — 1/2"x12" ZINC CHROMATE STEEL CARRIAGE BOLTS W/NUTS & WASHERS

MATERIALS FOR 24 PLANKS

176 L.F. — 1" STEEL RODS
4400 L.F. — #5 REBAR
672 L.F. — #3 REBAR (STIRRUPS)
14 CU.YDS. — CONCRETE
48 — #3, 9"x9" CORNER STEEL
4 — 1/2"x8" GALV. J-BOLTS W/NUTS & WASHERS
4 — 1/2"x3" I.D. GALV. STEEL RINGS

NO.	REVISION	DATE	APPROVED
1	REVISED & UPDATED DWG., INCREASED SIZE OF PLANKS	9-15-82	T.D.

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF PARKS
STATE OF ALASKA

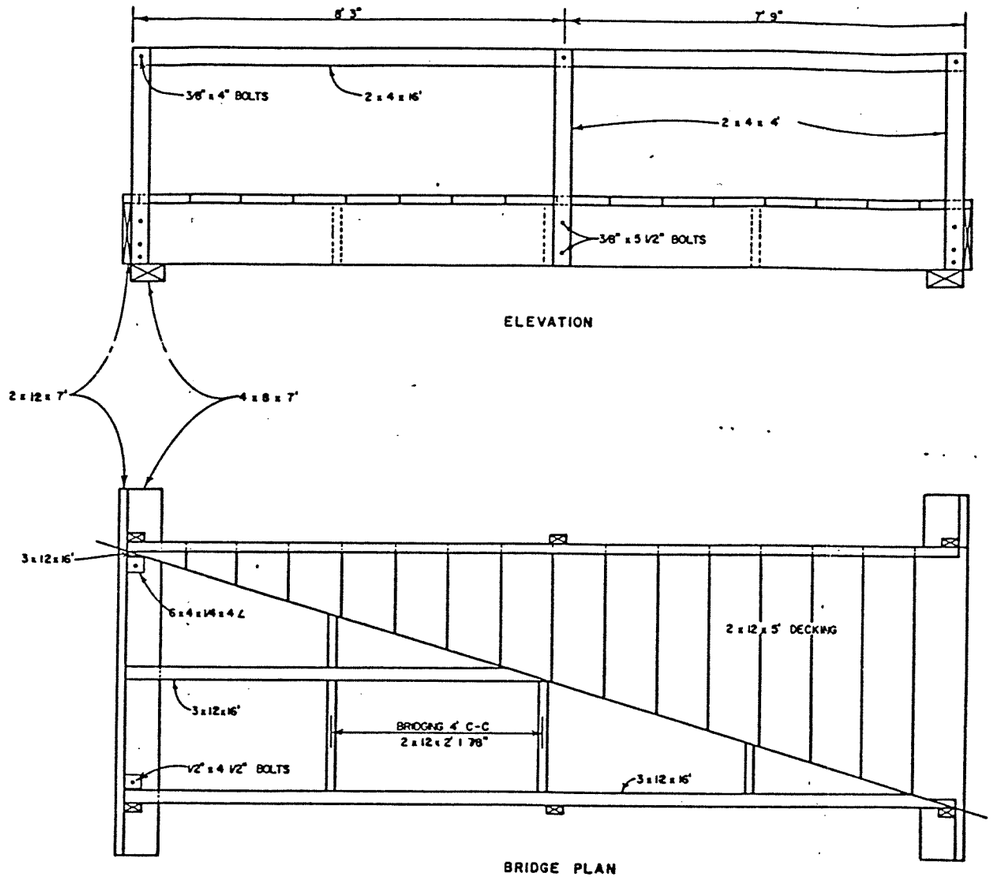
DESIGN & CONSTRUCTION SECTION

SCALE: 1"=1'-0" & NOTED

CONCRETE BOAT RAMP

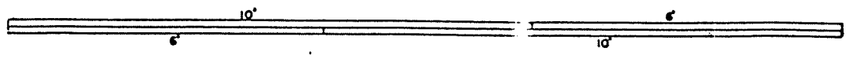
DRAWN T.D.
CHECKED
APPROVED
DATE 9-15-82

SHEET W-1
OF SHEETS

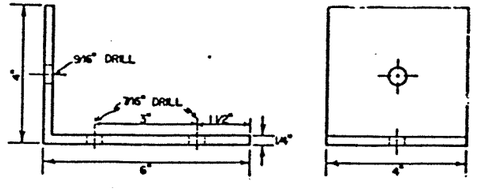


ELEVATION

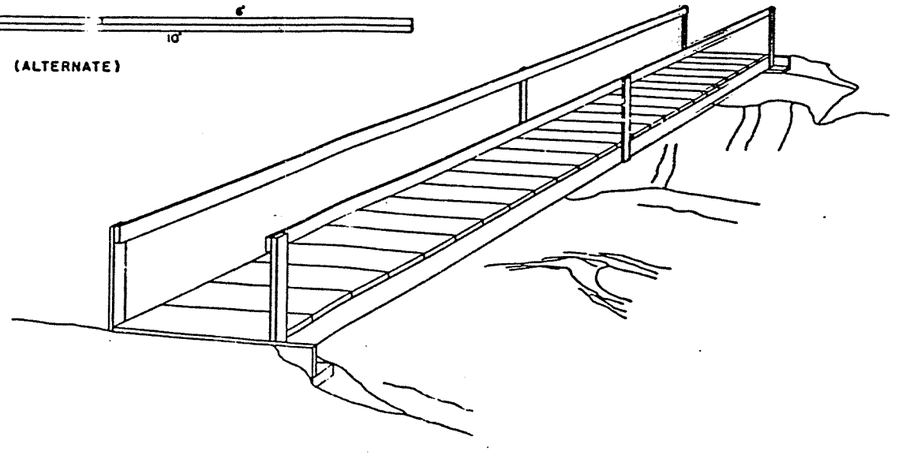
BRIDGE PLAN

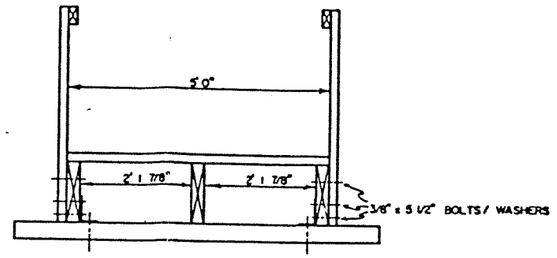


DETAIL— LAMINATED BEAM (ALTERNATE)



FOUNDATION ANGLE
SCALE: 1" = 2"





END

GENERAL NOTES

1. THE BRIDGE SHOULD BE AT LEAST TWO FEET ABOVE HIGH WATER.
2. ATTACH FOUNDATION ANGLES TO FOUNDATION PLATE PRIOR TO SETTING.
3. FOUNDATION PLATES SHOULD SIT ON GRAVEL OR A PLACED ROCK FOUNDATION
4. IF THE FOUNDATION IS UNSTABLE, DRILL AND DRIVE TWO 3/4" x 4' STEEL BARS THROUGH THE FOUNDATION PLATE
5. EACH BRIDGING IS CONNECTED TO THE STRINGERS WITH FOUR TYPE C TRIP-L-GRIP ANCHORS.
6. MAXIMUM SAFE LOAD:
   100 lb per sq. ft or
   60 lb per. sq. ft and two moose.
7. ALL WOOD SHALL BE DOUGLAS FIR, S-DRY.
8. ALL WOOD SHALL BE PRESERVATIVE TREATED WITH PENTACHLOROPHENOL IN ACCORDANCE WITH AWPI STANDARD LP-77 AND AWPA STANDARD P-8 WITH A MINIMUM NET RETENTION OF 50 LBS. PER CU. FT.
9. ALL HARDWARE SHALL BE GALVANIZED OR CADMIUM PLATED STEEL.
10. ALL DECKING SHALL BE INSTALLED WITH A 1/4" CLEAR SPACING

MATERIALS LIST

LUMBER:

S4S—"SELECT STRUCTURAL"—STRUCTURAL LIGHT FRAMING

6	2 x 4 x 4'
2	2 x 4 x 16'

ROUGH—"SELECT STRUCTURAL"—JOISTS AND PLANKS

17	2 x 12 x 5'
6	2 x 12 x 2' 1 7/8"
2	2 x 12 x 7'
3	3 x 12 x 16'
2	4 x 8 x 7'

HARDWARE:

4	6 x 4 x 1/4 x 4 ∠
24	TYPE C, TRIP-L-GRIP WITH NAILS
12 LB	20d COMMON NAILS
6	3/8 x 4 MACHINE BOLT W/ NUT AND WASHERS
16	3/8 x 5 1/2 MACHINE BOLT W/ NUT AND WASHERS
4	1/2 x 4 1/2 MACHINE BOLT W/ NUT AND WASHERS

LAMINATED BEAM ALTERNATE

1. GLUE FULL CONTACT FACE OF ADJOINING BOARDS
2. NAIL ADJOINING BOARDS USING 10d NAILS
3. SPLICE BOARDS AS INDICATED IN DETAIL

MATERIAL LIST

S4S- SELECT STRUCTURAL-JOISTS

6	2 x 12 x 10'
3	2 x 12 x 12'

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF PARKS — STATE OF ALASKA

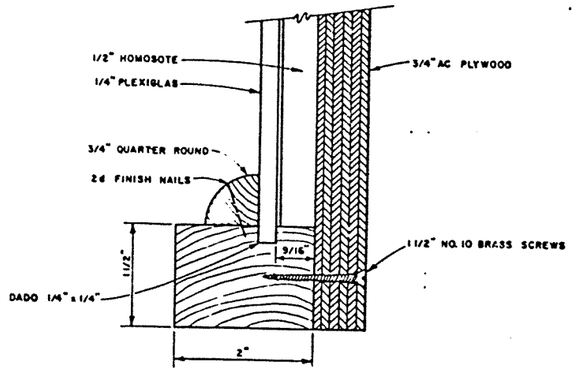
DESIGN & CONSTRUCTION SECTION

SCALE: NONE

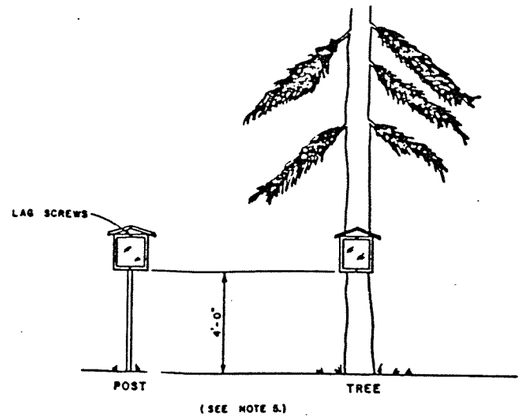
16' TRAIL BRIDGE

DRAWN MJ
CHECKED J.F.S.
APPROVED
DATE

SHEET E-1-2



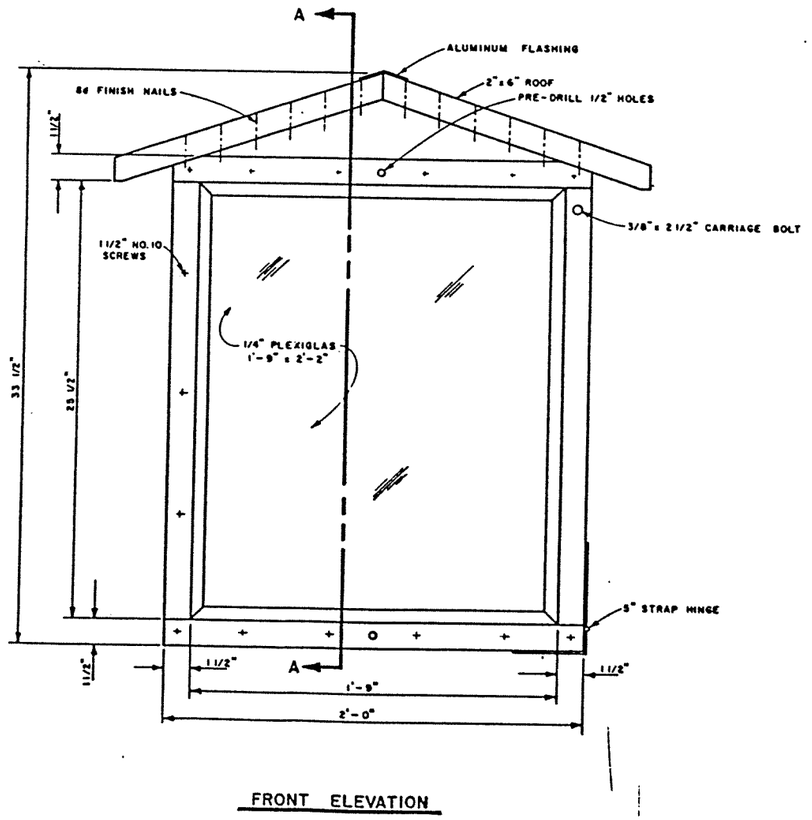
DETAIL B
SCALE 1" = 1"



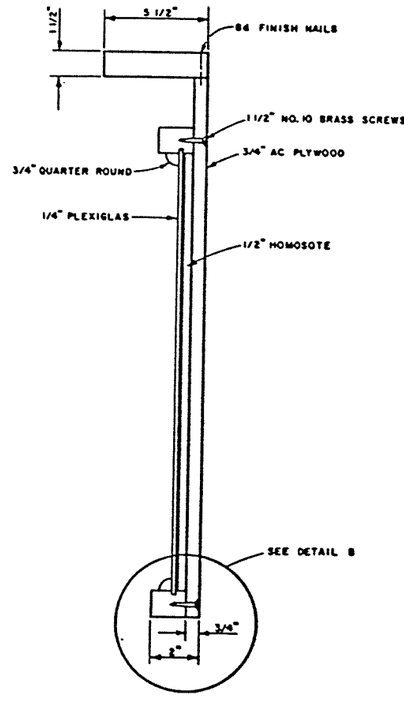
TYPICAL MOUNTING
NOT TO SCALE

GENERAL NOTES

1. ALL LUMBER SHALL BE DOUGLAS FIR, S-DRY.
2. TWO COATS PREPACO OIL BASE STAIN ON ALL WOOD (RUSSETT 63-138).
3. HARDWARE SHALL BE GALVANIZED.
4. TWO COATS OFF-WHITE LATEX PAINT ON HOMOSOTE. (ONE SIDE ONLY).
5. FOR MOUNTING ON POSTS OR LOGS SEE STANDARD DWG. S-8.



FRONT ELEVATION



SECTION A-A

BILL OF MATERIALS

LUMBER

9 FT. — 1 1/2" x 2" CLEAR
3 FT. — 2" x 6"
2'-0" x 2'-8" — 3/4" AC PLYWOOD
8 FT. — 3/4" QUARTER ROUND

HARDWARE

1 — 1 1/2" x 5" STRAP HINGE
1 — 3/8" x 2 1/2" CARRIAGE BOLT
24 — 1 1/2" NO. 10 FLATHEAD BRASS SCREWS
1'-9" x 2'-1 1/2" — 1/2" HOMOSOTE
1'-9" x 2'-2" — 1/4" PLEXIGLAS
1/4 LB. — 8d GALVANIZED FINISH NAILS
4" x 6" — 24 GAUGE ALUMINUM SHEET METAL
1/4 LB. — 2d GALVANIZED FINISH NAIL

MISCELLANEOUS

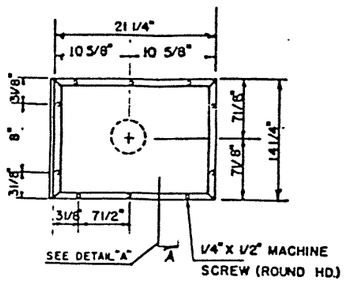
1 QT. — PREPACO OIL BASE STAIN
1 PT. — OFF WHITE LATEX PAINT

DEPARTMENT OF NATURAL RESOURCES DIVISION OF PARKS — STATE OF ALASKA	DESIGN & CONSTRUCTION SECTION	SCALE: 1/4" = 1" & NOTED	TRAIL BULLETIN BOARD	DRAWN T.D. CHECKED D.T. APPROVED DATE 7-16-82	SHEET 1 S-7 OF 1 SHEETS

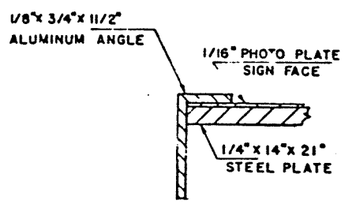
7-12-5

GENERAL NOTES

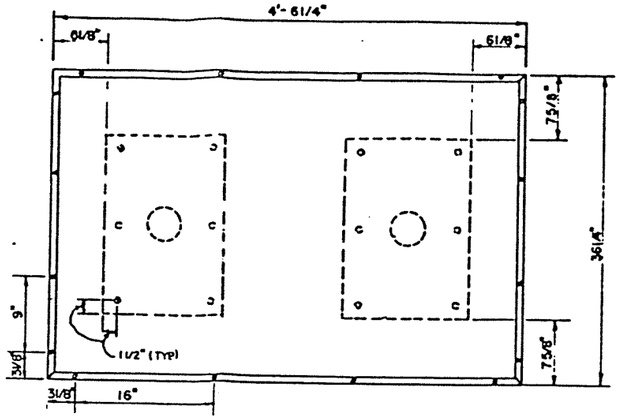
1. USE EPOXY GLUE TO SECURE PHOTO PLATE SIGN TO STEEL BACK PLATE
2. FASTEN ALUMINUM ANGLE FRAME TO BASE PLATE AFTER GLUING SIGN TO BASE.
3. DRILL & TAP HOLES IN BACK PLATE TO RECEIVE FRAME SCREW.
4. SIGN SHALL BE ADEQUATELY BRACED FOR 24 HRS. AFTER PLACING CONCRETE.
5. PAINT EXPOSED SECTION OF PIPE & PLATE WITH RUSTOLEUM BROWN PAINT.



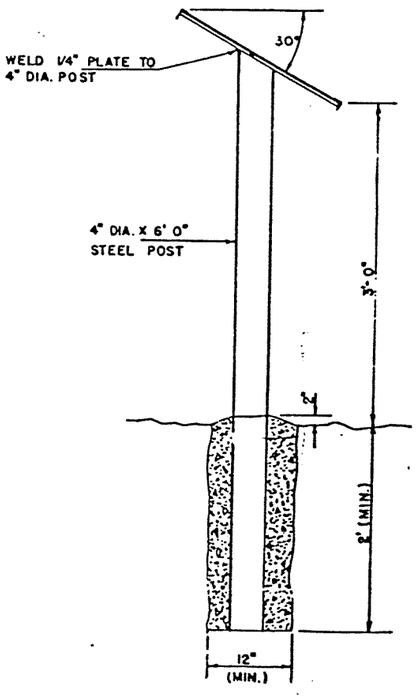
PLAN



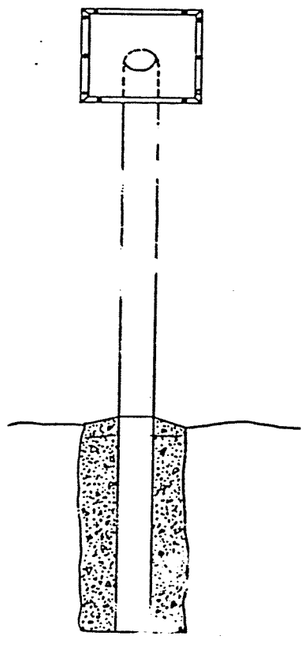
DETAIL A



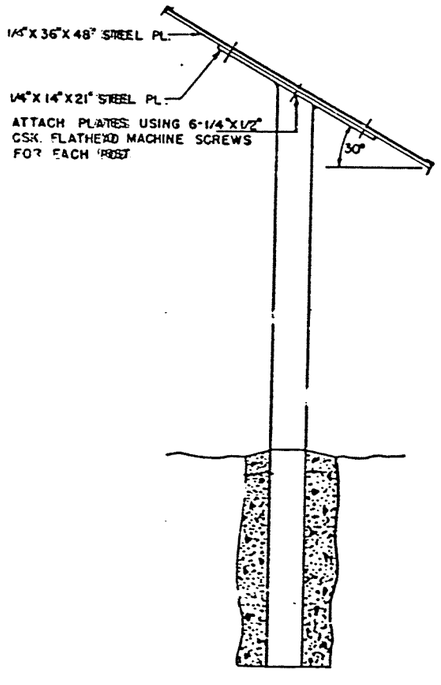
DETAIL B



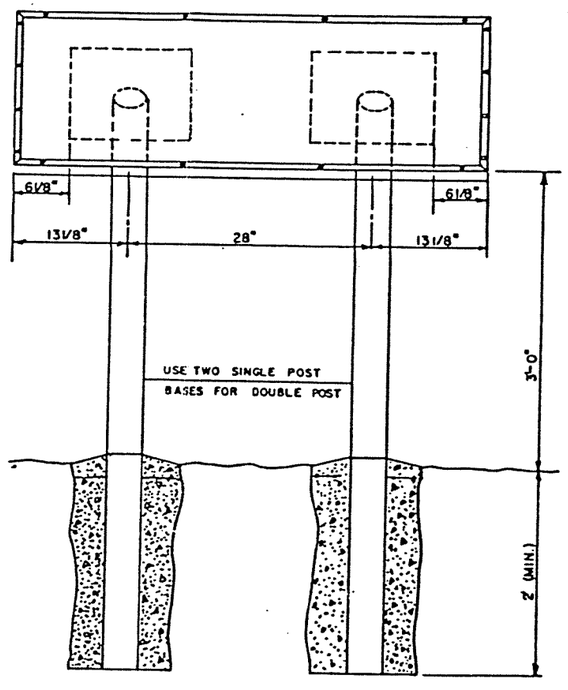
SIDE VIEW



ELEVATION



SIDE VIEW



ELEVATION

MATERIAL LIST

SINGLE POST INSTALLATION

1ea.	4" DIA X 6' STEEL POST
1ea.	1/4" X 14" X 21" STEEL PLATE
6ft	1/8" X 3/4" X 1 1/2" ALUMINUM ANGLE
10ea.	1/4" X 1/2" MACHINE SCREW (ROUND HD., ST STL.)
1/2cf	CONCRETE

DOUBLE POST INSTALLATION

2ea.	4" DIA X 6' STEEL POST
2ea.	1/4" X 14" X 21" STEEL PLATE
1ea.	1/4" X 36" X 54" STEEL PLATE
15ft.	1/8" X 3/4" X 1 1/2" ALUMINUM ANGLE
12ea.	1/4" X 1/2" MACHINE SCREW (FLATHD., CSK.)
16ea.	1/4" X 1/2" MACHINE SCREW (ROUNDHD.)
3cf.	CONCRETE

S-6

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF PARKS
STATE OF ALASKA

PARK DEVELOPMENT

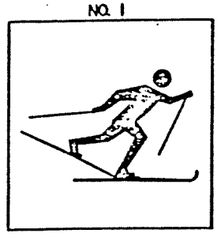
NO SCALE

STANDARD INTERPRETIVE SIGN INSTALLATION

DRAWN
CHECKED
APPROVED
DATE April 4/75

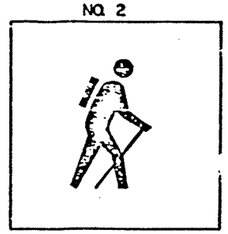
SHEET S-8 OF SHEETS

NO. 1



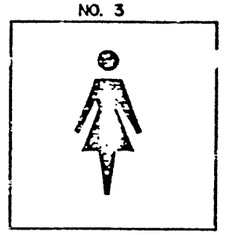
CROSS COUNTRY SKI TRAIL

NO. 2



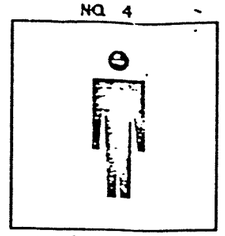
HIKING TRAIL

NO. 3



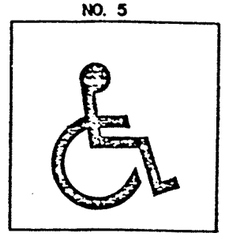
WOMEN'S RESTROOM

NO. 4



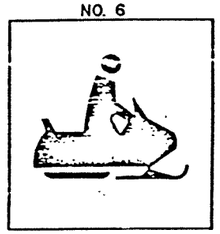
MEN'S RESTROOM

NO. 5



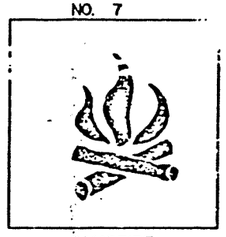
HANDICAPPED

NO. 6



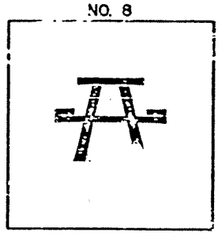
SNOWMOBILING

NO. 7



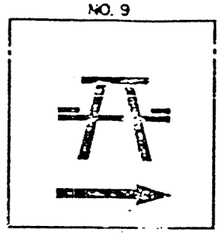
CAMPFIRE

NO. 8



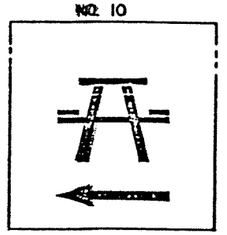
PICNIC AREA

NO. 9

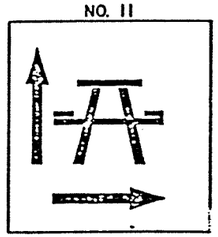


W/DIRECTIONAL ARROW

NO. 10



NO. 11



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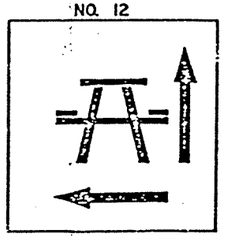

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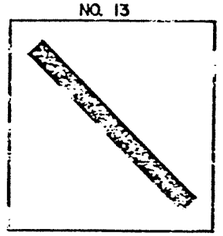
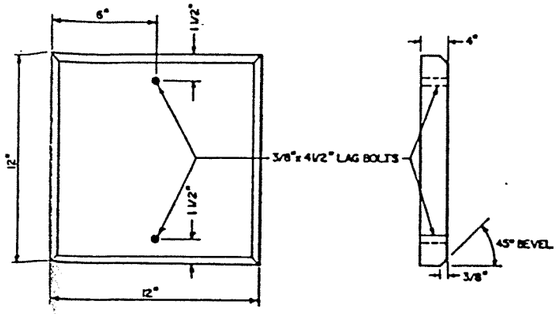
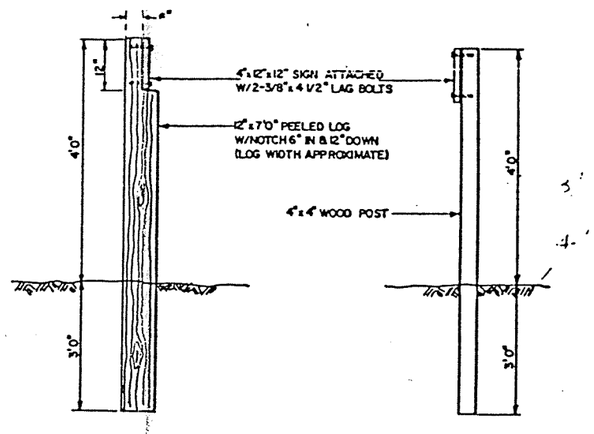


INDICATES ACTIVITY IS PROHIBITED
(CAN BE USED WITH ANY SYMBOL)



SIGN PLATE



LOG POST

4"x4" WOOD POST

GENERAL NOTES

1. ALL LUMBER SHALL BE DOUGLAS FIR, S-DRY, S4S.
2. ALL BURIED PORTIONS OF SIGNPOST SHALL BE PRESERVATIVE TREATED WITH PENTACHLOROPHENOL IN ACCORDANCE WITH AWPL STANDARD LP-77 AND AWPA STANDARD P-8 WITH A MINIMUM NET RETENTION OF 50LBS PER CU FT.
3. ROUTED PORTION OF SIGN PLATE TO BE PAINTED WITH TWO COATS WHITE EXTERIOR ENAMEL.
4. THE "ACTIVITY PROHIBITED" ACCESSORY SYMBOL TO BE PAINTED WITH TWO COATS RED EXTERIOR ENAMEL.
5. SIGN PLATE AND POSTS TO BE PAINTED WITH EITHER TWO COATS FLOOD CWF CLEAR WOOD FINISH FOR EXTERIOR WOOD OR TWO COATS PREPACO OIL BASE SOLID COLOR STAIN (RUSSETT 63-138)
   NOTE: RUSSETT STAIN SHOULD BE USED FOR SIGNS WHICH ARE TO BE VIEWED FROM A VEHICLE.
6. ALL HARDWARE SHALL BE GALVANIZED.

MATERIALS LIST

LUMBER ----- 1- 2"x12"x12"
1-12" (APPROX DIAM) x 7'0" PEELED LOG OR 4"x4"x7'0"

HARDWARE --- 2- 3/8"x4 1/2" LAG BOLTS

MISCELLANEOUS -- WHITE EXTERIOR ENAMEL
RED EXTERIOR ENAMEL (WHEN PROHIBITIVE ACCESSORY PLATE IS USED)
1/2 PINT- FLOOD CWF CLEAR WOOD FINISH FOR EXTERIOR WOOD OR PREPACO OIL BASE SOLID COLOR STAIN (RUSSETT 63-138)

S-5

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF PARKS — STATE OF ALASKA

PARK DEVELOPMENT SECTION

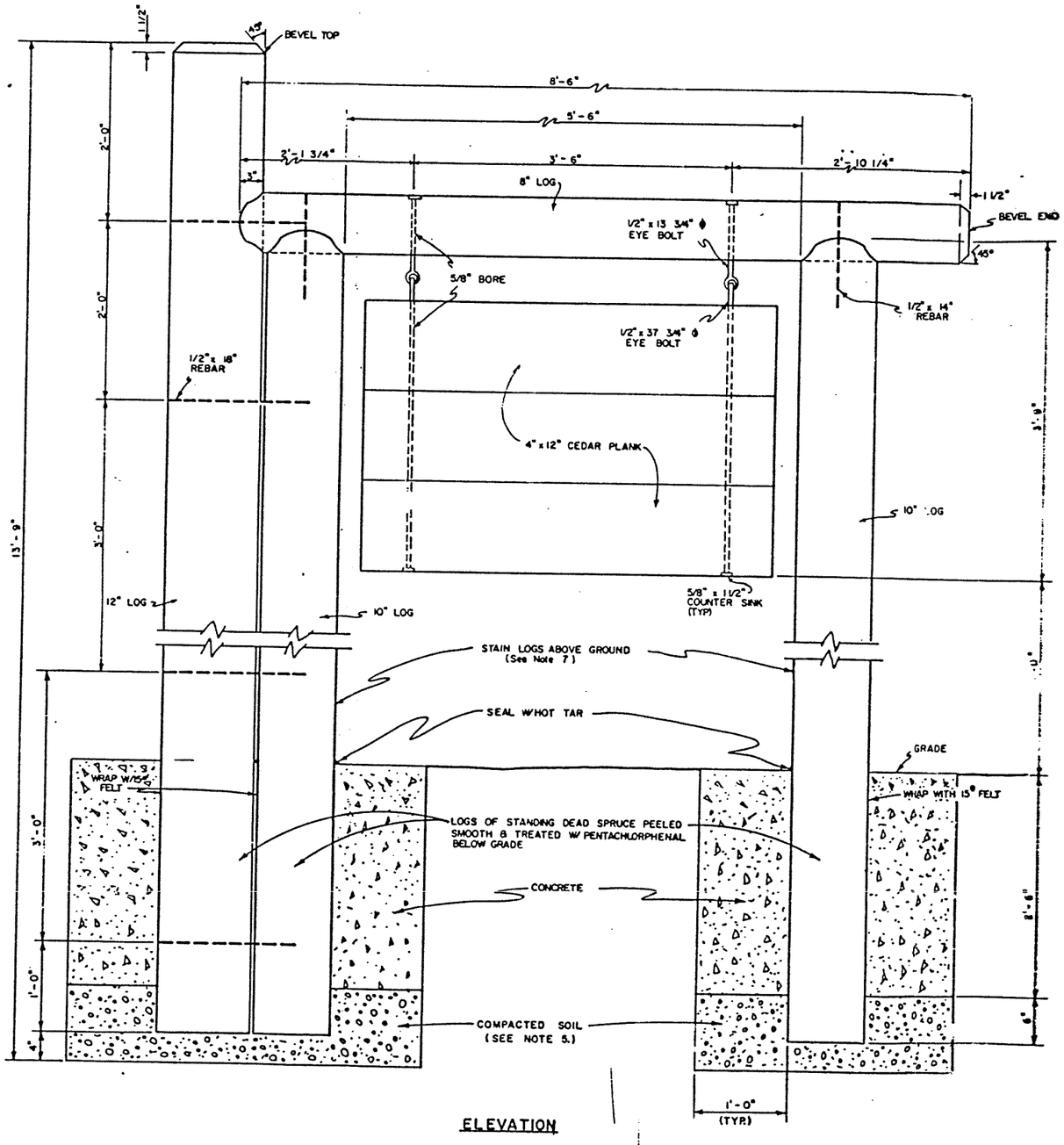
SCALE: AS NOTED

STANDARD WOOD SIGNS
SYMBOLS

DRAWN R.F.M.
CHECKED
APPROVED
DATE 11-14-77

SHEET 1
S-7A
OF 1 SHEETS

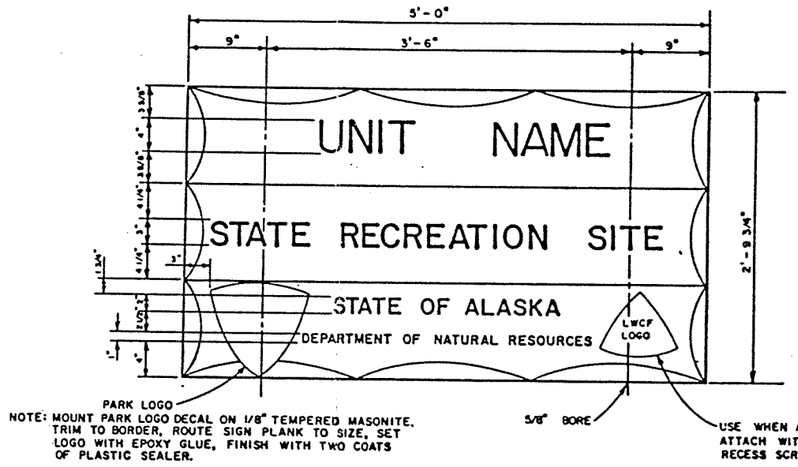
7-12-7



ELEVATION

NOTES

1. SIGN TO BE ROUTED BOTH SIDES AND PLACED AS SHOWN ON THE DRAWING.
2. ROUTED LETTERS TO BE STANDARD GOTHIC 5/16" DEEP & PAINTED W/ WHITE EXTERIOR ENAMEL – 2 COATS REQUIRED.
3. STAIN 4 x 12 CEDAR PLANK W/ PREPACO OIL BASE SOLID COLOR STAIN (RUSSETT 63-138) STAIN – 2 COATS REQUIRED.
4. HAND CHAMFER EDGES 1/2" x 2" AS SHOWN ON THE DRAWING BELOW.
5. SET LOG POSTS IN 6" OF COMPACTED SOIL PRIOR TO POURING CONCRETE.
6. SIZE OF LETTERS MAY VARY WITH WORD LENGTHS.
7. STAIN LOGS W/PREPACO OIL BASE STAIN (RUSSETT 63-138) - 2 COATS REQUIRED.



NOTE: MOUNT PARK LOGO DECAL ON 1/8" TEMPERED MASONITE. TRIM TO BORDER, ROUTE SIGN PLANK TO SIZE, SET LOGO WITH EPOXY GLUE, FINISH WITH TWO COATS OF PLASTIC SEALER.

SIGN

NO.	REVISION	DATE	APPVD.
5.	REVISED NOMENCLATURE ON SIGN	8-16-82	T.D.
4.	REVISED SIZE OF SIGN	6-22-82	T.D.
3.	ADDED NOTES & MISC.	4-16-82	
2.	ADDED CONCRETE SUPPORT, LWCF LOGO	9-15-81	
1.	CHANGED STAIN TO PREPACO OIL BASE STAIN	6-15-76	

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF PARKS
STATE OF ALASKA

DESIGN & CONSTRUCTION SECTION

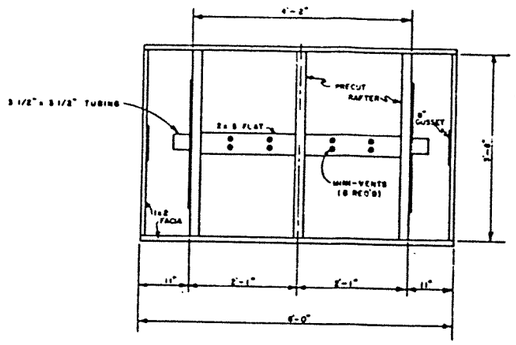
SCALE: 1 1/2" = 1' 0"

RECREATION SITE ENTRANCE SIGN

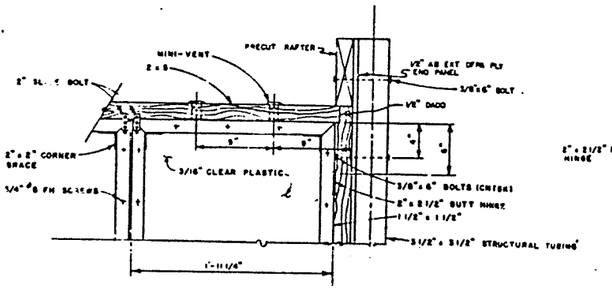
DRAWN MJ
CHECKED J.E.S.
APPROVED
DATE

SHEET 1
S-3
OF 1 SHEETS

7-17-8

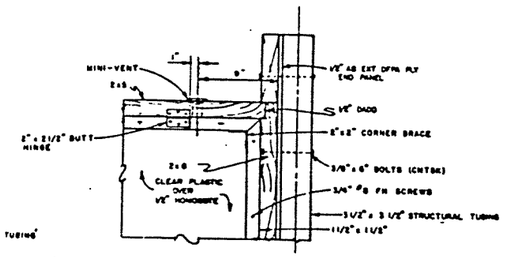


ROOF FRAMING PLAN



DETAIL I (FRONT)

SCALE: 1 1/2" = 1'-0"



DETAIL I (BACK)

SCALE: 1 1/2" = 1'-0"

GENERAL NOTE

1. ALL LUMBER SHALL BE DOUGLAS FIR, S-DRY, S4S.
2. TWO COATS PREPACO OIL BASE STAIN ON ALL WOOD.
3. TWO COATS OFF-WHITE LATEX PAINT ON HOMOSOTE.
4. ALL HARDWARE SHALL BE GALVANIZED, BRASS, OR CADMIUM PLATED STEEL.

MATERIALS LIST

LUMBER

"CONSTRUCTION" — BOARD

5	1 1/2" x 1 1/2" x 8' CLEAR
1	1" x 2" x 8' CLEAR
1	1" x 2" x 12' CLEAR

"SELECT STRUCTURAL" — STRUCTURAL LIGHT FRAMING

2	2" x 5" x 8'
2	3 1/2" x 3 1/2" x 10' STRUCTURAL TUBING

"SELECT STRUCTURAL" — JOISTS AND PLANKS

1	2 x 8 x 12'

PLYWOOD

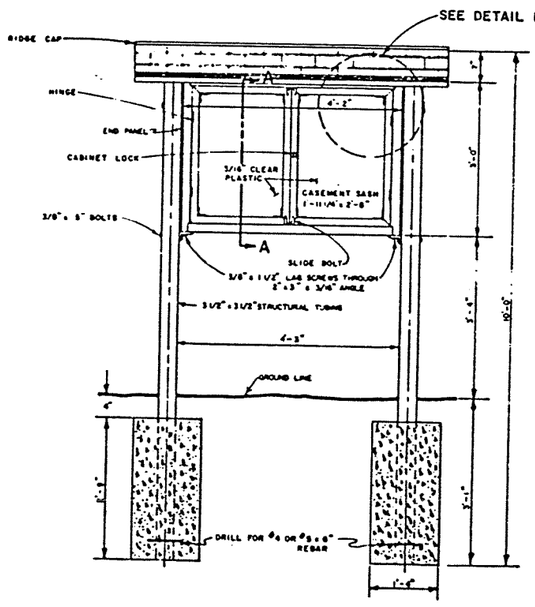
1	1/2" x 4' x 4' AB EXT. DFPA PLY.
2	3/4" x 4' x 8' AC EXT. DFPA PLY.

HARDWARE

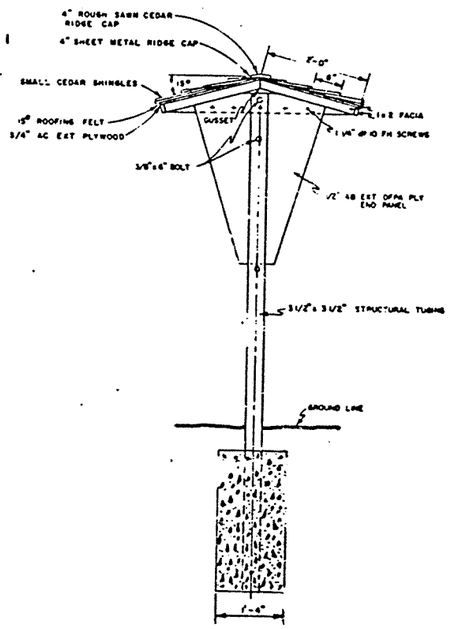
48	#8 x 3/4" BRASS F.H. SCREWS		
8	#10 x 1/4" FH SCREWS		
2	1/4" x 2 1/2" LAG SCREWS W/ WASHER	2	3/8" x 5" BOLTS
4	2" SLIDE BOLT	4	3/8" x 6" BOLTS
2	2" x 2 1/2" BUTT HINGE W/ SCREWS	2	2" x 3" x 3/16" ANGLES
1	7/8" TUMBLER CABINET LOCK	2	NO. 4 OR 5 x 6" REBAR
1/4 LB.	3/4" ROOFING NAILS	12	2" x 2" FLAT CORNER BRACE W/SCREWS
1/4 LB	1" SHINGLE NAILS	8	1" MINI-VENTS W/SCREEN
1/2 LB	6d COMMON NAILS		
1/2 LB	16d COMMON NAILS		
1	4" x 6' x 16 GA. METAL RIDGE CAP (BROWN)		

MISCELLANEOUS

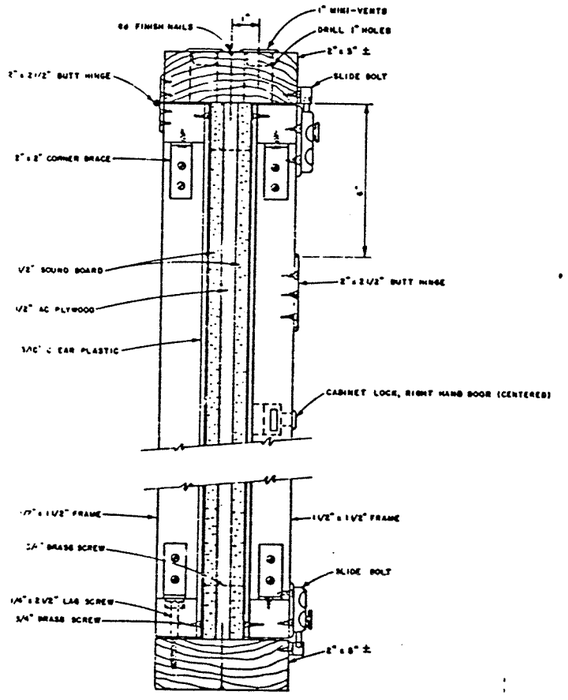
1/2 GAL.	PREPACO OIL BASE SOLID COLOR STAIN (RUSSETT 63-138)
1 QT	OFF-WHITE LATEX PAINT
2	1/2" x 2'-8" x 3'-10" HOMOSOTE
1	3/16" x 2'-8" x 3'-10" CLEAR PLASTIC
3	CU. FT CONCRETE
2	3/16" x 1'-11 1/4" x 2'-8" CLEAR PLASTIC
1	BUNDLE SMALL CEDAR SHINGLES
12'	15# ROOFING FELT
6'	4" ROUGH SAWN CEDAR RIDGE CAP



FRONT ELEVATION

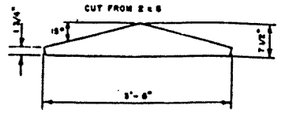


END ELEVATION

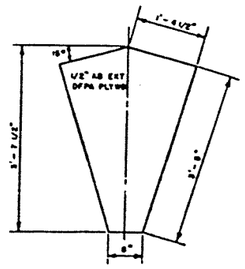


SECTION A-A

SCALE: 3/8" = 1'-0"



RAFTER PATTERN



END PANEL PATTERN

NO.	REVISION	DATE	APPVD.
5	ADDED VENTS	9-17-82	T.D.
4	REVISED & CLARIFIED DIMENSIONS	8-3-82	T.D.
3	REVISED CABINET & ROOF	4-5-82	T.D.
2.	CHANGED TO METAL SUPPORTS SET IN CONCRETE	7-14-81	
1	CHANGED STAIN TO PREPACO OIL BASE STAIN	6-15-76	

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF PARKS
STATE OF ALASKA

DESIGN & CONSTRUCTION SECTION

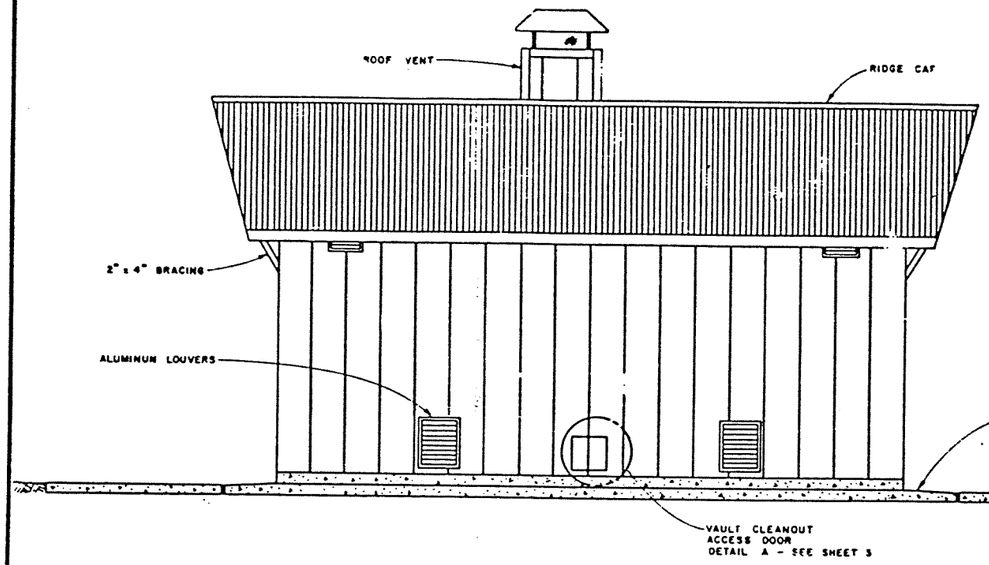
SCALE: 3/4" = 1'-0"

BULLETIN BOARD

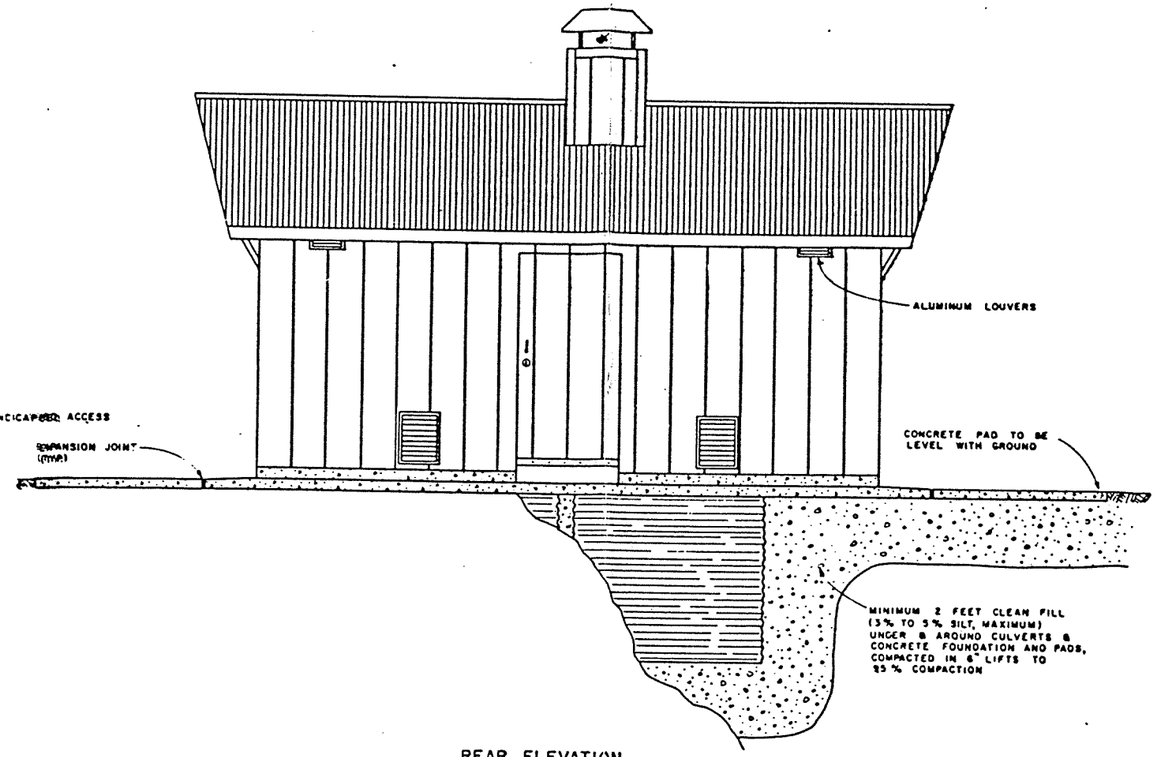
DRAWN MJ
CHECKED J.F.S.
APPROVED
DATE

SHEET 1
S-1
OF 1 SHEETS

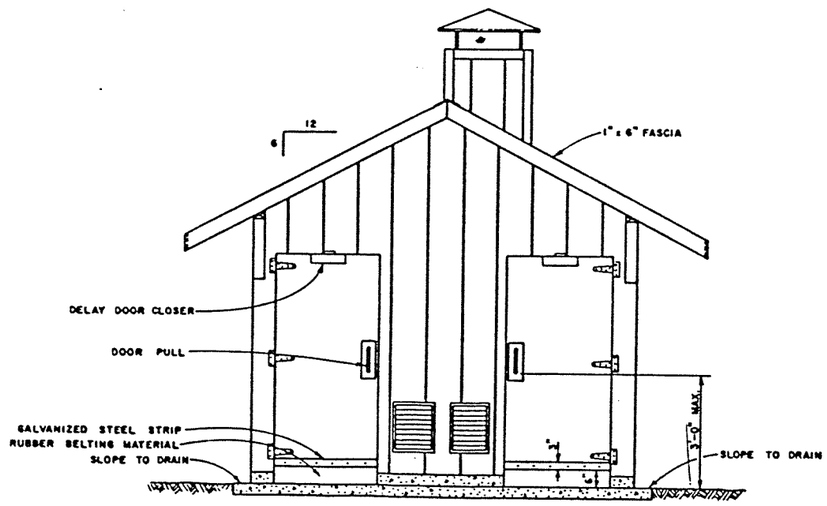
7-17-9



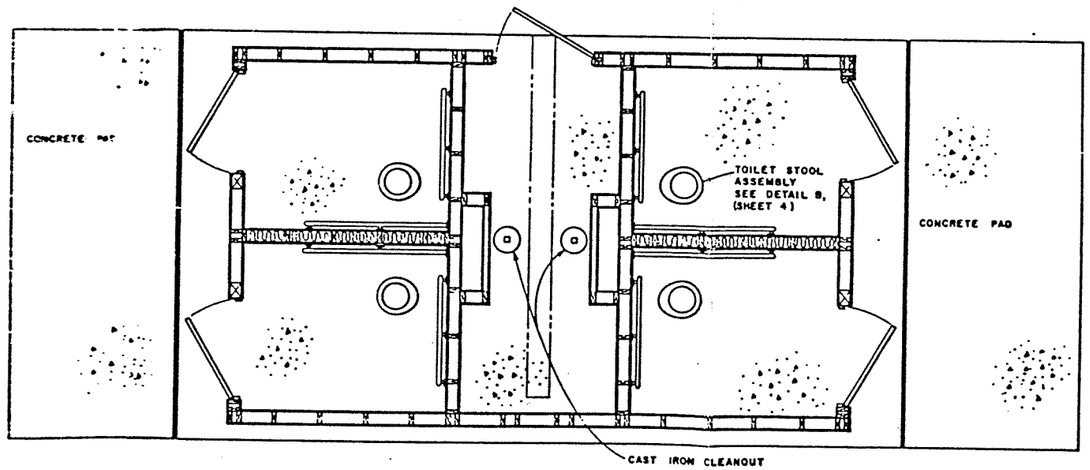
FRONT ELEVATION



REAR ELEVATION



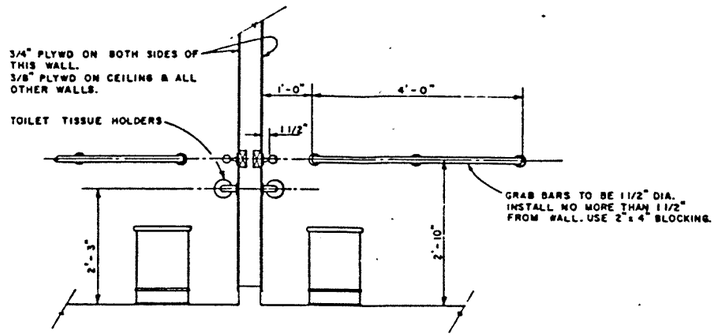
RIGHT SIDE ELEVATION



FLOOR PLAN

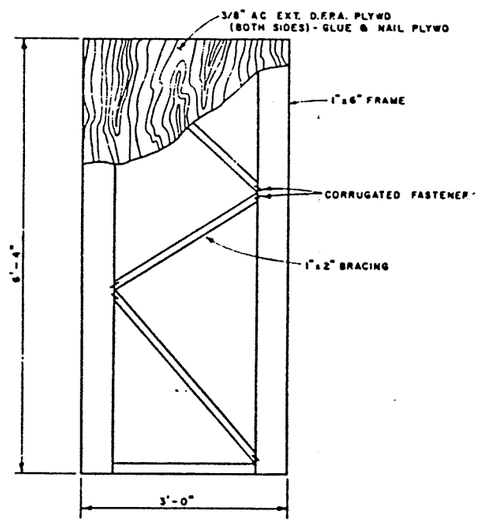
DEPARTMENT OF NATURAL RESOURCES DIVISION OF PARKS — STATE OF ALASKA	DESIGN & CONSTRUCTION SECTION	SCALE: 1/2" = 1'-0"	DOUBLE VAULTED TOILET WITH ENCLOSED ATTIC	DRAWN T.D. CHECKED D.N. APPROVED DATE 3-21-82	SHEET 1 R-8 OF 4 SHEETS

7-12-10



INTERIOR ELEVATION

NOT TO SCALE



DOOR DETAIL

SCALE: 1" = 1'-0"

GENERAL NOTES:

1. ALL WOOD SHALL BE DOUGLAS FIR, S-DRY, S4S.
2. ALL FRAMING TO BE MADE FROM 2 x 4'S, UNLESS OTHERWISE INDICATED.
3. SOLE PLATES SHALL BE PRESERVATIVE TREATED WITH PENTACHLOROPHENOL, IN ACCORDANCE WITH A.W.P.A. STANDARD C14-77 & A.W.P.A. STANDARD P-8 WITH A MINIMUM NET RETENTION OF .50 LBS. PER CU. FT.
4. A SILICONE GROUT SHALL BE PLACED AT THE FOLLOWING LOCATIONS
   a. STOOL FLANGES TO FLOOR
   b. AROUND VENT DUCTING AT FLOOR CONNECTION & STUDS AT CEILING CONNECTION
   c. PARTITION WALLS ADJACENT TO VENT
   d. SKYLIGHTS TO CEILING
   e. ROOF JACK TO ROOF
   f. INSIDE WALLS TO CEILING
5. FINISHED GROUND PROFILE SHALL BE FLUSH WITH ENTRANCE DECK OR PAD SURFACE AT FRONT OF BUILDING TO ACCOMODATE WHEELCHAIR TRAFFIC.
6. DIVIDER WALL TO BE COVERED WITH 3/8" A-C EXT. D.F.P.A. PLYWOOD; CEILING AND INTERIOR WALLS TO BE COVERED WITH 3/8" A-C EXT. D.F.P.A. PLYWOOD.
7. INTERIOR WALLS AND CEILING TO BE SEALED AND PAINTED WITH 2 COATS OF EXT. WHITE, SEMI-GLOSS ENAMEL.
8. ATTIC AREA SHALL BE SEALED AS TIGHT AS POSSIBLE.
9. EXTERIOR OF BUILDING TO BE COVERED WITH T1-11 SIDING WITH 8" GROOVES, & STAINED WITH PREPACO OIL BASE SOLID COLOR STAIN (RUSSETT 63-138), 2 COATS REQ'D.
10. CLOSED CELL SPONGE WEATHERSTRIPPING 1/2" WIDE x 1/16" THICK TO BE STAPLED ON DOOR JAMB AS A SOUND DEADENER.

MATERIALS LIST

LUMBER

6 - 1"x2"x16 FT. (DOOR STOPS FRAMING, ROOF VENT TRIM, DOOR BRACING)
8 - 1"x3"x 8 FT. (LOUVER & SKYLIGHT FRAMING)
4 - 1"x4"x 8 FT. (FASCIA)
6 - 1"x4"x 14 FT. (FASCIA, FILLER STRIPS, & DOOR CONSTRUCTION)
2 - 1"x6"x 14 FT. (ROOF NAILERS)
6 - 1"x6"x 16 FT. (ROOF NAILERS)
2 - 1"x6"x 18 FT. (ROOF NAILERS)

36 - 2"x4"x 7'-6 1/2" (WALL FRAME STUDS - OUTER)
24 - 2"x4"x 8 FT. (RAFTERS)
12 - 2"x4"x 8'-8" (CEILING JOISTS)
4 - 2"x4"x 6 FT. (PLATES)
2 - 2"x4"x 14 FT. (PLATES)
2 - 2"x4"x 16 FT. (PLATES)
2 - 2"x4"x 16 FT. (TREATED SOLES)
12 - 2"x4"x 18 FT. (NAILERS, SPACERS, ROOF VENT & MISC. BLOCKING & FORMS)
1 - 2"x10"x 5 FT. (TREATED; DIVIDER WALL)
1 - 2"x10"x 8'-4" (DIVIDER WALL)
1 - 2"x10"x 16 FT. (DIVIDER WALL)
2 - 2"x12"x 10 FT. (HEADERS)
1 - 2"x 6"x 16 FT. (RIDGE POLE)

2 - 4"x4"x 6'-3" (DOOR FRAMING)
2 - 4"x 6"x 6'-3" (DOOR FRAMING)

PLYWOOD

19 - 3/8"x 4 FT. x 8 FT. AC EXT. D.F.P.A.
3 - 3/4"x 4 FT. x 8 FT. AC EXT. D.F.P.A.
9 - 3/8"x 4 FT. x 8 FT. T1-11 D.F.P.A. (8" GROOVES)

HARDWARE & MISCELLANEOUS

1 - 5'x 5'x 16 GA. CULVERT W/ 2 2/3"x 1/2" CORRUGATIONS
18 - 1/2"x 8" ANCHOR BOLTS
330 FT. - #3 REBAR
1 - 8"W x 30"L x 10"HIGH 24 GA. GALV. DUCTING
1 - 8"W x 30"L x 8'-4" HIGH 24 GA. GALV. DUCTING
10 LBS. - 1 3/4" ROOFING NAILS W/NEOPRENE WASHERS
20 LBS. - 6d GALV. FINISH NAILS
20 LBS. - 16d GALV. COMMON NAILS
2 - 12"H x 12"W LOUVER ASS'Y (McM-C # 2049K14 OR EQUAL)
4 - 18"H x 14"W LOUVER ASS'Y (McM-C # 2049K17 OR EQUAL)
2 - TISSUE HOLDERS (ACME)
2 - 3" HAT/COAT HOOKS
1 - CAST IRON CLEANOUT (OLYMPIC FOUNDRY # 3518)
2 - FOREST TOILET STOOL ASS'Y (HANDICAPPED) (REHCO)
.37 YDS. - TYPE 5 CEMENT (SULFATE RESIST)
3.50 YDS. - STANDARD CEMENT
6 - TUBES SILICONE GROUT
6 - 8" T-TYPE HEAVY DUTY DOOR HINGES (McM-C # 1530A43 OR EQUAL)
2 - 10" H.D. ADJUSTABLE DOOR SPRINGS (McM-C # 1474A19 OR EQUAL)
2 - 1/4" THICK x 8"x 36" RUBBERIZED BELTING
2 - 1/8"x 2" x 36" GALV. STEEL STRAPS
10 - 1/4" x 1 1/2" LAG BOLTS
2 - DOOR PULLS (McM-C # 1404A11 OR EQUAL)
4 - MAGNETIC DOOR CATCH (McM-C # 1101A12 OR EQUAL)

16 FT. - 1/4" THICK x 1/2" WIDE WEATHERSTRIPPING
4 - 1/2" O.D. x 4 FT. LONG GRAB BARS W/CENTER & END MOUNTS
4 - 14" x 20" REINFORCED RIGID VINYL WINDOWS
16 3/4 FT. - CORRUGATED RIDGE CAP
18 SHEETS - 2'x 5' HEAVY DUTY CORRUGATED FIBERGLASS ROOFING
60 FT. - CORRUGATED RUBBER ROOFING FILLER STRIP
2 - HOOK & EYE (McMASTER-CARR # 1779A15)
1 - 3 1/2'x 2' GALV. SHEET METAL (24 GA.) FOR ROOF VENT
12 FT. - 10" WIDE GALVANIZED FLASHING
1 - 8" x 7 FT. METAL INSECT SCREENING
75 SQ. FT. - BLACK BUILDING PAPER
110 SQ. FT. - 4" FIBERGLASS INSULATION (UNFACED)
2 - 1/2" x 4" x 10 FT. EXPANSION JOINT

6 GAL. - WOOD SEALER
5 GAL. - PREPACO OIL BASE STAIN (RUSSETT 63-138)
5 GAL. - WHITE EXT. SEMI-GLOSS ENAMEL PAINT
4 GAL. - CONCRETE SEALER
4 GAL. - BLACK BITUMINOUS ASPHALT PAINT (McMASTER-CARR # 7746T61)

NO.	REVISION	DATE	APPROVED
1	UPDATED DRAWING, NOTES & MATERIALS	6-2-82	T.D.

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF PARKS — STATE OF ALASKA

DESIGN & CONSTRUCTION SECTION

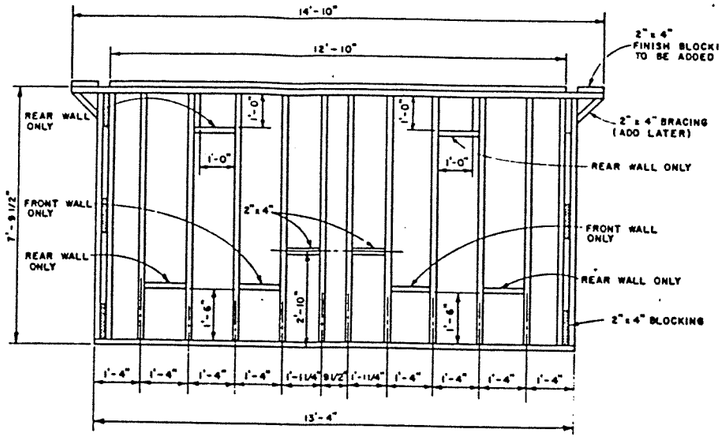
SCALE: NOTED

SINGLE VAULTED TOILET WITH ENCLOSED ATTIC

DRAWN T.D.
CHECKED
APPROVED
DATE 4-15-82

SHEET 3
R-7
OF 3 SHEETS

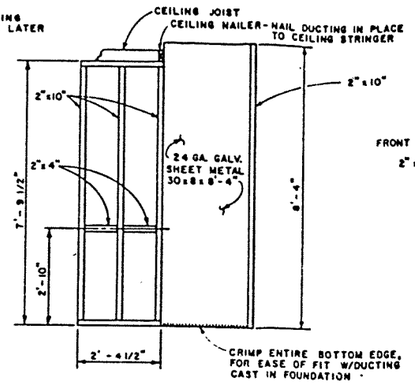
7-17-11



FRONT & REAR WALL ELEVATION

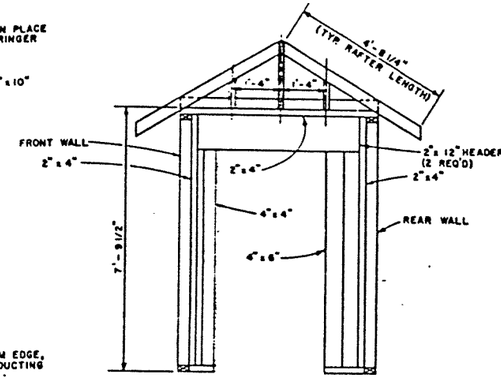
SCALE: 1/2" = 1'-0"

NOTE: CONSTRUCT ENTIRE WALL OF 2" x 4"



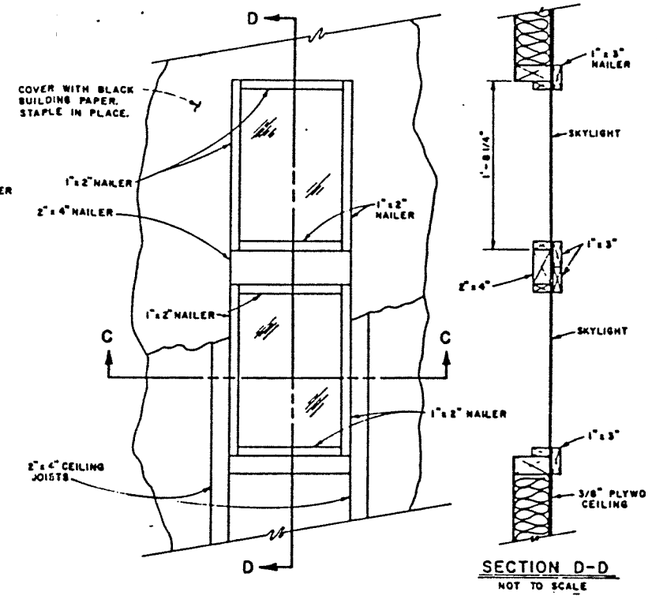
INTERIOR WALL ELEVATION

SCALE: 1/2" = 1'-0"



END WALL ELEVATION

SCALE: 1/2" = 1'-0"

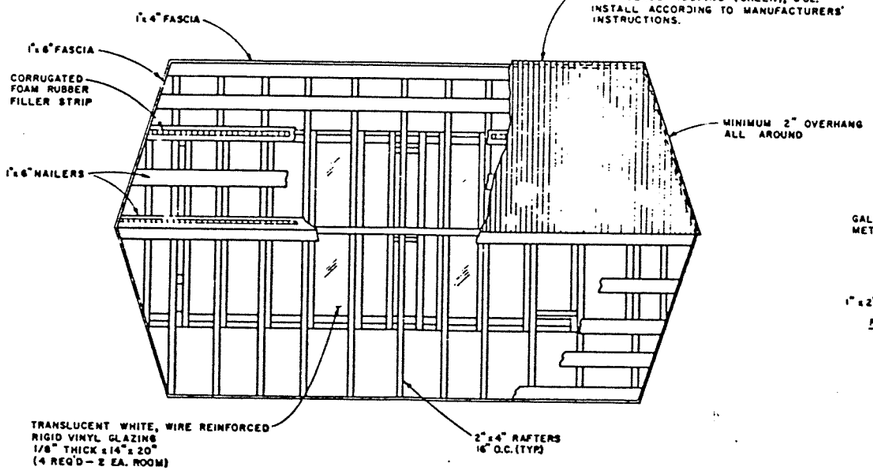


SECTION D-D

NOT TO SCALE

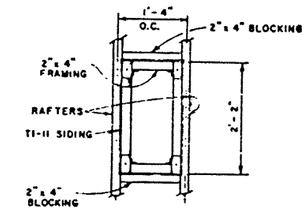
ATTIC VIEW OF SKYLIGHT

NOT TO SCALE



ROOF & ATTIC VIEW

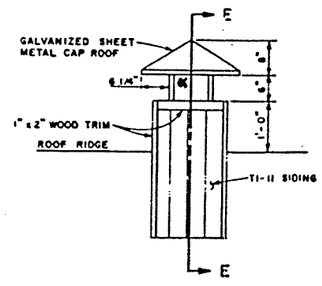
NOT TO SCALE



VENT PLAN VIEW

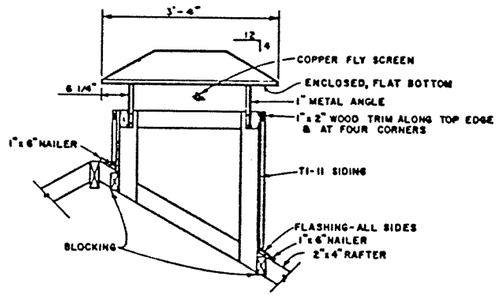
NOT TO SCALE

NOTE:
FABRICATE VENT CAP OUT OF GALVANIZED SHEET METAL. PRIME & PAINT WITH RUSTOLEUM PAINT (MATCH TRIM).



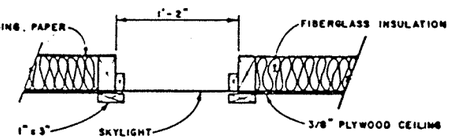
EXTERIOR END VIEW

NOT TO SCALE



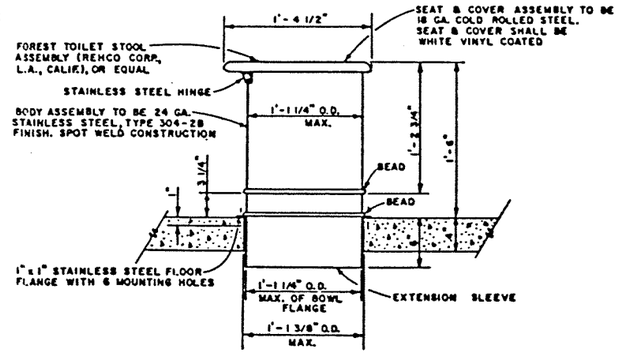
SECTION E-E

NOT TO SCALE



SECTION C-C

NOT TO SCALE



SECTION B-B

(ROTATED 90° COUNTER CLOCKWISE)

NOT TO SCALE

NO.	REVISION	DATE	APPROVED
1	UPDATED DRAWING	6-2-82	T.D.

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF PARKS — STATE OF ALASKA

DESIGN & CONSTRUCTION SECTION

SCALE: 1/2" = 1'-0" & NOTED

SINGLE VAULTED TOILET WITH ENCLOSED ATTIC

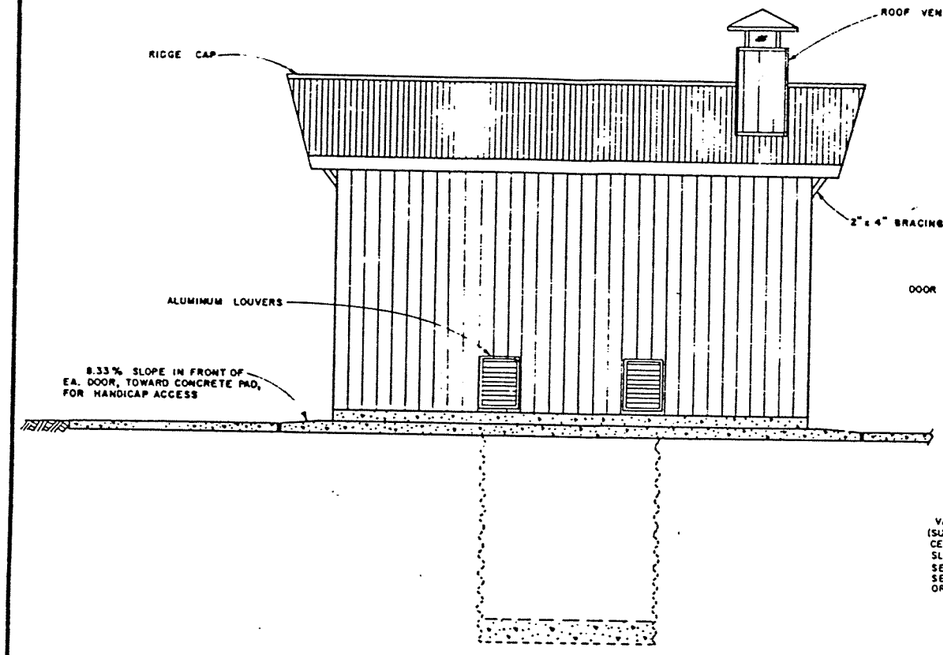
DRAWN T.D.
CHECKED
APPROVED
DATE 4-15-82

SHEET 2

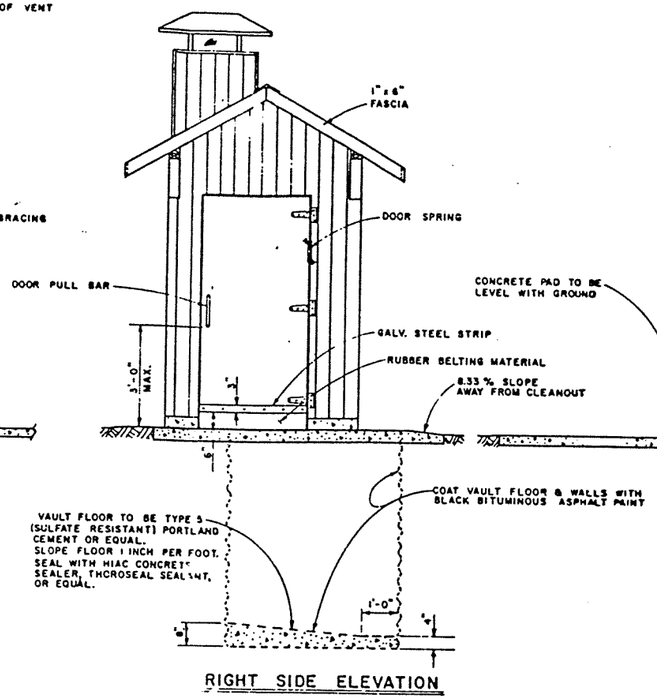
R-7

OF 3 SHEETS

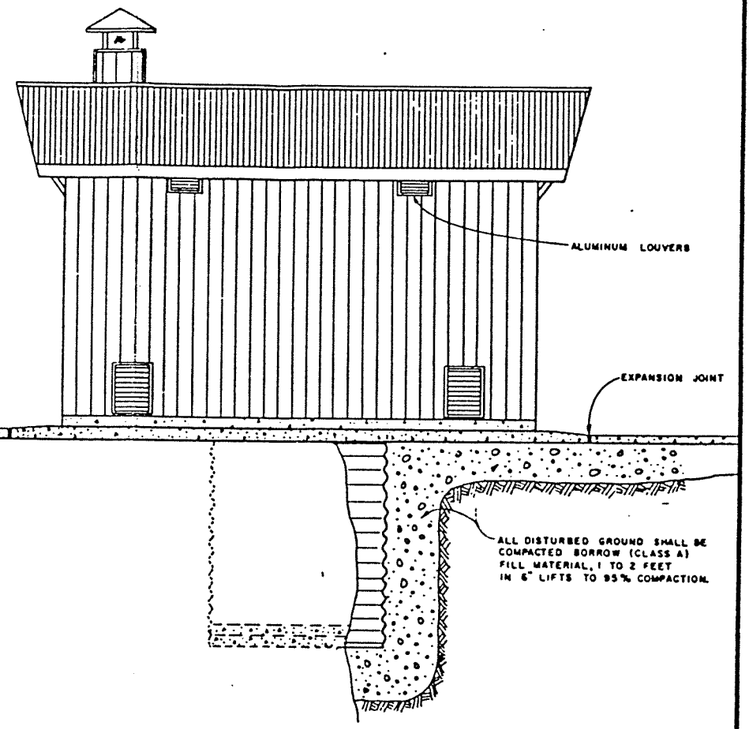
7-12-12



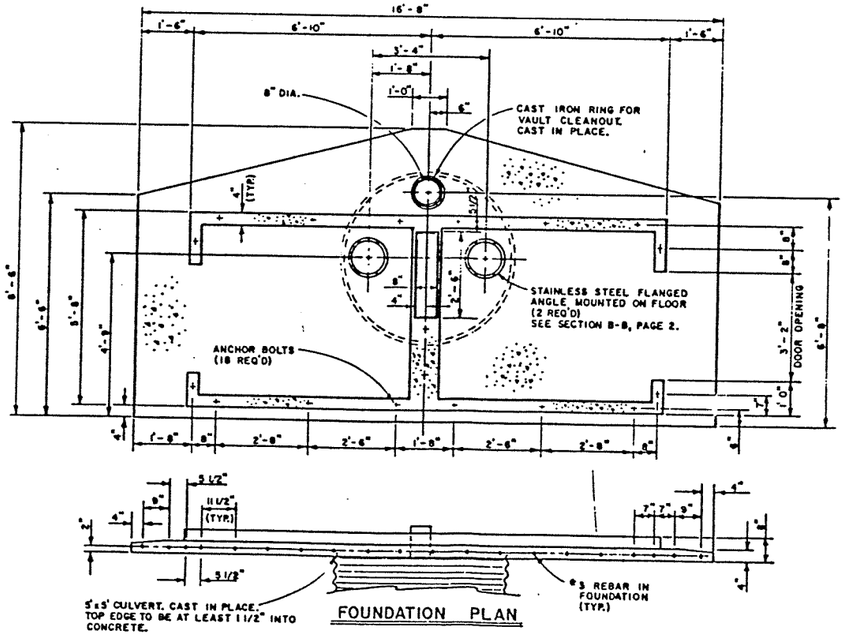
FRONT ELEVATION



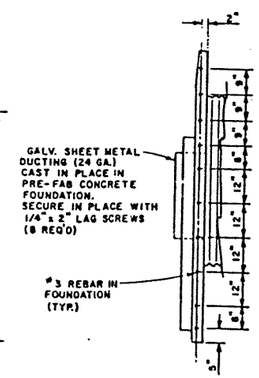
RIGHT SIDE ELEVATION

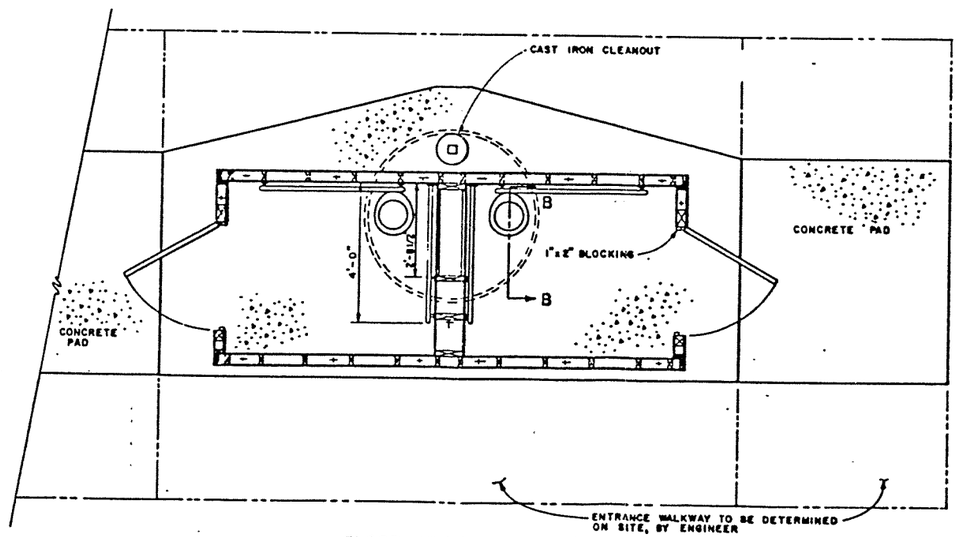


REAR ELEVATION



FOUNDATION PLAN





FLOOR PLAN

NO.	REVISION	DATE	APPROVED
1	UPDATED DRAWING	6-2-82	T.D.

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF PARKS — STATE OF ALASKA

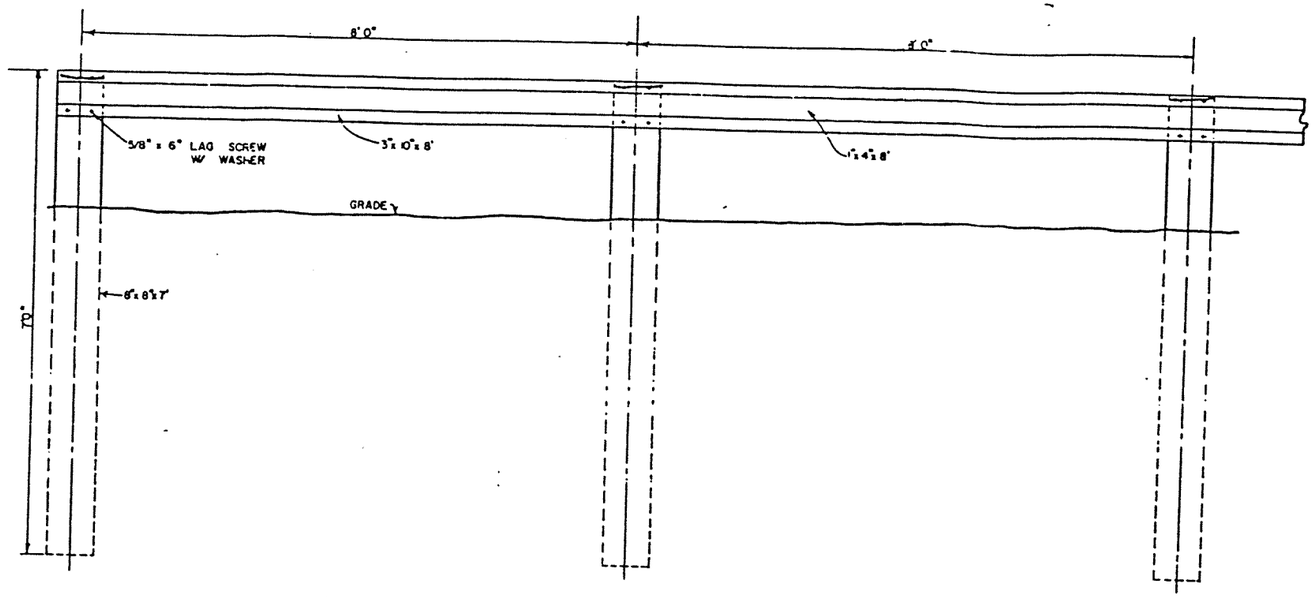
DESIGN & CONSTRUCTION SECTION

SCALE: 1/2" = 1'-0"

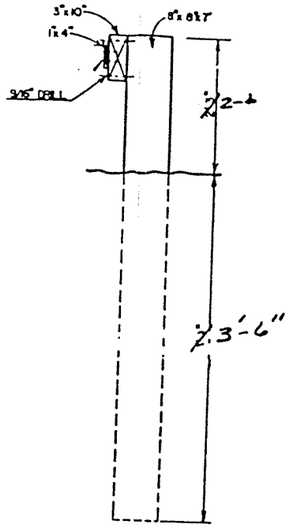
SINGLE VAULTED TOILET WITH ENCLOSED ATTIC

DRAWN T.D.
CHECKED
APPROVED
DATE 4-15-82

SHEET 1
R-7
OF 3 SHEETS



SAFETY GUARD RAIL



END SECTION

NOTES

1. ALL WOOD EXCEPT 1x4'S SHALL BE PRESERVATIVE TREATED WITH PENTACHLOROPHENOL IN ACCORDANCE WITH AWPA STANDARD LP-77 AND AWPA STANDARD P-8 WITH A MINIMUM NET RETENTION OF 50 LBS PER CU FT.

2. 1"x4"x8' PAINTED WHITE-FASTENED W/ 60 GALV. NAILS STAGGERED 12" O.C OR "SCOTCHLITE" REFLECTIVE DELINEATOR, H-19, 3271 YELLOW.

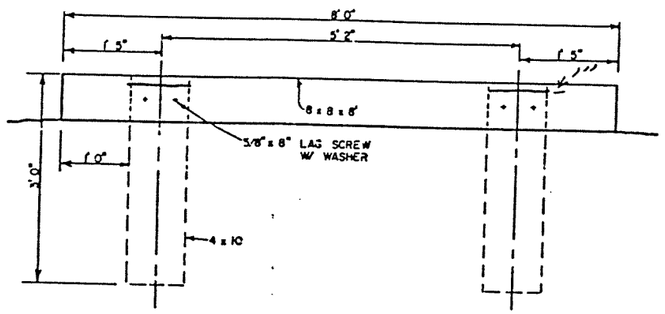
MATERIAL LIST

SAFETY GUARD RAIL

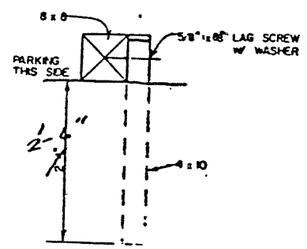
1.	1	3"x10"x8' RAIL
2.	1	8"x8"x7' POST
3.	-	[illegible] (SEE NOTE 2)
4	4	5/8"x6" GALVANIZED LAG SCREW W/WASHER

PARKING BUMPER

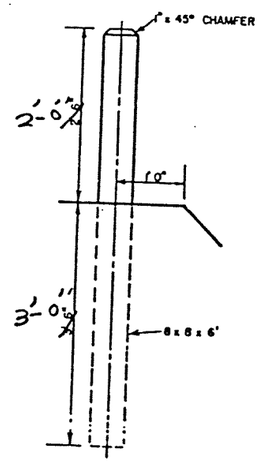
1	1	8"x8"x8'
2	1	4"x10"x6'
3	4	5/8"x8" LAG SCREW/ WASHER



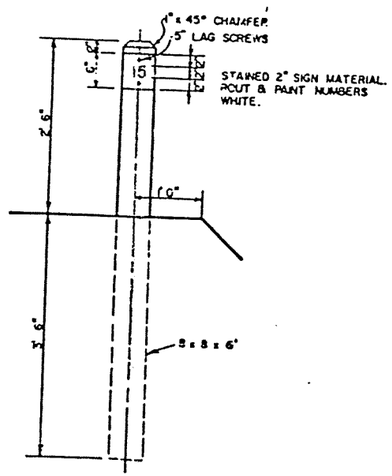
PARKING BUMPER



END SECTION



GUARD POST



GUARD POST & SPACE NUMBER

L	CHANGED LENGTH OF GUARD POSTS	4-18-77	[illegible]
NO	REVISION	DATE	APPVD.

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF PARKS — STATE OF ALASKA

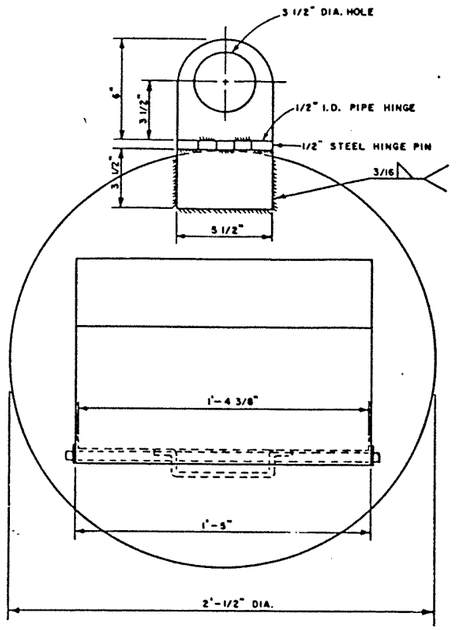
DESIGN & CONSTRUCTION SECTION

SCALE: 1" = 10"

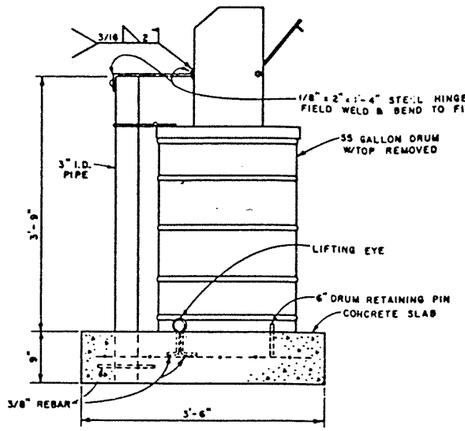
BARRIER
~~SAFETY GUARD RAIL~~
PARKING BUMPER LOG
GUARD POST, NUMBER POST

DRAWN [illegible]
CHECKED J.F.S.
APPROVED [illegible]

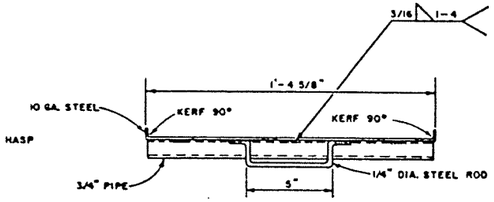
SHEET 1
P-3



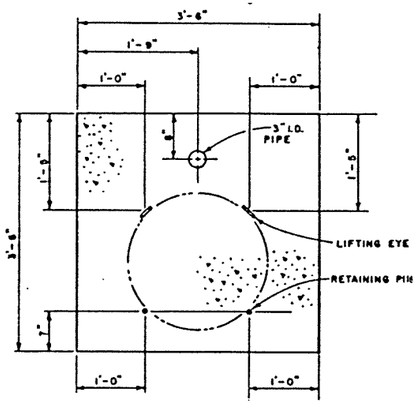
TOP VIEW



INSTALLATION
SCALE: 1" = 1'-0"



DOOR DETAIL
SCALE: 1" = 1'-0"



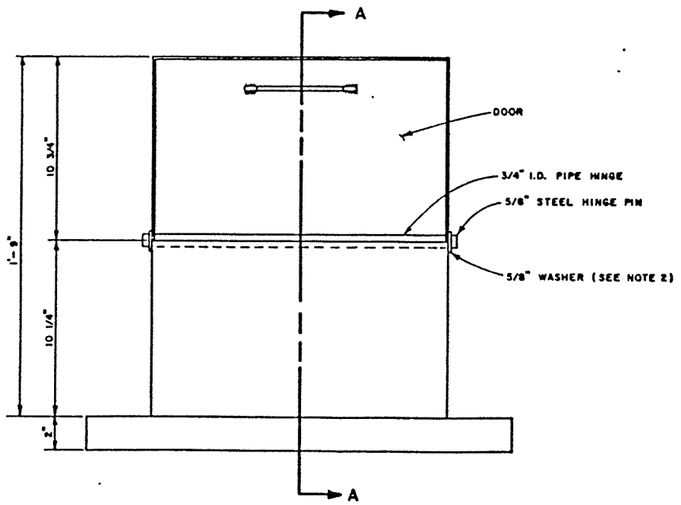
CONCRETE SLAB
SCALE: 1" = 1'-0"

GENERAL NOTES

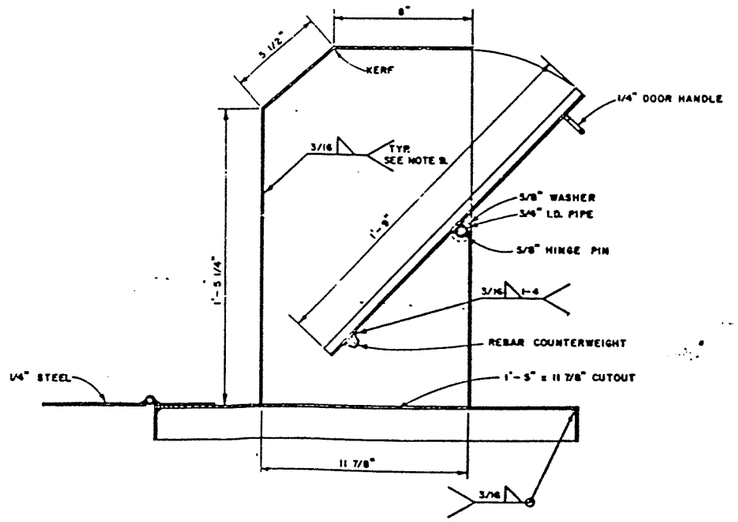
1. SHEET STEEL TO BE 10 GAUGE (1/8") SHEET.
2. WASHERS TO BE WELDED EACH SIDE TO DOOR PIN.
3. USE BOTTOM PLATE CUTOUT (1'-5" x 11 7/8") AS FRONT PLATE.
4. HEAT & WELD 2" STRIP TO OUTSIDE OF BOTTOM PLATE.
5. LIFTING EYES ARE 3/8" REBAR FOR LIFTING CONCRETE SLAB & HOLDING DRUM IN PLACE.
6. DRUM RETAINING PINS TO EXTEND 1 1/2" ABOVE SLAB.
7. PLACE TOP ON DRUM & WELD HINGED HASP LEVEL.
8. PRIME ALL EXPOSED METAL WITH RUSTOLEUM # 960 ZINC CHROMATE, & THEN PAINT WITH RUSTOLEUM # 956 ORANGE.
9. ALL WELDS TO BE 3/16 FILLET.

BILL OF MATERIALS

1 SHEET — 10 GA. STEEL (3'-0" x 6'-0")
18 INCHES — 3/4" I.D. IRON PIPE
6 INCHES — 1/2" I.D. IRON PIPE
4 FT. 6 INCHES — 3" I.D. IRON PIPE
1 — 1/4" x 5 1/2" x 10" STEEL
10 INCHES — 1/4" STEEL ROD
8 INCHES — 1/2" STEEL ROD
18 INCHES — 5/8" STEEL ROD
2 — 5/8" STEEL WASHERS
43 FT. — 3/8" REBAR (# 3)
1/3 CU. YD. — CONCRETE
1 QT. — RUSTOLEUM # 960 ZINC CHROMATE PAINT
1 QT. — RUSTOLEUM # 956 ORANGE PAINT



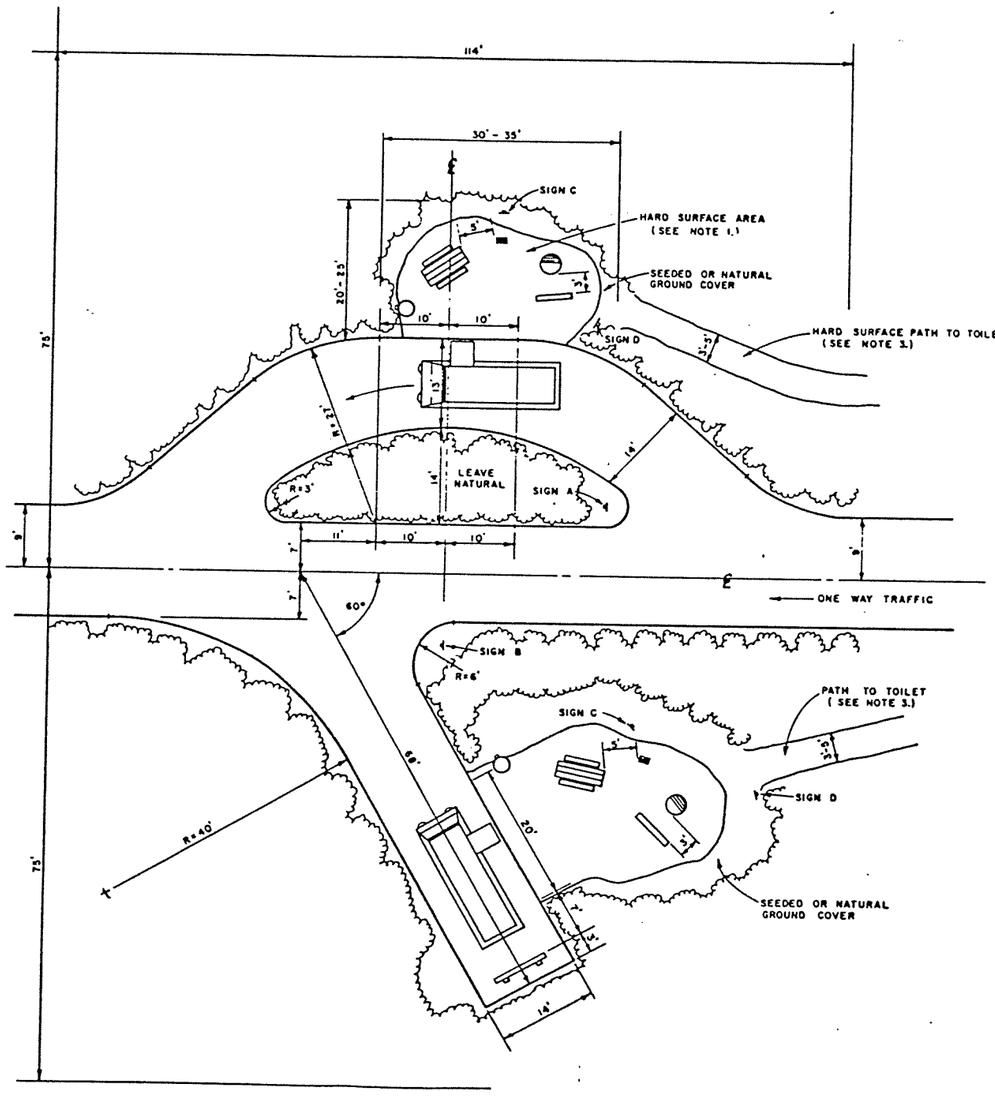
FRONT VIEW

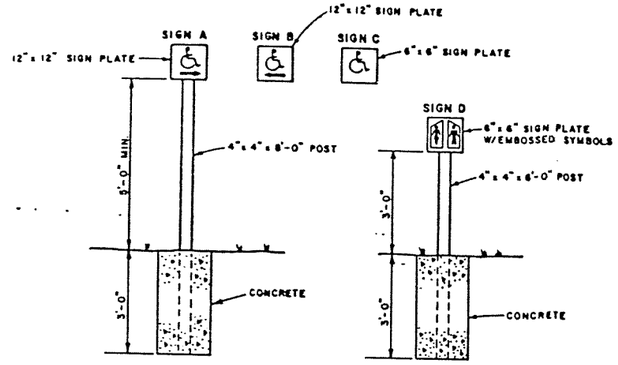


SECTION A-A

DEPARTMENT OF NATURAL RESOURCES DIVISION OF PARKS — STATE OF ALASKA	DESIGN & CONSTRUCTION SECTION	SCALE: 1/4" = 1" & NOTED	BEARPROOF GARBAGE CAN	DRAWN T.D. CHECKED D.M. APPROVED DATE 8-3-82	SHEET 1 C-17 OF 1 SHEETS

7-17-15



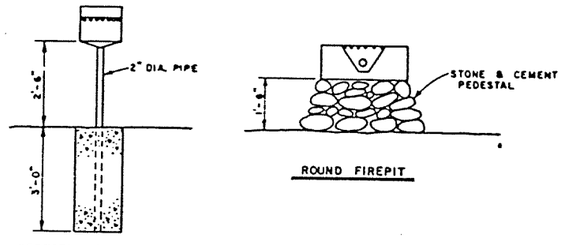


TYPICAL SIGN INSTALLATIONS

SCALE: 1/2" = 1'-0"

GENERAL NOTES

1. HARD SURFACE AREAS MAY BE ASPHALT, CEMENT, OR A CADIONIC SLOW SETTING EMULSION, AS DETERMINED BY THE ENGINEER.
2. ORIENTATE FIREPLACES SO FRONT IS TOWARD PREVAILING WINDS.
3. PATH TO TOILET SHOULD BE 3' TO 5' WIDE & NOT OVER 150' TO 200' DISTANCE. PATH WILL BE CLEARED OF ALL BRANCHES, ROCKS, ETC.
4. SIZE OF CAMPSITE, & VEGETATION TO BE CLEARED, WILL BE DETERMINED BY THE ENGINEER
5. PREPARE HARD SURFACE AREAS BY REMOVING APPROXIMATELY 4" OF TOPSOIL & REPLACING WITH COMPACTED, UNWASHED GRAVEL.



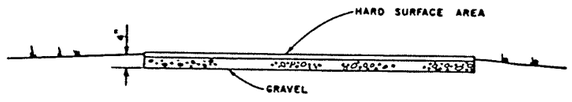
PEDESTAL FIREPLACE

ROUND FIREPIT

TYPICAL FIREPLACE INSTALLATIONS

SCALE: 1/2" = 1'-0"

LEGEND		STANDARD DRAWING NO.
	PICNIC TABLE	C-1
	BENCH	C-2
	BUMPER LOG	P-3
	FIREPIT	C-4
	PEDESTAL FIREPLACE	C-5
	SIGN	S-8
	TRASH RECEPTACLE	NONE



HARD SURFACE AREA CROSS SECTION

NOT TO SCALE

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF PARKS — STATE OF ALASKA

DESIGN & CONSTRUCTION SECTION

SCALE: 1" = 10' & NOTED

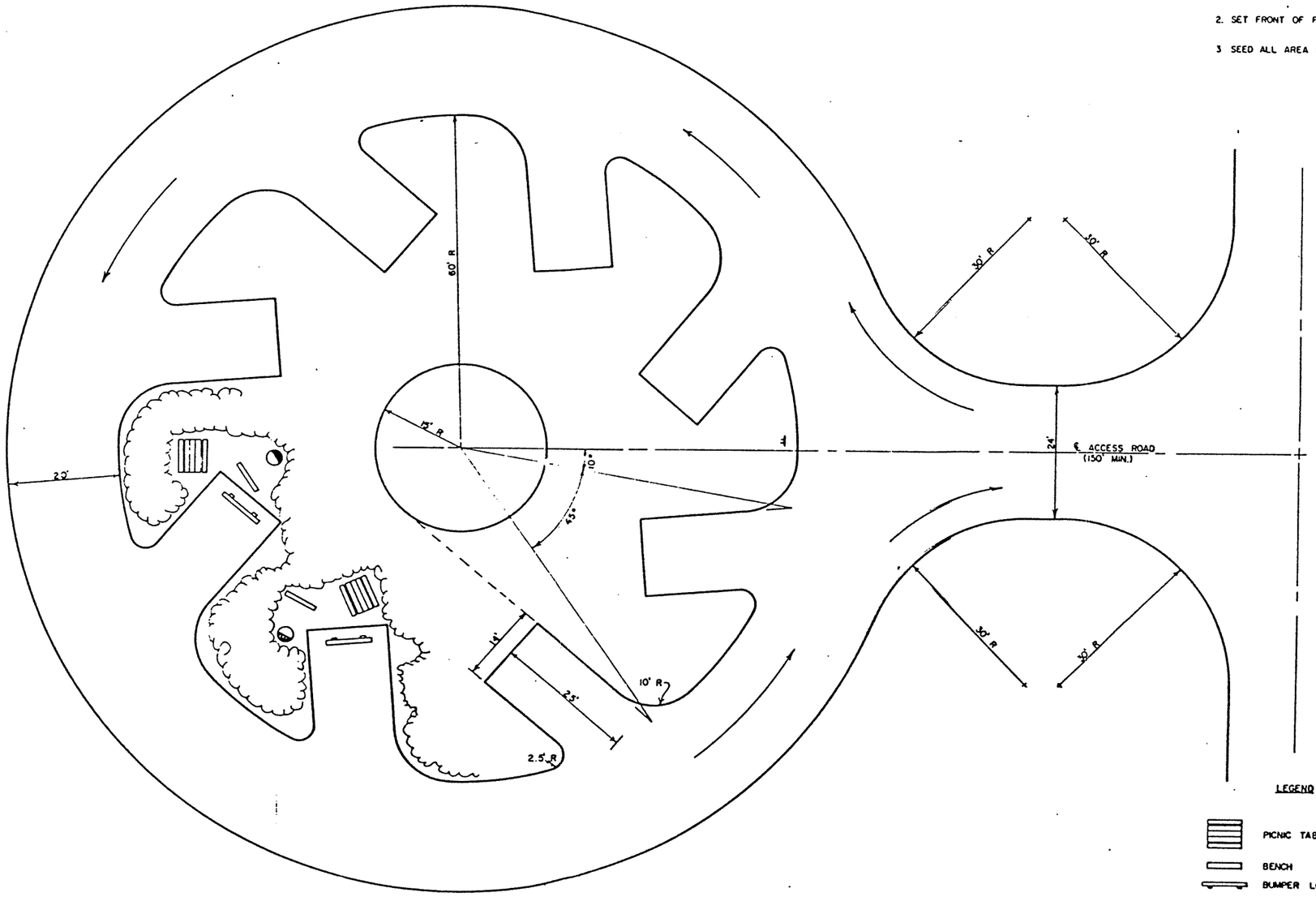
TYPICAL HANDICAPPED CAMPSITES

DRAWN T.D.
CHECKED D.M.
APPROVED
DATE 8-6-82

SHEET 1
C-16
OF 1 SHEETS

NOTES

1. CLEAR SPACES AS DIRECTED BY THE ENGINEER.
2. SET FRONT OF FIREPLACE AWAY FROM PREVAILING WINDS
3 SEED ALL AREA NOT COVERED WITH GRAVEL.



LEGEND

- PICNIC TABLE
- BENCH
- BUMPER LOG
- ROUND FIREPIT
- TRAFFIC SIGN

NO.	REVISION	DATE	APPROVED
1	REVISED & UPDATED DRAWING	8-31-82	T.D.

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF PARKS — STATE OF ALASKA

DESIGN & CONSTRUCTION SECTION

SCALE: 1" = 10'

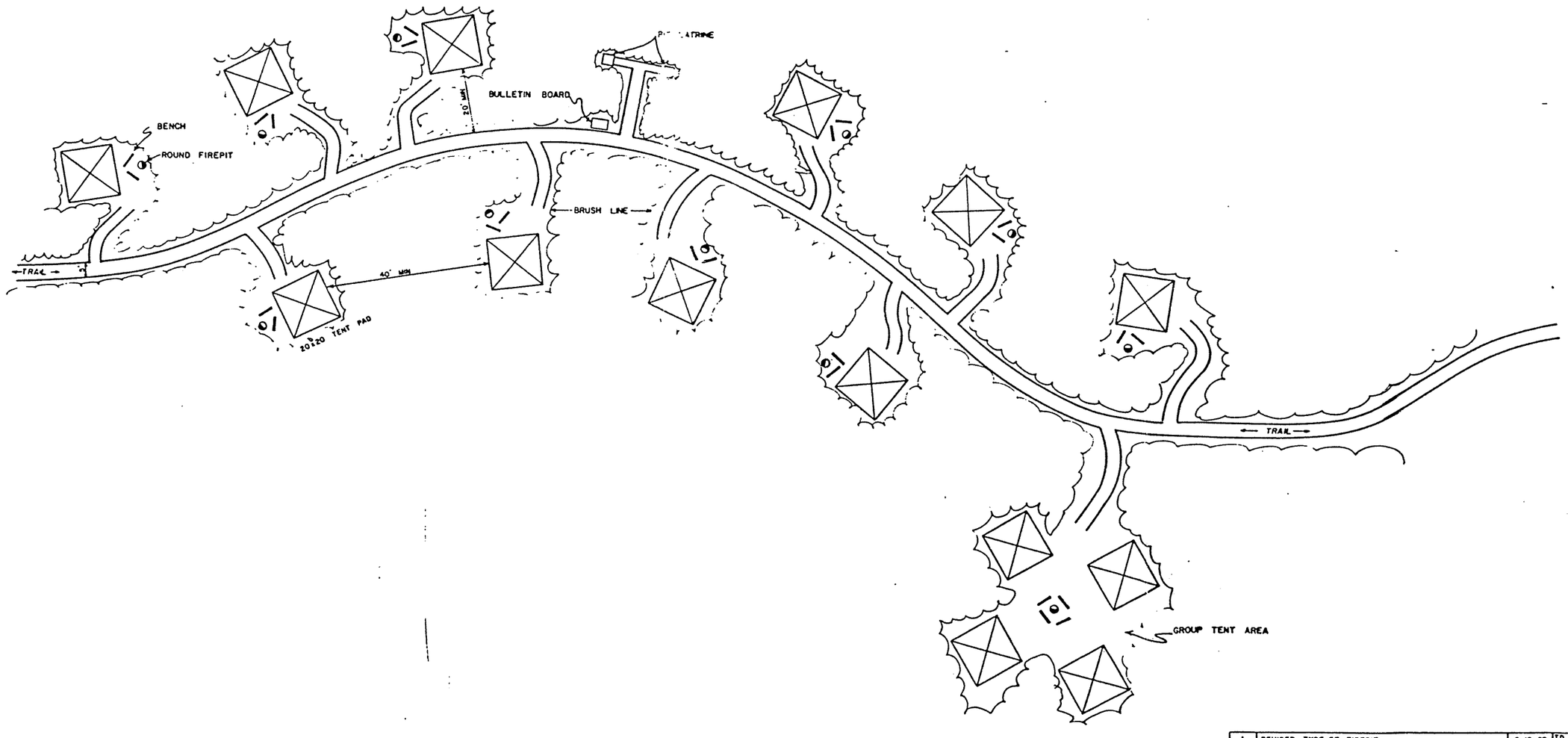
DAISY CAMPSITE

DRAWN MJ
CHECKED JFR
APPROVED
DATE

SHEET 1
C-13
OF 1 SHEETS

GENERAL NOTES

1. STANDARD PICNIC TABLES WILL BE INSTALLED IF SITE IS SUCH THAT MAINTENANCE COULD BE ACCOMPLISHED.
2. MINIMUM CLEARING TO BE DONE TO ESTABLISH SITE DEVELOPMENT.
3. ALL DIMENSIONS ARE MINIMUM – FACILITIES TO BE CONSTRUCTED TO CONFORM TO SITE.



NO.	REVISION	DATE	APPROVED
1	REVISED TYPE OF FIREPIT	8-18-82	T.D.

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF PARKS — STATE OF ALASKA

DESIGN & CONSTRUCTION SECTION

NOT TO SCALE

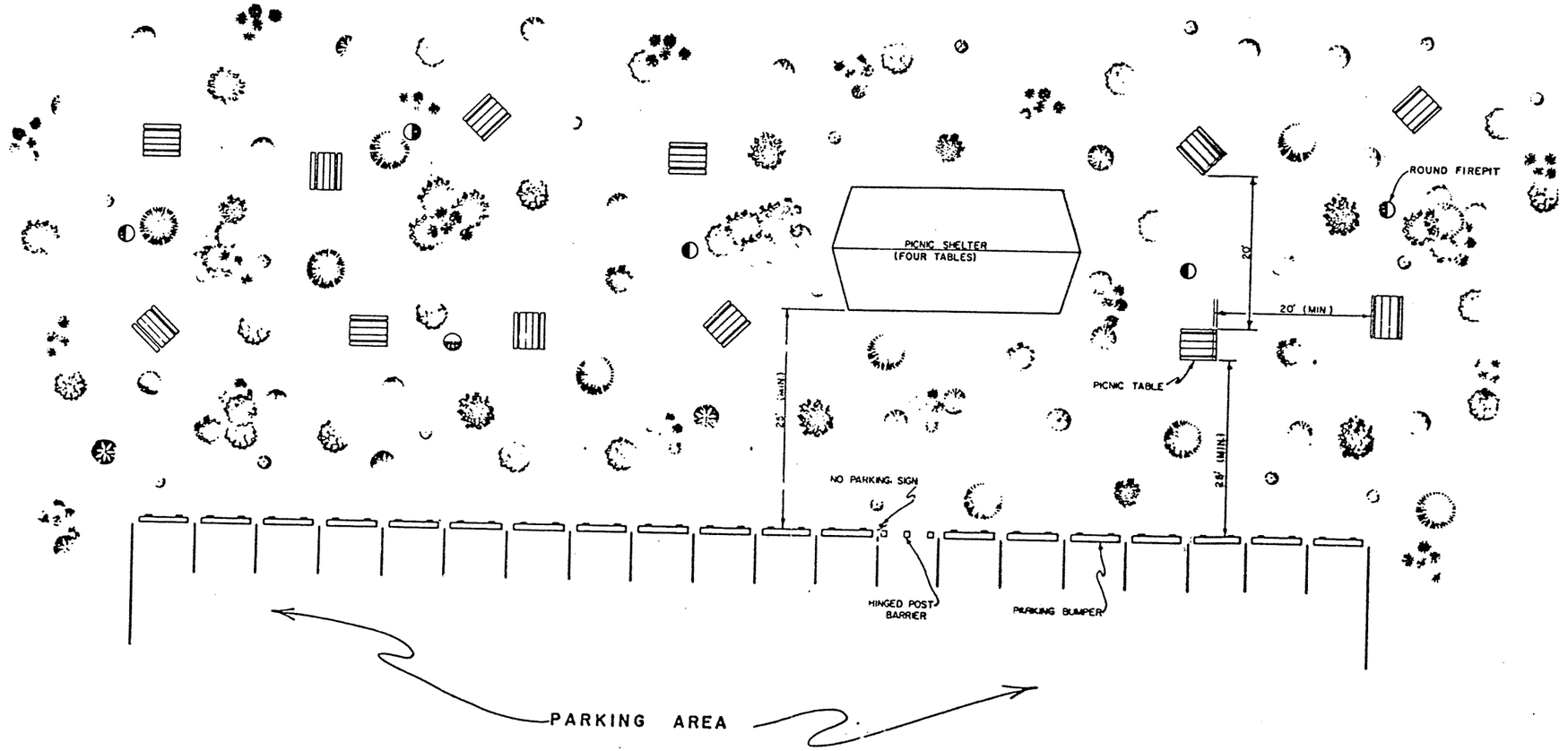
CONCEPT
REMOTE CAMPING AREA

DRAWN VHR.
CHECKED J.F.S.
APPROVED
DATE

SHEET 1
C-11
OF 1 SHEET

GENERAL NOTES

1. ALL DIMENSIONS ARE MINIMUM.
2. INSTALL ONE GARBAGE CAN ASS'Y FOR TWO PICNIC TABLES.
3. TWO PICNIC TABLES WILL SHARE A PEDESTAL TYPE FIREPLACE.
4. PROVIDE PARKING AREA COMPATIBLE WITH SITE — MINIMUM - ONE SPACE PER TABLE.
5. SIX PICNIC TABLES IN SHELTER.
6. SITE DEVELOPMENT SHALL INCLUDE:
   1 BULLETIN BOARD
   2 DOUBLE VAULTED LATRINE
   3 POTABLE WATER SUPPLY
   4 INFORMATION SIGNING



NO.	REVISION	DATE	APPROVED
1	REVISED & UPDATED DRAWING	8-31-82	T.O.

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF PARKS
STATE OF ALASKA

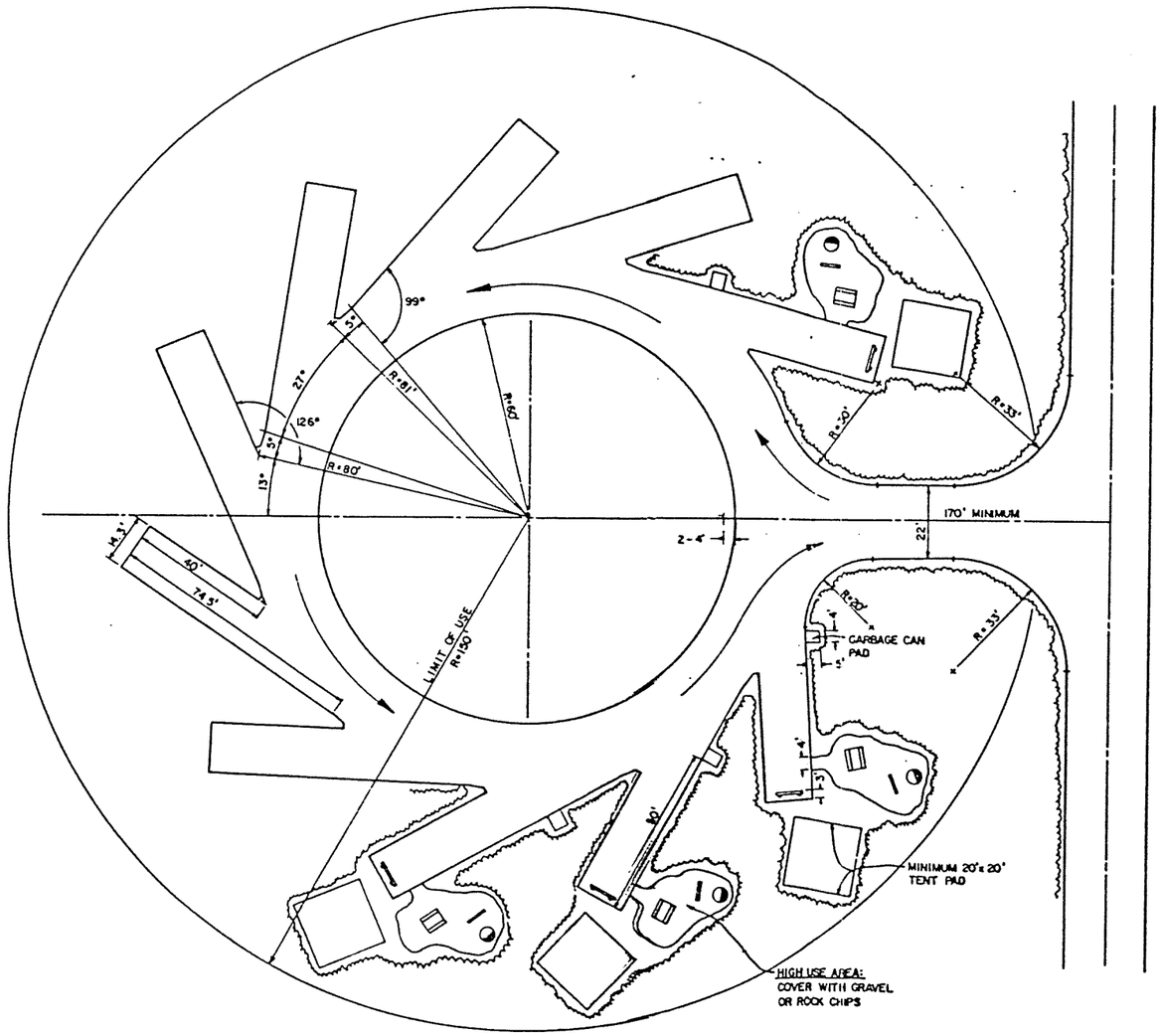
DESIGN & CONSTRUCTION SECTION

SCALE: 1" = 10'

CONCEPT
PICNIC AREA

DRAWN MJ
CHECKED JFS
APPROVED
DATE

SHEET 1
C-10
OF 1 SHEETS



LEGEND

- PICNIC TABLE
- BENCH
- BUMPER LOG
- ROUND FIREPIT
- TRAFFIC SIGN

NOTES

1. CLEAR SPACES AS STAKED OR DIRECTED BY THE ENGINEER.
2. SET FRONT OF FIREPLACE AWAY FROM PREVAILING WIND.
3. SEED ALL DISTURBED AREAS INCLUDING CUT & FILL SLOPES.
4. COVER TENT AREA WITH 6" TOPSOIL AND CROWN 3" BEFORE SEEDING.
5. WHEN PULL THROUGH CAMPSITES ARE NOT PROVIDED FOR ELSEWHERE IN THE PARK AREA, PARKING PADS MAY BE CONSTRUCTED AN ADDITIONAL 10 FEET IN LENGTH TO ACCOMMODATE TRAILERS.

NO.	REVISION	DATE	APPROVED
1	REVISED TYPE OF FIREPIT, REMOVED GUARD POSTS	8-31-82	T.D.

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF PARKS — STATE OF ALASKA

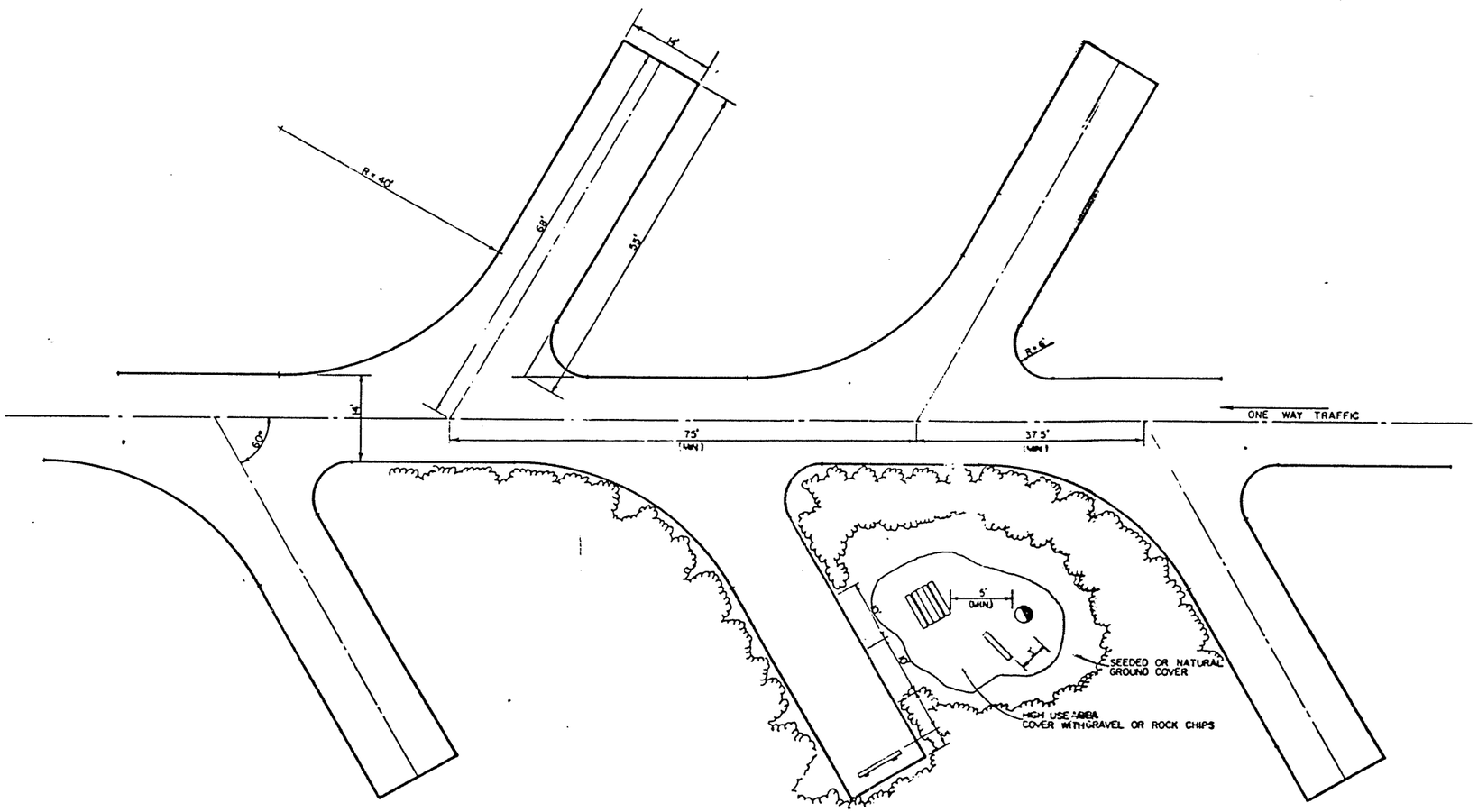
DESIGN & CONSTRUCTION SECTION

SCALE 1"=20 FEET

60' R. CUL-DE-SAC CAMPSITE

DRAWN REM
CHECKED
APPROVED
DATE 4-8-77

SHEET 1
C-9A
OF 1 SHEETS



NOTES

1. CLEAR SPACES AS DIRECTED BY THE ENGINEER.
2. SET FRONT OF FIREPLACE AWAY FROM PREVAILING WINDS.
3. PROVIDE TENT PAD IF OPEN SPACE IS AVAILABLE.
4. GUARD POSTS DEPENDENT UPON VEGATATION MAXIMUM NUMBER INDICATED
5. GRADE TO DRAIN AWAY FROM DEVELOPMENT

LEGEND

PICNIC TABLE

BENCH

BUMPER LOG

ROUND FIREPIT

NO	REVISION	DATE	APPVD.
2	REVISED TYPE OF FIREPIT	8-17-82	E.Q. 4-77
1.	REMOVED BUMPER LOGS, GUARD POSTS, ETC.	11-17-81	PTN

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF PARKS — STATE OF ALASKA

DESIGN & CONSTRUCTION SECTION

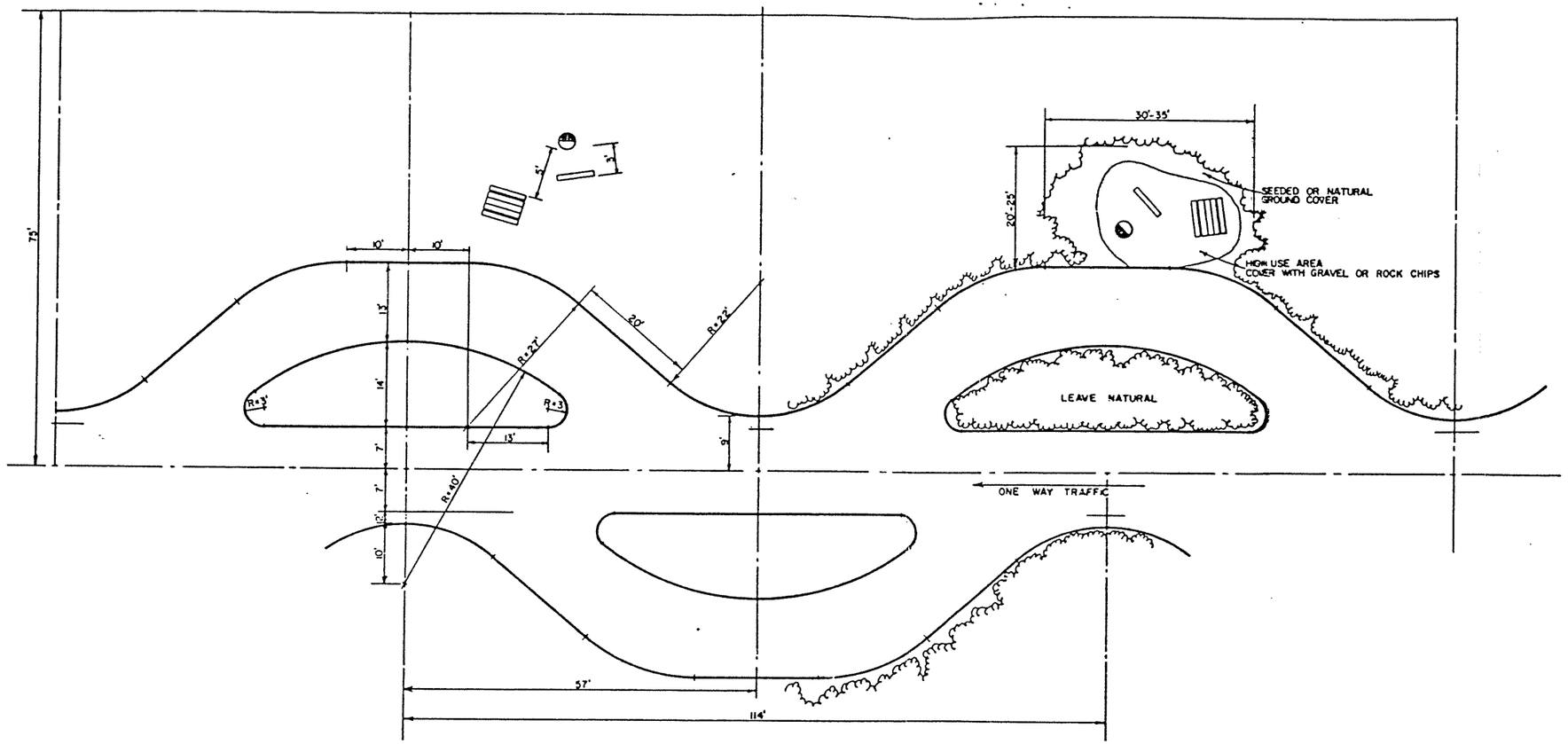
SCALE: 1" = 10'

BACK IN SPUR CAMPSITE

DRAWN MJ
CHECKED J.A. Logan
APPROVED
DATE

SHEET 1
C-7
OF 1 SHEETS

7-12-21



NOTES

1. CLEAR SPACES AS DIRECTED BY THE ENGINEER.
2. SET FRONT OF FIREPLACE AWAY FROM PREVAILING WINDS.
3. PROVIDE TENT PAD IF OPEN SPACE IS AVAILABLE.
4. GUARD POSTS DEPENDENT UPON VEGATATION MAXIMUM NUMBER INDICATED
5. GRADE TO DRAIN AWAY FROM DEVELOPMENT

LEGEND

PICNIC TABLE

BENCH

ROUND FIREPIT

NO	REVISION	DATE	APPVD.
2	REVISED TYPE OF FIREPIT	8-17-82	CO. 49 71
1.	REMOVED BUMPER LOGS, GUARD POSTS, ETC.	7-10-81	

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF PARKS
STATE OF ALASKA

DESIGN & CONSTRUCTION SECTION

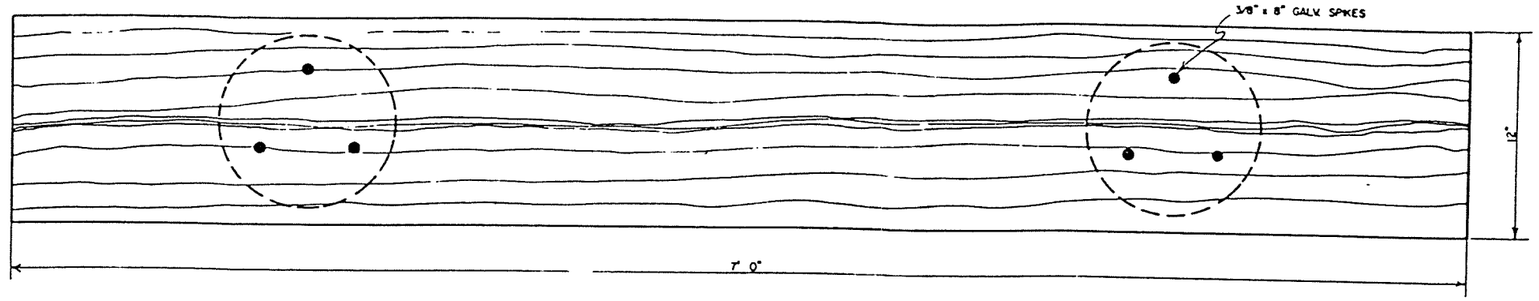
SCALE: 1" = 10'

PULL THRU CAMPSITE

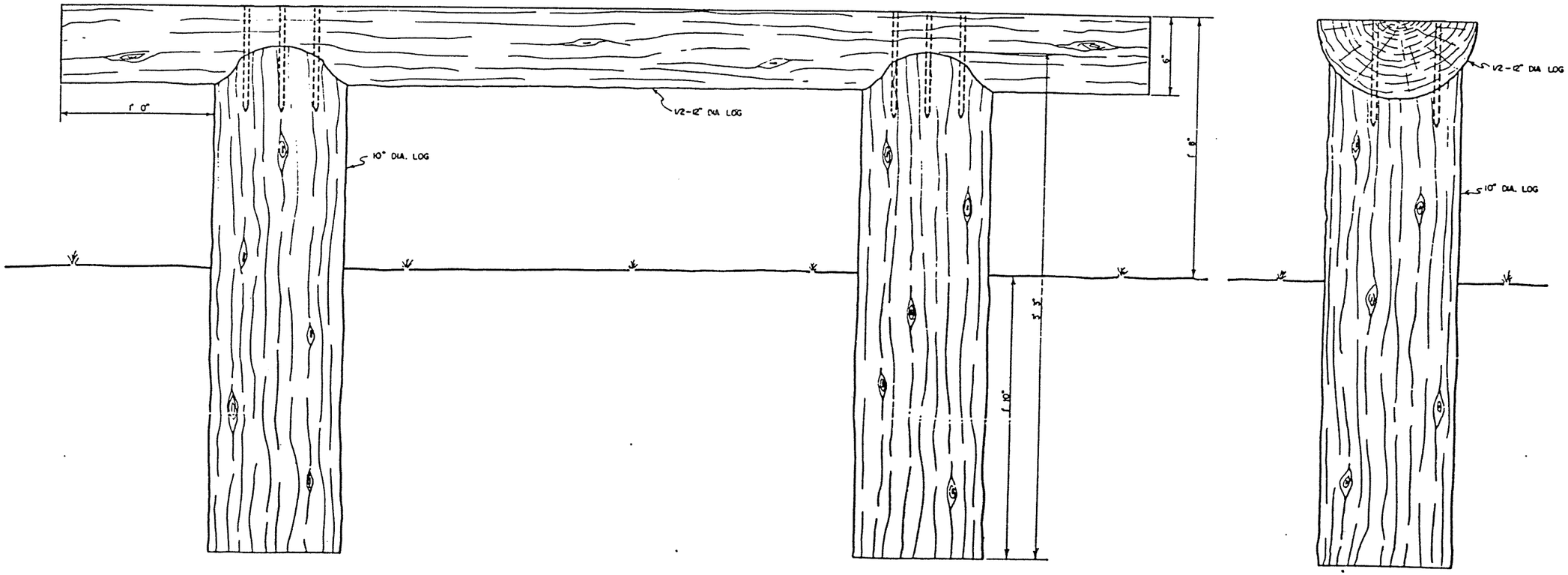
DRAWN MJ
CHECKED J & Logan
APPROVED
DATE

SHEET 1
C-6
OF 1 SHEETS

7-17-77



TOP VIEW



SIDE VIEW

END VIEW

C-3

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF PARKS
STATE OF ALASKA

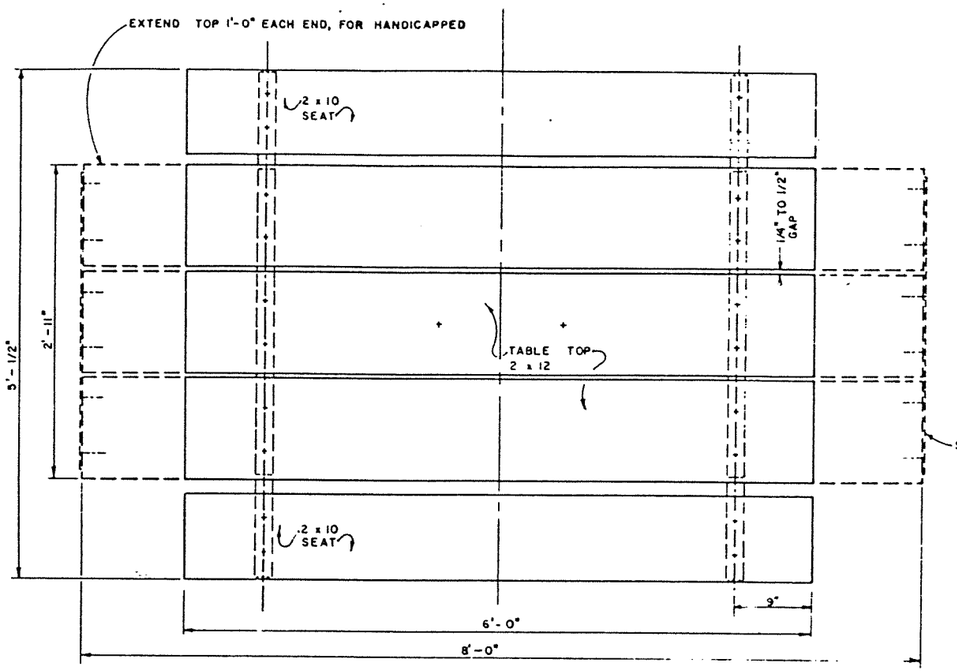
PARK DEVELOPMENT

SCALE: 3" = 1' 0"

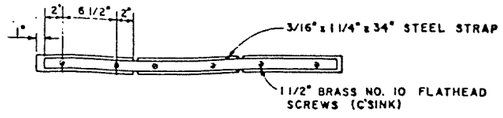
LOG BENCH

DRAWN MJ
CHECKED J.F.S.
APPROVED

SHEET 1
~~07~~

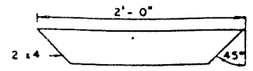


PLAN

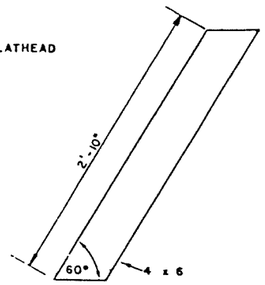


END STRAP

HANDICAPPED TABLE TOP ONLY



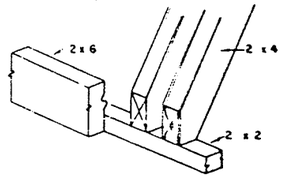
CENTER BRACE PATTERN



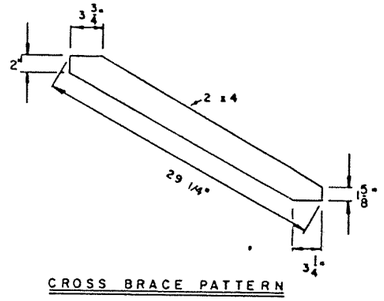
LEG PATTERN

GENERAL NOTES

1. ALL WOOD SHALL BE DOUGAS FIR, S-DRY, S4S
2. ALL WOOD SHALL BE PRIMED WITH ONE COAT PREPACO OIL BASE SOLID COLOR STAIN (RUSSETT 63-138)
3. INSIDE EDGES TO BE GIVEN SECOND COAT BEFORE SUBASSEMBLY.
4. FIELD PAINTING WILL BE TOUCHUP AND ONE COAT APPLICATION TO TOP OF SEATS AND TABLE.
5. ALL HARDWARE SHALL BE GALVANIZED OR CADMIUM PLATED STEEL.
6. BOLT HOLES FOR SEAT SUPPORT TO BE SHOP DRILLED.
7. 1/2" x 45° CHAMFER ON TABLE & BENCH TOP



DETAIL A



CROSS BRACE PATTERN

MATERIALS LIST

LUMBER

"SELECT STRUCTURAL" - STRUCTURAL LIGHT FRAMING

1	2 x 2 x 6'
1	2 x 4 x 12'
1	2 x 4 x 6'

"SELECT STRUCTURAL" - JOISTS AND PLANKS

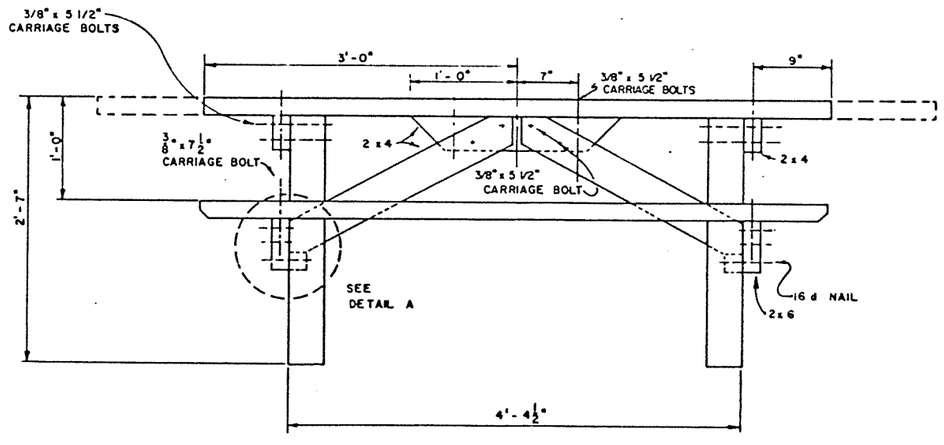
1	2 x 6 x 10'
1	2 x 10 x 12'
1	2 x 12 x 18'
1	4 x 6 x 12'

HARDWARE

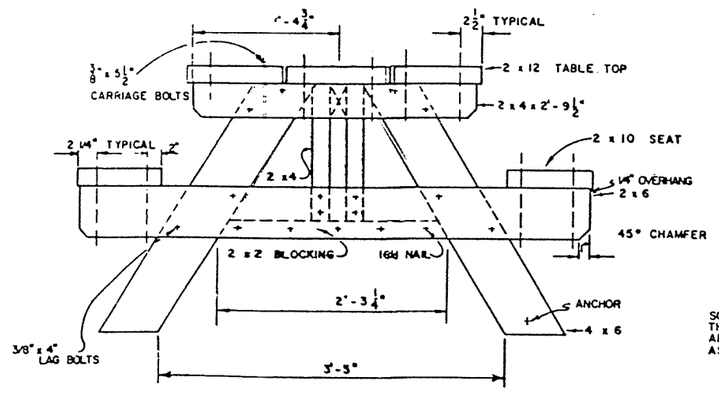
26	3/8 x 5 1/2 CARRIAGE BOLTS W/ NUT & WASHERS
8	3/8 x 7 1/2 CARRIAGE BOLTS W/ NUT & WASHERS
4	5/16 CABLE CLIPS
8	3/8 x 4 LAG BOLTS WITH WASHERS
2	5/16 x 1 1/2 MACHINE BOLTS W/ NUT & WASHERS
2	3/8" x 5" EYE BOLTS W/NUT & WASHERS
2	3/16 x 1 1/4" x 34" STEEL STRAP (FOR HANDICAPPED ONLY)
12	1 1/2" BRASS NO. 10 FLATHEAD SCREWS
8 FT.	5/16 GALVANIZED CABLE
1/2 LB.	16 d NAILS

MISCELLANEOUS

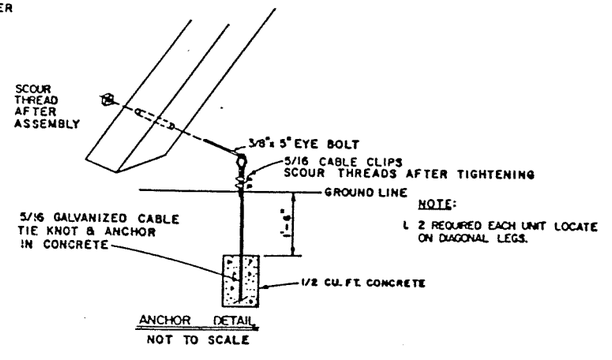
1 GAL. PREPACO OIL BASE SOLID COLOR STAIN (RUSSETT 63-138)
1/2 CU. FT. CONCRETE



SIDE ELEVATION



END ELEVATION



ANCHOR DETAIL
NOT TO SCALE

NOTE:
L 2 REQUIRED EACH UNIT LOCATE ON DIAGONAL LEGS.

NO	REVISION	DATE	APPVD.
4	UPDATED DRAWING	8-16-82	DD
3	EXTENDED TABLE TOP 1'-0" EA. END. ADDED STL. STRAP	3-31-82	DD
2.	CHANGED LENGTH OF TABLE LEGS	7-10-81	
1	CHANGED STAIN TO PREPACO OIL BASE STAIN	6-15-76	

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF PARKS — STATE OF ALASKA

DESIGN & CONSTRUCTION SECTION

SCALE: 1/2" = 1'-0"

PICNIC TABLE

DRAWN RAY EAKIN
CHECKED J.F.S.
APPROVED
DATE

SHEET 1
C-1
OF 1 SHEETS

EXHIBIT E

7. Recreational Resources

Comment 13 (p. E-7-101, para. 5; p. E-7-110, para. 4; p. E-7-113, para. 3)

Copies of any existing agreements, as well as any future arrangements between the applicant and cooperating entities relative to implementation of the proposed recreation plan, must be submitted to the Federal Energy Regulatory Commission.

Response

Copies of future arrangements between the Power Authority and cooperating entities relative to implementation of the proposed recreation plan will be submitted on a timely basis to the Federal Energy Regulatory Commission by the Power Authority. At this time, no formal agreements are in existence.

7. Recreational Resources

Comment 14 (p. E-7-105, para. 1)

Aside from APA, the Division of Parks, and directly affected land owners, specify how other local residents would be involved in decisions concerning scheduling and implementation of increased recreational developments.

Response

Development of the required agreements, policies, and regulations for implementation of the proposed recreation plan is scheduled for the latter half of 1983, culminating in a recreation implementation report in December 1983. Community involvement in these efforts will be encouraged through the Susitna Public Participation Program, which has provided information to local communities on all aspects of the project for the past 3 years. This program established a forum and channels for local community members to provide their ideas and preferences as the development prodceeds. The recreation implementation report will establish specific mechanisms for obtaining additional agency and community involvement during the recreation development period and will describe this particular decision-making process in more detail.

EXHIBIT E

8. Aesthetic Resources

Comment 1 (p. E-8-30, para. 1; to p. E-8-31, para. 4)

Indicate if the four natural features of Clear Valley (p. E-8-22), Watana Creek Falls, Watana Lake (p. E-8-24), and Tyone River are considered exceptional in relation to the project area. If so, describe them in the Exceptional Natural Features Section 5.2; include photos in the appendix, and show their locations on Figure E.8.5.

Response

During the final evaluation of the project area's natural features, Clear Valley, Watana Creek Falls, Watana Lake, and Tyone River were eliminated from the exceptional natural features identified on pp. E-8-30 and E-8-31 in Chapter 8, Exhibit E of the License Application. Thus, the text should be revised as follows:

(1) Page E-8-22, line 13: Remove the reference to "4. *Clear Valley".

(2) Page E-8-24, line 21: Remove the reference to "12. *Watana Lakes."

Watana Creek Falls and Tyone River were not listed on the Landscape Character Type charts. Therefore, their reference does not need to be deleted.

EXHIBIT E

8. Aesthetic Resources

Comment 2 (p. E-8-33, para. 1-8)

Provide a brief description (e.g., viewer vantage point, viewing distance, number of potential viewers, duration of view) of those significant views that are indicated on Figure E.8.8 and mentioned in the charts of Appendix 8.F. Provide a similar level of information for the transmission line corridor, including the intertie.

Response

The following example indentifies the types of view considerations that are delineated in Figure E.8.8 of Chapter 8, Exhibit E of the License Application. Additional information on views along the transmission line corridor is included in Part 2 of the response to Aesthetics Comment 7.

VIEW CONSIDERATIONS

Observer Position:	Access Road Recreation Sites Other Project Facilities
View Duration: (a function of rate of movement and points opportunity)	50 miles per hour for specific distance Walking for specific distance Stationary observation at major destination
Distance:	Foreground: 0 to 1/2 mile Middle ground: 1/2 to 2 miles Background: 2 miles and beyond Panoramic (all of the above)

Potential Viewers:	Vehicular travelers
	Off-road recreational users
	Town residents
	Power plant workers
	Dam site visitors
Proposed Facilities which will be seen	Dams
	Damsite facilities
	Reservoirs
	Transmission lines and ancillary facilities
	Access roads
	Railroad
	Trails and trailheads

The remainder of this response provides view consideration information for the thirty views identified in Figure E-8-8 (see attached version of this figure). This information is keyed to the attached Maps 1-5.

SIGNIFICANT NORTH/SOUTH ACCESS ROAD VIEWS (Map 1)

1. Nenana River Valley and Alaska Mountain Range

Observer Position:	Access road
View Duration:	Seen at 50 miles per hour for ±3 miles
Potential Viewers:	All vehicular traffic traveling north
Distance:	Panoramic
Facilities Seen:	Access road (foreground)

2. View of Butte Landmark

Observer Position:	Access Road
View Duration:	Seen at 50 miles per hour for ±6 miles
Potential Viewers:	All vehicular traffic traveling north
Distance:	Middle ground
Facilities Seen:	Access road fore-middle-ground

3. Panoramic View of Clear Water Mountains

Observer Position:	Access road
View Duration:	Seen at 50 miles per hour for 4 miles
Potential Viewers:	Vehicular traffic
Distance:	Panoramic
Facilities Seen:	None

4. Views up small drainage ways into the Chulitna Mountains

Observer Position:	Access road
View Duration:	Seen at 50 miles per hour for ±3 miles or during stops at road pull-offs with trail heads
Potential Viewers:	Vehicular traffic/hikers
Distance:	Drainage way, fore-middle ground, Chulitna Mountains background
Facilities Seen:	Trailheads, trails

5. Panoramic View of Talkeetna Mountains

Observer Position:	Access road
View Duration:	Seen at 50 miles per hour for ±4 miles
Potential Viewers:	Vehicular traffic
Distance:	Foreground, Big/Deadman Lakes Middle ground, Watana Reservoir Background, Talkeetna Mountains
Facilities Seen:	Access road and reservoir

6. Deadman Creek

Observer Position:	Access road or road pull-off
View Duration:	Seen at 50 miles per hour for ±6 miles or at stationary pull-offs
Potential Viewers:	Vehicular traffic
Distance:	Foreground
Facilities Seen:	None

7. Tsusena Butte

Observer Position:	Access road or town site
View Duration:	Seen at 50 miles per hour for ±10 miles or stationary/destination
Potential Viewers:	Access road users and town residents
Distance:	Middle ground
Facilities seen:	None

8. Tsusena Drainage

Observer Position:	Access road
View Duration:	Seen at 50 miles per hour for 2.5 miles
Potential Viewers:	Access road users
Distance:	Mid- to background
Facilities seen:	Access road, foreground

SIGNIFICANT WATANA AREA VIEWS (Map 2)

9. Townsite Views

Observer Position:	Watana townsite
View Duration:	Stationary/destination
Potential Viewers:	Town residents
Distance:	Fore- to middle ground
Facilities seen:	Dam, damsite facilities, reservoir

10. Watana Reservoir

Observer Position:	Damsite
View Duration:	Stationary/destination
Potential Viewers:	Damsite workers, visitors
Distance:	Foreground through background
Facilities seen:	Power plant facilities, dam, and reservoir

11. Downstream Watana Views

Observer Position:	Damsite
View Duration:	Stationary/destination
Potential Viewers:	Damsite workers, visitors
Distance:	Fore- to middle ground views of facilities Background views of river valley
Facilities seen:	River borrow areas and powerhouse road, middle ground Power facilities and transmission lines, foreground

12. Fog Lakes area

Observer Position:	Damsite
View Duration:	Stationary/destination
Potential Viewers:	Damsite workers and visitors
Distance:	Middle to background
Facilities seen:	Visitors facilities

13. Transmission Lines

Observer Position:	Damsite
View Duration:	Stationary short-term and destination
Potential Viewers:	Damsite workers and visitors
Distance:	Fore- to middle ground
Facilities seen:	Transmission lines and switchyard (silhouetted)

14. Watana Site

Observer Position:	Access road above facilities
View Duration:	Seen at 50 miles per hour for ±2 miles
Potential Viewers:	Damsite workers and visitors
Distance:	Middle to background
Facilities seen:	Damsite facilities, the dam, and reservoir

SIGNIFICANT EAST/WEST ROAD VIEWS (Map 3)

15. Transmission Corridor Crossing

Observer Position:	Access road immediately under the line
View Duration:	Seen at 50 miles per hour for ±200 feet
Potential Viewers:	East/west road users
Distance:	Foreground
Facilities seen:	Transmission towers and corridor

NOTE: This crossing occurs at a sharp angle and minimizes the length of view duration.

16. Transmission Corridor Crossing

Observer Position:	Access road immediately below facility
View Duration:	Seen at 50 miles per hour for ±200 feet (crossing)
Potential Viewers:	East/west road users
Distance:	Fore- to middle ground
Facilities seen:	Transmission corridor and towers

NOTE: This crossing is very oblique, causing a much greater length of corridor to be prominent at the crossing as well as along the uphill side of the east/west road.

17. Talkeetna Mountains and Susitna River Valley

Observer Position:	Access road
View Duration:	Seen at 50 miles per hour for ±5 miles
Potential Viewers:	East/west road users
Distance:	Panoramic
Facilities seen:	None

18. Devil Creek Drainage

Observer Position:	Access road
View Duration:	Seen at 50 miles per hour for one mile
Potential Viewers:	East/west road users
Distance:	Middle to background
Facilities seen:	Transmission line (uphill side)

19. High Lake

Observer Position:	Access road
View Duration:	Seen at 50 miles per hour for ±2 miles of stationary pull-off
Potential Viewers:	High Lake visitors, road users
Distance:	Middle ground to background
Facilities seen:	None

SIGNIFICANT DEVIL CANYON VIEWS (Map 4)

20. Reservoir

Observer Position:	Damsite
View Duration:	Stationary/destination
Potential Viewers:	Damsite workers, visitors
Distance:	Fore- to middle ground; reservoir extends to background
Facilities seen:	Dam, damsite facilities, and reservoir

21. Saddle Dam

Observer Position:	Damsite
View Duration:	Stationary
Potential Viewers:	Damsite workers, visitors
Distance:	Middle ground
Facilities seen:	Saddle dam and associated facilities

22. Devil Canyon Bridge

Observer Position:	Bridge surface
View Duration:	Seen at 30 miles per hour for $\pm$1 miles
Potential Viewers:	Visitor center visitors and damsite workers
Distance:	Fore to middle ground
Facilities seen:	Power plant outfall, transmission line corridor

23. Devil Canyon (downstream view)

Observer Position:	Dam top (800 feet and higher)
View Duration:	Stationary
Potential Viewers:	Damsite visitors and workers
Distance:	Fore- to middle ground
Facilities seen:	Power facilities, power access roads, and dry river bed

SIGNIFICANT OFF-ROAD VIEWS (Map 5)

24. Alaska Range and Chulitna River Valley

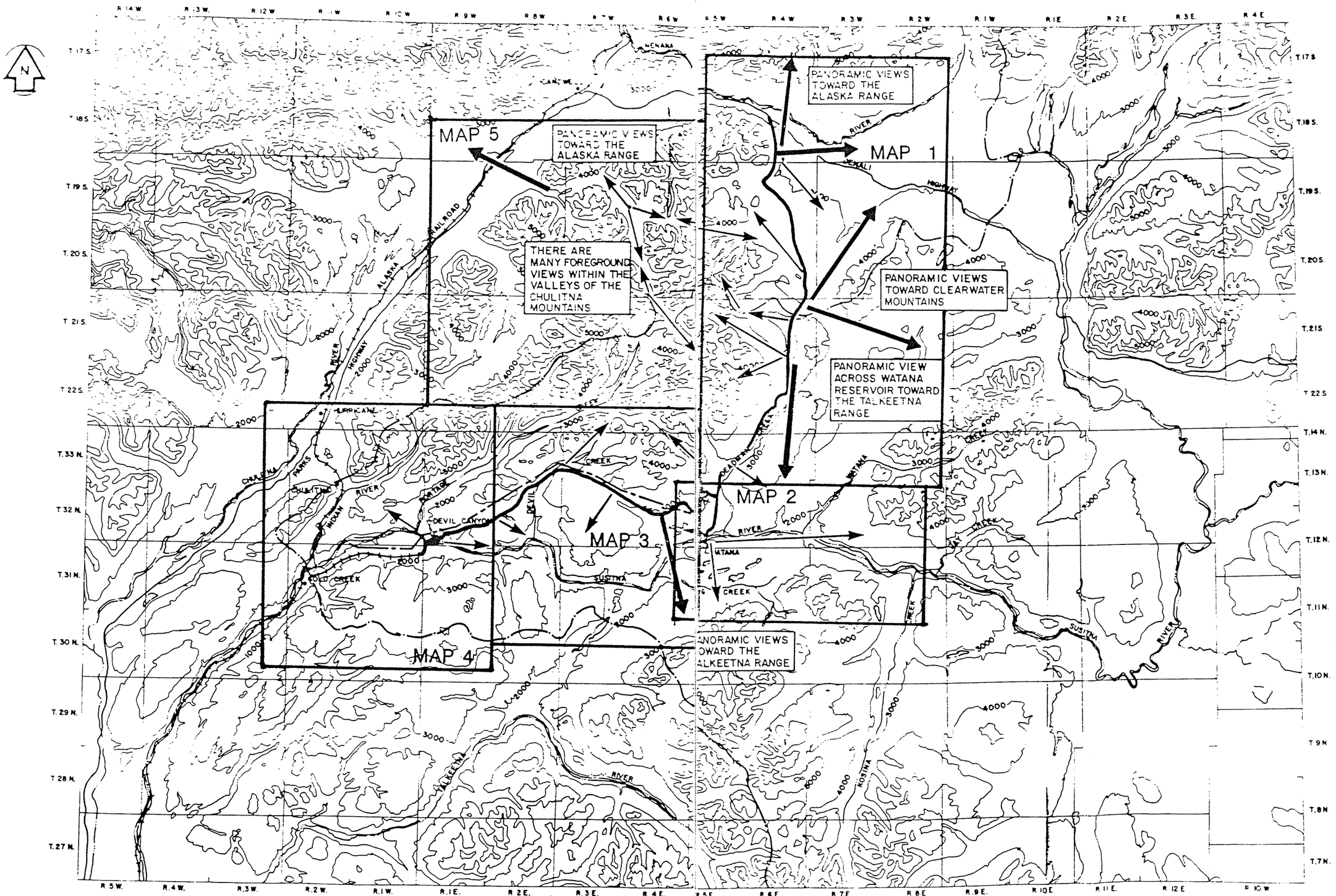
Observer Position:	Back country trails
View Duration:	Walking for indeterminate distance
Potential Viewers:	Hikers
Distance:	Panoramic
Facilities seen:	None

25 - Soul Creek, Deadman Creek and Tsusena Creek
29. Caribou Pass, etc.

Observer Position:	Back country trails
View Duration:	Walking pace at many positions
Potential Viewers:	Hikers and recreational users
Distance:	Panoramic, enclosed
Facilities seen:	None

30. Susitna River Views

Observer Position:	River surface or shore
View Duration:	Seen at floating speed for ±6 miles
Potential Viewers:	River recreationists
Distance:	Fore- to middle ground
Facilities seen:	Railroad



LEGEND:

PANORAMIC VIEWS

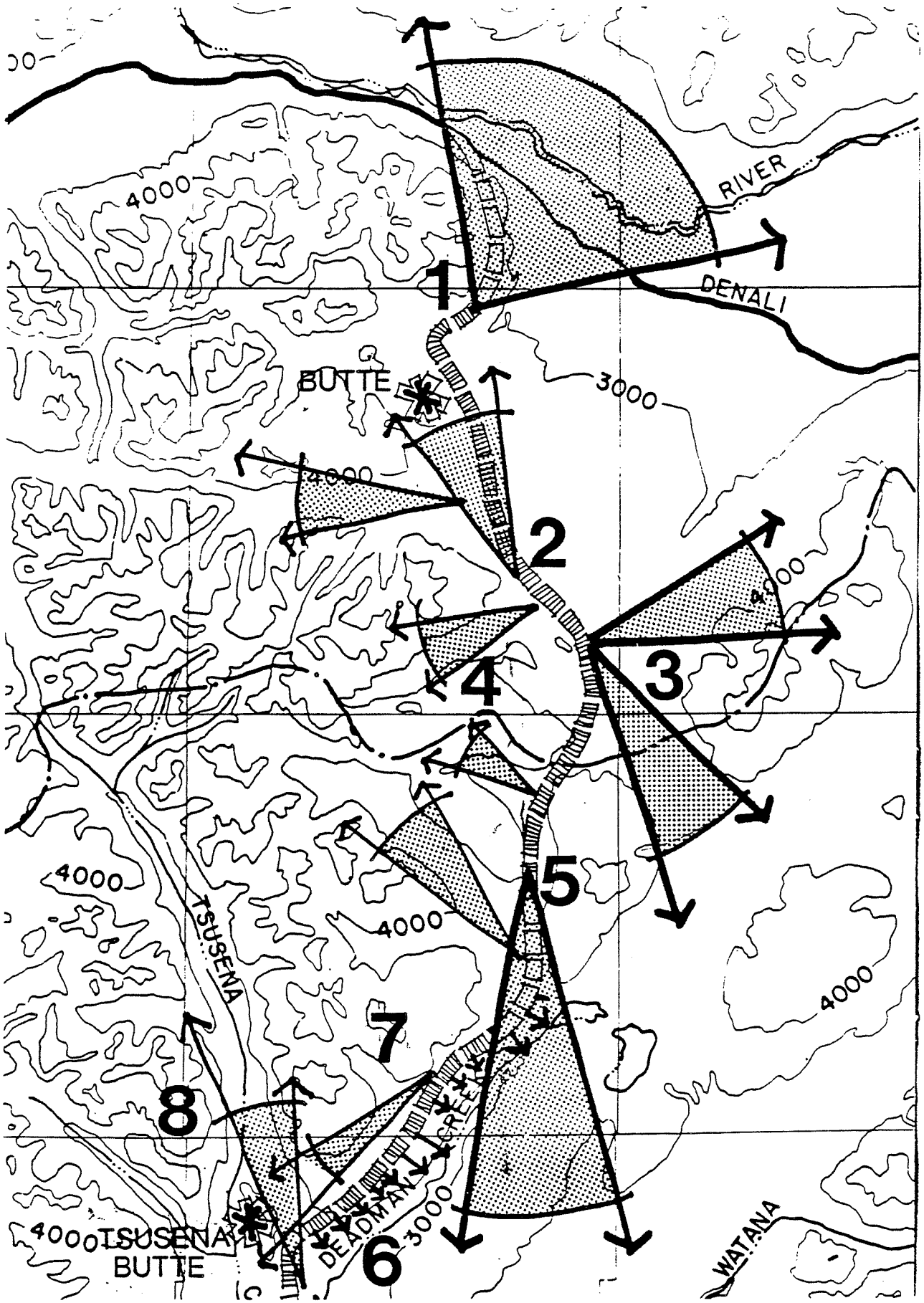
IMPORTANT FOREGROUND VIEWS

SCALE 0 4 8 MILES

SIGNIFICAT VIEWS

REVISED JUNE 1983

FIGURE E.8.8



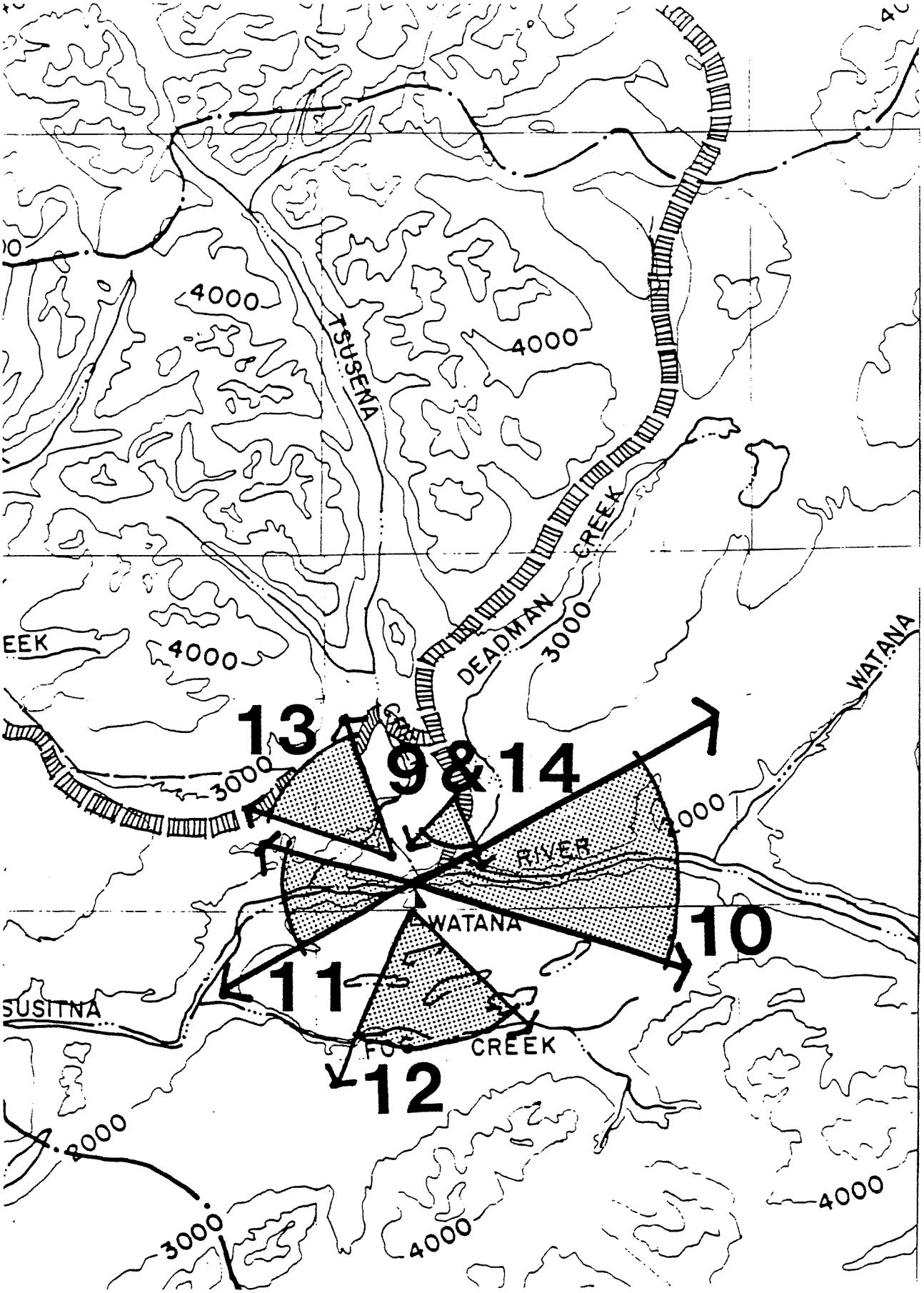
MAP 1

NORTH/SOUTH ACCESS ROAD
SIGNIFICANT VIEWS

SUSITNA HYDROELECTRIC PROJECT AESTHETIC RESOURCES

EDAW

8-7-14



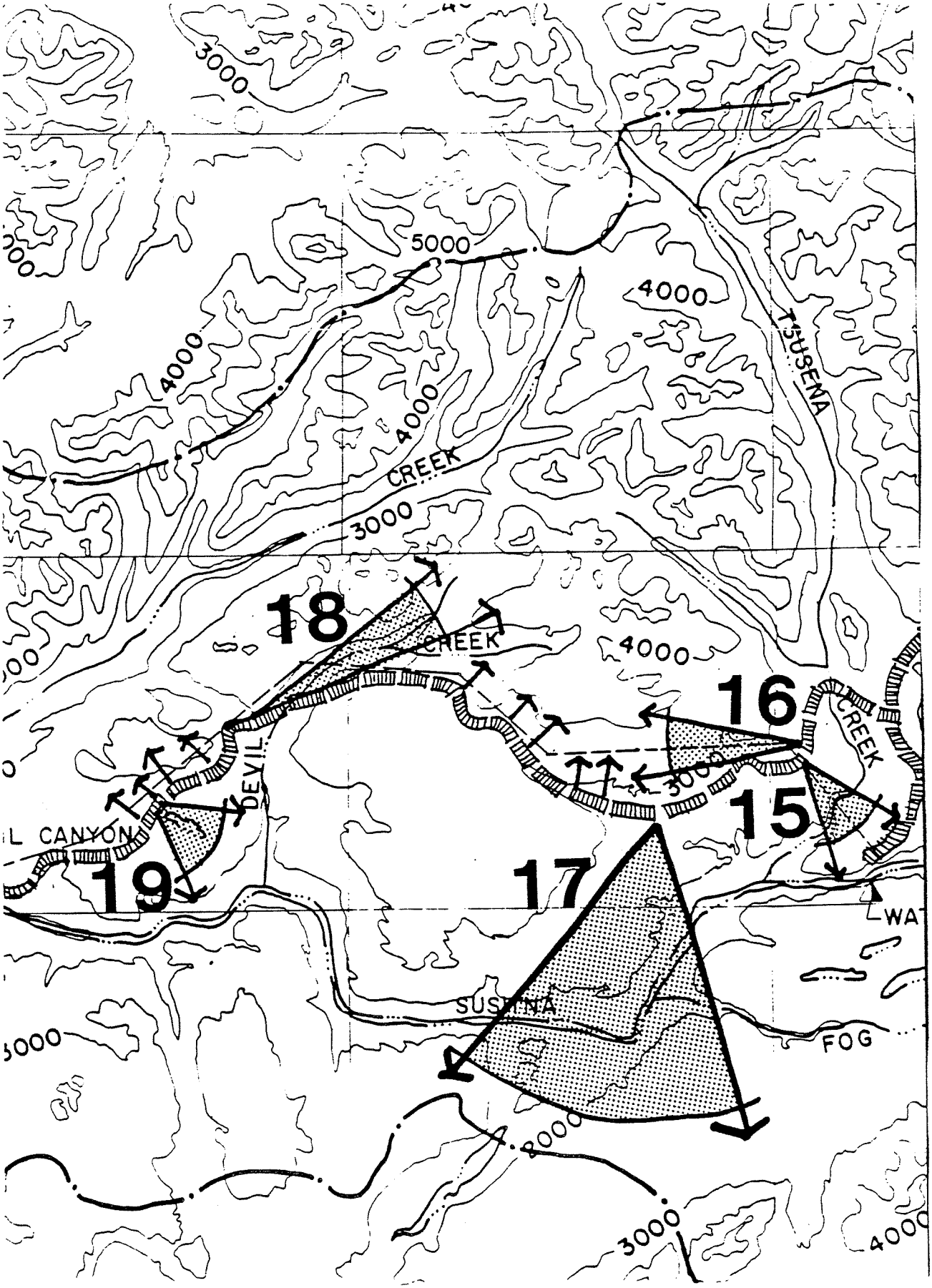
MAP 2

WATANA AREA
SIGNIFICANT VIEWS

SUSITNA HYDROELECTRIC PROJECT AESTHETIC RESOURCES

EDAW 1983

8-2-15



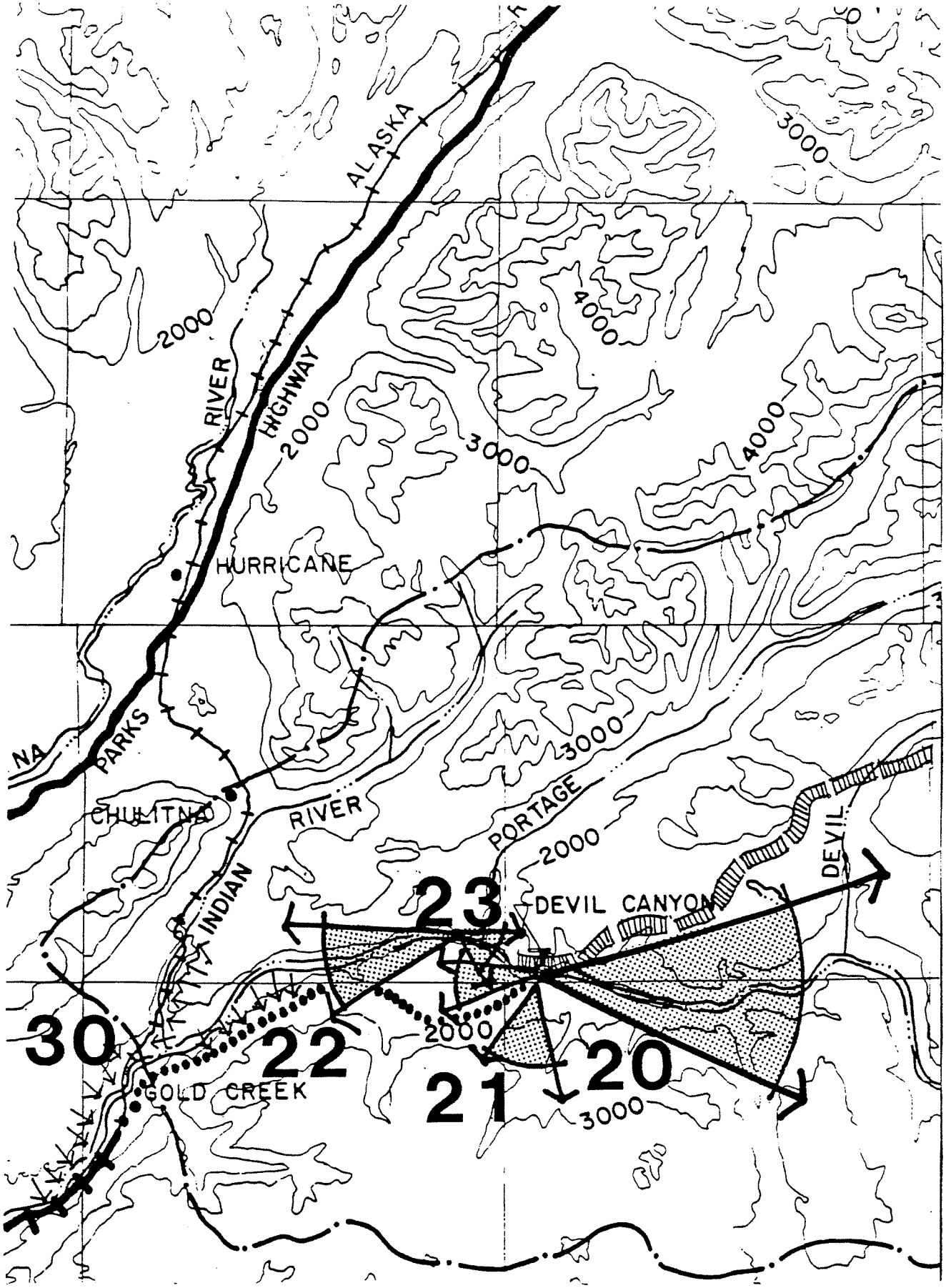
MAP 3

EAST/WEST ACCESS ROAD
SIGNICANT VIEWS

SUSITNA HYDROELECTRIC PROJECT AESTHETIC RESOURCES

EDAW 1983

8-2-16



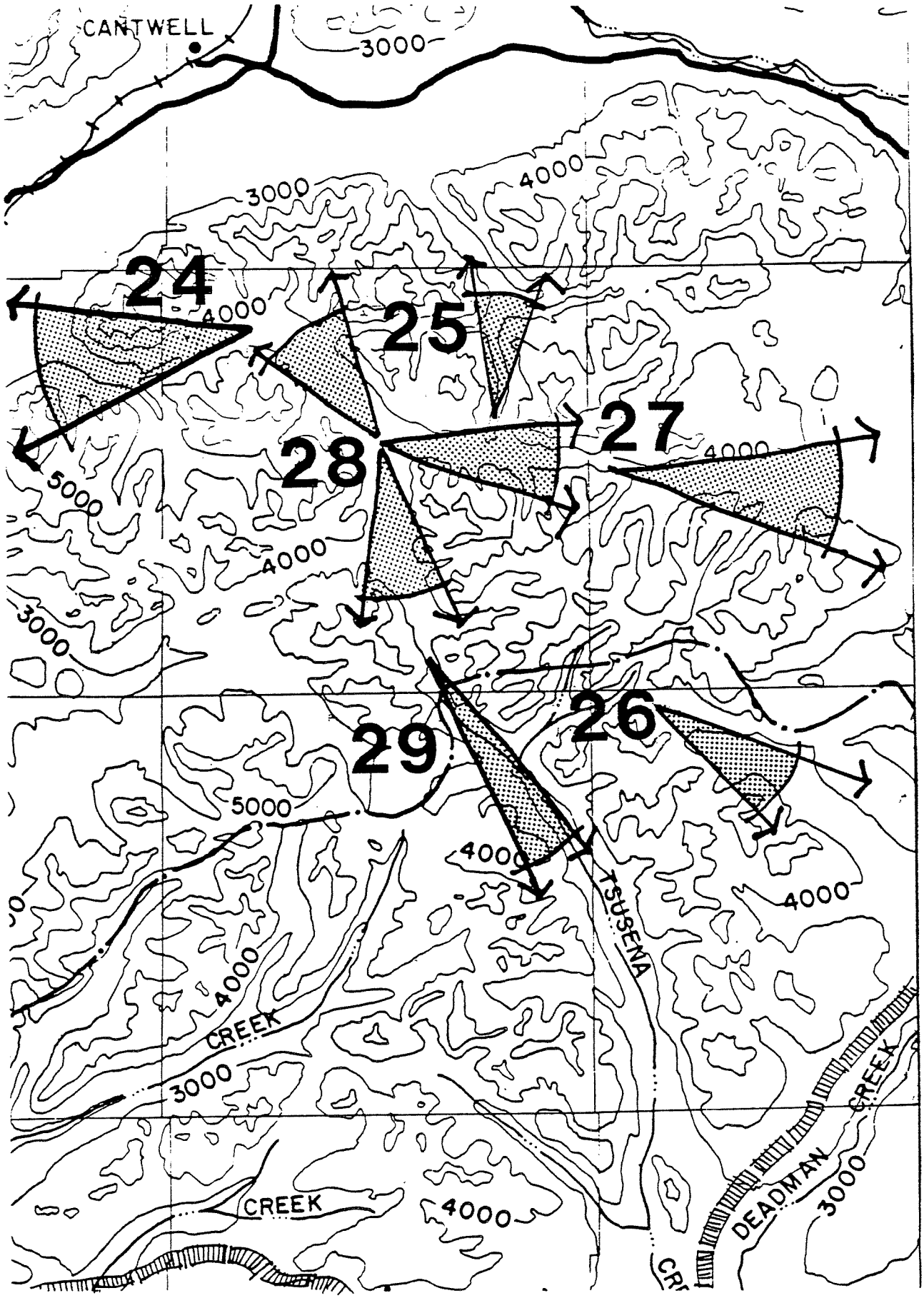
MAP 4

DEVIL CANYON AREA
SIGNIFICANT VIEWS

SUSITNA HYDROELECTRIC PROJECT AESTHETIC RESOURCES

8-2-17

EDAW 1983



MAP 5

OFF ROAD AREAS
SIGNIFICANT VIEWS

SUSITNA HYDROELECTRIC PROJECT AESTHETIC RESOURCES

EDAW 1983

8-7-18

EXHIBIT E

8. Aesthetic Resources

Comment 3 (p. E-8-36 to p. E-8-41)

Indicate if there is a distinction between use of the terms "medium" and "moderate", which are used interchangeably in the Aesthetic Value and Absorption Capability Rating Charts and on the Composite Rating Matrix.

Response

There is no distinction between the terms "medium" and moderate" as used in the Aesthetic Value and Absorption Capability Rating Charts and on the Composite Rating Matrix. The term "medium" should be replaced with "moderate" wherever it appears on pp. E-8-36 through E-8-41.

8. Aesthetic Resources

Comment 4 (p. E-8-39 to p. E-8-40)

Indicate whether the absorption capability rating for the landscape character type of Tanana Ridge is "low" (p. E-8-39) or "moderate" (p. E-8-40).

Response

The absorption capability rating for the landscape character type of Tanana Ridge is "low". Therefore, the absorption capability rating should read as "low" on Line 1 of the Aesthetic Value and Absorption Capability Ratings chart on p. E-8-40 in Chapter 8, Exhibit E of the License Application.

EXHIBIT E

8. Aesthetic Resources

Comment 5 (p. E-8-41)

Indicate if the absorption capability rows have similar high, medium, and low designations as shown for the aesthetic value rating columns.

Response

The absorption capability rows should read "high", medium", and "low", from top to bottom on p. E-8-41 of Chapter 8, Exhibit E of the License Application. In addition, in accordance with the response to FERC Comment No. 3 under 8, Aesthetic Resources, the term "medium" should be replaced with the term "moderate" in the row and column headings on the chart.

EXHIBIT E

8. Aesthetic Resources

Comment 7 (p. E-8-61, para, 1; p. E-8-68, para. 3)

Provide a similar level of description and analysis to that used for the project area, access roads, and transmission line stubs (including photos, mapping, and descriptions of landforms, waterforms, vegetation, and views) for the Intertie transmission line corridor landscape types of Talkeetna Lowlands, Chulitna River, Broad Pass, Alaska Range, and Yanert River Valley (Step 3). Briefly describe and indicate on maps (Step 4) all significant viewpoints, viewsheds, distances, and potential numbers of viewers along the entire transmission line corridor (e.g., at road crossings, river crossings, skylined areas, etc.). Provide aesthetic value and absorption capability ratings for the Intertie landscape character types (Steps 5 & 6) and determine the project feature impacts (Steps 7 & 8). Finally, provide proposed mitigation measures for the Intertie project feature (Step 9).

Response

Additional study and further documentation of the transmission line corridors, addressing all aspects of route selection and evaluation, have been performed during the first six months of 1983. This effort will continue for several more months, with a full supplemental report on the project transmission system tentatively scheduled to be submitted in November, 1983. This report will include a visual resources analysis of all segments of the transmission corridor. In the interim, however, preliminary information concerning the Intertie corridor has been developed as requested. These findings are based on a literature review and limited field work. Final ground truthing will occur during the 1983 field season.

The remainder of this response separates Comment 7 into five parts. Each part corresponds exactly with the original comment.

PART 1

"Provide a similar level of description and analysis to that used for the project area, access road and transmission line stubs (including photos, mapping, and descriptions of landforms, waterforms, vegetation and views) for the Intertie transmission line corridor landscape types of Talkeetna Lowlands, Chulitna River, Broad Pass, Alaska Range and Yanert River Valley (Step 3)."

The subsequent discussion provides information on land forms, water forms, vegetation, views, and other characteristics for the following landscape character types of the Intertie portion of the Susitna transmission line:

- Susitna River Lowlands[1/]
- Mid-Susitna River Valley[1/]
- Talkeetna Mountains (lowlands and uplands)[1/]
- Chulitna River
- Broad Pass
- Alaska Range
- Yanert River Valley
- Nenana Uplands[1/]
- Curry Ridge[1/] (not directly impacted by the Intertie but existing in close association with the other units).

[1/] Because of several changes in the Intertie alignment subsequent to the publication of the Commonwealth Associates Intertie report (1982), these landscape character types were added to the five specified in Part 1 of Comment 7.

TALKEETNA MOUNTAIN (LOWLANDS AND UPLANDS)
(see EDAW Photo #3 on p. 8-7-56)

Landforms

- After rising steeply several thousand feet from the Susitna River valley, the landscape in the lower Talkeetna becomes a rolling terraced plateau.
- The average elevation is about 3000 feet (900 meters).
- A few knobs rise above 4000 feet (1200 meters).

Waterforms

- The tundra environment is very wet.
- The tundra contains hundreds of small lakes and muskey bogs.
- Gold, Cheechako, Chulitna and Disappointment Creeks are among the more scenic drainages.

Vegetation

- The dominant environment is tundra.
- Spruce trees scattered through the area are usually found at lower elevations within the drainages.

Views

- The flat and rolling character of these uplands affords panoramic views of the Alaska Range, and the Chulitna and Talkeetna mountains.

° Views of surrounding river valleys from high points and terrace edges are also very good.

Other

° Access into the area is predominantly by floatplane, snowmobile, and use of a few existing mining and/or settlement trails.

CURRY RIDGE
(see Commonwealth Photo #5 on p. 8-7-45)

Landforms

° The Curry Ridge landscape lies between the Susitna River lowlands and the Chulitna River landscape type.

° It is dominated by Curry Ridge and the Chulitna and Susitna Rivers.

° The two river valleys narrow to 5 to 8 miles wide along the base of Curry Ridge; the valley floors continue to slope gradually upward to 1400 feet in elevation at the north end of Curry Ridge.

° Curry Ridge reaches 4000 to 4500 feet in elevation.

Waterforms

° The Chulitna River varies in width from 1.5 miles in the middle of Denali National Park to approximately 100 yards near the park's southern boundary.

° The eastern portion of the landscape is dominated by the Susitna River and its tributary, the Indian River.

° Byers, Lucy, and Spinks lakes are the most visible.

Vegetation

° Landcover is upland spruce-deciduous and alpine tundra.

° Isolated areas of lowland spruce, deciduous forests, and low brush; muskeg-bog are present.

° The moist slopes are covered with brush.

° Willow and alder are typical deciduous cover.

° The plant system above timberline is alpine tundra where barren rocks are interspersed with herbaceous and shrubby low-growing plant mats.

Views

° South Curry Ridge commands an excellent view of Mt. Denali, rising above the flat Chulitna River valley, and Ruth Glacier.

° The Parks Highway and the Byers Lake area have excellent views of Curry Ridge.

CHULITNA RIVER
(see Commonwealth Photo #11 on p. 8-7-48)

Landforms

° Dividing the Alaska Range and Chulitna Mountains, this flat-to-rolling valley is predominantly an open landscape.

° The dominant Alaska Range rises gently from the valley in comparison to the steep rise of the Chulitna Mountains. Hurricane Creek and Hurricane Gulch form a dramatic descent from the Chulitnas.

- Landforms vary from level valleys to steep ridges in the Alaska Range to steeply incised valleys, exemplified by the Hurricane Gulch railroad bridge (which is 260 feet above the creek bottom).

Waterforms

- Water is abundant due to the presence of the meandering Chulitna River and its tributaries. The river divides into the East, Middle and West Forks within this landscape type.

- Waterfalls are present along Hurricane, Honolulu and Antimony Creeks and are visible from the Parks Highways.

- The lakes are small and elongated.

Vegetation

- Sparse-to-moderately-dense spruce-deciduous forested areas characterize the land cover in the bottomlands.

- Spruce-deciduous occupy the uplands, which merge into alpine tundra and rocky barren ground at the treeline.

- Large areas of deciduous vegetation occupy the floodplains and valley slopes.

- Treeless bogs with low-growing vegetation are also common.

- Visually, the thin, conical spruce stand out above the shrub vegetation, especially in the uplands.

Views

° Spectacular mountain, glacier, and valley views are offered in open areas and vantage points.

° There are prominent views of the Alaska Range to the west and steep river gulches and mountainous terrain along the Parks Highway.

Other

° The Alaska Railroad and Parks Highway parallel the river along the upper slopes and terraces on the Chulitna Mountains.

° These features cross the entire length of this landscape type from south to north.

° Several small road and railroad-related communities and a few designated recreational sites are located in the valley. Portions of the Parks Highway between Chulitna Pass and Broad Pass have been recommended for scenic highway designations by the Alaska Department of Natural Resources.

Broad Pass
(see Commonwealth Photos #13-15 on pp. 8-7-49 and 8-7-50, and EDAW Photo #7 on p. 8-7-58)

Landforms

° The area is characterized by a broad, gently-rolling, glacially-carved valley floor with little relief, and steep mountainous slopes separating the Alaska Range and the northwest Chulitna Mountains.

- The valley is over ten miles (16 km) wide near the town of Broad Pass, narrowing to four miles (6.4 km) wide near Cantwell).

- The highest elevation along the Parks Highway, approximately 2300 feet above sea level, occurs in Broad Pass.

- The area is characterized by contrasting topography.

- Valley floor morains and drumlins parallel the axis of this trough.

- This open, flat-to-rolling landscape is very scenic with long, linear lakes.

Waterforms

- Lakes are the most visible water feature in Broad Pass. Summit and Mirror Lakes are examples of the long, narrow lakes found in the pass.

- The Jack and East Fork Chulitna rivers are highly visible only at the northern and southern portions, respectively, of Broad Pass.

Vegetation

- The land cover is characterized by a variety of tundra and spruce cover patterns.

- Visually, white and black spruce are the most important vegetation in Broad Pass, since their spire-like shape and deep green color provide a contrast with the surrounding treeless lands.

Views

- Notable views from Broad Pass include Mt. Denali, Mt. Deborah, Mt. Pendleton, Panorama Mountain, and the Reindeer Hills. The Alaska Department of Natural Resources recommended in their 1981 Scenic Resources along the Parks Highway report that the road between the town of Broad Pass and Windy be considered for scenic designation.

Other

- The Parks Highway goes through the northern side of the pass near the Denali National Park boundary.

- The Alaska Railroad passes through the Summit Lake area and parallels the highway. Cantwell is the west junction of the Denali and Parks highways.

Alaska Range
(see Commonwealth Photo #18 on p. 8-7-51 and EDAW Photo #2 on p. 8-7-55)

- The Alaska Range landscape type lies north and west of many other landscape types, thus providing background views from them.

- The Intertie passes through this landscape character type in the Windy Pass area around Sugar Loaf Mountain.

Landforms

- The Alaska Range is a steep, crescent-shaped mountain range heavily sculptured by recent glacial activity. It is approximately 600 miles in length. The average width is 50 to 80 miles. Elevations range from approximately 2,000 feet in the valley to over 20,000 feet at Mt. Denali.

- The Nenana River valley is relatively narrow within the Windy Pass region of the range, thereby providing a contrast to the open Broad Pass landscape type to the south.

- The U-shaped valley, which is nearly flat, is almost 1 mile wide in places with broadly flaring walls rising 2,000 to 3,500 feet above the river. This topography provides direct views up the valley.

- Visually prominent landforms include Pyramid Mountain, Panorama Mountain, Reindeer Hills, Mt. Healy, Mt. Fellows, and Sugar Loaf Mountain.

Waterforms

- The most important water feature is the Nenana River, which is usually gentle with a few rapids.

- The Yanert Fork, Jack River, Moody Creek, Montana Creek, and Carlo Creek are other significant features.

- Glacial lakes are also present with the Deneki Lakes being the most visible.

- Streams occupying old glacial valleys have cut narrow gorges into the glacial drifts and underlying bedrock.

- Several major mountain peaks support glaciers that extend 20 or 30 miles from their sources and spread out in piedmont lobes at the mountain fronts.

Vegetation

° Land cover is primarily white spruce-dominated forests at the lower elevations (up to 3,000 feet) and bare rock surfaces at higher elevations.

° Snow is the most extensive land cover between mid-September and early May. During that time, the dark green spruce are visually distinctive.

° Treeline in the Alaska Range fluctuates with exposure and latitude. In general, tundra and forest separate between 2,500 and 3,200 feet. Shrub lands form a transition zone between the two zones.

° Wet tundra occurs on lower elevations.

° Alpine tundra in the higher areas may be primarily barren with low, clumping vegetation.

Views

° Within the Windy Pass area views are directed north and south, up and down the valley.

° Although present, glaciers are of minor visual significance in this part of the Alaska Range.

Other

° The primary evidence of human settlements includes the Alaska Railroad, Parks Highway, Cantwell, McKinley Village, and a few private residences.

YANERT RIVER VALLEY
(Yanert Fork)
(Photo not available - see Commonwealth photo #22 on p. 8-7-53 for similar landscape)

Landforms

- A 35-mile swath through the Alaska Range east from the Nenana River, the Yanert River Valley ranges from two miles in width at the Yanert Glacier to over five miles at the confluence with the Nenana River.
- The Alaska Range rises steeply from the valley near the glacier.
- Gently sloping terraces up to the mountains become progressively longer as the valley opens into the adjoining Nenana River Valley.

Waterforms

- The Yanert River is heavily braided for most of its length before turning into a broad fixed channel river for the last five miles.

Vegetation

- The valley is tundra dominated with scattered stands of spruce adjacent to the river bottom.

Views

- The Nenana Valley, Yanert Fork, and upper Nenana Valley near the Denali National Park entrance provide dramatic views.

EXISTING CONDITION/LANDSCAPE CHARACTER TYPE PHOTOGRAPHS

Individual landscape character types and existing conditions within the Intertie corridor were photographically documented by Commonwealth Associates, Inc., in their environmental studies of the Alaska Intertie (Commonwealth Associates, Inc., 1982). The list below indicates the landscape character types that are represented by the following Commonwealth photographs as well as several photos documented by EDAW Inc.

Landscape Character Types	Photograph Numbers (Commonwealth)	Photograph Numbers (EDAW Inc.)
Susitna River Lowlands	1,2,3	1
Curry Ridge	4,5,6,7	-
Chulitna River	8,9,10,11	-
Broad Pass	12,13,14,15	7
Alaska Range	14,15,16,17,18,19,20	2
Yanert River Valley	22	-

(Note: The Intertie route no longer passes through Nenana Gorge, so this landscape character type is not included in the supplemental response; see Plates G44 and G45).

PART 2

"Briefly describe and indicate on maps (Step 4) all significant viewpoints, viewsheds, distances and potential number of viewers along the entire transmission line corridor (e.g., at road crossings, river crossings, skylined areas, etc.)."

Significant views for the Willow to Healy segment of the Intertie have been mapped using aerial and limited ground reconnaissance, USGS topographic map analysis, and a literature review. Further view analysis, beyond what was presented in the License Application for the Willow to Anchorage and Healy to Fairbanks transmission stubs are currently in progress and are scheduled to be completed in November, 1983.

Criteria used in determining the significance of potential view points and view zones along the transmission corridor include:

Distance:	Foreground: 0 to 0.5 miles Middle ground: 0.5 to 2 miles Background: 2 miles and beyond
Potential:	Parks Highway tourists and local travelers
Viewers:	Denali Highway travelers Alaska Railroad travelers Local residents Back country recreationists Boaters/rafters
Context:	Landscape character type aesthetic value Landscape character type absorption capability in conjunction with exceptional natural features Other

The following views (listed by Intertie segment) have been identified as potentially significant.

Segment #1: Susitna River Lowlands (see Map 1 on p. 8-7-59)

A. ° Willow Creek Bridge Viewpoint

Distance: Middleground

Viewers: Parks Highway and Alaska Railroad travelers

Context: In general, this setting has a high absorption capability, but the transmission lines will be visible as they cross Willow Creek.

B. ° Willow Substation Vicinity View Zone
(Fish Hook-Willow Road Viewpoint)
(see Commonwealth Photo #1 on p. 8-7-43)

Distance: Foreground/middle ground

Viewers: Local road travelers, local residents

Context: Both facilities will be somewhat visible at the substation site and just north, and as the transmission lines pass through the Willow area. This is particularly true along Fish Hook-Willow Road due to a lack of vegetation adjacent to the road.

C. ° Kashwitna River Crossing View Zone

Distance: Foreground

Viewers: Water recreationists

Context: High absorption capability because of the area's dense vegetation cover. This crossing would impact only a short segment of the river.

D. ° Caswell Residences View Zone

Distance: Middle ground

Viewers: Local residents

Context: Generally high absorption capability. The transmission line towers will be visible but not obtrusive.

E ° Larson Lake View Zone

Distance: Foreground/middle ground

Viewers: Future residents, lake recreationists

Context: Heavy vegetation will screen much of this conflict, except where the transmission lines pass close to the southern end of the lake, possibly making them visible from the water. Also as the transmission lines continue north, they rise along a ridge which places them in a silhouetted position between this property and Alaska Range views.

F. ° Talkeetna River Crossing View Zone

Distance: Foreground/middle ground

Viewers: Boaters, river recreationists (this river is heavily used)

Context: The wider, braided character of the river in this location may cause the crossing to be visible for some distance up and down the channel.

Segment #2: Talkeetna Lowlands/Uplands (see Maps 1 and 2 on pp. 8-7-59 and 8-7-60)

G. ° Chulitna Creek Crossing View Zone

Distance: Foreground/middle ground

Viewers: Creek recreationists

Context: Heavy vegetation cover may limit the views of this crossing.

H. ° Curry Ridge View Points

Distance: Background

Viewers: Back country recreationists in Denali State Park

Context: While the Talkeetna Landscape itself is not particularly sensitive, the state park within the adjacent Curry Ridge landscape is sensitive. Views across the valley of the transmission lines will potentially impact the wilderness experience of hikers along the ridge.

Segment #3: Mid-Susitna River Valley (see Map 2 on p. 8-7-60)

I ° Gold Creek Area View Zone

(see Commonwealth Photo #7 on p. 8-7-46)

Distance: Middle ground

Viewers: Local residents, Alaska Railroad travelers

Context: In the Gold Creek area, occasional glimpses of the transmission lines will be possible where vegetation provides inadequate screening.

J. ° Susitna River Crossing View Zone

Distance: Foreground/middle ground

Viewers: River boaters and recreationists (the river is fairly heavily used in this area for fishing, etc.)

Context: While the landscape generally has a moderate ability to absorb the transmission lines, the crossing will potentially intrude on the natural river experience here. However, the Gold Creek Substation south of this crossing will not be visible from the river.

K. ° Chuiltna Pass View Zone

Distance: Foreground

Viewers: Local Residents (Chulitna), Alaska Railroad travelers

Context: As a result of the higher elevations in Chulitna Pass, vegetation is more sparse and cannot provide screening for this 5000 foot section where the railroad and transmission lines pass. Some reduction of impact can be expected since views are generally oriented to the west away from the transmission lines.

Segment #4: Chulitna River Valley (see Map 2 on p. 8-7-60)

L. ° Hurricane Gulch Viewpoint

(See Commonwealth Photos #9 and #10 on p. 8-7-47)

Distance: Middle ground

Viewers: Parks Highway and Alaska Railroad travelers, visitors to the Hurricane Gulch pull-off

Context: This outstanding natural feature is very sensitive and contains little vegetation capable of screening the transmission line towers.

M. ° Honolulu Area View Zone

Distance: Foreground/Middle ground

Viewers: Alaska Railroad and Parks Highway users.

Context: This section has a high aesthetic rating. The highway has been proposed as a scenic highway. Due to the proximity and moderate ability of the scattered vegetation to screen the corridor, views could be obstrusive. This condition is partially mitigated by the fact that the best views along this area are away from the corridor to the west.

N. ° Forks Campground/rest area view point

Distance: Foreground

Viewers: Parks Highway travelers, campers, recreationists

Context: Because of the limited screening capability in the area and the proximity to the rest area, the transmission lines could seriously affect views from this area.

O. ° East Fork Chulitna River Crossing

Distance: Foreground

Viewers: Water recreationists

Context: This area has a high aesthetic quality.

Segment #5: Broad Pass (see Map 3 on p. 8-7-61)

P. ° Broad Pass Community View Zone

Distance: Foreground

Viewers: Parks Highways, Alaska Railroad travelers, local residents

Context: This area has a high aesthetic capability and low absorption capability

Q. ° Broad Pass Valley View Point

(see Commonwealth Photo #13 on p. 8-7-49)

Distance: Background

Viewers: Parks Highway and Alaska Railroad travelers

Context: This area provides a short opportunity to view the valley as the road and railroad cross the middle fork of the Chulitna River.

R. ° Summit Lake Area
(see commonwealth Photo #15 on p. 8-7-50)

Distance: Middle ground
Viewers: Alaska Railroad and Parks Highway travelers
Context: This area is a proposed scenic highway section of the Parks Highway. Views from tourist trains are directed toward the transmission lines. The area has high aesthetic quality and low absorption capability.

S. ° Cantwell Area
(see Commonwealth photo #16 on p. 8-7-50)

Distance: Foreground to middle ground
Viewers: Parks Highway, Alaska Railroad, Denali Highway, and Old Airport Road travelers; local residents
Context: The sparse vegetation cannot screen immediate views of the transmission lines in this area. There may also be little screening due to limited vegetation for the section leaving Cantwell and rising over the Reindeer Hills.

Segment #6: Alaska Range Windy Pass (see Map 3 on p. 8-7-61)

T. ° Windy Pass entrance/Nenana River crossing
(see Commonwealth Photo #17 on p. 8-7-51)

Distance: Foreground/middle ground
Viewers: Parks Highway and Alaska Railroad travelers, local residents of Windy, Nenana River boaters

Context: This view of the transmission lines is very apparent. However, the initial view beyond Windy Pass will take predominance for auto and train travelers. The proximity of the transmission lines to the Nenana River will make the lines highly visible to boaters. This part of Parks Highway is proposed for scenic highway designation.

U. ° Windy Pass Corridor

(see Commonwealth Photo #18 on p. 8-7-51)

Distance: Foreground to middle ground

Viewers: Parks Highway and Alaska Railroad travelers

Context: Although there is a fair amount of vegetation, the closeness of the transmission line alignment will cause it to be visible at certain angles. This is a proposed scenic highway area.

V. ° Carlo Creek

(see Commonwealth Photo #19 on p. 8-7-52)

Distance: Foreground to middle ground

Viewers: Local residents, Parks Highway and Alaska Railroad travelers

Context: This area exhibits high aesthetic character with limited absorption capability where the transmission lines cross Carlo Creek.

Segment #7: Yanert River Valley (see Map 3 on p. 8-7-61)

W. ° McKinley Village

Distance: Middle ground

Viewers: Local residents and tourists

Context: Views from McKinley Village across the valley will be somewhat affected since there is little vegetation to screen the transmission lines.

X. ° Yanert River Crossing

Distance: Foreground/middle ground

Viewers: Yanert and Nenana River recreationists/boaters

Context: This area is charactrized by high aesthetic value.

Segment #8: Alaska Range

No significant views identified.

Segment #9: Nenana Uplands (see Map 3 on p. 8-7-61)

Y. ° Healy

Distance: Foreground/middle ground

Viewers: Local residents

Context: Although this landscape character type is moderately capable of absorbing these facilities, the proximity to residences will cause visual disruption. Healy is already visually disrupted by an existing generation station and associated transmission facilities.

PART 3

"Provide aesthetic value and absorption capability ratings for the Intertie landscape character types (Steps 5 & 6)."

AESTHETIC VALUE AND ABSORPTION CAPABILITY RATINGS
FOR THE WILLOW TO HEALY INTERTIE

Landscape Character Type	Aesthetic Value	Absorption Capability	Comments
Susitna River Lowlands	Low	High	Low in aesthetic value due to lack of aesthetically attractive features. Scale is large and common. Flat terrain and diverse vegetation patterns should be able to effectively absorb most manmade features. Aesthetic impacts will not be significant.
Talkeetna Mountains (Lowlands)	Moderate	Moderate	Manmade features would be visible in most areas due to flat to rolling, open terrain. Scattered spruce trees are consistent with transmission line character.
Talkeetna Mountains (Uplands)	Moderate	Low	The overall aesthetic value of this area is good due primarily to variety of landforms, but is not as scenic (middle and foreground views) in comparison to many other character types. The bisecting forested river valleys create a distinct and interesting pattern.

AESTHETIC VALUE AND ABSORPTION CAPABILITY RATINGS
FOR THE WILLOW TO HEALY INTERTIE

Landscape Character Type	Aesthetic Value	Absorption Capability	Comments
Mid-Susitna River Valley	Moderate	Low	Common Alaskan landscape. Nothing makes it particularly distinctive. Existing manmade elements (i.e. railraod parallel to river, railroad bridge, cabins, and railroad-related structures) have not had significant negative aesthetic impacts.
Chulitna River	High	Moderate to High	Dense lowland forest vegetation and flat to rolling landforms allow for good absorption.
Broad Pass	High	Moderate to low	Spruce cover is arranged in long, narrow north/south stands which allow for good screening. Massive landforms also diminish impacts. DNR recommends this area be officially designated a scenic highway due to landscape's low-to-moderate absorption capability.
Alaska Range	High	Moderate to to high	The massiveness of the mountains will cause the facilities to be less significant because of the extreme difference in scale.

AESTHETIC VALUE AND ABSORPTION CAPABILITY RATINGS
FOR THE WILLOW TO HEALY INTERTIE

Landscape Character Type	Aesthetic Value	Absorption Capability	Comments
Alaska Range, cont.			Complex sharp topography allows effective concealment.
Yanert River Valley	Moderate	Moderate	Open forested lowlands and terraces allow for good absorption. Spruce stands offer similar form and texture compared to transmission lines.
Nenana Uplands	Moderate	Moderate	Landscape has good variety of landforms and vegetation patterns and large distinctive river. Aesthetic value is not high compared to many other Alaskan character types. The diverse patterns of the natural elements and generally open landscape will be able to absorb limited manmade features assuming proper planning and design.
Curry Ridge	High	Moderate to high	Sufficient vegetation, topography, and texture to absorb the transmission lines in lower areas. Upper elevations are less capable of absorption and include important recreational areas.

There are also impacts common to most alignments which were too numerous to locate and evaluate. These include: trails supporting activities such as hiking, hunting, dog sledding, and skiing; rafting, canoeing, and access waterways; aerial sightseeing tours, private aircraft, and railroad users; and visual impacts to residences where the alignment crosses jeep trails and other unimproved roads leading to their land. Finally, the analyses did not include cases where cleared rights-of-way will open up some wilderness areas to human trespass or access, primarily vehicular, which could lead to the destruction of natural values and consequential visual disruptions (Commonwealth, 1982).

PART 4

"Determine the project feature impacts (Steps 7 & 8)".

A preliminary examination of visual impacts along the Intertie portion of the Susitna transmission line corridor was conducted by EDAW, Inc. in the fall of 1982. These enclosed findings and evaluations are based on aerial and limited ground inspection of the preferred and alternative alignments as well as an examination of USGS topographic maps. Much of the inventory and analysis data is based on the March, 1982 Commonwealth Report: Anchorage-Fairbanks Transmission Intertie Environmental Assessment. While this document addressed only the construction phase of the Intertie, the inventory of existing conditions and analysis of the alignment are valid for the Susitna project phase. However, the prior construction of the Alaska Intertie creates one significant difference; namely, in many areas the Susitna transmission lines will be crossing otherwise pristine areas that have been previously affected by the construction of the Intertie.

RELATIONSHIP BETWEEN PROPOSED FEATURES AND LANDSCAPE RATINGS
STEPS 7, 8

Transmission Segment	Segment #1 - Susitna River Lowlands
Landscape Character Type Composite Rating	1--low aesthetic value; high absorption capability
Feature Description	° Leaving the Willow Substation, Segment 1 parallels the Parks Highway and Alaska Railroad at a distance of 1 to 3 miles away for 20 miles. ° At P.I.10* the lines pull away from the road and run parallel to it, about five miles away. ° The segment passes within a quarter of a mile of Larson Lake at P.I.39 and P.I.40. ° The line leaves Talkeetna four miles to the west around P.I.40. ° After crossing the Talkeetna River, Segment 1 ends at P.I. 46.
Feature Impacts	° The line will generally be distant enough from the Parks Highway and screened by the thick foreground vegetation in this low landscape that it will be largely unseen by most viewers on the ground. Foreground vegetation is defined as areas within one-half to one-quarter mile either side of the highway. This condition will largely conceal the alignment from motorists traveling the highway as well as persons residing along the highway.

*Points of inclination referenced in these charts are taken from Exhibit G, February 1983.

Feature Impacts, cont.	° Some impact will occur to motorists when the alignment is viewed from certain angles, i.e. for example, as one looks east over open bogs. But here, distance will lessen the impact as the alignment is 1.5 miles from the highway, causing the towers to resemble the thin, vertical black spruce in form and color. ° There are residences in Caswell with views to the towers but again, the one mile distance allows the towers to be integrated with the existing landscape, creating moderate visual impact. ° The open bog areas between the black spruce stands allow for a natural right-of-way, thus lessening the impact. ° Significant visual impact will be imposed upon residences along Fishhook-Willow Road due to the lack of vegetation immediately adjacent to the road. ° The lines will cross the southwest corner of the Mat-Su Borough's proposed Larson Lake development. Passing within one-quarter mile of the lake and rising along a north/south ridge, the Intertie would impact westward views from the property. ° The line will be highly visible as it crosses the Talkeetna River, an important recreational resource. Particularly when the Intertie is expanded, visual impacts will be significant at this point.

RELATIONSHIP BETWEEN PROPOSED FEATURES AND LANDSCAPE RATINGS
STEPS 7, 8

Transmission Segment	Segment #2 - Talkeetna Mountains (Uplands/Lowlands)
Landscape Character Type Composite Rating	5--moderate aesthetic value; moderate absorption capability
Feature Description	° Beginning at P.I.46 just north of the Talkeetna River, segment #2 runs northward through rolling terrain. ° At P.I.52 about three miles away from Deadhorse, the line turns northeast to P.I.61 above the community of Gold Creek.
Feature Impacts	° There is little visual impact along the majority of Segment #2 because thick stands of spruce, birch and balsam poplar were retained as spatial separations between the alignment and residences. ° Impacts will occur where the alignment crosses trails and waterways leading to local residences, although maintenance of a vegetation buffer along major water courses will impair views along the right-of-way. ° There could be serious impact where the alignment crosses the southeast corner of the Chase II, Unit IV subdivision. ° The alignment bisects the West Talkeetna Bluffs Addition (1983) which is waiting for final approval of the Intertie project before starting disposals. The thick spruce and birch on-site vegetation should provide significant screening to the addition except to parcels nearest the right-of-way.

RELATIONSHIP BETWEEN PROPOSED FEATURES AND LANDSCAPE RATINGS
STEPS 7, 8

Transmission Segment	Segment #3 - Mid-Susitna River Valley
Landscape Character Type Campsite Rating	5--moderate aesthetic value; moderate absorption capability
Feature Description	° Beginning at P.I.61, Segment #3 drops from 3000 ft in elevation to about 1300 feet. It passes within one mile of Gold Creek and the Alaska Railroad, which crosses the Susitna River at this point. ° The lines run parallel to the Susitna River for four miles. They are one-quarter to one-half mile from the river on the valley side. ° The Gold Creek Substation will be located at P.I.65 just above the Susitna River. ° From this point the Intertie turns northward and crosses the river. The Susitna Project stubs run east, following the Susitna River. ° Segment #3 also crosses the Indian River at P.I.70 and passes by Chulitna. ° Segment #3 runs through Chulitna Pass within one-half mile of the Alaska Railroad, ending at P.I.73.
Feature Impacts	° After the Talkeetna River crossing, the route will not be generally visible until it again nears the Susitna River, when it will be in full view from Curry Ridge in Denali State Park.

RELATIONSHIP BETWEEN PROPOSED FEATURES AND LANDSCAPE RATINGS
STEPS 7, 8

Feature Impacts, cont.	° The tower tops along Segment #3 will introduce a moderate degree of impact to residences along the Alaska Railroad and tourists traveling the railroad. This is due to the vegetation being generally shorter than the towers and the towers being located on slopes. ° The impact will increase if the towers are viewed through the scattered openings associated with the area, particularly in the Chulitna Pass where the railroad and transmission lines pass within one-half mile of each other.

RELATIONSHIP BETWEEN PROPOSED FEATURES AND LANDSCAPE RATINGS
STEPS 7, 8

Transmission Segment	Segment #4 - Chulitna River
Landscape Character Type Composite Rating	8--high aesthetic value; moderate absorption capability
Feature Description	° Just north of Chulitna Pass Segment #4 begins at P.I.73. ° The power lines turn northward at this point, passing between Chulitna Butte and the Chulitna Mountains. ° The lines cross Hurricane Gulch around P.I.75 and the lines run alongside the Parks Highway (about one-half to one mile away) from P.I.74 until P.I.80 just north of where the lines cross the east fork of the Chulitna River.
Feature Impacts	° Impacts in the southern portion of the Chulitna River segment are generally low to moderate because of the visual absorption capability provided by the dense spruce and spruce-birch vegetation and the alignment which places Chulitna Butte between the towers and the Parks Highway. ° Segment #4 traverses a highly scenic and visibly sensitive landscape of Hurricane Gulch. Consequently, the alignment was kept at least one-half mile off the Parks Highway to allow using more of the foreground vegetation for screening. However, the tops of the towers will be visible occasionally from the Parks Highway and the cleared right-of-way will be visible as it crosses Hurricane Gulch.

RELATIONSHIP BETWEEN PROPOSED FEATURES AND LANDSCAPE RATINGS
STEPS 7, 8

Feature Impacts, cont.	°	The foreground vegetation, the alignment's distance from the highway and the fact that the views along this portion of the highway are oriented to the west across the Chulitna River to the Alaska Range will moderate visual impact to motorists.

RELATIONSHIP BETWEEN PROPOSED FEATURES AND LANDSCAPE RATINGS
STEPS 7, 8

Transmission Segment	Segment #5 - Broad Pass
Landscape Character Type Composite Rating	9--high aesthetic value; low to moderate absorption capability
Feature Description	° The segment begins just north of the East Chulitna River Valley P.I.80. ° It runs along the east side of the Middle Fork Chulitna River Valley, paralleling the Parks Highway and the Alaska Railroad (1/2 to 1 mile away). ° The line passes within one mile of Broad Pass community. ° Running along the valley edge, it crosses the Middle Fork of the Chulitna River at P.I.83. ° This segment passes within approximately four miles of the community of Cantwell where it crosses both the Jack River and the Denali Highway at P.I.90. ° Just north of Cantwell, Segment #5 rises out of the river valley and crosses Reindeer Hills, P.I.90 to 93 (mistakenly identified as P.I.99 in Exhibit G). ° After crossing the Nenana River, this segment ends south of Windy Pass (P.I.99).
Feature Impacts	° Impacts in the Broad Pass segment are low to moderate despite the low visual absorption capability of the landscape type because alignments are generally located in the background beyond the particular sensitive foreground and middle ground lands. Impacts became significant when alignments are placed in the foreground.

Feature Impacts, cont.	° The minimal impact can be attributed to four factors: the distance between the viewer and the alignment allows the towers to diminish in size relative to the viewers; the right-of-way will be less evident because the spruce in Broad Pass are arranged in long, narrow north to south stands allowing the openings between stands to be used as a natural cleared right-of-way; some of the alignment is located behind vertical topography and below the crest line to avoid complete silhouetting; and the massiveness of the mountains diminishes the presence of the towers because of the large scale differences. ° The alignment will introduce significant visual impacts into the Cantwell area because of its proximity to existing residential lands extending east out of Cantwell along the Denali Highway and Old Airport Road. ° The towers and cleared right-of-way will be apparent and adequate mitigation measures will be difficult because of the sparse, low vegetation. ° Significant visual impact by the towers will occur to nearby residences as the line crosses the Nenana River. The crossing will also potentially impact the wilderness experience of rafters on the Nenana River. ° The alignment over Reindeer Hills was chosen to minimize visibility from the Parks Highway. ° Where the alignment ranges from a few hundred feet to approximately two miles near Broad Pass community from the highway, visual impacts will be higher. ° The crossing of the Denali Highway, currently under study by the Bureau of Land Management for scenic highway designation, will also be in full view. This is the only major road crossing which occurs in the Intertie portion of the corridor.

RELATIONSHIP BETWEEN PROPOSED FEATURES AND LANDSCAPE RATINGS
STEPS 7, 8

Transmission Segment	Segment #6 - Alaska Range (Windy Pass)
Landscape Character Type Composite Rating	8--high aesthetic value; moderate absorption capability
Feature Description	° The Intertie passes through the Alaska Range via Windy Pass. Beginning at P.I.99 the transmission lines follow the Nenana River. ° In this area, the alignment is located less than one-quarter mile from the Parks Highway and approximately one-half mile from the Alaska Railroad. ° Beginning at P.I.106 the widening valley allows the line to pull back to one-half mile away. ° Segment 6 ends at P.I.109.
Feature Impacts	° There will be some attention drawn to the alignment near the Parks Highway north of Cantwell. However, the massiveness of the surrounding landscape and the initial revealing of Windy Pass will get most of the attention, alleviating the negative exposure. ° The line will be highly visible to motorists as it parallels the Parks Highway and Panorama Mountain through Windy Pass. Only a few short, scattered spruce offer any screening on Panorama Mountain.

RELATIONSHIP BETWEEN PROPOSED FEATURES AND LANDSCAPE RATINGS
STEPS 7, 8

Feature Impacts, cont.	° Although there is generally a good distribution of foreground screening available between Slime and Carlo creeks, the alignment is so close to the highway and residences that it will be visible from certain angles. ° Impacts are generally low before Windy Pass. Impacts in the remainder of the Alaska Range landscape are low to moderate because the alignments were placed in the dense stands of spruce along the low river terraces. There is a general availability of foreground vegetation immediately adjacent to the highway. This and the increased distance, as the alignment moves away from the highway and residences, will lessen the impact. ° There are several residences behind McKinley Village which will have views to the line because of inadequate screening vegetation, but the impact will be lessened by the distance factor of one mile. ° The alignment will also introduce a potential visual impact to rafters on the Nenana River.

RELATIONSHIP BETWEEN PROPOSED FEATURES AND LANDSCAPE RATINGS
STEPS 7, 8

Transmission Segment	Segment #7 - Yanert River Valley
Landscaping Character Type Composite Rating	8--high aesthetic value; moderate absorption capability
Feature Description	° P.I.109 begins the seventh Intertie segment. ° Dropping down from Windy Pass the Intertie traverses the Yanert River valley. ° The lines cross the river at P.I.110 where the Yanert joins the Nenana River. ° After following the east shore of the Nenana for about 2.5 miles, the Intertie turns northeast and ascends Montana Creek. ° Segment #7 ends at P.I.113.
Feature Impacts	° Crossing this valley, the alignment is approximately 2 miles east of the highway and will not have major impacts. ° Rafters will be potentially impacted at the Yanert River crossing.

RELATIONSHIP BETWEEN PROPOSED FEATURES AND LANDSCAPE RATINGS
STEPS 7, 8

Transmission Segment	Segment #8 - Alaska Range (Sugar Loaf Mountain)
Landscape Character Type Composite Rating	8--high aesthetic value; moderate absorption capability
Feature Description	° Beginning at P.I.113, the Intertie corridor runs through the Alaska Range for about 12 miles. ° The lines run up the Montana Creek drainage in a northeasterly direction. ° At P.I.116 the lines turn back to the northwest and descend through the Moody Creek drainage to P.I.121.
Feature Impacts	° This route east of Suger Loaf Mountain was selected to eliminate visual impacts in the highly scenic Nenana Gorge area. ° There are bush pilots using the Moody and Montana Creek Basins as part of their tour as well as a hunting guide service. Both services feel the alignment will disrupt the views of hunters and airplane passengers.

RELATIONSHIP BETWEEN PROPOSED FEATURES AND LANDSCAPE RATINGS
STEPS 7, 8

Transmission Segment	Segment #9 - Nenana Uplands
Landscape Character Type Composite Rating	5--moderate aesthetic value; moderate absorption capability
Feature Description	° After crossing Sugar Loaf Mountain and descending along the Moody Creek drainage, the Nenana Uplands Segment begins at 2000 feet in elevation (P.I.121). ° Crossing the Healy Creek Basin, the Intertie terminates with a substation near the town of Healy (P.I.123).
Feature Impacts	° The location of the Healy Substation near the Alaska Railroad and Nenana Railroad will be highly visible. ° Healy residences will also be visually affected by Segment #8, although Healy is already visually disrupted by an existing generation station and its associated transmission facilities. ° No other residences will be affected.

PART 5

"Finally, provide proposed mitigation measures for the Intertie projects feature (Step 9)."

In addition to the mitigation program discussed on pp. E.8.47 through E.8.59 in Chapter 8, Exhibit E of the License Application, specific mitigation measures are currently being developed for the entire transmission line corridor, including the Intertie portion of the project. These are tentatively scheduled to be completed in November, 1983 and will be provided to the Federal Energy Regulatory Commission at that time.

Photo 1
Susitna River Lowland looking east near Willow.

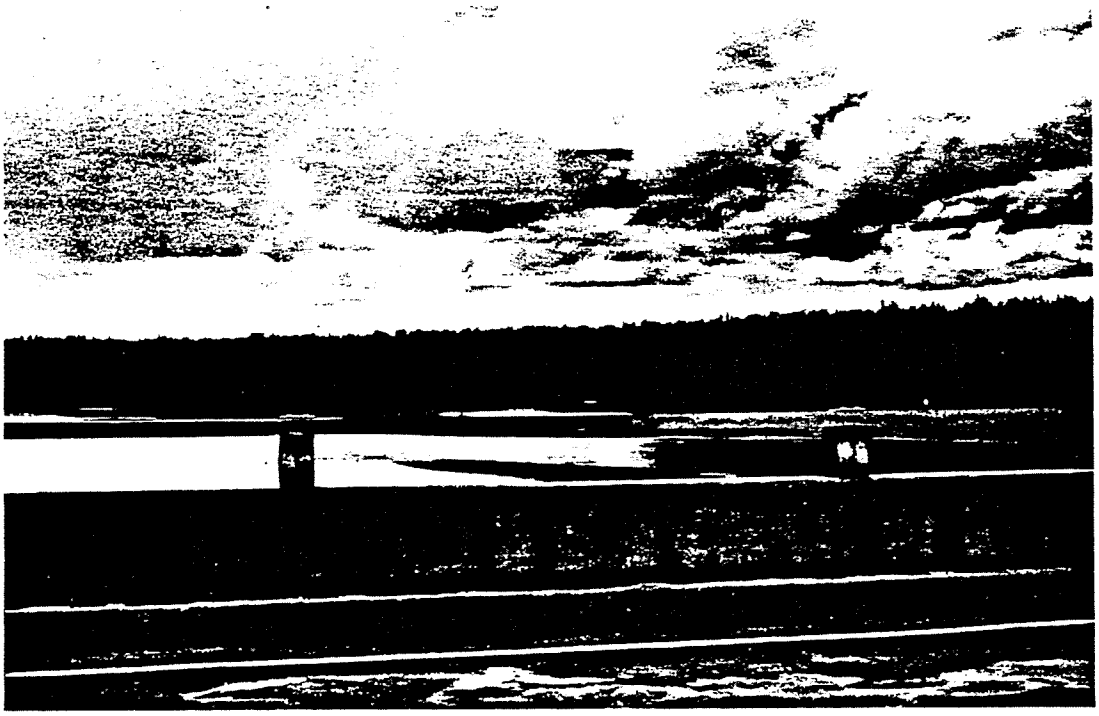


Photo 2
Susitna River Lowlands, Mile Post 104.3 south from the Susitna River Bridge.

FIGURE 21

Alaska Power Authority ANCHORAGE FAIRBANKS TRANSMISSION INTERTIE

Existing Landscapes

8-7-43

Gilbert/Commonwealth

Photo 3
Susitna River Lowlands, Petersville Road.

Photo 4
Mile Post 144.
Looking east up Byers Creek.

FIGURE 22
Alaska Power Authority | ANCHORAGE FAIRBANKS TRANSMISSION INTERTIE

Existing Landscapes

8-7-44

Photo 5
Byers Lake, looking toward Curry Ridge.

Photo 6
Mile Post 168.
Looking at the north end of Curry Ridge, Pass Creek in foreground.

FIGURE 23

Alaska Power Authority | ANCHORAGE FAIRBANKS TRANSMISSION INTERTIE

Existing Landscapes

8-7-45

Gilbert/Commonwealth

Photo 7
Railroad Mile Post 264.
Looking up the Susitna River north of Gold Greek.

Photo 8
Mile Post 170.
Looking west across the Chulitna River towards the Alaska Range.

FIGURE 24

Alaska Power Authority ANCHORAGE FAIRBANKS TRANSMISSION INTERTIE

Existing Landscapes

8-7-46

Photo 9
Mile Post 174.
Looking east up Hurricane Gulch.

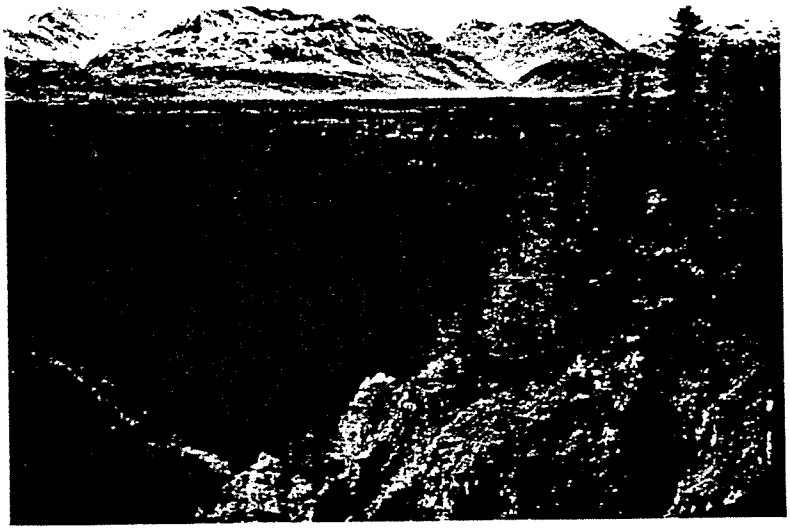


Photo 10
Mile Post 174.
Looking west down Hurricane Gulch.

8-7-47

FIGURE 25

Alaska Power Authority ANCHORAGE FAIRBANKS TRANSMISSION INTERTIE

Existing Landscapes

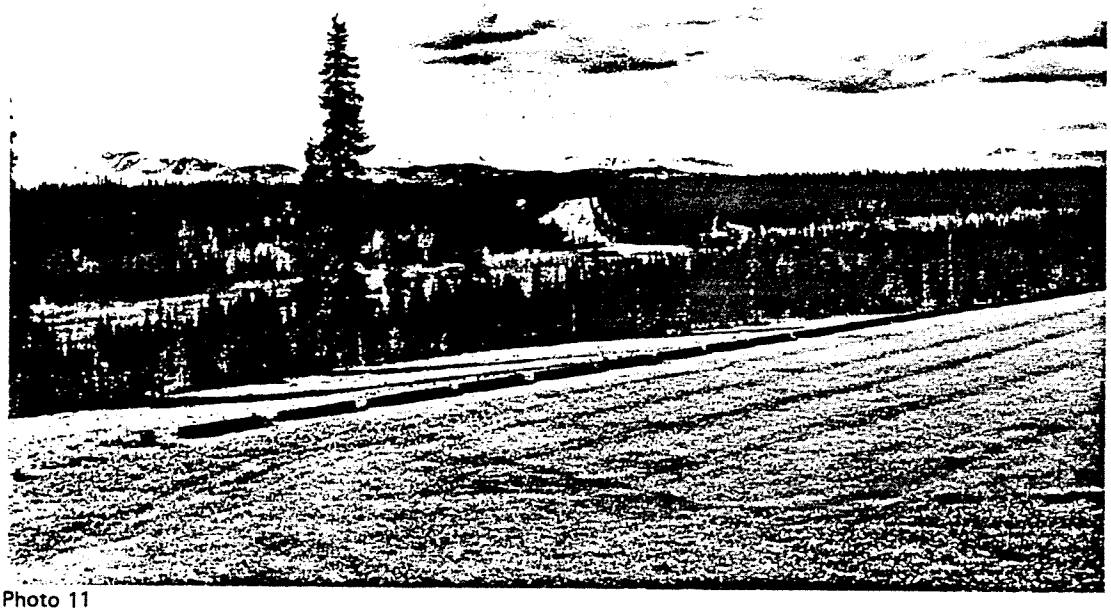


Photo 11
Mile Post 179.3.
Looking northwest across the Chulitna River.

Photo 12
Mile Post 194.3.
Looking east across the south end of Broad Pass.

FIGURE 26
Alaska Power Authority ANCHORAGE FAIRBANKS TRANSMISSION INTERTIE

Existing Landscapes

8-7-48

Photo 13

Mile Post 194.3.

Looking northeast toward the Alaska Range from the south end of Broad Pass.

Photo 14

Mile Post 198.

Looking southwest toward Mt. McKinley from Broad Pass.

FIGURE 27

Alaska Power Authority ANCHORAGE FAIRBANKS TRANSMISSION INTERTIE

Existing Landscapes

8-7-49

Gilbert/Commonwealth

Photo 15

Mile Post 199.

Looking east across Summit Lake from Broad Pass.

Photo 16

Mile Post 209.9.

Looking east toward the Denali Highway juncture with the Parks Highway.

8-7-50

FIGURE 28

Alaska Power Authority | ANCHORAGE FAIRBANKS TRANSMISSION INTERTIE

Existing Landscapes

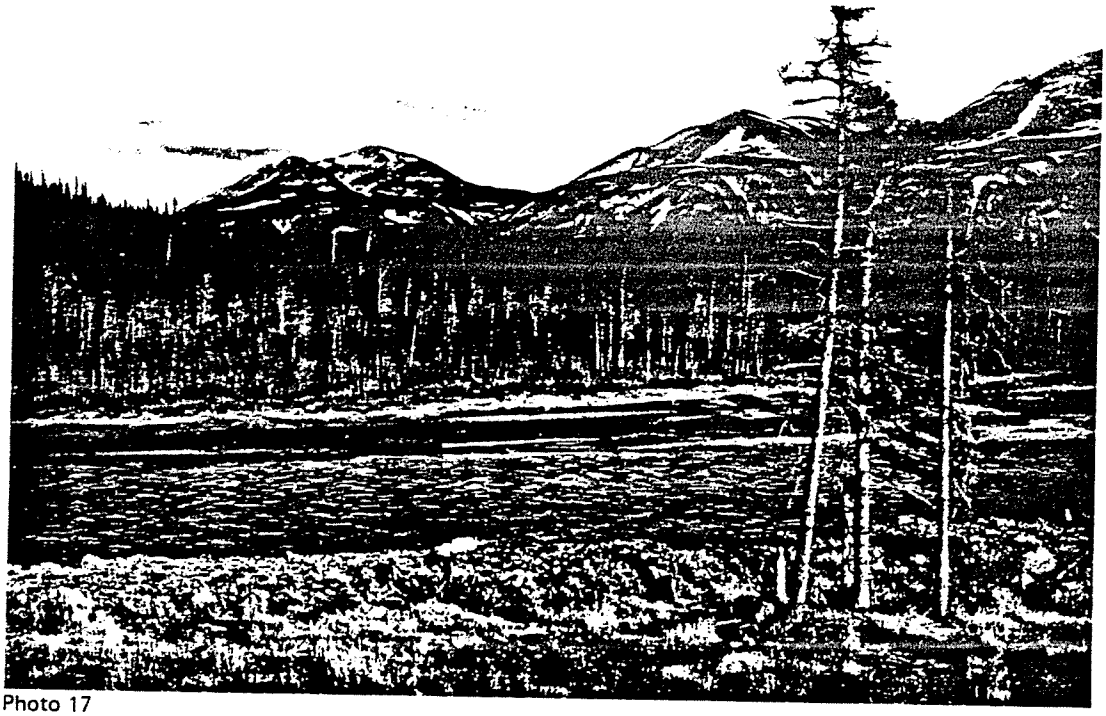


Photo 17

Mile Post 215.6.

Looking east across the Nenana River prior to entering Windy Pass from the south.

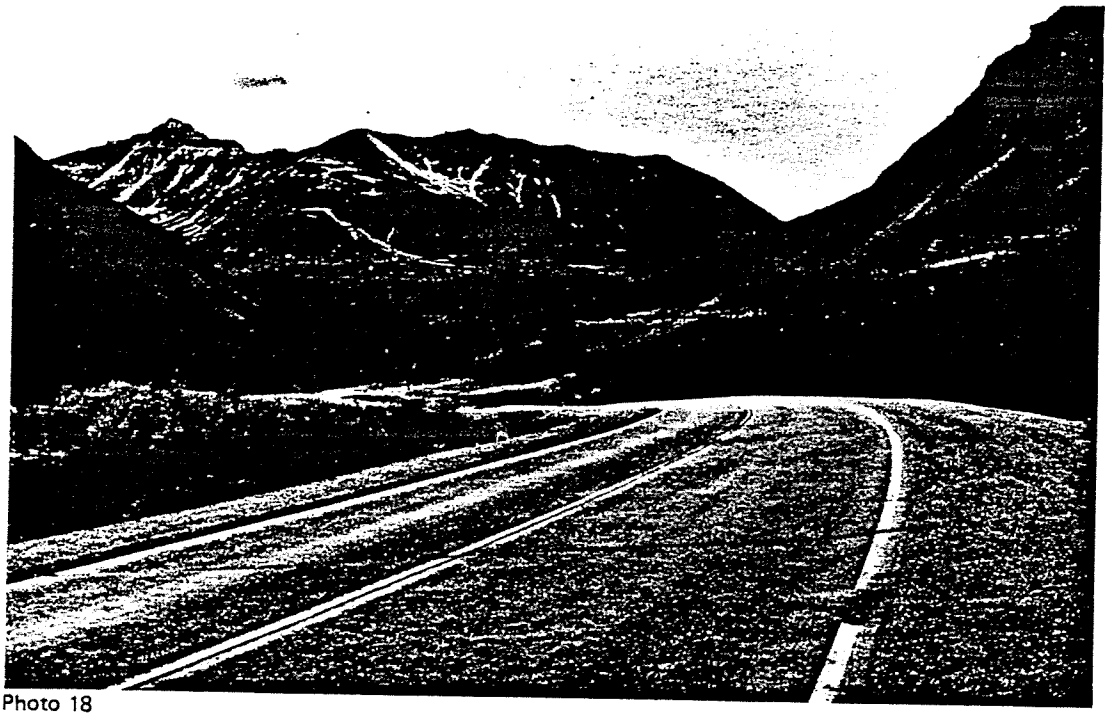


Photo 18

Mile Post 216.1.

Looking north up Windy Pass in the Alaska Range.

8-7-51

FIGURE 29

Alaska Power Authority **ANCHORAGE FAIRBANKS TRANSMISSION INTERTIE**

Existing Landscapes

Photo 19
Mile Post 224.
Looking east up Carlo Creek in the Alaska Range.

Photo 20
Mile Post 237.
South of the Denali National Park entrance looking northeast.

8-7-52

FIGURE 30

Alaska Power Authority ANCHORAGE FAIRBANKS TRANSMISSION INTERTIE

Existing Landscapes

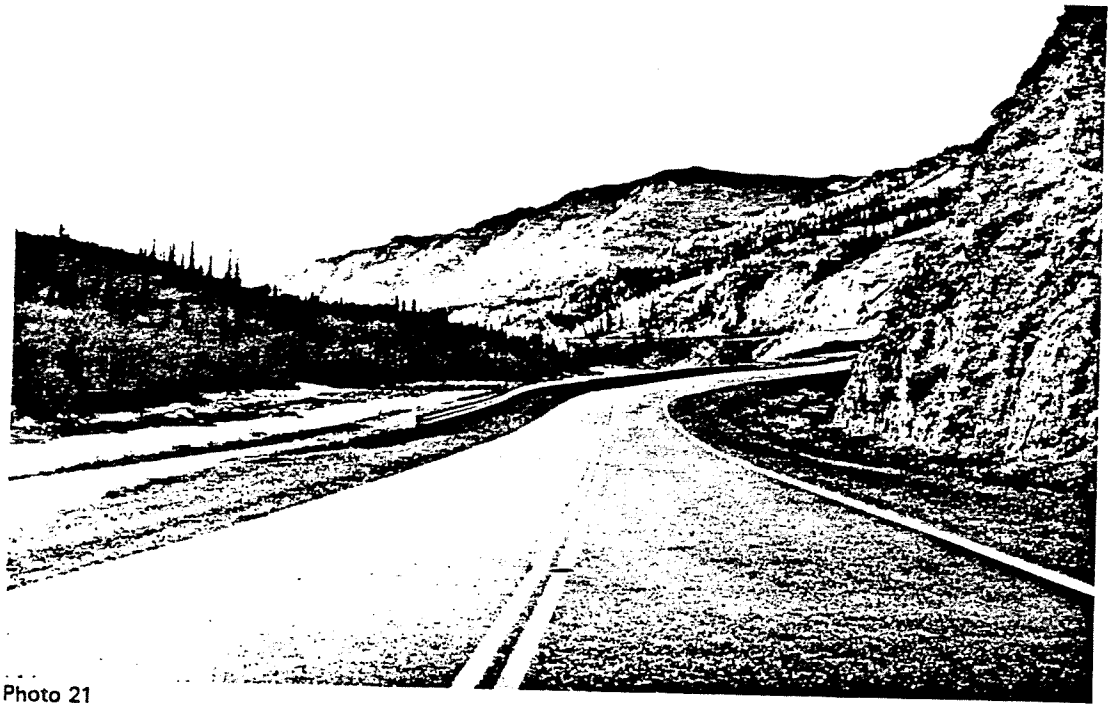


Photo 21
Mile Post 241.
Looking north up the Nenana Gorge.

Photo 22.
Mile Post 242.
Looking south down Nenana Gorge from the Dragonfly Creek area.

Alaska Power Authority | FIGURE 31
ANCHORAGE FAIRBANKS TRANSMISSION INTERTIE

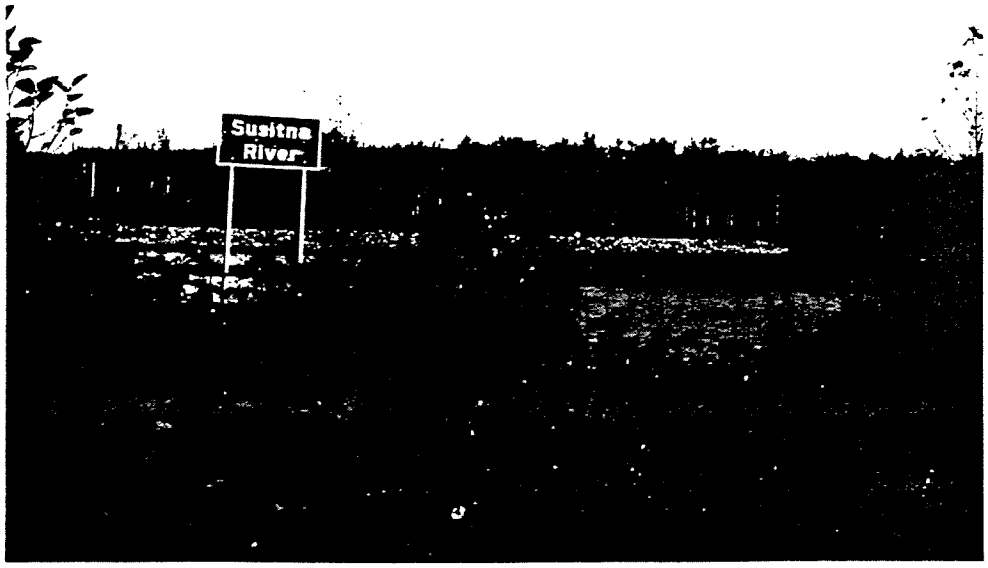
Existing Landscapes

8-7-53

EXISTING CONDITIONS PHOTO DOCUMENTATION

EDAW INC 1983

8-7-54



1 SUSITNA LOWLANDS

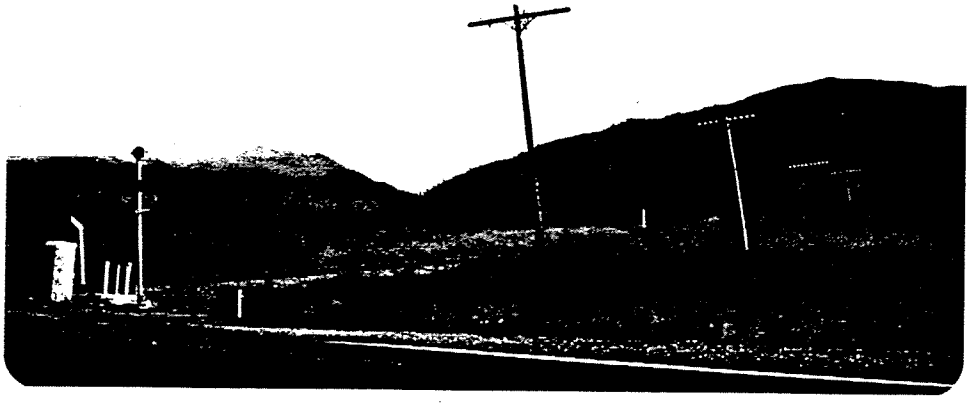
2 ALASKA RANGE

8-7-55

3 TALKEETNA LOWLANDS

4 TALKEETNA

8-7-56



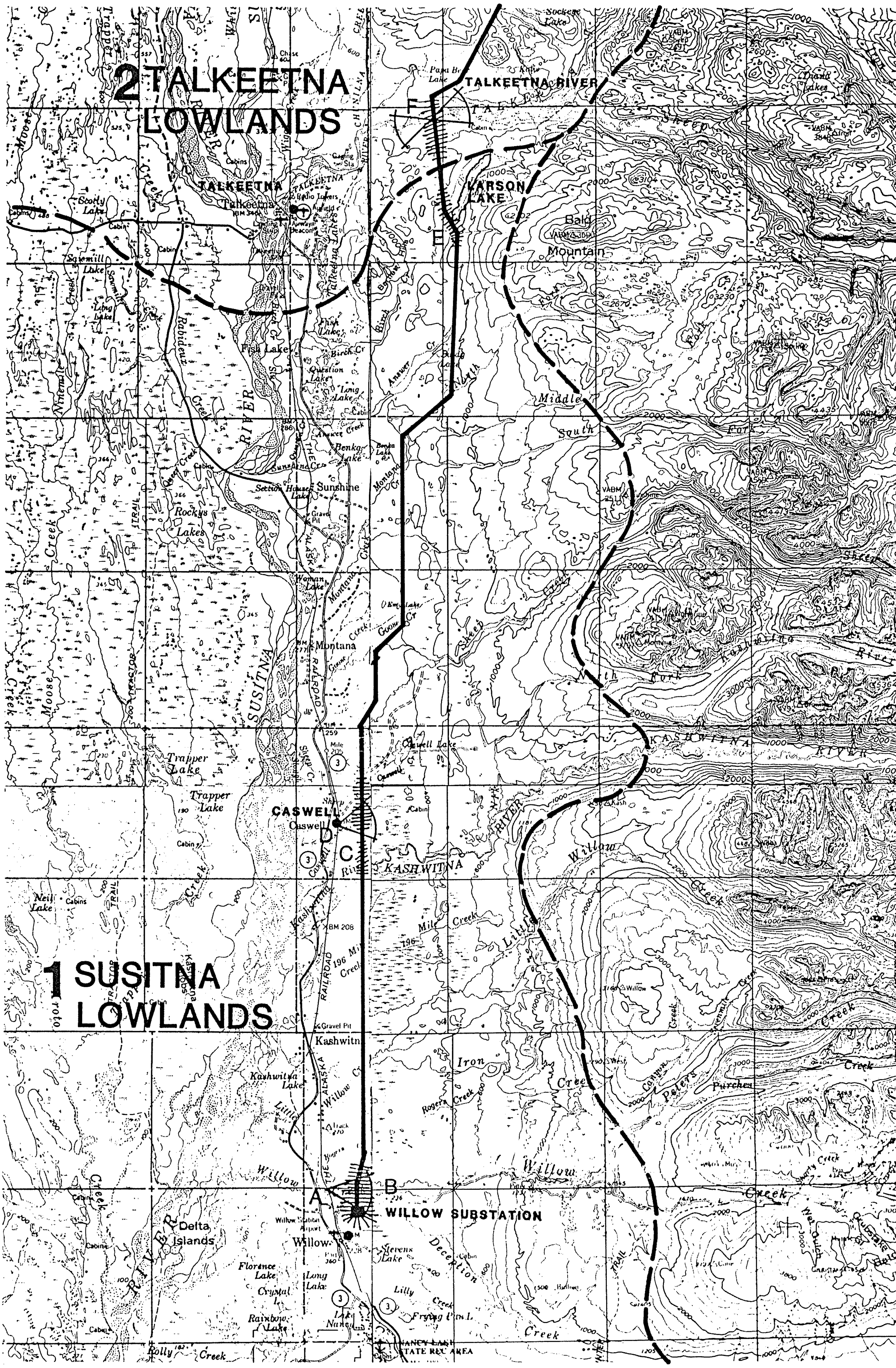
5 ALASKA RAILROAD

6 NENANA GORGE

8-7-57

7 BROAD PASS

8-7-58



MAP 1 OF 3

WILLOW HEALY TRANSMISSION INTERTIE
SIGNIFICANT VIEWS

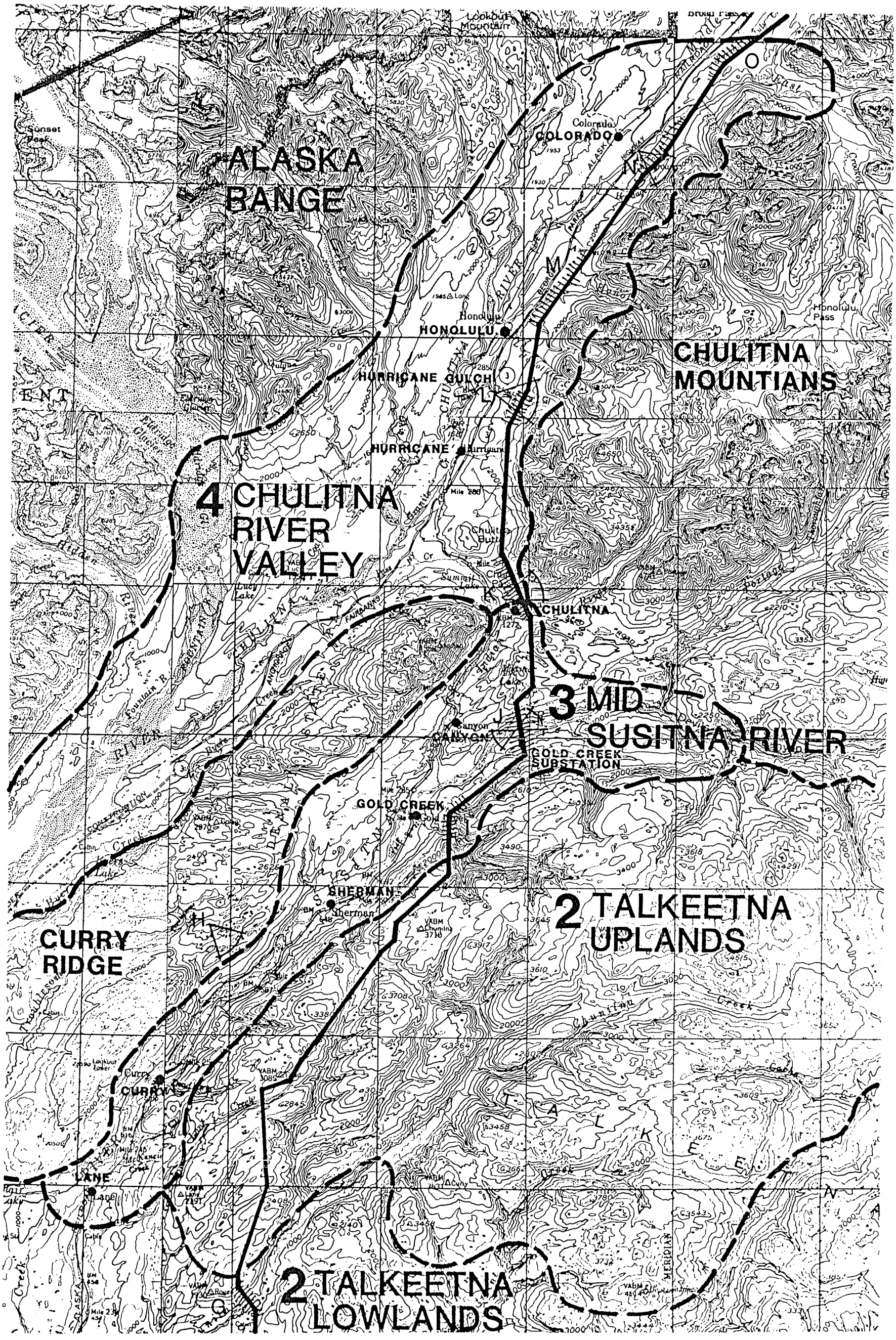
SUSITNA HYDROELECTRIC PROJECT AESTHETIC RESOURCES

EDAW 1983

LEGEND

9	INTERTIE SEGMENT
	INTERTIE CORRIDOR
A	SIGNICANT VIEWS
	VIEW ZONES
	LANDSCAPE TYPES

8-7-59



MAP 2 OF 3

WILLOW HEALY TRANSMISSION INTERTIE
SIGNIFICANT VIEWS

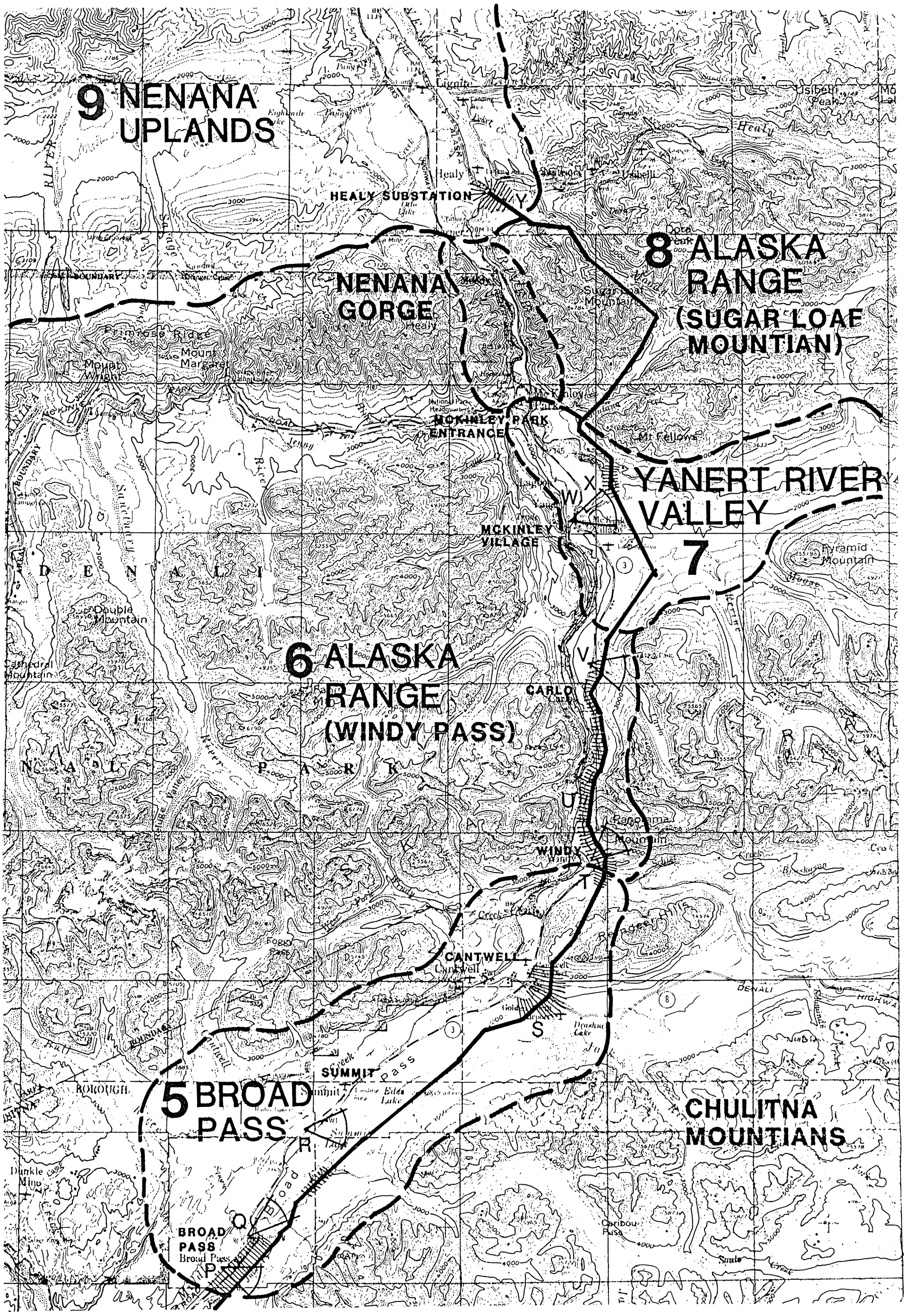
SUSITNA HYDRO ELECTRIC PROJECT AESTHETIC RESOURCES

EDAW 1983

LEGEND

- 9 INTERTIE SEGMENT
- INTERTIE CORRIDOR
- A SIGNIFICANT VIEWS
- VIEW ZONES
- LANDSCAPE TYPES

8-7-60



MAP 3 OF 3
WILLOW HEALY TRANSMISSION INTERTIE
SIGNIFICANT VIEWS

SUSITNA HYDROELECTRIC PROJECT AESTHETIC RESOURCES
EDAW 1983

LEGEND

9 INTERTIE SEGMENT
INTERTIE CORRIDOR
A SIGNIFICANT VIEWS
VIEW ZONES
LANDSCAPE TYPES

8-7-61

EXHIBIT E

8. Aesthetic Resources

Comment 8 (p. E-8-61, para. 1 to p. E-8-68, para. 3)

Indicate the potential extent of visual impacts to the Denali National Park and Denali State Park due to the location of the proposed transmission line. Discuss the significance of these impacts in relation to viewpoints, distances, duration, and number of viewers. Indicate how any visual impacts to these areas will be mitigated.

Response

Denali National Park

Some adverse visual impacts will occur as a result of the proposed transmission line routing. In the area east of the Denali National Park boundary, no development has taken place. The landscape is dominated by extensive changes in elevation with Mt. Fellows, Sugarloaf Mountain, Mt. Healy, Pyramid Peak, and the Yanert Fork Valley as outstanding natural features.
An assessment of visual impacts due to the proposed transmission line distinguished views from two directions: (1) from the Parks Highway northeast towards the south-facing slopes of Mt. Fellows, and (2) from the Denali National Park entrance east towards the north facing slopes of Montana Creek. It is anticipated that changes in the scenic quality of the landscape will occur primarily as a result of the cleared transmission line right-of-way since the visibility of the proposed structures will be lessened with viewing distances exceeding 1.6 miles. Although the line of sight will be occasionally interrupted by topography or vegetation, the proposed transmission line will nevertheless be viewed periodically from the Parks Highway near Mile Posts 231 through 236. In addition, the northern

portion of the facility will be visible from various points within the park entrance area, particularly at the Denali Railroad Depot, where the proposed transmission line angles in a northeasterly direction across Montana Creek at a viewing distance of 3.3 miles. Other viewpoints in the park entrance area include Riley Creek Campground and the Mckinley Park Station Hotel. While viewing distances to the proposed transmission line vary from 2.7 miles at the campground to 3.4 miles at the hotel, views will be partially or totally obscured by existing vegetation or topography. In 1982, recreational visits at the park were approximately 322,000 with less than 7 percent of the visitors (21,194) having arrived via the Alaska Railroad (U.S. Department of Interior, National Park Service 1983.) The majority of these visits occurred between June and September.

The Intertie route selection process recognized the importance of reducing visual impacts in the vicinity of the Denali National Park entrance. Therefore, a transmission line route was selected to shorten the total number of miles of transmission line route in the area opposite the park entrance; to utilize a small promontory to partially conceal, break, and reduce the length of the transmission line visible from any one viewing point along the Parks Highway or Denali National Park entrance; and to keep the transmission line as distant as possible from these viewpoints. Placement of the Susitna transmisison line within the Intertie right-of-way would achieve these same objectives and minimize visual impacts in this area.

Mitigation of visual impacts associated with the Intertie will occur during the design and construction phases of the project. Since it was noted that right-of-way clearing represented the most significant visual effect, design changes were made to reduce clearing required during construction. Through revising tower placement (to take advantage of existing topography) and increasing tower height (to increase conductor-to-ground clearance), clearing in the right-of-way will be substantially avoided. As a result,

the principal clearing requirements in the vicinity of Mt. Fellows and north of the Yanert Fork will occur at each tower base (in an area approximately 20 by 20 feet for tangent structures and 25 by 70 feet for angle structures) and at selected puller and tensioner sites along the right-of-way (in an area approximately 75 by 500 feet at 10,000 foot intervals). Similar measures are possible for the proposed transmission line route for the Susitna project.

Denali State Park

Visual impacts of the proposed transmission line at Denali State Park will not be significant and will occur primarily from viewpoints in the northeastern portion of the park. Primary viewers will be hikers on the Curry Ridge and Indian Pass trails. Curry and Indian ridges eliminate views of the transmission line east from the Parks Highway or Byers Lake Campground. From the southern boundary of the park, the transmission line will be generally obscured from view for approximately 8.5 miles, where topography provides adequate screening. However, the transmission facilities will be visible to hikers east of Sherman and near Gold Creek, where the line drops from the Talkeetna Mountains to the Susitna River lowlands. Views of these areas will be distant (over 6.0 miles from Curry Ridge trail) and visibility will be primarily confined to the structures and conductors, since the right-of-way is situated above the treeline. Additionally, the extent of the impacts will be lessened somewhat due to the presence of higher background topography.

Views within Denali State Park are dominated by the presence of the Alaska Range and Mt. McKinley. Viewing distances to these features range from 35 to 40 miles along the Parks Highway, which bisects the park north to south. Views are predominantly northwest in their orientation. Principal viewers

are found along the Parks Highway. For example, over 6,900 visitors utilized the park in 1982 (Alaska Department of Natural Resources, Division of Parks, 1983). The Byers Lake Campground and highway rest area are the principal developed facilities and have been classified as a Class I Recreation Resource Zone, which is the only high density zone designated in the state park (Alaska Deparment of Natural Resources, Division of Parks 1975).

Little future development is anticipated by the Division of Parks in the eastern portion of Denali State Park except for a small campground proposed in the Park's Master Plan. The campground, located north of Gold Creek Station where the railroad crosses to the west side of the Susitna River, would be directly accessible to both park visitors and railroad passengers (Alaska Department of Natural Resources, Division of Parks 1975). The proposed transmission line would be situated approximately 1.1 miles to the east, with views partially interrupted by vegetation.

References

Alaska Department of Natural Resources, Division of Parks. Denali State Park, A Master Plan. 1975.

Alaska Department of Natural Resources, Division of Parks. Dave Stephens. June 3, 1983. Personal communication.

United States Department of the Interior, National Park Service. Ralph Pingley. June 1983. Personal communication.

EXHIBIT E

9. Land Use

Comment 1 (p. E-9-9, para. 2, to p. E-9-13, para. 2)

Describe the existing land status for the intertie portion of the proposed transmission line corridor. Indicate if Tables E.9.1 and E.9.2 include data for the intertie. If they do not, please include land status/ownership information for the intertie. Provide figures (similar to Figures E.9.4 - E.9.6 and E.9.10 - E.9.12) indicating land status and land use development maps for the intertie section of the proposed transmission line corridor. Land ownership should be provided for the intertie portion of the transmission line corridor in Exhibit G, plates 34-37 and 41-45.

Response

Tables E.9.1 and E.9.2 in Chapter 9, Exhibit E of the License Application include land status data for those portions of the Intertie corridor within the USGS Talkeetna Mountains Quads C-5, C-6, D-5, and D-6, and the USGS Healy Quad A-5. Although the Intertie route is not identified on the map, Figure E.9.3 in Chapter 9 depicts land status along more than 60 miles of the Intertie corridor, from south of Gold Creek to north of Cantwell.

The Anchorage-Fairbanks Intertie environmental assessement (Commonwealth Associates, Inc. 1982) describes land status and land use development between Willow and Healy along the selected route for the Susitna transmission lines. Current land use along the Intertie corridor is discussed on pp. 126-131 of the Commonwealth report; land use impacts are discussed on pp. 215-219. As shown in Figure 15 of the Commonwealth report, land use development in this corridor consists of numerous scattered parcels between Talkeetna and Willow, and isolated parcels and settlements along the highway

or railroad from Talkeetna to Healy. The Intertie route avoids almost all developed parcels south of Talkeetna (although many are within two miles), as well as Denali State Park and Denali National Park and Preserve. (Superlink 65 was subsequently relocated several miles to take the route further away from several homesteads along the Alaska Railroad near Sherman.) Steep terrain presented serious routing constraints, particularly in the northern portion of the corridor. Consequently, the selected route avoids, but passes close to, several small communities from Hurricane to Healy. Steep terrain between Hurricane and Gold Creek, combined with the location of Denali State Park, resulted in the selection of a route that passes through the Indian River land disposals.

Land status within the Intertie corridor is addressed on pp. 132-139 and 219-220 of the Commonwealth report. Federal lands, which are generally located north of Talkeetna, consist primarily of Denali National Park and Preserve, railroad withdrawals, and BLM land. Additionally, the state has extensive landholdings within the corridor (including selections), mostly south of Broad Pass. Moreover, the Matanuska-Susitna Borough has some lands in the southern portion of the route, generally near the Parks Highway and Petersville Road. Native lands and selections are concentrated in the Cantwell-Broad Pass area (Ahtna Region, Inc.) and near Talkeetna (Cook Inlet Region, Inc.). Private lands are generally confined to the southern one-third of the corridor south of Curry.

The attached table outlines the land ownership schedule for the Intertie portion of the Susitna transmission corridor. In addition, land ownership is provided for the Intertie portion of the transmission line corridor on revised Exhibit G plates 34-38 and 41-45, contained in the response to Supplemental Comment 16, Exhibit G.

June 29, 1983

Willow to Healy Intertie

Land Schedule

DESCRIPTION:	OSTENSIBLE OWNER:
T. 19N., R. 4W., S.M.	
Section 4: W½NW¼SW¼; ptn. of W½SW¼NW¼ Southerly of Road R/W	Private (Matanuska Electric Association)
Section 4: Hatcher Pass Road R/W	State of Alaska (DOT-PF)
Section 4: Lots 3 & 4; S½NW¼; SW¼ Northerly of Road R/W	Private (Ethel I. and William C. Jones)
T. 20N., R. 4W., S.M.	
Section 4 Section 9 Section 16 Section 21 Section 28 Section 33	State of Alaska (DNR)
T. 21N., R. 4W., S.M.	
Section 4: S½SE¼ Section 9 Section 16 Section 21 Section 28 Section 33	State of Alaska (DNR)
Section 4: N½SE¼; S½NE¼; Lot 1 & 2	Private (Cook Inlet Region, Inc.)
T. 22N., R. 4W., S.M.	
Section 4: E½ Section 9: E½ Section 16: N½SE¼; SE¼SE¼; N½SW¼SE¼ Section 28: E½	State of Alaska (DNR)
Section 16: N½; SW¼; S½SW¼SE¼ Section 21	Private (Cook Inlet Region, Inc.)
Section 33	Mat-Su Borough
T. 23N., R. 4W., S.M.	
Section 2: Lot 4; SW¼NW¼; W½SW¼	Private (Norman H. Read)
Section 10: S½SE¼; SE¼SW¼ Section 11: NW¼; W½W½SW¼ Section 15 Section 22: NW¼SW¼ Section 27: W½W½ Section 33	State of Alaska (DNR)
Section 22: N½; SE¼; E½SW¼; SW½SW¼	Private (Cook Inlet Region, Inc.)
Section 34: NW¼NW¼	Private (Alvera McClain)

9-1-3

DESCRIPTION:	OSTENSIBLE OWNER:
T. 24N., R. 4W., S.M.	
Section 1 Section 2: E½E½; S½NW¼NE¼; W½SE¼; SW¼NE¼; SE¼NW¼; NE¼SW¼; E½NW¼SW¼; SW¼NW¼SW¼; E½SW¼ excepting Tract 30 ASLS 79-109 Section 11: Excepting Tracts 30 & 31 of ASLA 79-109, USS 4863 & Yoder Road	Private (Cook Inlet Region, Inc.)
Section 14: N½NW¼ excepting Tract 31, ASLS 79-109	
Section 2: N½NW¼; SW¼NW¼; NW¼NW¼SW¼; N½NW¼NE¼	State of Alaska (DNR)
Section 2 & 11: Tract 30, ASLS 79-109	Private (Trude Hightower)
Section 11 & 14: Tract 31, ASLS 79-109	Private (G.G. Tomlinson)
Section 23 Section 26	Mat-Su Borough
Section 35: W½W½	Private (Harry J. Crimmins & Lawerence R. Schuffman)
T. 25N., R. 4W., S.M.	
Section 36	Private (CIRI)
T. 25N., R. 3W., S.M.	
Section 6 Section 7 Section 30: S½ Section 31	Private (CIRI)
Section 18 Section 19 Section 30: N½	State of Alaska (DNR)
T. 26N., R. 3W., S.M.	
Section 30: SW¼; W½W½NW¼	Mat-Su Borough
Section 31	Private (CIRI)
T. 26N., R. 4W., S.M.	
Section 1: E½	State of Alaska (DNR)
Section 12: E½ Section 13: E½ Section 24: E½ Section 25: NE¼	Mat-Su Borough

DESCRIPTION:	OSTENSIBLE OWNER:
T. 27N., R. 4W., S.M.	
Section 36: Excepting A.S.L.S. 74-77 & ASLA 74-78	State of Alaska (DNR)
T. 27N., R. 3W., S.M.	
Section 5 Section 8 Section 17 Section 19: SE¼SE¼ Section 20 Section 29: NW¼ Section 30 Section 31: Excepting A.S.L.S. 74-78	State of Alaska (DNR)
T. 28N., R. 3W., S.M.	
Section 5 Section 7: E½SE¼ Section 8 Section 17 Section 18: E½E½ Section 19 Section 20 Section 29 Section 32	State of Alaska (DNR)
Section 20 Section 29	Mining Claims located by Harold Parker
T. 29N., R. 3W., S.M.	
Section 3 Section 8: SE¼ Section 9 Section 10: N½NW¼; SW¼NW¼ Section 16: NW¼ Section 17 Section 20 Section 29 Section 32	State of Alaska (DNR)
T. 30N., R. 3W., S.M.	
Section 13: E½ Section 24 Section 25 Section 26 Section 34: SE¼ Section 35: NW¼; W½SW¼; NW¼NE¼SW¼; N½NE¼; N½NE¼	State of Alaska (DNR)
T. 30N., R. 2W., S.M.	
Section 5 Section 6 Section 7 Section 8 Section 18	U.S.A. (CIRI Selected)

DESCRIPTION:	OSTENSIBLE OWNER:
T. 31N., R. 2W., S.M.	
Section 1	State of Alaska (DNR)
Section 2: SE¼SE¼	
Section 10: SE¼ Southeasterly of Susitna River	
Section 11	
Section 12	
Section 15	
Section 16: excepting USS 4851	
Section 21: excepting USS 4851 USMS 2355	
Section 28: W½	
Section 32: SE¼	
Section 33: W½; W½NE¼	
Section 21: USMS 2355 & Gold Creek Assn. No. 2	Private Mining Claim (Clifford Driskell and Builders Millwork & Supply)
T. 32 N., R. 2W., S.M.	
Section 1: N½; N½S½ excepting USS 4602 & USS 4956; SE¼SE¼	State of Alaska (DNR)
Section 2: NE¼ Easterly of ARR excepting USS 4602	
Section 12: E½E½ excepting Lot USS 4956	
Section 13: E½E½	
Section 24: E½E½	
Section 25	
Section 36: S½; NW¼	
Section 1 & 2: Lot 4, USS 4956	Private (Buelah J. Colborn)
Section 1: Lot 2, USS 4602	Private (Estate of Oliver David Moore)
T. 33N., R. 2W., S.M.	
Section 14	State of Alaska (DNR)
Section 23	
Section 26	
Section 35: Easterly of ARR excluding USS 5515	
T. 22S., R. 11W., F.M.	
Section 13: E½	State of Alaska (DNR)
Section 23: SE¼	
Section 24	
Section 26: E½	
Section 35	
T. 22S., R. 10W., F.M.	
Section 6	U.S.A. (BLM)
Section 7	
Section 18	

DESCRIPTION:	OSTENSIBLE OWNER:
T. 21S., R. 10W., F.M.	
Section 2	State of Alaska (DNR)
Section 3: E of Parks Highway	
Section 9: E of Parks Highway	
Section 10	
Section 16	
Section 20: E of Parks Highway	
Section 21: E½	
Section 29	
Section 30: E of Honolulu Creek and Parks Highway excepting AA6092	
Section 31: E of Honolulu Creek excepting AA6078, AA7791, AA6092	
T. 20S., R. 10W., F.M.	
Section 24: E of Chulitna River	State of Alaska (DNR)
Section 25: E of Chulitna River	
Section 26: E of Chulitna River	
Section 35: E of Chulitna River	
T. 20S., R. 9W., F.M.	
Section 4	State of Alaska (DNR)
Section 5: E of Parks Highway	
Section 7: E of Parks Highway	
Section 8	U.S.A. (BLM)
Section 17	
Section 18: Lots 2, 3, 4, E½W½, E½	
Section 19	
T. 19S., R. 9W., F.M.	
Section 12	Private (AHTNA, INC.)
Section 13	
Section 14: E of Alaska Railroad	
Section 23	
Section 26	
Section 27: SE¼; E½NE¼; SW¼NE¼; S½SW¼; NE¼SW¼	
Section 33: SE¼; S½NE¼; NE¼NE¼	
Section 34	U.S.A. (AHTNA Selected)
Section 33: SW¼ Southerly of Parks Highway	State of Alaska
T. 19S., R. 8W., F.M.	
Section 4	Private (AHTNA, INC.)
Section 7	
Section 8	
Section 6: E½	State of Alaska (DNR)
Section 5	

DESCRIPTION:	OSTENSIBLE OWNER:
T. 18S., R. 8W., F.M.	
Section 13 Section 23 Section 24 Section 25 Section 26 Section 27 Section 33 Section 34	U.S.A. (AHTNA Selected)
T. 18S., R. 7W., F.M.	
Section 3: NA F-14372	U.S.A. (David Nicklie, N/A)
Section 9: USS 5594	Private (Jake Tansy & Estate of Lilly Tansy)
Section 9 & 10: F-14360 NA	U.S.A. (Jack Tansy, N/A)
Section 17 Section 18	U.S.A. (AHTNA Selected)
Section 8: South of Parks Highway Section 9: excepting F-14360 & USS 5594 Section 10: NW¼ excepting F-14360, USS 5594 & F-14544 Section 3: excepting USS 5594, USS 5590 F-14372, F-14669, F-15557, USS 3229	Private (AHTNA Inc.)
T. 17S., R. 7W., F.M.	
Section 1: E of Parks Highway excepting USS 4434 Section 12: E of Parks Highway except USS 4322, USS 4434 & NA F-14665 Section 13: except F-14665 Section 23 Section 24 Section 26 Section 34: E½ except F-14372 Section 35	Private (AHTNA, INC.)
Section 12 & 13: m & b, F-14665	U.S.A. (Maggie Oliver, N/A)
Section 34: m & b, F-14372	U.S.A. (David Nicklie)
T. 16S., R. 7W., F.M.	
Section 1: E of Nenana River excepting USS 5576 Lot 2 Section 12: E of Nenana River Section 25: E of Nenana River excepting USS 5597 Section 36: E of Nenana River	Private (AHTNA, INC.)
Section 24: SE¼ excepting USS 5067	U.S.A. (AHTNA Selected)

8-1-6

DESCRIPTION:	OSTENSIBLE OWNER:
T. 16S., R. 6W., F.M.	
Section 6: excepting USS 5576 Section 7 Section 18: E of Nenana River excepting USS 3652 Section 19: E of Nenana River	Private (AHTNA, INC.)
T. 15S., R. 6W., F.M.	
Section 5: except F-17779 Section 8 Section 17: except USS 5604 Section 19: E of Parks Highway except USS 4040 & 5564 Section 30 Section 31: excepting Lot 2 USS 5576	Private (AHTNA, INC.)
Section 4 Section 9	U.S.A. (AHTNA Selected)
Section 20	U.S.A. (BLM)
T. 14S., R. 6W., F.M.	
Section 5 Section 6 Section 7 Section 18 Section 19: E of Nenana River Section 20 Section 29 Section 30: NE¼; E of Nenana River Section 32	State of Alaska (DNR)
T. 14S., R. 7W., F.M.	
Section 12 Section 13: E of Nenana River	State of Alaska (DNR)
T. 13S., R. 6W., F.M.	
Section 6 Section 7 Section 8 Section 16 Section 17 Section 18 Section 21 Section 28 Section 29 Section 32 Section 33	State of Alaska (DNR)
T. 13S., R. 7W., F.M.	
Section 1 Section 12	State of Alaska (DNR)

DESCRIPTION:	OSTENSIBLE OWNER:
T. 12S., R. 7W., F.M.	
Section 27 Section 28: E of Nenana River Section 34 Section 35 Section 36	State of Alaska (DNR)
Section 21: W½NW¼SW¼; W½E½NW¼SW¼; SW¼SW¼	Private (GVEA)

9-1-10

EXHIBIT E

9. Land Use

Comment 2 (p. E-9-13, para. 3)

Indicate the existing land values for the project area, transmission line corridor (including the Intertie), and adjacent lands to assist in substantiating statements in Section 3 of the Land Use chapter concerning changes in land values. Include a projection of future land values. If land values cannot be precisely determined for the project area or transmission line corridor, include some indication or examples of typical land values for the types of land in the project area.

Response

As indicated on p. E-9-13 in Chapter 9, Exhibit E of the License Application, land value data for the project area is generally unavailable due to land status and development characteristics. Market values apply only to state, borough, Native, or private lands that have been (or are to be) sold and developed, a status that is exhibited by only a small portion of the land in the project area and along the transmission corridor. Consequently, data for the areas of interest are sparse. Complete coverage is not maintained by public agencies or other sources. For example, the assessment program of the Matanuska-Susitna Borough principally covers only the Willow-Palmer area, with additional data for the few private parcels in the Parks Highway/Alaska Railroad corridor from Willow to Summit (e.g., the Cantwell-Broad Pass area). The sparse data coverage, combined with wide variations in land values based on location and other factors, makes it difficult to determine normal or typical values for lands adjacent to project facilities. The value of lands required for the project will not be established until the land-acquisition process occurs.

In the absence of a more comprehensive data series, information from the land disposal program of the Alaska Department of Natural Resources was assembled to provide a sample of land values near the project area and the transmission corridor. Data on subdivision and agricultural disposal parcels are useful as sample values because the purchase prices for these lands are established through a formal appraisal process prior to disposal. However, prices actually paid for these parcels are often much less than the appraisal price due to land discounts granted to qualified Alaska residents of up to 50 percent for non-veterans and 75 percent for veterans. Disposal parcels are often the only lands available for sale in remote areas of the state.

Data on unit prices, parcel size, type of access, and other factors are presented for eleven subdivisions and seven agricultural disposals in Table 1. As shown on the attached map, these disposals are located in the general vicinity of the project area or transmission corridor. In addition, all were active between 1981 and 1983. Nonetheless, this sample does not represent every disposal located near project facilities nor every disposal that was active during this period. For example, the sample does not cover the area around Anchorage where prices for individual lots may be $75,000 or more. As indicated on the map, the selected disposal areas are concentrated near the Parks Highway from Talkeetna to Anchorage and from Healy to Fairbanks. The Indian River Subdivision, the only parcel located within the general project area, is also along the Parks Highway. This location pattern is indicative of low-level development activity throughout this region of Alaska.

Unit prices for the subdivision sales listed in Table 1 range from $356 per acre in the Bald Mountain Subdivision, located approximately eight miles southeast of Talkeetna, to $5,268 per acre in the Parkridge Subdivision, located 14 miles west of Fairbanks. The wide disparity in the values of these two disposals may be explained by general location, site characteristics, and access. For example, the Parkridge Subdivision is view property

on a ridge adjacent to the Parks Highway and within easy commuting distance of Fairbanks. Therefore, this property would attract rather strong demand for suburban development. Conversely, the Bald Mountain area is more removed from large urban areas and the highway corridor. Currently, this land must be accessed via a cat trail by All-Terrain-Vehicle or snow-machine.

While land prices for the other nine subdivisions appear to reflect the pattern described above, the sample is too small and varied to identify definitive relationships. Sample values near the Healy-Fairbanks corridor are clearly highest for the two disposals close to Fairbanks, however per-acre values for disposal areas number 3 through 7 appear to be more dependent upon parcel size and site attributes than upon proximity to an urban area. The comparatively higher values for Puppy Haven, the only subdivision in the sample in the general vicinity of the southern transmission corridor, reflect its proximity to Anchorage and the greater level of development in the lower Susitna basin.

Agricultural land values are less variable, as indicated by the seven agricultural disposals in the sample. For example, appraisal prices range from $103 per acre at Moose Creek, located twelve miles southwest of Talkeetna, to $227 per acre for Delta Island, located four miles southwest of Willow. In general, land values are higher for the more southerly disposals due to climatic and marketing factors. Additionally, the proportion of Class II and III soils also appears to be a major price determinant.

A reliable projection of future land values in areas affected by the project cannot be provided. Land values have increased dramatically in Alaska during the past ten to fifteen years, as they have elsewhere in the United States. In addition to the broad-based economic forces underlying national real estate trends during this period, the recent Alaskan land value

escalation resulted from rapid population and economic growth and a restricted supply of land. As growth decelerates and state, borough, and Native corporation programs make more land available for development, land value appreciation is likely to taper off to an unpredictable level. This uncertainty would be prominent in developing land value projections for the undeveloped areas affected by the project, where a single event, such as the expansion or contraction of the state disposal program, could have a significant effect on the amount of available land and its price. Given these considerations, any land value projection would be merely speculation.

TABLE 1

SAMPLE LAND VALUE DATA

SUBDIVISIONS

Disposal Name	Map Number	Access Code	No. of Parcels	Ave. Parcel Size (acres)	Ave. Parcel Price ($)	Ave. Per Acre Price ($)
Northridge	1	1	18	11.6	26,450	2,277
Parkridge	2	1	13	5.3	27,796	5,268
Farmview	3	1	21	23.7	16,571	699
Nenana South	4	1	35	4.2	3,497	832
Anderson	5	3	53	36.9	22,245	603
June Creek	6	1	255	5.0	5,000	994
Panguingue Creek	7	3	165	6.0	5,684	953
Indian River	8	1	60	4.4	4,362	985
Bald Mountian	9	3	173	4.8	1,692	356
South Bald Mountain	10	3	84	11.6	5,955	511
Puppy Haven	11	3	13	38.8	41,530	1,069

AGRICULTURAL DISPOSALS

Disposal Name	Map Number	Access Code	No. of Parcels	Acres	Percent in Class II/III Soils	Ave. Per Acre Price ($)
Two Mile Lake	12	1	17	3,101	74	136
Brown's Court	13	1	9	1,775	96	134
Moose Creek	14	2	4	667	60	103
Goose Creek*	15	3	1	160	42	105
Delta Island	16	3	4	906	79	227
Nancy Lake	17	1	2	200	65	136
Little Susitna	18	2	3	560	73	152

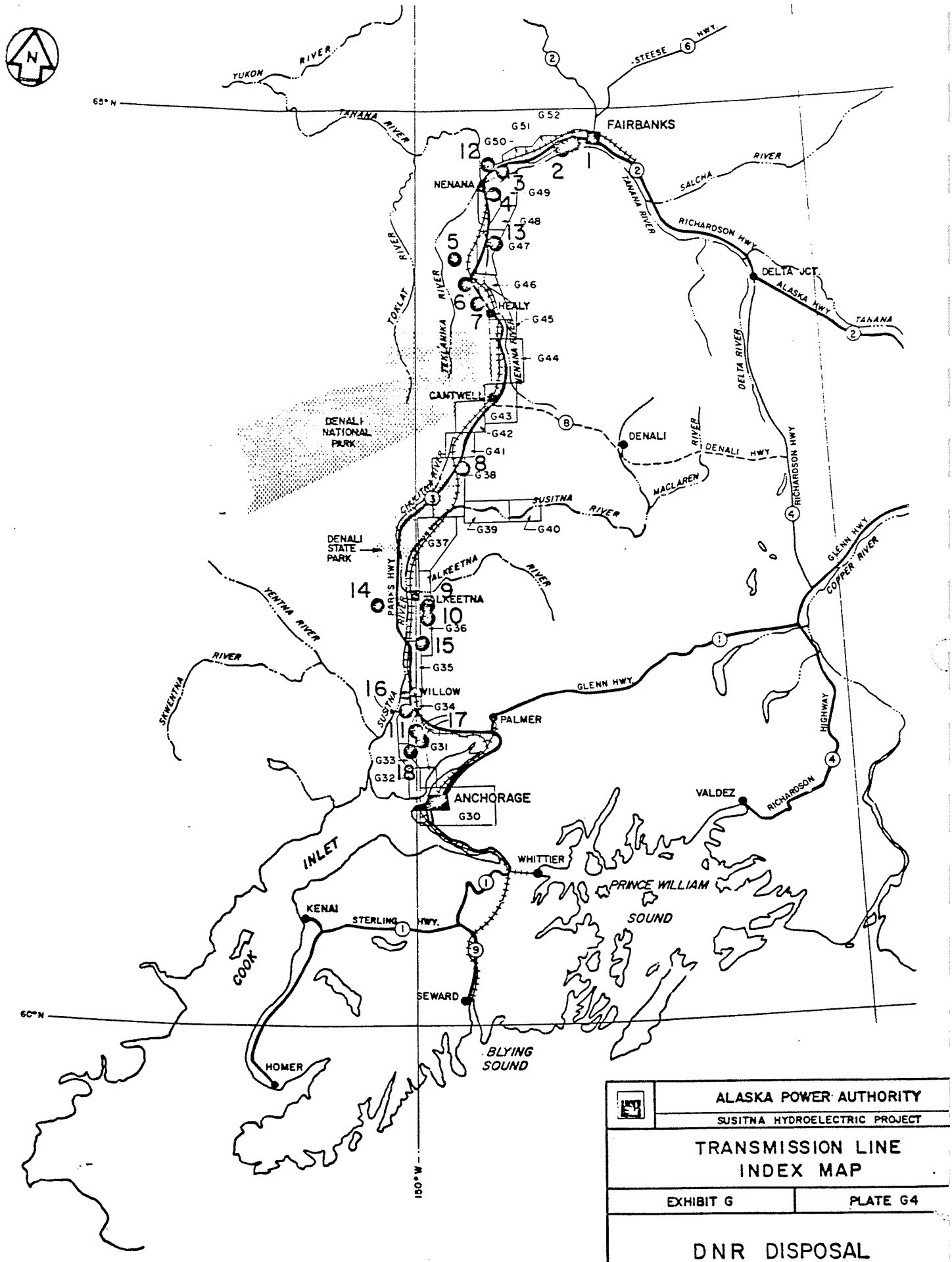
*Crossed by project transmission line.

Access Code:

1 - Adjacent to (within one or two miles) the Parks Highway
2 - Served by major existing or planned secondary road
3 - Not accessed by main road

Source: Alaska Department of Natural Resources, Division of Land and Water Management. Materials prepared for State Land Disposal Brochures for 1981-1983 period.

9-7-5



ALASKA POWER AUTHORITY

SUSITNA HYDROELECTRIC PROJECT

TRANSMISSION LINE INDEX MAP

EXHIBIT G | PLATE G4

DNR DISPOSAL LAND VALUE SAMPLE

EXHIBIT E

9. Land Use

Comment 3 (p. E-9-27, para. 3 to p. E-9-29, para. 6)

Describe existing land use management plans for the proposed transmission line corridor, including the intertie.

Response

Existing land use management plans for the transmission line corridor, including the Intertie portion, are generally described in Exhibit E, Chapter 9, Section 2.3 of the License Application. Land use jurisdiction is summarized below for the various segments of the Susitna transmission corridor.

Corridor Segment	Jurisdiction
Healy - Fairbanks	Fairbanks-North Star Borough; Alaska Department of Natural Resources; U.S. Department of Defense, National Park Service, and Bureau of Land Management; Ahtna Region, Inc.
Willow - Healy	Matanuska-Susitna Borough; Alaska Department of Natural Resources; U.S. National Park Service and Bureau of Land Management; Ahtna Region, Inc. and Cook Inlet Region, Inc.

Corridor Segment	Jurisdiction
Watana - Gold Creek	Matanuska-Susitna Borough; Alaska Department of Natural Resources; Cook Inlet Region, Inc.
Willow - Anchorage	Matanuska-Susitna Borough; Municipality of Anchorage; Alaska Department of Natural Resources; U.S. Department of Defense

The following discussion provides additional information on the planning activities in the jurisdictions outlined above.

In the Healy-Fairbanks corridor area, the Alaska Department of Natural Resources is developing a Tanana Area Plan. Currently only baseline information has been prepared; no policies or draft plans have been published. In addition, the Fairbanks-North Star Borough is preparing a comprehensive plan which covers approximately 25 miles of the northeastern portion of this segment. Furthermore, the Department of Natural Resources has an on-going and active disposal program in this region. Formal planning activities for Ahtna Region, Inc. lands have not begun. National Park Service and BLM activities are described in Chapter 9 of Exhibit E. Because the Healy-Fairbanks route avoids defense installations, the corridor would have no impact on plans for defense facilities in this area.

The planning activities of federal agencies and Native corporations within the Intertie corridor and the Watana-Gold Creek corridor are discussed in Chapter 9 of Exhibit E. While the planning efforts of the Mat-Su Borough were also described in Chapter 9, it should be noted that a draft of the Boroughs' new comprehensive plan was released in March, 1983. This plan, however, focuses on the more developed areas of the Borough and is directly

directly applicable to only about 30 miles of the Intertie corridor north of Willow. The creation and regulation of the Talkeetna Mountains Special Use District (see p. E-9-29 in Chapter 9) continues to represent the most significant Borough planning activity with reference to the transmission line in these areas. See pp. E-9-28, E-9-29, and E-9-54, in Chapter 9 for a discussion of the Alaska Department of Natural Resources planning activities.

Only a very small portion of the Willow-Anchorage transmission line corridor would be located within the Municipality of Anchorage. The municipality has both a current comprehensive plan and a draft utility corridor plan (Municipality of Anchorage 1982). The latter plan does not identify corridors within which future transmission lines would be located. Most of the transmission lines on the east side of Knik Arm would be located on federal military reservation lands under the jurisdiction of the U.S. Air Force (Elmendorf Air Force Base) and the U.S. Army (Fort Richardson). Master planning programs exist for both of these facilities.

The land use managment plans mentioned above and those listed in Chapter 9 of Exhibit E have been consulted with regard to the planning implications of the proposed transmission line. Additional and more detailed studies of planning activities and their relationships to the transmission line will occur during the continuing transmission studies. Identified planning concerns will be fully documented when these studies conclude in late 1983.

9. Land Use

Comment 4 (p. E-9-31, para. 2, to p. E-9-52, para. 2)

Estimate impacts to land values within and adjacent to the project area and transmission line corridor.

Response

Impacts to land values within and adjacent to the project area and the transmission line corridor cannot be estimated with precision or certainty, due to the factors discussed in the response to Item 4. As stated on p. E-9-31 in Chapter 9, Exhibit E of the License Application, land values will tend to increase as a result of project-related activities, particularly for properties located along the Denali and Parks highways. However, given the small base of currently available land, the primary determinant of changes in land values will be in the supply responses of landowners. For example, if relatively little additional land is made available to accommodate project-induced development, land value increases could potentially be significant in areas where such development is concentrated. Conversely, much of the impetus for land value appreciation would be dissipated if public and private landowners responded to the project by greatly increasing the supply of developable land. Due to the transitional state of the land selection and management processes in the project area, it is not possible to accurately project these responses at this time.

9. Land Use

Comment 5 (p. E-9-31, para. 2, to p. E-9-52, para. 2)

Indicate how proposed land uses within and adjacent to the project area and along the entire transmission line corridor will affect existing wetland and floodplain areas.

Response

Wetlands and project-related effects on wetlands are discussed in detail in Chapter 3, Exhibit E of the License Application. For example, existing wetland areas and wetland impacts are described on pp. E-3-220 through E-3-224 and on pp. E-3-245 and E-3-246, respectively. These discussions are supported by the quantification of vegetation impacts on pp. E-3-225 through E-3-244 and by Tables E.3.77 through E.3.86 and Figures E.3.38 through E.3.73. The responses to Comments 7 and 12 on the Botanical Resources Section of Chapter 3 should also be examined for corrections and additions to wetland impacts. These materials indicate the extent of wetland areas that would be occupied or disturbed by project facilities or inundated by the impoundments. In addition, they also describe the indirect effects on wetlands resulting from project development. The wetlands discussion on pp. E-9-21 through E-9-25 in Chapter 9 is keyed to the more extensive description and analyses in Chapter 3.

Project-related effects on floodplain areas were not described in detail in Exhibit E of the License Application, due to the lack of comprehensive data from which to identify floodplain areas. In general, floodplain effects will consist of direct effects resulting from project activities within floodplain areas, and indirect effects resulting from changed flow regimes or land use activity patterns. With the exception of the dams, project

facilities will be sited out of floodplains wherever possible. Nonetheless, some crossing of floodplains by the access road and transmission lines will be unavoidable. In general, the direct and indirect effects on floodplain resources (such as vegetation, wildlife, hydrology, and aesthetics) are described in Chapters 2 and 3 of Exhibit E, or can be inferred from the relevant resource discussions. For example, the effect of altered river flows on floodplain vegetation downstream from the project is identified on p. E-3-249 in Chapter 3. From a land use perspective, direct floodplain effects will be minor due to the generally low level of development and activity in the project area and along the transmission line corridor. However, the flow regulation and flood protection resulting from the project could indirectly contribute to land use development in floodplain areas downstream from Devil Canyon, such as in the Talkeetna area.

EXHIBIT E

9. Land Use

Comment 6 (p. E-9-49, para. 3, to p. E-9-51, para. 4)

Estimate induced land use changes (development and activity) for the intertie section of the transmission line corridor.

Response

Existing land use and land use impacts for the Anchorage-Fairbanks Intertie are described in the Intertie environmental assessement (Commonwealth Associates, Inc. 1982). The Intertie portion of the Susitna transmission line corridor will affect the same areas analyzed in the Commonwealth report. The incremental induced land use changes attributable to the Susitna transmission lines will be negligible. Any induced land use changes likely to result from increased access (such as possible effects on further residential development along the Fishhook-Willow Road and near Chase, Gold Creek, Cantwell, Indian River, and Healy) would result from the construction and maintenance of the Intertie and would occur with or without the Susitna project.

EXHIBIT E

9. Land Use

Comment 7 (p. E-9-50, para. 1)

Indicate if there are any other proposed agricultural sales along the entire transmission line corridor other than the Point MacKenzie agricultural sale.

Response

The following list identifies other proposed agricultural sales along the transmission line corridor in addition to the Point MacKenzie agricultural sale:

Willow to Anchorage Transmission Corridor

1) Fish Creek Management Unit -- located between the Point MacKenzie project and Red Shirt Lake. Agricultural sales will begin within the next two years. The proposed transmission corridor crosses approximately eleven miles of the Fish Creek unit. Planning for this unit is currently taking place. Therefore, the extent of agricultural sales is unknown.

2) Delta Islands agricultural disposal -- located approximately five miles southwest of Willow. The area is currently open for agricultural sales. The proposed transmission corridor is more than one mile from the Delta Islands disposal area.

Willow to Healy Transmission Corridor

1) Goose Creek Agricultural disposal -- 160-acre parcel (currently open for sale) located approximately seventeen miles southeast of Talkeetna, north of Goose Creek and east of Emil Lake. The Intertie easement occupies the western portion of the parcel, running one-half mile in length and 400 feet in width.

Healy to Fairbanks Transmission Corridor

1) Healy agricultural disposal -- begins approximately seven miles northwest of Healy and extends northward for six miles between the Parks Highway and the Nenana River. Agricultural sales will begin in Fiscal Year 1985. The proposed transmission corridor crosses six miles of the Healy disposal.

2) Windy agricultural disposal -- located south of the Clear Missile Early Warning Station. Agricultural sales will begin in Fiscal Year 1985. The proposed transmission corridor crosses approximately three miles of the Windy disposal.

3) Brown's Court agricultural disposal -- located ten miles south of Anderson and thirty miles north of Healy. Agricultural sales were offered in 1983. The transmission corridor passes approximately one-half mile from the southeastern corner of the parcel.

4) Goldstream agricultural disposal -- located west of the Bonanza Creek Experimental Forest. The agricultural sale is planned for Fiscal Year 1984. The prosposed transmission corridor either crosses or is adjacent to approximately 3.5 miles of the Goldstream disposal.

EXHIBIT E

10. Alternative Locations, Designs, and Energy Sources

Comment 1 (p. E-10-6, para. 5)

Provide the basis for determining the "cut-off points" for rating the 16 sites and and a description of how partial and total scores were integrated to yield selections.

Response

Cut-off points were established at 134 for total scores and 100 points for partial scores in order to select 10 of the 16 sites for more detailed development and cost estimates. The 10 sites were selected on the basis of total scores (which included eight criteria). Partial scores (which included 4 of the 8 criteria) were used only to validate the sites selected by using the total scores.[1]

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[1]Acres American, Inc. December 1981. Development Selection Report, Appendix C.

10. Alternative Locations, Designs, and Energy Sources

Comment 2 (p. E-10-7)

Describe what, if any, geologic constraints were analyzed in assessing the alternative damsite impacts.

Response

No geologic constraints were analyzed in assessing the Snow and Keetna hydroelectric sites because little geologic information is available. At Snow River, a limited geologic reconnaissance was conducted of the site. The site is in a deep, narrow, incised gorge in bedrock composed of greywacke and slate (U.S. Department of Energy, 1980). Geologic conditions appear to be favorable based on the limited field reconnaissance.

At the Chakachamna hydroelectric site, an interim feasibility study has been completed which included an assessment of the geologic constraints which could impact the site (Bechtel, 1983). The potential constraints included the following:

> (1) those associated with the physical layout of the civil structures (Lake Tapping, tunnel alignment/rock conditions, and the underground powerhouse site); and (2) those associated with the natural phenomena occurring within and adjacent to the project area (glacials, volcanic, and seismic activity).

The geologic constraints associated with the siting of the civil structures is a direct consequence of the level of investigations associated with an interim feasibility stage program. The sitings to date are based on no

subsurface exploration and very little geologic mapping. It was believed that suitable tunneling conditions would be encountered but there was a potential for high pressure groundwater conditions and high in-site rock stresses. Due to the proximity of the Lake Clark - Castle mountain fault to the underground powerhouse it was suggested that the structure be moved upstream away from the fault zone (see attached Figure 1). In one alternative, the construction of a major dam was proposed in Chakachatna Canyon. The foundation conditions on the north abutment consists of a complex sequence of lava flows, pyroclastics, volcaniclastics, outwash, and fill. It was suggested that construction of a dam across the canyon was likely to prove infeasible.

Glaciers

Barrier Glacier is the glacier that contains Chakachamna Lake and controls its water level. It was perceived that if hydroelectric development results in the lowering of the lake level the glacier may advance towards and block the Chakachatma River. A subsequent rise in the lake level could yield conditions conducive to an outburst flood from the lake. As a consequence, the lowering of the Chakachamna Lake level could cause the stream channels which drain adjacent lakes to incise their channels, thereby lowering the levels of the upstream lakes over time.

In the remote possibility Blockade Glacier advanced towards the McArthur River and caused the river bed to aggrade downstream, the tailwater level at the power plant site could rise. The extreme consequence would be blockage of the channel causing flooding of the powerhouse. The report states that no dramatic changes of these two glaciers is anticipated in the foreseeable future.

Volcanic Activity

The eruption of Mt. Spurr has occurred as recently as 1953. The probability of a major event occuring is small but it is a risk that would be associated

with development of the project. An eruption similar to the 1953 event would probably have little effect on the ability of the power facilities to continue in operation, but it could put the downstream fish passage facility out of service. The eruption could trigger a mud slide that could dam Chakachatna River thus flooding the facility. A catastrophic event similar to Mt. St. Helens, if directed towards the outlet and intake structures, could trigger a massive mudflow which could bury the upstream and downstream fish passage facility and the power intake. In addition, the heat generated by the pyroclastic ash flows could melt the lower parts of Barrier Glacier thus affecting the glacier's ability to contain Chakachamna Lake.

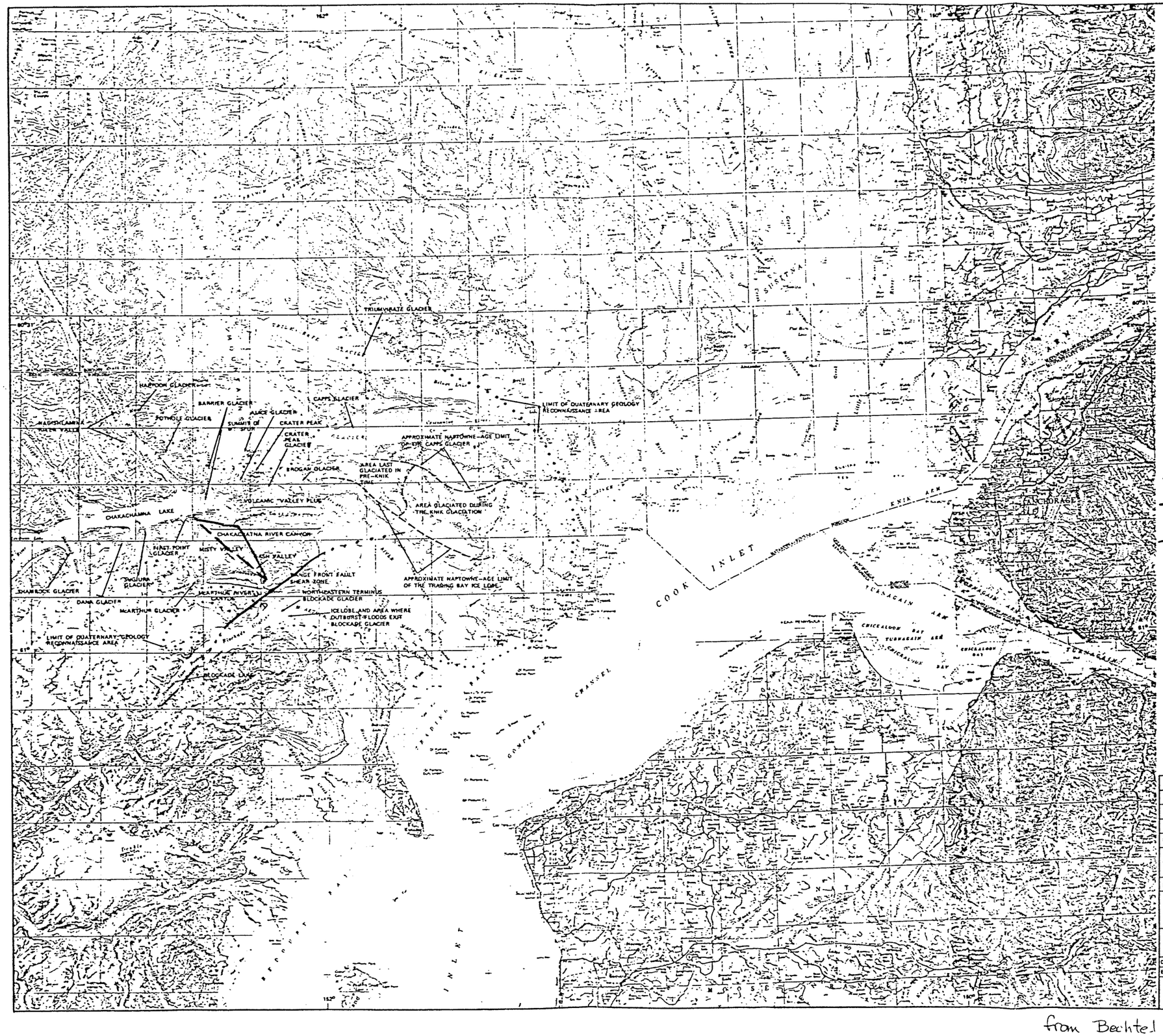
Seismic Activity

The potential seismic sources that may affect the site are the subduction zone and the Lake Clark-Castle Mountain fault. The Lake Clark-Castle Mountain fault crosses McArthur Canyon near the location of the proposed-powerhouse (Figure 1). It is considered to be capable of causing a large earthquake with significant displacement during the life of the project. Therefore the proposed powerhouse location should be shifted some distance from the fault where the rock quality improves. The structure can be designed to withstand the ground motion but it is not possible to design against any significant displacement within the structure. Four faults or lineaments were identified in the Chakachatna Valley of which one trends toward the proposed power intake structure. Further investigation of these potential faults will be necessary.

REFERENCES

Bechtel, Civil and Minerals, Inc. 1983. Chakachamna Hydroelectric Project Interim Feasibility Assessment Report. Prepared for the Alaska Power Authority.

U.S. Department of Energy. 1980. Hydroelectric Alternatives for the Alaska Railbelt. Prepared for the Alaska Power Administration, Juneau.



from Bechtel, 1983

10-2-14

EXHIBIT E

10. Alternative Locations, Designs, and Energy Resources

Comment 4 (p. E-10-11, para. 5)

Provide a brief description of what is considered "typical scenic quality" for the Snow Site region.

Response

The Snow site is situated in an environmental setting that is typical of Alaska's Kenai Peninsula region. The site itself is located on the Snow River, one of the peninsula's major river drainage courses. The Snow River originates in the large glacial icefields in the Kenai Mountains immediately northeast of the Snow site. This mountain range is characterized by steep mountain peaks with sharply defined ridges, angular steep-sided crests, and conspicuous boulder outcrops. The Snow site region is visually dominated by these snow-capped peaks. Three prominent peaks (which rise to 4,000 feet or higher in elevation) surround the Snow site location. Snow and ice fields cover approximately 25 percent of this region, dominating the higher elevations year-round.1/

Steep slopes, elevation, and climatic conditions greatly influence the vegetation characterizing the Snow site region. Slopes above 4,000 feet in elevation are typically barren rock and talus surfaces with the timberline varying between 1,000 and 1,500 feet in elevation. Alpine vegetation and subalpine herbaceous meadows dominate slopes above the treeline, while mixed

1/ U.S. Department of Agriculture, Forest Service. May 1979. Visual Character Types. Juneau, Alaska.

conifer and deciduous species comprise much of the densely forested areas below. The glacially-carved valleys, rugged, snow-capped mountain ridges, and variety of vegetation characterizing the Snow site area create a potentially highly valued visual experience to the viewers.

EXHIBIT E

10. Alternative Locations, Designs, and Energy Sources

Comment 5 (p. E-10-11, para. 5, through p. E-10-12, para. 10)

Provide a brief description of the socioeconomic environment of the Snow and Keetna sites.

Response

A. Snow Site

As shown on the attached map, the Snow site is located in the Kenai Peninsula Borough approximately halfway between Seward and Moose Pass. Seward is the largest nearby population center, followed by Moose Pass and several smaller communities including Primrose, Lawing, and Lakeview.

Seward, a home rule city, had an estimated 1982 population of 1,828 (1982 Kenai Peninsula Borough Special Census). Commerical fishing and seafood processing contribute significantly to the income of area residents. Other major sources of employment include state and local government, service industries, and retail trade establishments. While timber harvesting and processing were large sources of employment historically, the lack of forested lands available for harvest and low demand for timber has significantly curtailed employment in this industry.

About two-thirds of the housing units in Seward were single-family homes in 1982 (1982 Kenai Peninsula Borough Special Census) and a large number of housing units were rentals. In 1980, of the five principal communities in the Kenai Peninsula Borough, Seward had the highest proportion of rental units i.e., 45.4 percent (U.S. Bureau of the Census, 1980).

Law enforcement is provided by the Seward Police Department; while fire protection is the responsibility of a local fire department. Medical services are provided by Seward General Hospital, a two-doctor medical office, a chiropractor, a mental health clinic, and a nursing home. Water is provided by the city; waste water disposal is via the city sewer system.
Education facilities include one elementary school, one high school, and a branch of the Kenai Community College and a vocational training center. The 1982 enrollments at the elementary and high schools were 311 and 161, respectively.

Seward is the southern terminus of the Alaska Railroad. Additionally, it is connected to Anchorage by the Seward-Anchorage state highway, and is served by the Alaska ferry system.

The population of Moose Pass is 315 (1982 Kenai Peninsula Borough Special Census). The federal government is a major source of employment for residents of this area, since many residents work for the Alaska Railroad and the U.S. Forest Service. Additionally, some residents of the area commute to work in Seward and other nearby employment centers.

Housing consists primarily of owner-built, single-family structures. Police protection is provided by a resident state trooper, while fire protection is the responsibility of a volunteer fire department. The nearest medical services are at Seward. There is one elementary school (grades 1-8) in Moose Pass with a total enrollment of 30 children. Water is obtained from wells, and wastewater is disposed in individual septic tanks. Ground transportation to and from Moose Pass, which is principally via the Seward-Anchorage and Sterling highways, is variable, depending on the weather. There are no public airfields in close proximity to Moose Pass.

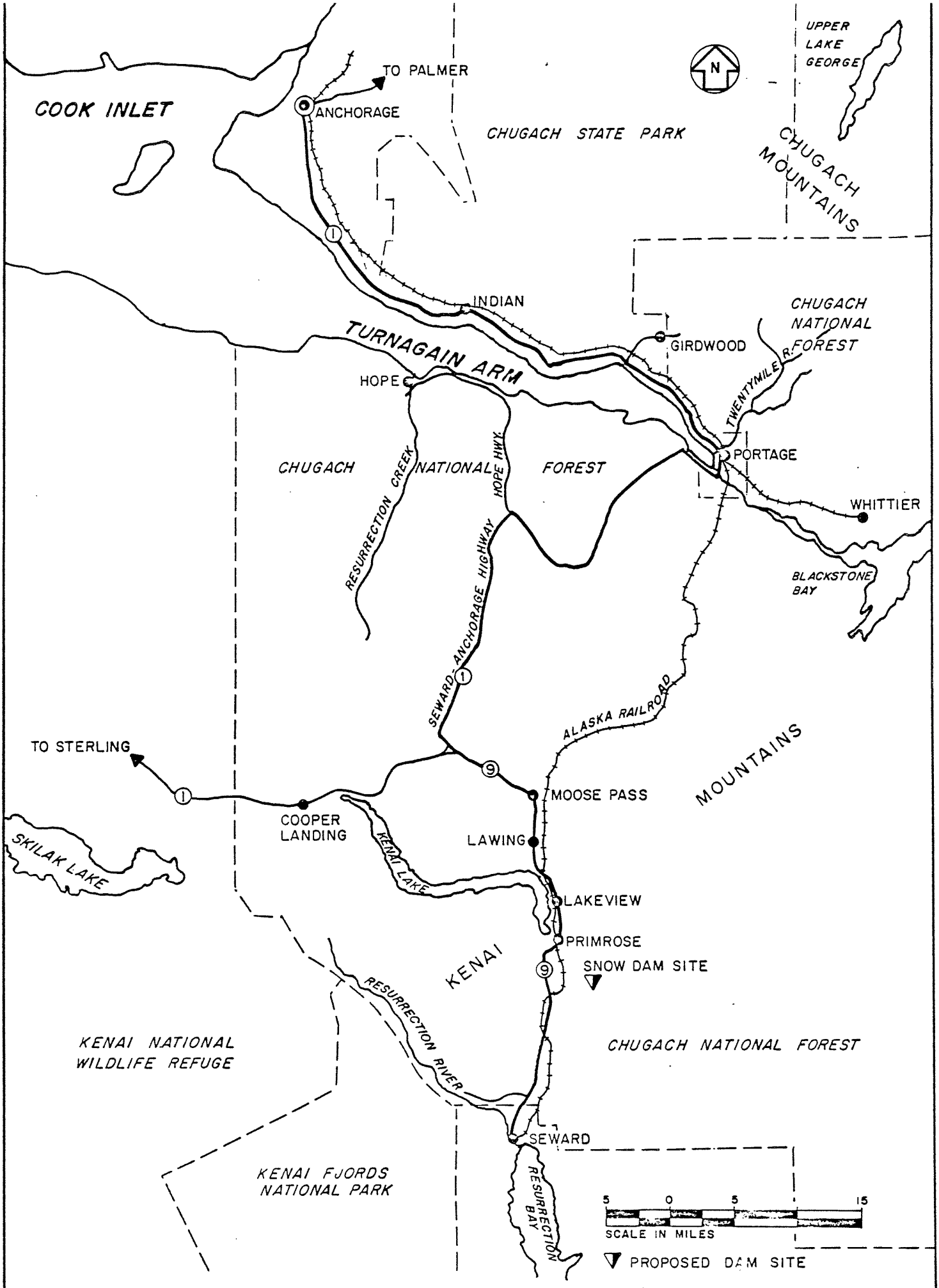
The Kenai Peninsula Borough and the City of Anchorage would contribute significantly to the work force for the project. The work force in the borough was estimated at 12,300, with a 9.8 percent unemployment rate in 1981. During the same year Anchorage had an estimated work force of 91,671 and a 6.9 percent unemployment rate (Bechtel 1981).

B. Keetna Site

The Keetna site (as shown in the attached map) is located on the Talkeetna River in a sparsely populated area of the Mat-Su Borough. The only community in the vicinity of the site is Talkeetna, with a 1981 population of approximately 640. The community of Trapper Creek, population 225, is located approximately sixty road miles west of Talkeetna and the Susitna River. North of Talkeetna, there are a number of small cabins that are not accessible by road. Major sources of income in the area are generally associated with tourism and recreation, including retail sales and guiding businesses. Other large employers include public schools, the Alaska Railroad, and the Federal Aviation Association (Alaska Power Authority 1983).

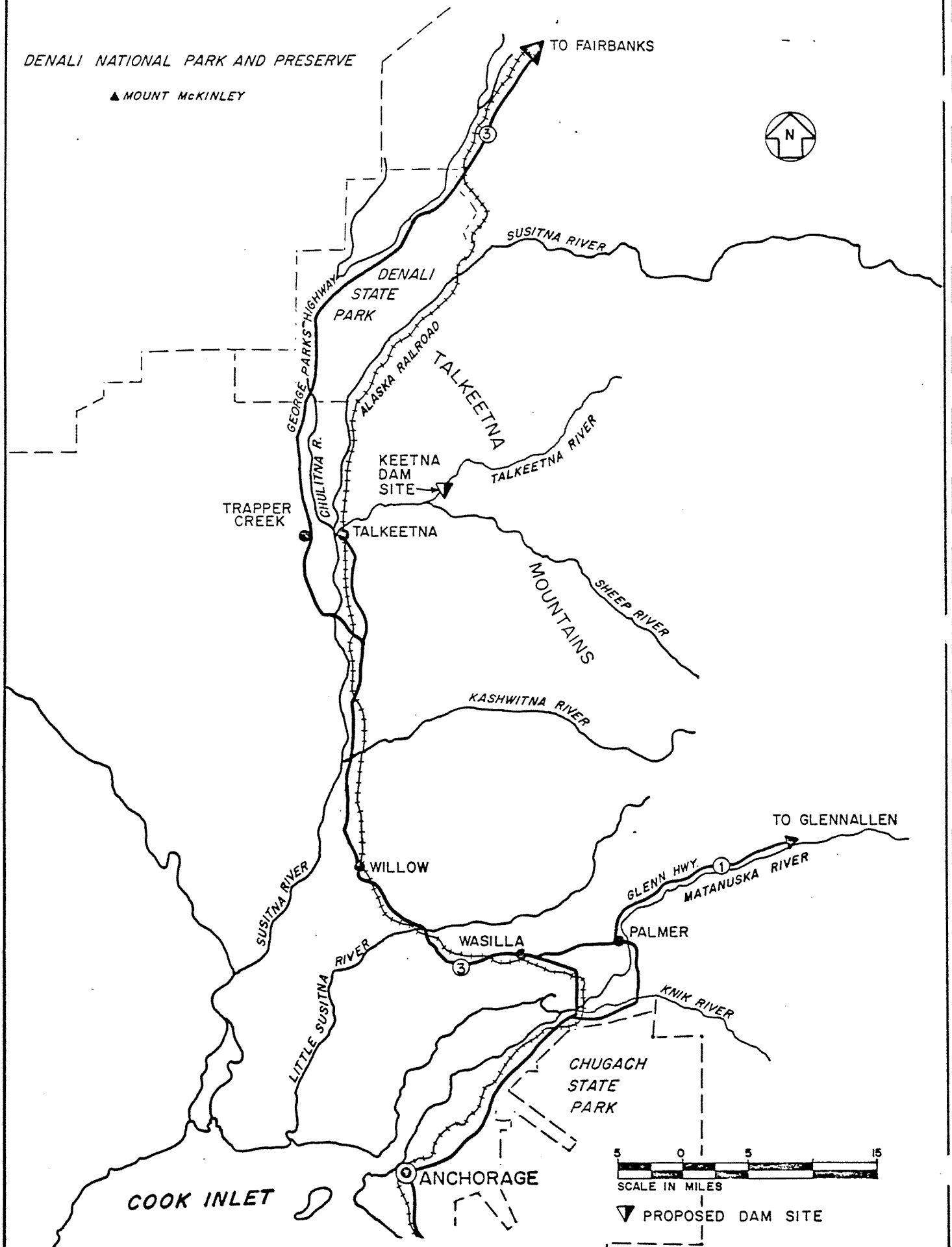
Almost all housing in the area consists of single family dwellings. There is one elementary school located in Talkeetna (1981 enrollment of 65) and one junior-senior high school (1981 enrollment of 122) approximately 30 miles south. Police protection is provided by the Alaska State Troopers at the Trapper Creek substation. (There are currently three officers assigned to the substation.) Talkeetna supports a fire service area and recently purchased new equipment for the Talkeetna firehouse. Medical care is provided by the Valley hospital in Palmer, private doctors in the southern part of the Mat-Su Borough, and facilities in Anchorage and Fairbanks. There is an ambulance located at the Talkeetna firehouse and volunteer Emergency Medical Trainees (EMTs) living in the vicinity. Water and sewage are provided by independent wells and septic tanks. The major transportation routes to the area include a spur of the Parks Highway, which ends at Talkeetna, and the Alaska Railroad. (Alaska Power Authority 1983.)

The southern portion of the Mat-Su Borough and the metropolitan areas of Anchorage and Fairbanks would contribute to the work force of the project. In 1981, the work force and unemployment rate in the Mat-Su Borough were 9,362 and 12.8 percent, respectively (Alaska Department of Labor 1983), compared to Anchorage which had a work force of 91,671 and 6.9 percent unemployment in the same year (Bechtel 1981), and Fairbanks which had a 1981 work force of 20,813 and an unemployment rate of 12.1 percent (Alaska Department of Labor 1983).



LOCATION MAP: SNOW SITE

10-5-5



LOCATION MAP: KEETNA SITE

10-5-6

EXHIBIT E

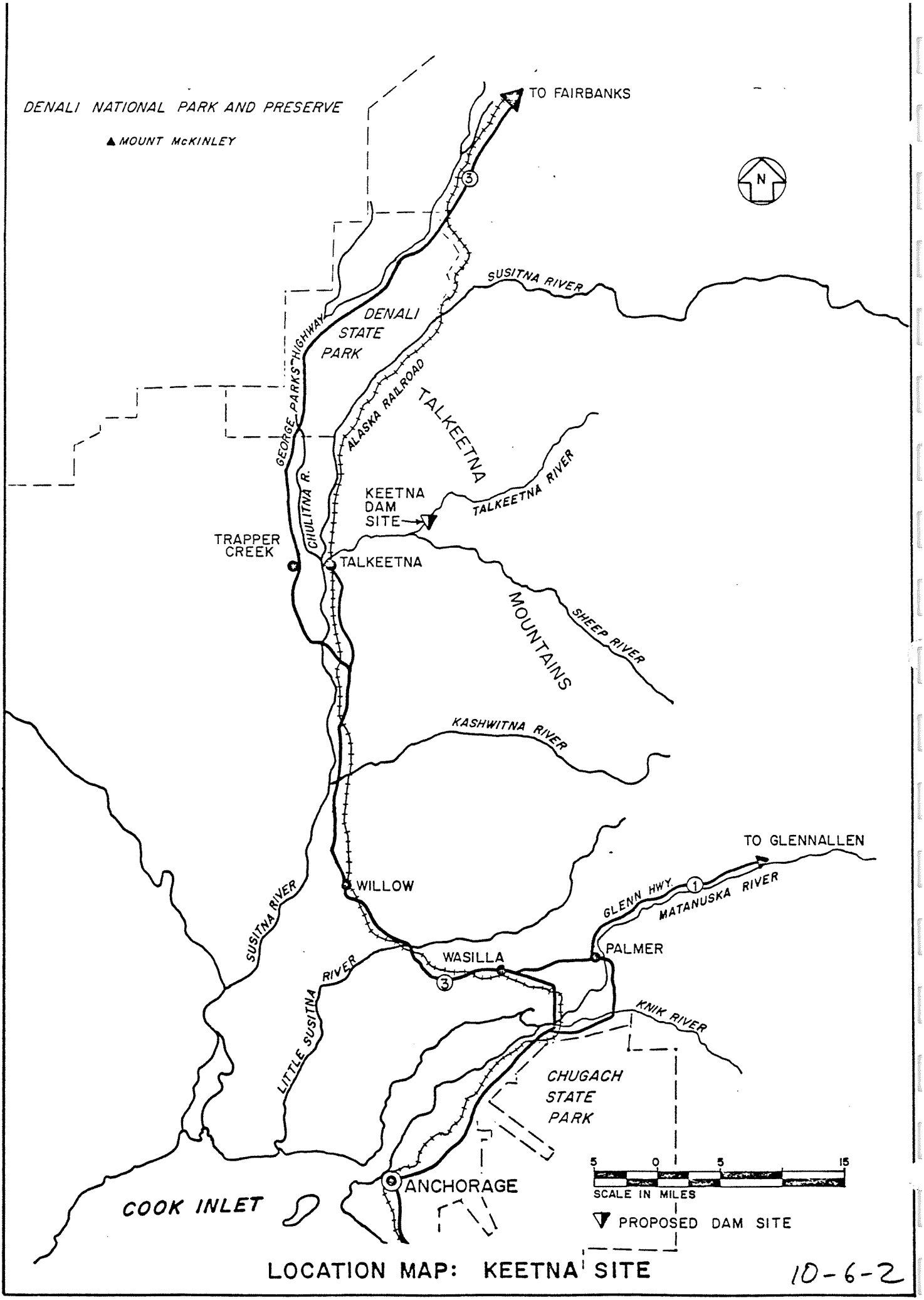
10. Alternative Locations, Designs, and Energy Resources

Comment 6 (p. E-10-12, para. 10)

Provide a brief description of the identified land uses for the Keetna site.

Response

Identified land uses in the area of the Keetna site (see attached map) are characterized by dispersed, low-intensity recreational and subsistence activities typical of remote areas in this region of Alaska. The closest land development consists of several homesteads at Larson Lake, approximately 13 miles southwest of the site (see p. E-9-20 in Chapter 9, Exhibit E of the License Application). Boating and off-road driving activities near the Keetna site are delineated in Figure E.7.4 in Chapter 7; fishing and boating are indicated activities further upstream. As described on p. E-7-22 in Chapter 7, approximately four to six boating parties are airlifted into Stephan Lake each year. In the site evaluation process (see Tables E.10.6 and E.10.7 in Chapter 10), the Keetna area was rated as having moderate recreational sensitivity (primarily due to existing and potential boating activity), and low agricultural, wilderness, and restricted land use sensitivities.



LOCATION MAP: KEETNA SITE

10-6-2

EXHIBIT E

10. Alternative Locations, Designs, and Energy Sources

Comment 7 (p. E-10-13, para. 1)

Provide estimates of the acreage of vegetation that would be lost by construction of the Chakachamna, Snow, and Keetna sites.

Response

The Chakachamna project involves a lake tap rather than a reservoir and, thus, will affect relatively little vegetation. However, the operating range of the lake will be modified. The lake outlet will be raised by about 27 feet (8 m) and the operating maximum level will be the same as the historical maximum level, while the operating minimum level will be less than the natural minimum. More frequent indundation (than under natural conditions) and shoreline destabilization may effect small areas of shoreline vegetation, but the anticipated changes cannot be "refined" until site-specific, field verified, habitat maps have been prepared and the operating reservoir levels better defined. (Bechtel Civil & Minerals, Inc. 1983. Chakachamna Hydroelectric Project, Interim Feasibility Assessment Report. Volume I, Section 7. Prepared for Alaska Power Authority.)

The Snows and Keetna Projects have been studied only at a very preliminary reconnaissance level. Based on these data, the Snow Project would have a reservoir area of about 2,600 acres. About 2,000 acres of this area is presently vegetated. Similarly, the Keetna project would have a reservoir area of about 4,800 acres, including about 4,100 acres of vegetated area.

EXHIBIT E

10. Alternative Locations, Designs, and Energy Sources

Comment 8 (p. E-10-23, para. 6)

Provide a comparison of socioeconomic factors (e.g., housing, transportation, community attitudes) in the comparison of alternative plans.

Response

Because the alternative hydroelectric plans (discussed in Exhibit E, Chapter 10, Section 1.3 of the License Application) are all located within the Middle Susitna Basin and because a construction camp would be provided to accommodate project workers, communities in the project area are expected to be similarly affected by any one of the alternatives, assuming that work force requirements, project schedule, and local purchases are comparable for each alternative.

EXHIBIT E

10. Alternative Locations, Designs, and Energy Sources

Comment 9 (p. E-10-24, para. 3ff)

Indicate what weighting was assigned to economic, environmental, and social attributes.

Response

The comparison of alternative basin development plans described in Chapter 10, Section 1.3.5 of the license application considered economic, environmental, and social attributes. Specific weights were not assigned to the factors; rather, they were considered to be generally equal. A paired comparison technique was used which evaluated each pair of plans individually. The selected plan was then compared with the next alternative plan. When conflicts among the criteria were identified, a subjective tradeoff was conducted and the consequences documented.

EXHIBIT E

10. Alternative Locations, Designs, and Energy Sources

Comment 10 (p. E-10-26, para. 5 to p. E-10-28, para. 5)

Provide estimates of the acreage of vegetation that would be lost by construction of the High Devil Canyon-Vee damsites.

Response

Construction of the High Devil Canyon-Vee damsites would result in the following estimated vegetated and unvegetated area losses. The figures account for the impoundments, dams and spillways, camps and villages, and borrow areas. However, design of these projects has not proceeded far enough to allow more than crude estimates of area requirements for these latter project features.

	Vegetated Area		Unvegetated Area		Total	
	ha	acres	ha	acres	ha	acres
High Devil Canyon*	7,400	18,400	2,500	6,200	10,000	24,600
Vee Canyon**	3,500	8,700	600	1,400	4,100	10,100
Total	10,900	27,100	3,100	7,600	14,100	34,700

*Impoundment Area = 24,000 acres

**Impoundment Area = 9,400 acres

EXHIBIT E

10. Alternative Locations, Designs, and Energy Sources

Comment 11 (p. E-10-27, para. 6)

Provide documentation for importance of Vee reservoir area to key furbearers.

Response

The Vee Canyon Reservoir area is outside the intensive furbearer study area of Gipson et al. (1982) and has never been systematically searched or surveyed for furbearers. No data are provided by Gipson et al. on use of areas upstream of Vee Canyon by aquatic furbeaers or marten, the furbearers identified as "key" species in the current report. Mention is made in Gipson et al. of the presence of lynx in the upper reaches of the proposed Watana impoundment near the mouth of the Oshetna River. Also, aerial transects for furbearer sign, which extended upstream almost to the Tyone River, demonstrated that the number of fox tracks increased markedly between Devil Canyon and the Tyone River. Foxes were most often found in vegetation types at elevations above the river valley in the study area with the exception of black spruce flats upstream from Vee Canyon. In addition, Gipson et al. states: "At the upper reaches of the proposed (Watana) impoundment fox density was observed to increase markedly. The south side of the river above Vee Canyon changes from mountainous terrain to open, marshy flats which are characteristic of good fox habitat." These "marshy flats" are also likely to be more attractive to most aquatic furbearers than "mountainous terrain".

10. Alternative Locations, Designs, and Energy Sources

Comment 12 (p. E-10-38, para. 5)

Describe the criteria used for evaluating responsiveness of access plans.

Response

Eighteen alternative access plans were evaluated according to the list of criteria on p. E-10-37 in Chapter 10, Exhibit E of the License Application. That evaluation produced seven access plans (all of which were located within three basic corridors). Those seven plans, in turn, were evaluated according to a subset of the criteria listed on p. E-10-37. That subset included the following:

1. No prelicense construction.

2. Minimize construction duration and maximize net project benefits.

3. Provide access between sites during project operation phase.

4. Provide access flexibility to ensure project is brought on-line within budget and schedule.

5. Accommodate preferences of Gold Creek and Indian River Communities.

As a result of this process, Plans 13, 16, and 18 were recommended as the most responsive plans.

EXHIBIT E

10. Alternative Locations, Designs, and Energy Sources

Comment 13 (p. E-10-40, para. 2)

Explain how aesthetic resource issues were factored into the evaluation and comparison of alternative access plans.

Response

Aesthetic resource issues were assessed in relationship to all project facilities, including alternative access plans (as described in Exhibit E, Chapter 8, p. E-8-5 of the License Application). Aesthetic value ratings and absorption capabilities were assigned to all relevant areas and calculated into composite aesthetic ratings for each landscape character type, including access alternatives. Nonetheless, aesthetic resource issues were of less importance in the route selection process than were factors such as cost, access flexibility, schedule, environmental impacts, and land use (see list on p. E-10-37 in Chapter 10, Exhibit E of the License Application). While preferences of the local communities, Native organizations, and agencies were considered, the effort focused on the listed criteria at the route selection stage. Aesthetics issues will subsequently be used as decision factors in the detailed routing and design process, which will be completed in September 1983. (Access Plan Recommendation Report, August 1982, Acres American, Inc.)

EXHIBIT E

10. Alternative Locations, Designs, and Energy Sources

Comment 14 (p. E-10-42, para. 1, to p. E-10-43, para. 2)

Indicate whether the alternative access route corridors will follow the alignments shown in Figures E.10.7 and E.10.8 or those in Figures E.3.42 through E.3.47. If the alignments shown in Figures E.10.7 and E.10.8 will be used, then provide vegetation and wetlands maps for these alternative routes. Also provide estimates of the number of hectares of vegetation types that would be cleared for the alternative access routes.

Response

For the southern route and a portion of the northern route none of the figures are correct. Vegetation Maps 1 and 2 with the correct routes are contained in Supplemental Attachments 10-14-1 and 10-14-2. Only segemnts requiring correction are depicted. The conversion from the vegetation types on the map to the Fish and Wildlife Service wetland categories (Cowardin et al. 1979) is in Table E.3.81. Areas of vegetation types for estimation of clearing and wetlands for the first six miles of road from Hurricane were calculated from the 1982 State of Alaska Department of Natural Resources Talkeetna Mountain Quad vegetation map. This map is not included, but detailed remapping of vegetation and wetlands in the project area is planned and new vegetation and wetland maps covering the entire area of the access routes will be submitted when available. Areas of vegetation types to be cleared for each access route are in Table 1.

Reference

Cowardin, L.M., V. Carter, F.C. Golet and E.T. LaRoe, 1979. Classification of Wetlands and Deepwater Habitats of the United States. Pub. FWS/BS-79-31. U.S. Fish and Wildlife Service.

TABLE 1

AREA OF VEGETATION TYPES TO BE CLEARED FOR ALTERNATIVE ACCESS ROUTES

	Route					
	Denali		North		South	
Vegetation Type	Hectares	Acres	Hectares	Acres	Hectares	Acres
Forest						
Woodland white spruce	5.7	14.2	41.3	102.1	24.7	60.7
Open white spruce	16.5	40.8	51.8	128.1	45.9	113.4
Woodland black spruce	1.8	4.4	--	--	4.1	10.2
Open black spruce	1.9	4.8	1.7	4.1	24.1	59.6
Open birch	0.6	1.5	1.2	2.9	1.8	4.3
Closed birch	0.9	2.2	-	-	-	-
Closed balsam poplar	0.3	0.7	-	-	0.6	1.4
Open mixed	18.5	45.7	11.2	27.6	28.8	71.0
Closed mixed	30.8	76.2	23.3	57.6	103.1	245.5
TOTAL	77.1	190.5	130.5	322.4	233.1	575.1
Shrubland						
Open tall	7.9	19.6	17.7	43.6	24.1	59.6
Closed tall	22.0	54.5	48.0	118.6	34.7	85.8
Low (birch)	123.5	305.1	64.6	159.7	28.3	69.8
Low (willow)	87.1	215.3	10.0	24.7	6.4	16.0
Low (mixed)	44.4	109.8	34.7	85.8	35.3	87.2
TOTAL	285.1	704.3	175.0	432.4	128.8	318.4
Tundra						
Wet sedge-grass	17.6	43.4	2.6	6.4	2.4	5.7
Sedge-grass	17.7	43.6	-	-	1.2	2.9
Sedge shrub	7.5	18.5	10.0	24.7	15.3	37.8
Mat and cushion	41.5	102.5	10.6	26.2	18.3	45.0
Grassland	-	-	0.9	2.3	-	-
TOTAL	84.2	208.0	24.1	59.6	37.2	91.4

EXHIBIT E

10. Alternative Locations, Designs, and Energy Sources

Comment 15 (p. E-10-42, para. 1, to p. E-10-43, para. 2)

Estimate the acreage of wetlands to be impacted by each of the three alternative access routes, and provide a brief comparison among routes of the extent of access route effects on wetland drainage patterns.

Response

The area of wetlands impacted by each of the three alternative access routes is presented in Table 1. These estimates are based on the conversion of Viereck and Dryness vegetations types to Fish and Wildlife Service Wetland classes as described in Chapter 3 (Table E.3.81). These estimates of wetlands are very conservative. To refine the comparison among routes of the effects of access roads on wetland drainage patterns, information from engineering studies (particularly on soils) was also evaluated.

TABLE 1
AREA OF WETLANDS ON THREE ALTERNATIVE ACCESS ROUTES

	Route					
	Denali		North		South	
Wetland Type	Hectares	Acres	Hectares	Acres	Hectares	Acres
Palustrine Forested	20.5	50.7	53.5	132.2	74.7	184.6
Palustrine Shrub-scrub	225.0	630.2	109.3	270.2	70.0	173.0
Palustrine or Lacustrine emergent	17.6	43.4	2.6	6.4	2.4	5.7
TOTAL	263.1	724.3	165.4	408.8	147.1	363.3

The wetlands area from Hurricane to Indian River is part of both the southern and northern access routes and has a relatively high potential for drainage alteration. Soils in this area have a poor bearing capacity, and any excessive settlement of the road in such areas would make installation and maintenance of culverts difficult.

Estimated area of wetlands is similar for the two routes beyond Indian River and the potential for alteration of drainage patterns is also similar for the two routes.

The Denali route does not have any wetlands with as high a potential for drainage alteration as the Hurricane-Indian River segment on the North and South routes, but the total potential wetlands area is greater.

Drainage alterations can be avoided or minimized by careful analysis of surface drainage patterns during the detailed civil design phase. Proper placement of adequate numbers of culverts and other drainage structures, monitoring after construction, and installation of additional drainage structures if unanticipated drainage problems occur (see also response to Comment 18, Botanical Resources, Chapter 3, Exhibit E). A more detailed answer to this question will be possible when planned detailed wetlands mapping is available.

Reference

Cowardin, L.M., V. Carter, F.C. Golet and ET. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. Published FWS/BS-79-31. U.S. Fish and Wildlife Service.

EXHIBIT E

10. Alternative Locations, Designs, and Energy Sources

Comment 17 (p. E-10-49, para. 5)

Describe weighting factors given to the criteria used in making the final choice.

Response

The choice of access routes was made with an emphasis on project objectives and general concerns of communities and resource agencies. While criteria were established and used in the selection process, specific weighting differentials were not developed for the criteria. Access flexibility and construction schedule compliance were emphasized in the final selection process, since cost considerations were not a key criterion. (Access Plan Recommendation Report, August 1982, Acres American, Inc.)

EXHIBIT E

10. Alternative Locations, Designs, and Energy Sources

Comment 18 (p. E-10-54, para. 4)

Provide a description of the selection process for routing from Healy to Willow.

Response

The route-selection process used by Commonwealth Associates, Inc. to select a transmission line corridor from Healy to Willow is summarized on the attached flow chart. In general, the selection process first developed constraint maps and identified potential corridors. Objectives followed throughout the selection process included:

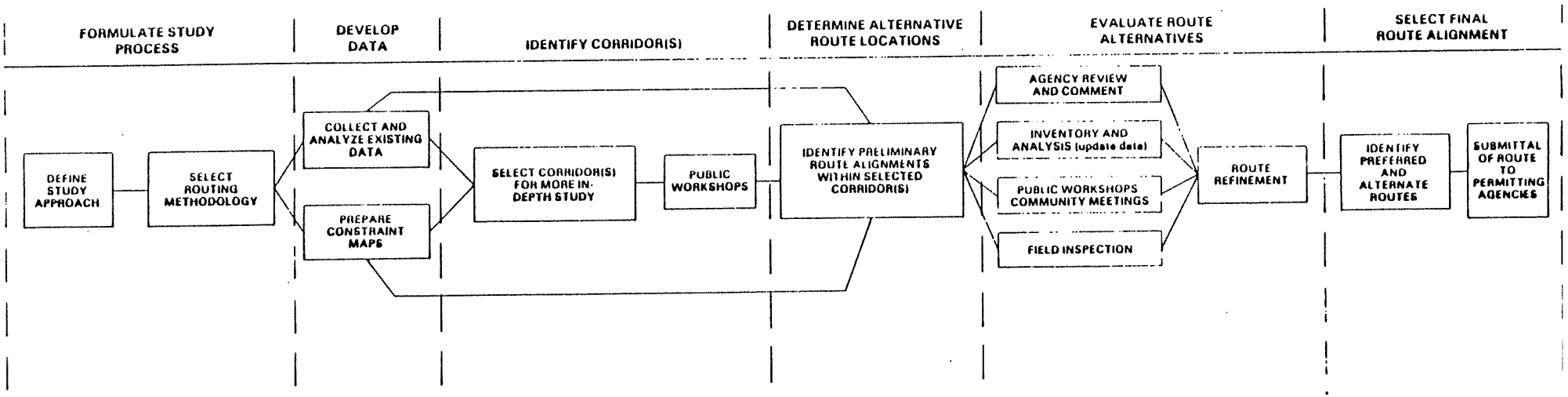
- Minimizing impact on land use,
- Minimizing conflict with existing lifestyles,
- Minimizing impact on natural systems,
- Minimizing visual impact,
- Minimizing impact on cultural resources,
- Maximizing sharing of existing rights-of-way, and
- Optimizing construction and operating costs.

The corridor-selection step produced potentially feasible corridors which were both technically acceptable (from an engineering, maintenance and system reliability point of view) and environmentally acceptable. Public workshops were held to review the corridor selection.

Within the corridors, preliminary route alignments were then identified based on data collected on terrain, topography, land ownership, stream crossings, property lines, scenic quality, and land use. Those alignments were reviewed with agencies and the public and revised in an iterative process according to engineering, environmental, and economic criteria. Detailed engineering and economic refinement analyses were performed on the preferred and alternative alignments as part of the final route selection process.

Route Selection Process

ANCHORAGE-FAIRBANKS TRANSMISSION INTERTIE



Source: Environmental Assessment Report: Anchorage-Fairbanks Transmission Intertie, Commonwealth Associates Inc., March 1982.

FIGURE 19

10-18-3

EXHIBIT E

10. Alternative Locations, Designs, and Energy Sources

Comment 19 (p. E-10-61, para. 1)

Provide the criteria for assigning ratings to each alternative corridor.

Response

As stated on p. E-10-56 in Chapter 10, Exhibit E of the License Application, environmental criteria were carefully scrutinized in the screening process for the transmission line corridors. The primary environmental considerations were: aesthetic and visual (including impacts to recreation) and land use (including land ownership and the presence of existing rights-of-way). Additionally, the following environmental considerations were also considered to be significant in the evaluation process: Length of the transmission line, topography, soils, cultural resources, vegetation, fishery resources, and wildlife resources. In order to compare the alternative corridors environmentally, the environmental criteria were presented in a series of tables (see Tables E.10.21 through E.10.23 in Chapter 10), that illustrated combinations of environmental constraints for each corridor segment under study. An environmental rating was then assigned to each corridor that identified the relative rating of each corridor within the three study areas. The assignment of environmental ratings was a subjective technique intended as an aid to corridor screening.

EXHIBIT E

10. Alternative Locations, Designs, and Energy Sources

Comment 20 (p. E-10-61, para. 3, to p. E-10-77, para. 2)

Provide estimates of the number of hectares of wetlands within each of the alternative transmission corridors in the Northern and Southern Study Areas and each of the technically and economically acceptable alternatives in the Central Study Area. Provide similar estimates for vegetation types that will require extensive clearing.

Response

Estimates of the number of hectares of each vegetation type to be crossed by the alternative transmission corridors which are technically and economically acceptable are presented in Tables 1, 2, and 3 for the Northern, Central, and Southern Study Areas, respectively. Similar data are presented for wetlands in Tables 4, 5, and 6, respectively.

A variety of maps were used for the different study areas and an attempt was made to be consistent within study areas. Therefore, in the attached tables, data for the proposed routes are consistent with data for alternative corridors in the same study area. However, data for the proposed routes are not entirely consistent with the data presented for them in Chapter 3 of Exhibit E, which was derived from different maps.

U.S. Fish and Wildlife Service National Wetlands Inventory maps were not available except in the Southern Study Area. However, these data were not complete enough to allow for comparisons among routes.

TABLE 1

HECTARES OF EACH VEGETATION TYPE TO BE CROSSED BY THE TECHNICALLY AND ECONOMICALLY ACCEPTABLE ALTERNATIVE TRANSMISSION CORRIDORS IN THE NORTHERN STUDY AREA[1/]

Vegetation Type	Corridor[2/] ABC	ABDC
Tall Conifer	21	0
Closed Tall Conifer	26	2
Open Intermediate Conifer	0	15
Dwarf Conifer	191	102
Closed Dwarf Conifer	158	268
Open Dwarf Conifer	146	110
Woodland Dwarf Conifer	50	96
Closed Deciduous	0	3
Closed Tall Deciduous	84	78
Closed Intermediate Deciduous	71	57
Open Mixed Forest	85	85
Closed Tall Mixed Forest	171	74
Tall Scrub	13	3
Closed Tall Scrub	35	106
Low Scrub	22	0
Closed Low Scrub	125	169
Open Low Scrub	100	100
Regrowth-Cutting area	6	0
Barren-strip mines/gravel pits	9	6
Water-rivers, streams	9	18
Total	1322	1292

[1/] Based on 1:250,000-scale State of Alaska, Department of Natural Resources vegetation maps for the Fairbanks and Healy Quads. In many cases, individual map polygons were mapped as complexes (i.e., the polygon was labelled with two vegetation types consisting of a primary and a secondary type). In these cases only the primary components of the mapping complexes were tabulated.

[2/] See Figure E.10.12 for corridor locations, corridor width equals 91 m (300 ft).

TABLE 2

HECTARES OF EACH VEGEATION TYPE TO BE CROSSED BY THE TECHNICALLY AND ECONOMICALLY ACCEPTABLE ALTERNATIVE TRANSMISSION CORRIDORS IN THE CENTRAL STUDY AREA[1/]

	Corridor[2/]						
Vegetation Type	ABCD	ABCF	ABECD	AJCD	ABECF	AJCF	CJAHI
Forest							
Open Spruce	88	88	97	6	97	6	6
Woodland Spruce	94	94	112	-	112	-	50
Closed Mixed	334	93	331	311	90	70	35
Open Mixed	38	123	56	74	141	159	84
Shrubland							
Open Tall	9	104	15	50	110	145	305
Birch	118	118	103	41	103	41	131
Willow	-	-	6	74	6	74	74
Mixed Low	-	-	7	-	7	-	208
Tundra							
Sedge-grass	-	-	3	-	3	-	-
Mat and cushion	-	-	10	-	10	-	163
Mat & cushion/ sedge-grass	-	-	26	50	26	50	50
Alpine Herbaceous	-	-	-	-	-	-	88
Snow and Ice	-	-	-	-	-	-	160
Barren	-	-	-	-	-	-	40
Water	10	-	16	16	6	6	6
Total	691	620	782	622	711	551	1400

[1/] Based primarily on 1:250,000-scale mapping of McKendrick et al. (1982). The 1:63,000-scale mapping of McKendrick et al. (1982) and the 1:250,000-scale State of Alaska, Department of Natural Resources vegetation map of the Healy Quad were used for portions of some routes where the primary mapping did not have coverage.

[2/] See Figure E.10.11 for corridor locations. Corridor width equals 91 m (300 ft) in areas with two circuits and 155 m (510 ft) in areas with four circuits.

TABLE 3

HECTARES OF EACH VEGETATION TYPE TO BE CROSSED BY THE TECHNICALLY AND ECONOMICALLY ACCEPTABLE ALTERNATIVE TRANSMISSION CORRIDORS IN THE SOUTHERN STUDY AREA[1/]

	Corridor[2/]		
Vegetation Type	ABC	ADFC	AEFC
Closed Conifer Forest	13	74	62
Open Coifier Forest	9	7	44
Closed Deciduous Forest	259	29	31
Mixed Forest	0	0	110
Closed Mixed Forest	512	110	0
Open Mixed Forest	53	54	34
Open Dwarf Tree Scrub	13	31	12
Open Tall Shrub-Scrub	49	0	0
Open Low Shrub-Scrub	0	38	0
Dry to Mesic Herbaceous	0	24	0
Wet Herbaceous	84	57	212
Sphagnum Bog	6	177	78
Water	16	0	0
Barren	6	0	0
Urban/Built-up	77	0	0
Total	1,097	601	583

[1/] Based on 1:250,000-scale State of Alaska, Department of Natural Resources vegetation map for the Anchorage Quad. In many cases, individual map polygons were mapped as complexes (i.e., the polygon was labelled with two vegetation types consisting of a primary and a secondary type). In these cases only the primary components of the mapping complexes were tabulated.

[2/] See Figure E.10.10 for corridor locations. Corridor width equals 91 m (300 ft).

TABLE 4

HECTARES OF POTENTIAL WETLANDS TO BE CROSSED BY THE TECHNICAL AND ECONOMICALLY ACCEPTABLE ALTERNATIVE TRANSMISSION CORRIDORS IN THE NORTHERN STUDY AREA[1/]

Wetland Type	Corridor[2/] ABC	ABDC
Palustrine Forested	616	648
Palustrine Scrub-Shrub	295	378
Riverine	9	18
Total	920	1044

[1/] Based on converting vegetation types given in Table 1 to the corresponding Cowardin et al. (1979) wetland types.

[2/] See Figure E.10.12 for corridor locations.

TABLE 5

HECTARES OF POTENTIAL WETLANDS TO BE CROSSED BY TECHNICALLY AND ECONOMICALLY ACCEPTABLE ALTERNATIVE TRANSMISSION CORRIDORS IN THE CENTRAL STUDY AREA[1/]

	Corridor[2/]						
Wetland Type	ABCD	ABCF	ABECD	AJCD	ABECF	AJCF	CJAHI
Palustrine Forested	182	182	209	6	209	6	56
Palustrine Scrub-Shrub	118	118	116	115	116	115	413
Riverine/Lacustrine	10	0	16	16	6	6	6
Total	310	300	341	137	331	127	475

[1/] Based on converting vegetation types given in Table 2 to the corresponding Cowardin et al. (1979) wetland types.

[2/] See Figure E.10.11 for corridor locations.

TABLE 6

HECTARES OF POTENTIAL WETLANDS TO BE CROSSED BY THE TECHNICALLY AND ECONOMICALLY ACCEPTABLE ALTERNATIVE TRANSMISSION CORRIDORS IN THE SOUTHERN STUDY AREA[1/]

Wetland Type	Corridor[2/] ABC	ADFC	AEFC
Palustrine Forested	22	81	106
Palustrine Scrub-Shrub	13	69	12
Palustrine/lacustrine emergent	90	234	290
Riverine	16	0	0
Total	141	384	408

[1/] Based on converting vegetation types given in Table 3 to the corresponding Cowardin et al. (1979) wetland types.

[2/] See Figure E.10.10 for corridor locations.

EXHIBIT E

10. Alternative Locations, Designs, and Energy Sources

Comment 21 (p. E-10-69 to p. E-10-79)

Indicate if any transmission line alternative is expected to require more (or less) construction of access roads.

Response

In all cases, the selected transmission line alternative for each major segment (Willow-Anchorage, Willow-Healy, Watana-Gold Creek, and Healy-Fairbanks) represents the alternative with the lowest requirements for new access construction. This results from attempting to minimize new access requirements in the corridor identification and evaluation process, and because of extensive opportunities to parallel existing access features or transmission lines.

Specific information about relative access requirements may be obtained from the discussion of transmission alternatives in Chapter 10, Exhibit E (pp. E-10-62 through E-10-82 and Figures E-10-10 through E-10-12) in the License Application.

10. Alternative Locations, Designs, and Energy Sources

Comment 22 (p. E-10-80, para. 1, to p. E-10-83, para. 3)

Explain how aesthetic resource issues were factored into the evaluation process for the transmission line corridor to link the dam sites with the Intertie.

Response

Aesthetic resources were incorporated into the environmental evaluation process used for transmission corridor screening. Moreover, they were considered in identifying a preferred route within the selected corridor. This assessment focused on views and potential visual impacts from recreational areas, hiking trails, vistas, highways, and heavily utilized lakes or streams.

The environmental screening criteria listed on p. E-10-66 in Chapter 10, Exhibit E in the License Application were used to evaluate each alternate transmission line corridor from the dam site to the Intertie. As was done for the northern and southern study areas, those criteria were combined into environmental constraint tables and a relative environmental rating was assigned to each corridor. In addition to aesthetic resources, the screening criteria included: land use and land status, length of corridor, topography, soils, cultural resources, vegetation, and fish and wildlife resources. Following the selection of a preferred corridor, constraint mapping was used to select one route within the corridor. Aesthetic resources were one of three decision factors utilized in this process. The other two included biological constraints (primarily wetlands and habitat areas for important or sensitive species) and manmade constraints (land use, including recreation, and cultural resources). In general, the selected transmission line corrodor from the Intertie to the dam parallels closely the project access route.

EXHIBIT E

10. Alternative Locations, Designs, and Energy Sources

Comment 23 (p. E-10-83 to p. E-10-104)

Document whether the surface soils at the alternative borrow sites are expected to be similar to or different from those in the proposed project area.

Response

The surface soils have been investigated at alternative borrow sites through photointerpretation, reconnaissance and geologic mapping, seismic refraction surveys, soil borings, and test pits. Surface soils are defined as topsoil and the underlying parent soil deposit which affect erosion potential and vegetation development. While the depth of the surface soils may vary, the zone affecting surface erodability and vegetation is generally within 3 to 5 feet of the ground surface. Anticipated differences and similarities of surface soils for alternative borrow sites may be estimated from Table 1, which summarizes soil types, classifications, geologic origin, and other information indicating comparitive soil properties.

Borrow Sites E, D, G, I, and J are within the project boundaries, while Borrow Sites C, F, and H are outside the boundaries. The characteristics of the granular surface soils at Borrow Sites C, E, F, and G are generally expected to be similar with the possible exception of Borrow Site C, located in the upper portion of Tsusena Creek. The semi-pervious/impervious Borrow Sites D and H are different with respect to depth of organic material in the surface soils. Site H is expected to have relatively deep topsoil and high organic content with much deeper stripping than Site D. In comparison to

Site D, Site H has poor surface drainage and shallow permafrost. The pervious Borrow Sites I and J in the Susitna River are expected to be similar in surface soils, with Site I having more terrace deposits and associated topsoil area than Site J. Surface soil deposits at Sites I and J will have limited topsoil development due to their location in an active river flood plain.

TABLE 1

SURFACE SOILS AT ALTERNATIVE BORROW SITES

BORROW SITE	WATANA C	WATANA E	WATANA F	DEVILS CANYON G	WATANA & DEVILS CANYON D	WATANA H	WATANA I	WATANA J
Category of Material	Granular	Granular	Granular	Granular	Semi-pervious Impervious	Semi-pervious Impervious	Pervious	Pervious
Geologic Origin	Outwash Alluvium (reworked outwash) (Tsusena C)	Flood plain alluvium Terrace/Fan Alluvium Outwash (Susitna R/ Tsusena C)	Flood plain alluvium Terrace/Fan Alluvium (Tsusena Creek)	Flood plain alluvium Terrace/Fan Alluvium (Susitna R/ Cheechacko Creek)	Glacial ice disintergration Outwash Alluvium Basal Till	Glacial Lacustrine over Ablation Till	Flood plain Fan & terrace alluvium (Susitna R)	Flood plain Alluvium Terrace alluvium (Susitna R)
Topsoil Avg. Range Thickness Types of Topsoil	1' / 0-2' Estimate similar to F but less thickness	1' / 0 - 2' OL, ML, SM	1'/ 0.2 - 2.0' OL, ML, SM PT with boulders	0.5' / 0 - 1' OL, ML pockets of PT to 4.5'	1.5' / 0 - 6' OL, ML, SM with boulder fields	2.0/1.5'-7.5 OL, PT	None in active river channel 1'on Terraces OL, ML, SM	None in active river channel 1' on Terraces OL, ML, SM
Surface Soil Avg./Range Thickness Types	0.5 / 0 - 2' Estimate similar to F but less silty soils	3'/0-4.5' Silty Sands & Gravel	1.5' / 1-3' Silty Sands & Gravel	1.5-2.0/1-6.5' Silts & Silty Sand		-/1.5-4.5 Silts & Sands with some organics	Alluvial sands & gravels with surface silty soils on terraces	Alluvial sands & gravels with surface silty soils on terraces
Location	Outside required project boundaries	Inside required project boundaries	Outside required project boundaries	Inside required project boundaries	Inside required project boundaries	Outside required project boundaries	Inside required project boundaries	Inside required project boundaries

10-23-3

TABLE 1 (Continued)

SURFACE SOILS AT ALTERNATIVE BORROW SITES

BORROW SITE	WATANA C	WATANA E	WATANA F	DEVILS CANYON G	WATANA & DEVILS CANYON D	WATANA H	WATANA I	WATANA J
Estimated Average Stripping	1.5'	4'	2.5'	2.0'	1.5'	5.5'	None in Channel Up to 3'-4' on Terraces	None in Channel Up to 3'-4' on Terraces
Vegetation	Alpine tundra on walls. Heavy brush & trees at edge flood plain. Mixed grass & tundra near river	Dense spruce alder, tundra, isolated brush.	Mixed spruce & tundra. Areas of alders and undergrowth.	Scattered brush with descidous trees to dense trees & underbrush on hillside	Tundra & sedge grass with isolated spruce	Thick tundra muskeg, marshy, alder, underbrush	None in active channel	None in active channel
Drainage	Very good	Very Good	Good	Good	Poor to Good	Poor	Very Good	Very Good
Permafrost	Sporadic	None Encountered	Limited	None Encountered	Sporadic	Shallow Permafrost to 14'	None Encountered	None Encountered
Unified Soil System Class. of Borrow	GW SW GP GM SM SP	GW GP SW SM ML SP	GW GP SW SP SM GM ML	GW GP SW SP SM GM ML	Varies with Geologic origin See Reference 1	SM ML SC CL GW GM GC	GP SW SP GW SM GM	GW GP SW GM SM SP

TABLE 1 (Continued)

SURFACE SOILS AT ALTERNATIVE BORROW SITES

BORROW SITE	WATANA C	WATANA E	WATANA F	DEVILS CANYON G	WATANA & DEVILS CANYON D	WATANA H	WATANA I	WATANA J
Exploration Data Base	Photo interp. Visual Recon. 3 seismic 1 test pit	Photo interp. Geological 7 seismic 9 auger 28 test pits	Photo interp. Visual Recon. 6 test pits	Photo interp. Geological Mapping 14 auger borings 2 test pits	Photo interp. Geological Mapping 27 rotary, 38 auger, 8 hammer borings; and 45 test pits	Photo interp. Visual Recon. 8 auger borings	Photo interp. Geological Mapping 6 seismic lines	Photo interp. Visual Recon. 5 test pits
Reference	(3)p. D-35-36	(3)p. D-35-36 (2)p. 6-49-51 (1)p. 8-5	(3)p. D-35-36 (2)p 6-51-52	(2)p 7-27-30	(3)p. D-31-36 (2)p. 6-52-54 (1)p. 6-1-16 (1)p 8-1-6	(2)p. 6-54-56 (1)p. 8-6	(2)p. 6-54-56 (1)p. 8-5	(2)p. 6-54-56

Sources

Acres American Incorportated. 1982. Susitna Hydroelectric Project, 1982 Supplement to the 1980-81 Geotechnical Report. Prepared for the Alaska Power Authority.

Acres American Incorporated. 1982a. Susitna Hydroelectric Project, 1980-81 Geotechnical Report. Prepared for the Alaska Power Authority.

U.S. Army Corps of Engineers, Alaska District, 1979. Supplemental Feasibility Study, Upper Susitna River Basin, Watana Dam Site, Section D Foundations and Materials.

EXHIBIT E

10. Alternative Locations, Designs, and Energy Sources

Comment 24 (p. E-10-83, para. 4, to p. E-10-104, para. 4)

Provide a brief discussion of how aesthetic resources were used in the evaluation process of determining borrow site alternatives.

Response

The primary emphasis in the general evaluation of borrow site alternatives was placed on water quality and environmental factors (especially the avoidance of streams and wetlands). While aesthetic resources were assessed for the selected borrow site areas, they were not specifically considered in the evaluation of the borrow site alternatives.

EXHIBIT E

10. Alternative Locations, Designs, and Energy Sources

Comment 26 (p. E-10-143, para. 4, through p. E-10-172, para. 2)

Provide a generic description of socioeconomic impacts of thermal alternatives other than coal, nuclear steam electric generation, biomass, geothermal, wind, and solar alternatives.

Response

This response assumes that Comment 26 was asking for a generic description of socioeconomic impacts of natural gas, nuclear, biomass, geothermal, wind, and solar electrical energy generating systems. This assumption was made because the text referred to in Comment 26 (p. E-10-143 through p. E-10-172) discusses these systems, but does not specifically address potential socioeconomic impacts.

Principal factors that will determine the extent and magnitude of socioeconomic impacts of electrical energy development include: the length of the construction and operation period, the size of the work force, the number and demographic characteristics of in-migrating workers, the ratio of project-related in-migrants to the existing population, the capacity of existing community infrastructure, and the location and amount of project-related expenditures. The following description provides a generic discussion of potential socioeconomic impacts resulting from the construction and operation of various electric energy generating technologies.

Natural Gas or Distillate-fired Steam Electric

In general, for a 200 MW natural gas or distillate-fired steam electric unit, the construction period could extend to 5 years with construction and

operation work forces peaking at approximately 600 and 70 workers, respectively. The majority of the project's capital expenditures would occur outside Alaska, while labor and fuel would come primarily from within the state.

Wind

The socioeconomic impacts of wind energy conversion systems would be minimal due to a short field assembly period for the wind turbines and small work force requirements. For example, it is expected that 10 to 15 persons would be required to work approximately 6 months to erect a 1-2.5 MW wind turbine. An on-site operating work force would not be required, and maintenance would be minimal. Expenditures for capital and labor would occur primarily outside Alaska.

Solar (Including Photovoltaic Systems and Thermal Electric Systems)

Construction of a 10 MW solar photovoltaic system would require about 100 construction/assembly workers (for 1 to 2 years) and approximately 10 operation and maintenance workers. In comparison, a similarly sized solar thermal electric system would require approximately 60 construction/assembly workers and 25 operation workers. Expenditures for capital and construction labor would occur primarily outside Alaska.

Biomass

Biomass-fired facilities typically would be sited in conjunction with sawmills, most of which are located in large- or medium-sized communities, such as Anchorage, Fairbanks, Nenana, and Soldotna. The construction period for 15 to 30 MW plants would range from 1.5 to 3 years. Work force requirements would be approximately 65 for construction and 25 for operation and maintenance. Expenditures for capital, labor, and fuel would be made primarily in Alaska.

Geothermal

The development and construction period for a 50 MW geothermal plant would be approximately 7 years. About 90 persons would be required for construction and 30 would be required for operation and maintenance. Project expenditures for capital and labor would be divided about equally inside and outside Alaska.

Nuclear

The socioeconomic impacts of a 1000 MW nuclear power plant would be potentially significant due to the long construction period (7 to 10 years) and large construction work force (averaging 1,300). An operation and maintenance work force of approximately 180 persons would be required. Project expenditures would be made primarily outside of Alaska since all equipment and most of the labor would be obtained from the lower 48 states.

References

Candidate Electric Energy Technologies for Future Application in the Rainbelt Region of Alaska, Volume IV. October 1982. Prepared by Battelle Pacific Northwest Laboratories for the Alaska Office of the Governor, Division of Policy Development, and Planning and the Governor's Policy Review Committee.

EXHIBIT E

11. List of Literature

Comment 1 (p. E-3-232, para. 4)

Wood et al. (1975).

Response

A search for the proper reference information is being conducted. This information will be provided to the Commission as soon as it is available.

EXHIBIT E

11. List of Literature

Comment 2 (p. E-5-129, para. 2)

Provide references for statement on commuting experiences of workers on similar projects.

Response

The following references were used to develop the statement on commuting experiences of workers on similar projects:

Denver Reserach Institute. February 1982. Socioeconomic Impacts of Power Plants. Prepared for Electric Power Research Institute.

Metz, W.C. September 11, 1980. The Mitigation of Socioeconomic Impacts by Electric Utilities. Public Utilities Fortnightly.

_____. 1981. Worker/Vehicle Ratios as Major Eastern Power Plant Construction Sites: A Time of Change. Traffic Quarterly. Volume 35, No. 3.

_____. September 1981. Construction Workforce Management: Worker Transportation and Temporary Housing Techniques. Prepared for the Western Rural Development Center.

_____. October 1981. Energy Industry Involvement in Worker Transportation. Submitted to Transportation Quarterly.

_____. August 25, 1982. Industry Initiatives in Impact Mitigation. Prepared for the Proceedings of the Alaska Symposium on Social, Economic, and Cultural Impact of Natural Resource Development. Anchorage, Alaska.

EXHIBIT E

11. List of Literature

Comment 3 (p. E-7-87, para. 1)

National Recreation & Park, Open Space Standards.

Response

The complete reference for "National Recreation & Park, Open Space Standards" is as follows:

The National Recreation and Parks Association. 1971. National Recreation & Park Open Space Standards. Washington, D.C.

EXHIBIT E

11. List of Literature

Comment 4 (Table E.7.9)

Frank Orth & Assoc., 4/82. Borough Planning Department, 10/21/82.

Response

The complete reference for "Frank Orth & Assoc. 4/82" is as follows:

Frank Orth & Associates, Inc. Peter Rogers. October 1982. Personal communication.

The complete reference for "Borough Planning Department, 10/21/82" is as follows:

Matanuska-Susitna Borough Planning Director. Claudio Arenas. October 1982. Personal communication.

EXHIBIT E

11. List of Literature

Comment 5 (p. E-8-71 to p. E-8-72)

All references listed in the Aesthetic Resources References Section should be appropriately cited within the written text of the application. If these listings are not citations, please indicate that they constitute a bibliography.

Response

Except for documents cited within the text of Chapter 8, the references listed in the Aesthetics Resources References Section constitute a bibliography.

EXHIBIT E

11. List of Literature

Comment 6 (p. E-10-120)

CIRI/Placer 1981.

Response

The complete reference for "CIRI/Placer 1981" is as follows:

Cook Inlet Region, Inc. and Placer Amex, Inc. 1981. Coal to Methanol Feasibility Study, Beluga Methanol Project. Volume IV, Environmental.

EXHIBIT E

11. List of Literature

Comment 7 (p. E-10-121)

Battelle 1978.

Response

The complete reference for "Battelle 1978" is as follows:

Battelle Pacific Northwest Laboratories, John B. Burnham. 1978. Natural Coal Utilization Assessment: The Impact of Increased Coal Consumption in the Pacific Northwest. Prepared for the U.S. Department of Energy. BNWL-RAP-21, VC-11.

11. List of Literature

Comment 8 (Table E.7.13)

EDAW estimate.

Response

The reference for Note #4 on Table E.7.13 in Chapter 7, Exhibit E of the License Application should read as follows:

EDAW estimates based on Susitna River Cooperative Study Methodology (John O'Neill, November 1978).